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RATIO AND PROPORTION

1. In a school, 10% of the boys are same in number as 1/5th of the girls. What is the ratio of boys to girls in that school?
(a) 1:2 (b) 3:4 (c) 3:2 (d) 2:1 (e) NOT

2. A sum of money is distributed among A, B and C such that A get double of C and B get average of A and B. find the ratio in which the money is distributed?
(a) 1:1:7 (b) 2:2:1 (c) 1:1:2 (d) 1:2:3 (e) NOT

3. Divide 27 into two parts so that 5 time the first and 11 times the second together equal to 195. Then ratio of the first and second part is:
(a) 10:17 (b) 17:10 (c) 10:13 (d) 1:2 (e) 5:7

4. The speed of a boat in still water is 500% more than the speed of the current. What is the respective ratio between the speed of boat downstream and speed of boat upstream?
(a) 4:9 (b) 5:7 (c) 5:6 (d) 11:2 (e) 7:5

5. In a class of 75 students, one-fifth of the total number of girls and three- fifth of total number of boys join a cricket club. If the total number of boys joining the club is 27. What is the respective ratio of the total number of boys to the total number of girls joining the club?
(a) 9:4 (b) 9:2 (c) 2:27 (d) 5:2 (e) NOT

6. In a class of 125, 20% students can dance. 2/5 of the total students can sing and 2/5 of the remaining students are good at sports. What is the respective ratio of students who can dance to students who are good at sport?
(a) 3:4 (b) 9:8 (c) 5:2 (d) 1:8 (e) 5:4

7. The respective ratio of the number of boys to girls studying in school is 25:29. The total number of students studying in the school is 270. If 15 boys and 15 girls take admission in the school. What will be the new respective ratio of the boys and girls studying in the school?
(a) 2:1 (b) 7:8 (c) 5:8 (d) 2:7 (e) 12:7

8. Two numbers are in the ratio of 3:5.if 9 is subtracted from each then they become 12:23. Find the numbers?
(a) 23,46 (b) 33,55 (c) 32,16 (d) 13, 28 (e) 14,28

9. The income of A, B and C are in the ratio of 7:9:12 and their spending are in the ratio 8:9:15. If A saves 1/4th of his income, then the saving of A, B and C are in the ratio of :
(a) 1:2:3 (b) 3:4:7 (c) 7:9:2 (d)data inadequate (e)NOT

10. The ratio of the number of boys and girls in a college is 5:6. If the percentage increase in the number of boys and girls are 25% and 30 % respectively, then find the new ratio?
(a) 120:131 (b) 125:156 (c) 123:121 (d) cannot be determined (e) NOT

11. In a bag, there are coins of 25p, 10p and 5p in the ratio of 1:2:3. If there is Rs. 30 in all, how many 5p coins are there?
(a) 750 (b) 100 (c) 150 (d) 200 (e) 450

12. Seats for mathematics, physics and English in a school are in the ratio 6:7:9. There is proposal to increase these seats by 40%, 30% and 60% respectively. What will be the ratio of increased seats?
(a) 13:45:34 (b) 13:34:45 (c) 84:91:144 (d) 15:26:31 (e) NOT

13. An amount of Rs. 2430 is divided among P, Q and R such that if their shares be reduced by Rs. 5, Rs. 10 and Rs. 15 respectively the remainders will be in the ratio of 3:4:5. Then Q's share was:
(a) 200 (b) 800 (c) 450 (d) 1200 (e) 1000

14. The ratio of the incomes of A and B is 5:4 and the ratio of their expenditure is 3:2. If at the end of the year, each saves 1600, then the income of B is :
(a) 1600 (b) 2400 (c) 3200 (d) 2000 (e) NOT

15. The side of triangles are in the ratio ½:1/3:1/4 and its perimeter is 104 cm. the length of the longest side is:
(a) 32 cm (b) 20 cm (c) 54 cm (d) 56 cm (e) 48 cm

16. The ratio of third proportional to 16 and 26 and the mean proportional between 9 and 25 is :
(a)13:60 (b) 169:60 (c) 60:169 (d) 60:31 (e) 60:13

17. What is the ratio whose terms differ by 50 and the measure of which is 3/7?
(a) 2:5 (b) 4:5 (c) 3:7 (d) 5:7 (e) 5:8

18. It is given that x varies inversely as square of y, then z varies as cube of y. if y=3, then the ratio of x/z is?
(a) $1/9^2$ (b) $1/9^3$ (c) $1/27^3$ (d) $1/3^2$ (e)NOT

19. 40 kg of an alloy M is mixed with 100 kg of alloy N. if alloy M has silver and gold in ratio 3:2 and alloy N has silver and gold in ratio 1:4, then the ratio of silver and gold in the new alloy is :
(a) 11:24 (b) 23:14 (c) 4:25 (d) data inadequate (e) NOT

20. The ratio between product of two numbers and difference of two numbers if 45:2, what is the ratio of LCM/ HCF of two numbers?
(a) 1:2 (b) 3:4 (c) 3:4 (d) data inadequate (e) NOT

21. Ravi invest in two schemes in the ratio 12:17 for two years, after that he increase his investment by 15%, what is the ratio of the profit he got in two schemes?
(a) 4:19 (b) 5:14 (c) data inadequate (d) 14:11 (e) NOT

22. The ratio of two consecutive odd numbers is in ratio 14:27. What is the ratio of difference and sum of these two numbers?
(a) 54:13 (b) 26:81 (c) 13:28 (d) 13:41 (e) 12:25

23. In a school 20 % of literate boys are same as illiterate girls and literate girls are 1/5 of illiterate boys. What is the ratio between total boys and total girls?
(a) 4:1 (b) 5:1 (c) 6:1 (d) cannot be determined (e) NOT

24. The average age of three girls is 25. Fifteen year hence, the ratio is in the proportion 3:5:7. The age of youngest girl is?
(a) 20 (b) 24 (c) 25 (d) 23 (e) NOT

25. If 10% of x is 45% of y and 35% of y is 12% of z then x: y: z is?
(a) 12:10:35 (b) 9:2:45 (c) 6:10:15 (d) 54:12:35 (e)NOT

26. Three containers have their volumes in the ratio 3:4:5. They are full of mixture s of milk and water. The mixtures contain milk and water in the ratio of (4:1), (3:1) and (5:2) respectively. The contents of all these three containers are poured into a fourth container. The ratio of milk and water in the fourth container is :
(a) 157:53 (b) 1:1 (c) 3:20 (d)34:19 (e) NOT

27. Rajiv has 14 currency notes in his pocket consisting of only Rs. 20 and Rs. 10 notes. The total money value of the notes is Rs. 230. The ratio of Rs. 10 notes to Rs. 20 that Rajiv has is:
(a) 4/5 (b) 1/6 (c) 1/1 (d) 5/9 (e) NOT

28. A, B and C share a sum of money in the ratio 7:8:16. If C receives Rs. 27 more than A, then the total money shared was?
(a) 65 (b) 93 (c) 445 (d) 450 (e) 280

29. A, B and C can complete a work in 2, 3 and 4 days respectively. If they complete the work together, in what ratio they should divide the money?
(a) 3:2:4 (b) 4:5:9 (c) 5:6:7 (d) 2:9:1 (e) 6:4:3

30. Two cogged wheels of which one has 16 cogs and other 27, work into each other. If the latter turns 80 times in three quarters of a minute, how often does the other turn in 8 second?
(a) 12 (b) 26 (c) 24 (d) 48 (e) 96

31. If ½ of the number of white mice in a certain laboratory is 1/8 of the total number of mice and 1/3 of the number of grey mice is 1/9 of the total number of mice, then what is the ratio of white mice to grey mice?
(a) 2:3 (b) 4:5 (c) 3:4 (d) 3:7 (e) 16:27

32. The ratio of incomes of John and Joe is 3:5 and ratio of their expenditure is 5:1. Who saves more?
(a) John (b) Joe (c) neither of them (d) cannot be determined (e) NOT

33. A and B can complete a work in 2 & 3 days respectively. They complete a work together and get Rs. 50 as the wages. How should they divide it?
(a) 1:2 (b) 1:3 (c) 1:5 (d) 3:2 (e) 3:1

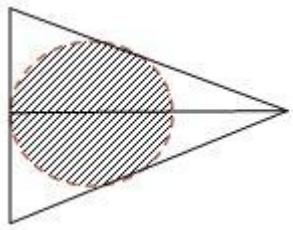
34. A certain ship floats with 3/5 of its weight above the water. What is the ratio of the ship's submerged weight to its exposed weight?
(a) 3:8 (b) 3:5 (c) 2:3 (d) 2:5 (e) NOT

35. If a carton containing dozen mirrors is dropped, which of the following cannot be the ratio of broken to unbroken mirrors?
(a) 1:1 (b) 2:1 (c) 3:2 (d) 3:1 (e) NOT

DIRECTION: Each of the statements given below is followed by two statements I and II. Study both the statement and state the relationship between both the statements and give your answer as:
(a) If I>II
(b) If I≥II
(c) If I=II or no relation can be made or data inadequate

(d) If I<II
(e) If I≤II

36. The radius of the circle is 14 cm.



I. Calculate the ratio of shaded to unshaded region?
II. Ratio is 4:5.

37. The ratio between A and B's salary is 4:9.
I. Expenditure of A: expenditure of B =5:7
II. Saving of A and B is ratio 6:7.

38. An amount is distributed between four brothers A, B, C and D.
I. Ratio of A:D is 5:6
II. Ratio between A, B, C and D is 1:2:3:1..

39. An amount of 50000 is distributed between three friends X, Y and Z.
I. Share of X, Yand Z is in ratio 4:6:15.
II. Ratio of X/Z = 1/5.

40. Area of a rectangle is 2746 square cm.
I. Perimeter of rectangle is 206 cm.
II. Length and breadth are in the ratio 1/3.

DIRECTION: Each of the questions below consist of a question and two statements I and II. You have to decide whether the data provided in the statement are sufficient to answer the question. Read both statement and give answer as-

(a) If data in statement I alone is sufficient to answer the question
(b) If statement II alone is sufficient to answer the question.
(c) If both statement together is required to answer the question
(d) If either of statement is sufficient to answer the question
(e) If neither of statement is sufficient to answer the question.

41. What is the ratio of two numbers?
I. Two numbers are such that sum of twice the first and thrice the second number is 36 and the sum of thrice the first number and twice the second number is 39.
II. First number is 40 more than second number.

42. The ratio of area of curved surface of a cone, a hemisphere and a cylinder is?
I. Radius and height of all are equal.
II. Radius of hemisphere is 12 cm.

43. The base of the two triangles is in ratio of?
I. Area of the two triangles is in the ratio of 3:4.
II. Area of both triangles is in ratio of 5:7 and each has same height.

44. The ratio of time taken by three cars to travel same distance is?
I. Speed of first car and second car is in ratio of 2:3
II. Speed of first car and third car is in ratio 1:2.

45. Find the original bill?

I. Present bill is Rs. 4500.
II. The wages of labour in a factory increased in ratio 22:25.

46. What was the price of horse A last year?
I. The ratio of price of horse A and B is 4:5. This year an increase of 25% take place in price of A and in B an increase of Rs. 50000. And their price is now in ratio 9:10.
II. The ratio of price of horse A and B is 9:5. This year a decrease of 25% take place in price of A.

47. What is the staff strength of company R?
I. Total number of officers is 132.
II. Male and female employees are in ratio 2:3.

48. What was the original fraction?
I. By an increase of 200% and 300% respectively to a fraction results into 6/11.
II. By a decrease of 50% and40% respectively, a fraction results to 5/6.

49. How many students are there in the class?
I. The ratio between boys and girls is 7:9
II. Difference between boys and girls is 14.

50. What is total amount of B and C together?
I. Sum of money divided among A, B, C and D in the ratio of 3:5:8:9. Share of D is Rs. 1872 more than share of A.
II. Sum of money divided among A, B, C and D in the ratio of 3:7:9:13. Share of C is Rs. 11172 more than share of A.

SOLUTION AND EXPLANATION OF RATIO AND PROPORTION

1. (d)
10% of boys = 1/5 of girls
Boys/girls = 1/5: 1/10/100 = 2:1

2.(b)
According to the question,
A= 2C and B =A+B/2,
A: B: C = A: A: A/2 = 1:1:1/2 = 2:2:1.

3.(b)
Let the first number be 27-x and second number be x,
5(27-x) +11x = 195,
Then x = 10, so the ratio is 17/10.

4.(e)
Let speed of boat in still water is u and speed of current is v
Then u =6v
Ratio= speed of downstream: speed of upstream = u+v: u-v = 7:5

5.(b)
Given, 3/5 of total boys joined the club = 27, so total boys = 45,
Total girls = 75-45 = 30,
Girls joining club = 1/5 * 30 = 6.
Ratio is = 27/6 = 9/2.

6.(e)

Ratio is = 5/4.

7.(b)
Boys/girls = 25/29, boys + girls = 270,
Then girls = 145 and boys = 125,
After admission of 15 boys and 5 girls new ratio = 140/160 = 7/8.

8.(b)
Let the numbers be x and y,
Then numbers are 33, 55.

9.(e)
Income of A, B & C are in ratio of 7:9:12 and their spending in the ratio of 8:9:15.
For A, 7x- 8y =7/4x, then x= 32y/21, savings of A, B & C is 7/4x: 9(x-y): 12x-15y
On putting the value of x = 32y/21 in the ratio we get ratio as 56:99:69.

10.(b)
The new ratio between boys and girls are

11.(c)
Let the total number of coins be x. then,
60x/100 = Rs. 30
Then x= 50,
5p coins = 3*50 = 150.

12.(c)
The new ratio is = 6 * 140/100: 7* 130/100: 9 * 160/100= 84:91:144.

13.(b)
Total reduced amount = 2430 – (5+10+15) = 2400.
Q's share =

14.(c)
Let the income be x and expenditure be y,
Then, 5x-3y = 1600
And 4x- 2y = 1600
On solving both equation, we get x = 800, income of B = 4x = 3200.

15.(e)
Let the side of triangle be a, b, and c so a+b+c = 104cm,
Also a: b: c = ½:1/3:1/4.
x/2 +x/3 + x/4 = 104 cm
x = 96
Longest side is x/2 = 48 cm.

16.(b)
Third proportion of 16:26 is 169/4 and mean of 9 and 25 is (9*25)^1/2 = 3*5 = 15
Ratio is 169/4:15 = 169:60.

17.(c)
Let the number be x and x+50, then x: x+50 = 3:7.
Then x = 75/2.
Ratio is 75/2: 175/2 = 3/7.

18.(e)
As per the question, $x = 1/y^2$ and $z = y^3$, so ratio of x/z = 1/y^5 = 1/243

19.(a)
In alloy M, silver is 3/5 * 40 = 24 kg.
In alloy N silver is 1/5*100 = 20 kg,
Total silver content in new mixture is 44 kg,
Ratio of silver to gold in new mixture is 44/96 = 11/24.

20.(d)
Let the numbers be x and y, x*y/x-y = 45/2.
Since no other data is given
We cannot calculate HCF and LCM so data inadequate.

21.(c)
Initial investment = 12:17, after increase investment = 12:17,
We cannot calculate the profit ratio as no other information is given regarding profit received by him.

22.(a)
Given, a/a+2 = 14/27, then two consecutive odd number = 28/13, 54/13
Ratio = 26/13: 82/13 = 13:41.

23.(b)
20% of literate boys = illiterate girls
And literate girls = 1/5 * illiterate boys
Ratio of total boys and total girls = 5:1

24.(b)
Let the three girls be a, b and c,
Then a+b+c = 25*3
After 15 years a+b+c = 120
And their ratio of age after 15 year is given as 3:5:7,
So on using above data we get age of youngest girl = 24.

25.(d)
According to the question,
10/100x = 45/100y so x/y = 9/2
Also 35/100y = 12/100z,
And y/z =12/35
So x: y: z = 54:12:35

26.(a)
Let the three containers contain 3x, 4x and 5x litres of mixtures respectively
Milk and water in 1st mixtures is 12x/5 and 3x/5 litres.

Similarly milk and water in 2nd mixture is 3x and x.
And milk and water in 3rd mixture is 25x/7 and 10x/7 litres.
Total milk in final mixture = 314x/35 litres.
Total water in final mixture = 106x/35 litres.
Ratio of water milk to water = 157:53.

27.(d)
Let the 20 rupees note be x and 10 rupees note be y.
From the question it is known that x+y = 14
And 2x + y =23.
X =9 and y= 5.
Ratio is 5/9.

28.(b)
Ratio of A, B & C is 7:8:16.
Difference of A and C is 9x.
As per the question 9x = 27, x = 3.
Total money = 31 * 3 = 93.

29.(e)
Efficiency of A: Efficiency of B: Efficiency of C = ½:1/3:1/4 = (6:4:3)/12
So ratio is 6:4:3.

30.(c)
By using chain rule
27*8*80 = x*45*16.
Then x= 24 times.

31.(c)
½ of white mice = 1/8 of total mice
And 1/3 of grey mice = 1/9 of total mice.
White mice/grey mice = ¼: 1/3 = 3:4

32.(d)
Saving = income-expenditure
More data is needed to answer the question.

33. (d)
Rs. 50 is to be divided in the ratio of their efficiency,
Efficiency of A: efficiency of B = ½:1/3 = 3:2/6 = 3:2.

34.(c)
Ship submerged weight: exposed weight = 2/5: 3/5 = 2:3.

35.(c)
From all the options, option (c) cannot be the ratio as 2+3 = 5 is not a factor of 12.

36.(c)
From statement I, no measurement of triangle is given so we cannot find the ratio

From statement II, ratio is 4:5.
So relation cannot be made.

37.(c)
From statement I, saving of A & B= 4x-5y: 9x-7y. Ratio cannot be calculated.
From statement II, saving of A& B = 6:7.
No relation can be made.

38.(d)
From statement I, ratio of A: D = 5:6.
From statement II, ratio of A: D = 1:1.
I< II.

39.(d)
From statement I, we can find the ratio of X/Z = 4:15
From statement II, X/Z = 1/5.
I< II.

40.(a)
From statement I, Length + breadth = 103 cm, area = 2746. On solving length: breadth = 54/49.
From statement II, length: breadth = 1:3.
I>II.

41.(a)
From statement I, let the two number be x and y.
2x +3y = 36, 3x +2y = 39, on solving x/y = 3/2.
From statement II, x/y = y+40/y not determined.

42.(a)
From statement I, radius and height is same, ratio is 1:2^1/2:2^1/2
From statement II, curved surface area of hemisphere is 2*pi*12².

43.(b)
From statement I, b1h1/b2h2 = 3/4
From statement II, b1h1/b2h2 = ¾, h1=h2, so b1/b2 =3/4

44.(c)
From statement I, speed of first car: speed of second car = 2:3.
From statement II, speed of first car: speed of third car = 1:2
On combining both we ratio as 2:3:4.

45.(e)
From statement I, present bill = Rs. 4500
From statement II, wages of labour increased in ratio = 22:25.
Also by combining both statements we do get the required result.

46.(a)
From statement I, 125/100*4x/5x + 50000 = 9/10, x = 10000, price of horse last year = 40000
From statement II, ratio after increase is 9:4.

47.(e)
From statement I, total officer = 132.
From statement II, male: female employee = 2:3.
Only officer strength is given not any other grade strength so we cannot calculate the total staff strength.

48.(d)
From statement I, let the fraction be x/y.
After an increase of 200% and 300% the fraction is 6/11.
Original fraction is 6/11 * 400/300 = 8:11.
From statement II, original fraction = 5/6 * 60/50 = 1:1.

49.(c)
From statement I, boys: girls = 7:9.
From statement II, boys-girls = 14.
On combining both statements, total strength is 112.

50.(d)
From statement I, ratio of A, B, C & D is 3x:5x:8x:9x, 6x = 1872, x= 312, B+C= 13x= 4056.
From statement II, ratio of A, B, C and D is 3:7:9:13, let x be the multiplier, then 6x = 11172, x = 1862
B+C = 16x= 29792.

PROBLEMS ON AVERAGE

1). There are 45 students in a class. The no. of boys is 5 more than girls. The average weight of boys is 5 more than average weight of girls. The total weight of boys is 100 more than girls. Calculate the average weight of the class?
(a) 50.1kg (b) 51.1 kg (c) 49.1kg (d) 50kg (e)52kg

2). If there are 10 people in a trip then the average height of all is 160 cm, but if 8 people go in the trip then the average height reduces by 1 cm. find the average height of remaining two?
(a) 160 cm (b) 164 cm (c) 155 cm (d) 170 cm (e) 164.5 cm

3). In a family of 8 of three generation, there are two fathers, two mothers, two brothers, and two male children. The total age of the female member of the family is 5 less than total age of male member of the family. What is the difference in the average age of male and female member of the family?
(a) 5 (b) 10 (c) 15 (d) 12 (e) Data inadequate

4). The average of three numbers is 59. When six more numbers are included the average becomes one-third more of the previous average, what is difference between the averages of the two set of numbers?
(a) 19.4 (b) 19.3 (c) 19.5 (d) 9.7 (e) 20.17

5). Two trains moving in opposite direction have an average speed of 56km/hr both. If both runs in same direction than the average speed of both train will be?
(a) 56km/hr (b) 50 km/hr (c) 56.7 km/hr (d) cannot be determined (e) None

6). There are 35 students in a lecture of physics, in which the difference between the girls and boys is 5. The average of marks got by girls is 5 more than boys and the total marks got by boys are 50 less than girls. What is the average mark of total students?

(a) 160/7 (b) 150/9 (c) 130/9 (d) 190/9 (e)190/7

7). Four boxes full of apples are placed one by one in a big box. The average height and length of the small boxes are in ratio of 5:7. The average of breadth of all boxes is 4 more than average of height. Calculate the approximate average volume of all four boxes if total height of all boxes is 60 cm.
(a) 48857 (b) 48867 (c) 47885 (d) 48897 (e) None of these

8). The average age of Arun and his wife was 25 at the time of their marriage and it increases by 3 at the birth of their child. What is the average age of the three at present at the 5th birthday of their son?
(a) 53/3 (b) 65/3 (c) 71/3 (d) 25 (e)23

9). The difference between the averages of two set of numbers is 6, if total numbers are 10 and the total sum of second set is 56. What is the average of sum of both set?
(a) 50 (b) 65 (c) 60 (d) cannot be determined (e) None of these

10). The average score of a cricketer is 100 in 15 matches, if his average score for 7 matches is 10 more than average score of 8 matches than what is difference in the averages of first 7 matches and last 8 matches if the cricketer scores 480 runs in last 8 matches?
(a) 5 (b) 4 (c) 6 (d) 12 (e) 10

11). The average runs of a cricketer in a tournament, in which he played 14 matches, was 47. His average runs in the first seven matches are 57 and that in the last five matches are 44. If the runs made by him in 8th match are 15, how many runs did he make in 9th match?
(a) 24 (b) 25 (c) 20 (d) 16 (e) 30

12). The average weight of 70 students in a class calculated as 40 kg. Later it was found that the weight of one of the student was calculated as 64kg instead of 32kg. What is the actual average weight of the students in the class?
(a) 34.5 (b) 40.5 (c) 39 (d) 39.5 (e) 40.1

13). There are 45 students in a hostel. Due to the admission of 15 new students the expenses of the mess were increased by Rs. 60 per day while the average expenditure per head diminished by Re. 1. What was the original expenditure of the mess?
(a) 675 (b) 670 (c) 360 (d) 480 (e) 390

14). In an examination, a student's average marks were 65 per paper. If he had obtained 20 more marks for his English paper and 5 more marks for his science paper, his average per paper would have been 70. How many papers were there in the examination?
(a) 5 (b) 10 (c) 6 (d) 11 (e) NOT

15). A motorist travels to a place 200 km away at an average speed of 40 km/hr and returns at50 km/hr. his average speed for the journey is how much less than its total speed?
(a) 300/7 (b) 400/9 (c) 200/9 (d) 350/9 (e) NOT

16). The arithmetic mean of the scores of a group of students in a test of mathematics was 48. The brightest 20% of them secured a mean score of 75 and dullest 25% a mean score of 30. The mean score of the remaining 55% is:
(a) 560/11 (b) 56 (c) 510/11 (d) 670/11 (e) NOT

17). Of the 5 numbers the average of first 4 numbers is greater than average of last 4 numbers by 6. What is the average of 5 numbers if the sum of middle 3 numbers is 59 and also last number is less than the average by 2?
(a) 27 (b) 29 (c) 26 (d) cannot be determined (e) 3

18). A company produces on an average of 500 items per month for the first 4 months. How many items it must produce on an average per month over the next 8 month, to make average of 1000 items per month?
(a) 1250 (b) 1350 (c) 1150 (d) 1550 (e) 1300

19). The average of 5 numbers is a and the average of three of these is b. if the average of last two is c, then which of the following is correct relation between a, b and c?
(a) b=a+c (b) 2a=3b+2c (c) 5a=3b+2c (d) a=b+c (e) a=b/c

20). In a coaching center the fees of girls is less than boys as some percent concession is given to girls to encourage them towards higher education. The average fee taken by 50 girls is Rs 2500 per year and the number of boys joining the center is 200. What is the average fee of all students if fees of each boy are 50% more than that of girls?
(a) 3000 (b) 2700 (c) 3500 (d) cannot be determined (e) 4500

21). A person invests Rs 505 on an average per month in different schemes and saves Rs 404 on an average per month. What is the difference in the amount he invests to save?
(a) 1111 (b) 2121 (c) 1212 (d) 1215 (e) NOT

22). The average age of a group of student of 40 is 12, if age of teacher and caretaker is included than the average of whole is, also it is given than the average age of teacher and caretaker is 36 more than the average age of whole group?
(a) 13.8 (b) 13.4 (c) 15.6 (d) 15.5 (e) 23.9

23). The average monthly income of a family of four earning members was Rs 15005. One of the daughters in the family got married and left home, so the average monthly income of the family came down to Rs 14560. What is the monthly income of the married daughter?
(a) 13460 (b) 14360 (c) 16439 (d) 16340 (e) 15649

24). There are three numbers A, B and C such that the sum of twice B to thrice C is 200. And the sum of twice A and thrice C is 250 and also A and B are in ratio of 2:3. What is the average of the three numbers?
(a) 45.6 (b) 34.8 (c) 34.5 (d) 33.5 (e) 37.5

25). The annual income of a person is Rs. 3, 60, 000 and average expenditure is Rs. 16,000. What is the ratio of average saving to average income?
(a) 7/15 (b) 6/13 (c) 3/4 (d) 9/17 (e) 4/9

26). In a club of 5 members when a member is retired & new member join the club then the average age of all the members becomes same which it was before 2 yrs. Then find the difference between the age of new member & the person replaced from the committee
(a) 14 (b) 10 (c) 15 (d) 17 (e) 16

27). A team of 10 members is taken part in a competition of shooting. The best secure 90 pts. If he secured 95 points then the average becomes 90. Then find the total points of the team?
(a) 900 (b) 890 (c) 790 (d) 895 (e) 995

28). The average monthly consumptions of rice by a family are 25 kg. If a new member joined them for three months the annual consumption of rice remains the same as before. What is the total rice in kg consumed yearly by the family?
(a) 350 kg (b) 450 kg (c) 400 kg (d) 500 kg (e) 300 kg

29). A PVR usually sell 500 tickets in a week and Rs 2, 50,000 is the monthly income that the PVR get while selling the tickets. What is the average amount per person it gets?
(a) 135 (b) 125 (c) 145 (d) 356 (e) 120

30). Mohan consist 3 times the amount of sohan and sohan consists of 50% more amount than pranav. If average of all amounts are 14,000, than find the amount of Mohan?
(a) 24000 (b) 16000 (c) 25000 (d) 27000 (e) 23000

31). The average of first 15 prime numbers between 10 to 250 is?
(a) 124/3 (b) 45.5 (c) 56/3 (d) 110/3 (e)112/5

32). The ratio of a two-digit natural number to a number formed by reversing its digits is 9:7. Which of the following is the average of sum of all the numbers of all such pairs?
(a) 45 (b) 55 (c) 67 (d) 76 (e) Cannot be answered

33). Consider a class of 50 students whose average weight is 40 kg. X new students join this class whose average weight is y kg. If it is known that X +y=50, what is the possible average weight of the class now?
(a) 45.56 kg (b) 45.66 kg (c) 45 kg (d) 46.56 kg (e) 50.45 kg

34). In a club of 10 members, average age of member is get down by 5 when two new member join them and also it get up when two member left the club what is the difference between the average of the 2 left to 2 joined?
(a) 15 (b) 20 (c) 40 (d) 30 (e) 10

35). A plant of height 15 cm was brought in Ravi's garden, day by day it grows to certain height. Ravi on Monday notice that it grows to 2.05 mm. after 3 days his wife notice that it grows to 1.01 cm. on the last day of week his son calculated the average height as 1 cm. what is the total height increased in the remaining days?
(a) 6.99 cm (b) 6.99mm (c) .679 dm (d) 2.99 cm (e) NOT

36). The average temperature of the town in the first four days of a month was 58 degrees. The average for 2nd to 5th days was 60 degrees. If the temperatures of the 1st and 5th days were in the ratio of 9:11, then what is the temperature on the 5th day?
(a) 36 (b) 45 (c) 44 (d) 55 (e) 60

37). The average consumption of petrol by a vehicle for the first seven month is 45 liters and last five month is 40 liters, what will be the ratio of consumption of petrol by the vehicle in the first and last month together if the difference in consumption of the two month is 5 liters and also the average of remaining month is 50 liters?
(a) 10/11 (b) 12/11 (c)11/12 (d) 11/10 (e) NOT

38). A scooter travel with starting speed of 40 km/hr to 5 places total distance is 400 km at different speed with equal time, what is the average speed with which it travels if it is known that at each interval speed increases to 3 km/hr?
(a) 45 (b) cannot be determined (c) 43 (d) 50 (e) 40

39). The average age of 3 children in a family is 20% of the average age of mother and the eldest child. The total age of father and the youngest child is 35 years. If the mother's age is 30 and average age of father and mother is 32, what is the age of second child?
(a) 5 (b) 12 (c) 7 (d) 9 (e) Data inadequate

40). A cricketer scores 25 runs in 25th inning and reduces its average by 3 runs; if he had made 45 runs he would hade scored a total of 5000 runs. What is the approximate average run before 25th innings?
(a) 206 (b) 207 (c) 208 (d) 204 (e) 201
Direction: Each one of the following questions given below consist of a statement and/or a question and two statements I and II given below it. You have to decide whether the data provided in the statement(s) is/are sufficient to answer the given question. Read both thee statement and give answer as:
(a)- If data in statement I is sufficient to answer the question
(b)- If data in statement II is sufficient to answer the question
(c)- If both the statement are required to answer the question
(d)- If either statement I or statement II is required to answer the question
(e)- If both the statement I and II are not sufficient to answer the question.
41). What is the average age of all employees of a company?
I. Total number of employee is 400.
II. The elder employee is 20 year more than average age.
42). How many candidates were interviewed everyday by the panel A out of the three panels A, B and C?
I. The three panels on an average interview 15 candidates everyday.
II. Out of a total of 45 candidates interviewed everyday by the three panels, the number of candidates interviewed by panel A is more by 2 than the candidates interviewed by panel C and is more by 2 than the candidates interviewed by panel B.
43). Praneet average marks is 5 more than what he got in English, what is his marks in geography?
I. The average mark is 65.
II. Total subject is 5 and the sum of English and geography is 104.
44). What is sushi's average salary?
I. Her salary at the time of joining was Rs 10000 and the salary increase every year by 10%.
II. She had joined exactly 5 yrs ago.
45). How many students are there in the class who has an average age of 15?
I. The ratio between the boys and girls is 4:3, total ages of whole class is 420.
II. The ratio between the average age of girls and boys is 13:15.
46). What is the average age of Neeta and David?
I. The ages of Neeta and David are 6:7.
II. After 6 years, the ratio of their ages will be 15:17.
47). A sum of money is divided among four brothers P, Q, R and S in the ratio 3:7:9:13. What is the average sum of money?
I. The share of P and R together is Rs 11312.
II. Share of S is more than Q
48). Whose body weight is second highest among the five boys vinay, Rajiv, sanjeev, ramesh and ajay?
I. Average weight of vinay, sanjeev and ajay is 59 kg, also weight of Rajiv is 58 kg, and ramesh is 70 kg. The weight of sanjeev and ajay is 65 kg and 60 kg respectively.

II. Average weight of vinay, Ramesh and Rajiv is 69 kg, also weight of Rajiv is 68 kg, and ramesh is 75 kg. The weight of sanjeev and ajay is70 kg and 69 kg respectively.

49). In an exam, find the no. of qualified students of class?

I. Average marks of 120 students are 35.

II. Average marks of disqualified is 15.

50). Find the age of father?

I. Average age of family members is 25 years.

II. When the age of father is included the average of 5 member which is 20 increases by 25%.

SOLUTION AND EXPLANATION OF PROBLEMS ON AVERAGE

1.(b)
Total student =45
Let no of boys be x then girls will be 45-x.
As given x = 45-x +5.
Then x = 25.
Let total weight of boys and girls be A and B respectively.
Then A/25 + 5 = B/20, also A = 100 + B.
On solving we get A+ B =1900 dividing by 45 we get 51.1 as answer.

2.(b)
Total height of 10 people is 1600 cm (10*160)
When people = 8, total height is 1272 cm (8*159)
Average of remaining two is (1600-1272)/ 2 = 164 cm.

3.(e)
Female are 3 and male are 5
Total age of male – total age of female = 5.
No other information is given so data inadequate

4.(e)
a+b+c= (3*59)
Let six new numbers be y then
a+b+c +y= (59 +1/3) * 9
On solving we get difference as 20.17

5.(d)
Let speed of both the train be x and y, then 2xy/(x+y) = 56 km/hr.
If both run in same direction than average speed will be 2xy/(x-y).
Since there is no data for x and y so answer is (d).

6.(e)
Case 1: when boys> girls
Total student =35
Let no of boys be x then girls will be 35-x.
As given x = 35-x +5.
Then x = 20. Let total weight of boys and girls be A and B respectively.
Then A/15 + 5 = B/20, also A = 50 + B.
On solving we get a negative value which is incorrect, so this assumption is wrong.

Case 2: when boys< girls
Total student =35
Let no of girls be x then boys will be 35-x.
As given x = 35-x +5.
Then x = 20. Let total weight of boys and girls be A and B respectively.
Then A/20 - 5 = B/15, also B = 50 + A.
On solving we get average marks as 190/9

7. (a)
The ratio between height and length is 5:7 and also average breath is 4 more than average height. Total height is 60 cm.
Then we get total breath as 19*4=68 then total length will be 300/7.
Then average volume (total L* total B * total H) will be total volume/4. i.e.48857.
8.(c)
Arun +wife = 50
Arun + wife = 56 at the birth of their son.
After 5 years average age =71/3
9.(d)
Let the two set sum be A and B and total numbers in each set be n and m respectively.
A/n –B/m =6
Also m+n =10, B=56
On solving inadequate data problem take place so answer is (d).
10.(e)
Total score = 1500 runs.
Also total runs in 7 matches/7 = 10 + total runs in last 8 matches/8
Total runs in 8 matches are 480. On solving we get average of 7 matches as 70,
Difference is 10.
11.(a)
Correct equation is
(47*14)- (57*7)-(44*5)-15= 9th match run
12.(d)
(70*40-32)/70 = 39.5
13.(c)
Let original average expenditure be y then
60 (y-1) – 45y = 60
The y= 8
The original expenditure is 8*45= 360.
14.(e)
Let no. of papers be x
Then 65x + 20 +5 = 70x
x=5
15.(b)
2*40*50/ (40+50) =400/9
16.(c)
Let the mean score be x.
20*75 + 25* 30 + 55*x =4800
On solving x= 510/11

17.(b)

Let the five numbers be a, b, c, d and e and their average be x.
Then a+b+c+d/4- b+c+d+e/4 =6 and a+b+c+d +e = 5 *y
Also b+c+d = 59. And e=y +2
59 +a+e=5y => 61 + a = 4y
Also a-e =24 => putting e = y+2, a-y = 26
On solving both equation we get y = 29.

18.(a)
Let items in 8 month be x, then 2000+8x= 12000
On solving x=1250

19.(c)
Sum of 5/5 =a, sum of 3/3 =b, sum of remaining 2/2=c.
So a= (3b+2c)/5

20.(c)
Total fees of girls = 125000 in a year.
Total fees of boys (boys=200) will be 150% of 2500 = 3750 *200.
Average fees = (3750*200 +125000)/250= 3500

21.(c)
505-404=101*12 = 1212.

22.(a)
(480+ teacher+ caretaker) /42 = y (average of all).
Teacher + caretaker =2y + 72.
Then average age of whole (y) is 13.8.

23.(d)
(15005*4)- (14560*3) = 16340

24.(e)
2B+ 3C =200
2A + 3C = 250
A/B =2/3
Average of 3 numbers is 37.5

25.(a)
14000/30000=7/15

26.(b)
Solution of this is 5*2.

27.(d)
90+ sum of scores of 9 member = 10y.
Also 10y + 5 = 90*10.
Total points are 895.

28.(e)
25*12=300 kg

29.(b)
500 tickets per week, so total ticket in a month are 2000.
Therefore average amount per persons is
250000/2000 = 125

30.(d)
Mohan = 3 sohan, sohan = 150/100 pranav.
Also Mohan + sohan+ pranav = 42000.
By using above data we get Mohan amount as 27000.

31.(d)

(11+13+17+19+23+29+31+37+41+43+47+53+59+61+67)/15 = 110/3

32.(e)
(10x+y)/ (10y+x) = 9/7which results into x/y = 61/83
x+y /2 cannot be calculated as no more data is given to calculate the value o x or y.
33.(a)
As given n>40. And m<10, also m+n =50
By using assumption we get that m* (n-40)/ (m+40) is maximum.
Using trial and error approach method we get m=5 and n= 45.
So average = 40 + (45-40)*5/45 = 40.56 kg
34.(e)
Let the average age of 10 members be x, then total age = 10x.
The two member joined be a and b, and two member left be c and d.
On solving we get a+b = 2x-60, c+d = 2x-40.
The difference is 10
35.(a)
Let the remaining sum be x
1.01 + x/no. of days = 1,1.01+ x/7=1
x= 6.99 cm
36.(c)
(60*4)- (58*4) = fifth day temperature– first day temperature
First/fifth = 9/11
Fifth =44 degree
37.(b)
(7*45)+ (5*40)-(8*50) =115=1st month petrol consumption (a)+ last month petrol consumption(b)
Also a-b = 5
So a/ b= 60/55=12/11
38.(b)
With an equal increase of 3km/hr speed, total speed = 40, 43, 46, 49 and52 km/hr.
Average speed =400/5*time taken in each intervals is not given, so answer is (b)
39.(e)
Let three children be a, b and c, then (a+b+c)/3= 20% * (mother + a)/2
Also total age of father and youngest child, father + c =35. Mother's age = 30
Average age of father and mother is 32 so father's age = 34.
Then c= 1
By using above information we get a+b+1=3/5 * (30 +a)/2.
More data is required to answer this questions option (e) is correct
40.(a)
(Runs in 24 innings + 25)/ 25 = average-3
Also runs in 24 innings + 45 = 5000
Then average runs in 24 innings is 4955/24= 206.4= approx. 206.
41.(e)
From statement I total employee is 400. Not adequate data to find the average age
From statement II average age of all employees cannot be calculated.
On combining we do not get the desired result. So option (e) is correct.
42.(b)
From statement I A+B+C /3 = 15
From statement II A=C+2, C= B+2, A+B+C = 45, then total candidate interviewed in panel A is 17.

43.(c)
From statement I, average marks are 65.
From statement II, subjects=5, English + geography = 104
On combining both statement we get English = 60 and geography as 44
44.(c)
From statement I, first salary is 10000; every year 10% increment takes place, next year is 11000, and so on.
From statement II, total year of joining till now is 5, average of five year is to calculated,
By combining both the statement we get the desired result.
45.(e)
From statement I, it is not cleared about the total strength of students.
From statement II, only the ratio between the ages of boys and girls is given, which is inadequate.
On combining we get that total number of student is multiple of 7 but we do not get the total number, so option (e) is correct.
46.(c)
From statement I, Neeta/David= 6/7
From statement II, (Neeta +6)/David + 6= 15/17,
On combining both statements we get the age of Neeta and David, by which we can find the average age of both.
47.(a)
From statement I, 3x+9x/32= 11312, x= 4242, total = 4242 *42
From statement II, S>Q
From statement I we get the desired result so option (a) is correct
48.(d)
Both the individual statement can be used to answer the following question
49.(e)
From statement I, total marks of class = 120*35
From statement II, average marks of disqualified student are given which is inadequate.
So option (e) is correct.
50.(c)
From statement I, average age is 25 years
From statement II, average of 5 member = 20,
After inclusion average = 25, total age now is 15(25*6).
On combining both statements we get total age before age inclusion as 100.
So age of father is 50 (150-100).

PROFIT & LOSS

1. A man sold an article for Rs. 6800 and incurred a loss. Had he sold the article for Rs. 7600, his gain would have been equal to half of the amount of the loss that he incurred. At what price should he sell the article to have 20 % profit?
(a) Rs. 8000 (b) Rs. 8500 (c) Rs. 8800 (d) Rs. 9000 (e) Rs.7500

2. The cost price of two cars is same. One is sold at a profit of 20% and the other for Rs. 360 more than the first one. If the overall profit earned after selling the tables is 22%, then what is the cost price of each chair?
(a) Rs.10,00,000 (b) Rs. 15,00,000 (c) Rs. 9,00,000 (d) cannot be determined (e) NOT

3. If a shopkeeper marks the price of goods 50% more than their cost price and allows a discount of 40%, what is his gain or loss percent?

(a) 10 % loss (b) 5% profit (c) 15 % loss (d) 5 % loss (e) NOT

4. A retailer brought 40 kg of wheat at a discount of 15 % on the market price. Besides, he was given 6 kg of wheat free of cost, by the retailer for purchasing bulk quantity. If retailer sold the entire quantity of rice at the marked price to his customers, then approximately what was his profit percent?
(a) 50% (b) 25% (c) 18% (d) 35% (e) NOT

5. A shopkeeper bought 30 kg of wheat at the rate of Rs. 45 per kg. He sold 30 % of total quantity at the rate of Rs. 50 per kg. Approximately, at what price per kg should he sell the remaining quantity to make 28 % profit?
(a) Rs.69 per kg (b) Rs. 40 per kg (c) Rs.60.85 per kg (d) Rs. 54.70 per kg (e) NOT

6. A mobile phone and a tablet were sold at a profit of 10% and at a loss of 6 % respectively. If the cost price of the mobile is 1.5 times of the tablet, what is the overall profit percentage earned by selling both the articles?
(a) 4% (b) 1% (c) 5% (d) 8% (e) 2%

7. Prateek sold a music system to karthik at 20 % profit and karthik sold it to sweta at 40 % profit. If sweta paid Rs. 10500 for the music system, what amount did Prateek pay for the same?
(a) 6250 (b) 5000 (c) 8000 (d) 7500 (e) 9000

8. A shopkeeper makes a default of 5% on purchasing the goods and again makes a default of 5 % on selling the goods then find the total profit percent?
(a) 10.25% (b) 15.5% (c) 12% (d) 10.5% (e) NOT

9. On selling a book in Rs. 60, publisher get 1/11 part of its cost as loss, then find cost price of the book?
(a) 55 (b) 66 (c) 61 (d) 77 (e) 68

10. The profit after selling a pair of shirts for Rs. 863 is same as loss incurred after selling the same pair of shirts for Rs. 633. What is the cost price of the pair?
(a) 748 (b) 568 (c) 650 (d) data inadequate (e) 550

11. A shopkeeper sold his article with 10 % profit and used the weights which are 20 % less than the real weights. Then find his total profit %?
(a) 45.5% (b) 37.5% (c) 25% (d) data inadequate (e) NOT

12. Ram sold an article with 2.5% loss. If he sold it 100/- more then Ram get 7.5% profit. What will be the selling price of article if Ram wants to earn 12.5% profit?
(a)1200 (b) 1000 (c) 1205 (d) 1125 (e) NOT

13. Rajesh purchase some card board of Rs. 14000, paid Rs. 300 for loading & paid Rs. 1300 as wages & prepared 350 boxes. If he sold boxes @ Rs. 55 per box, then Find his profit %?
(a) 23.4% (b) 10% (c) 13% (d) 18% (e)21.3%

14. A shopkeeper allows 23 % commission on his advertised price and still makes a profit of 10%. If he gains 56/- on one item, his advertised price of the item in Rs. Is?
(a) Rs.450 (b) Rs. 623 (c) Rs. 639 (d) cannot be determined (e) NOT

15. The cost of an apple is twice that of a bananas and the cost of a banana is 25% less than that of a guava. If the cost of each type of fruit increase by 10 %, then the percentage increase in cost of 4 bananas, 2 apples and 3 guavas is :
(a) 20% (b) 10% (c) data inadequate (d) either (a) or (b) (e) 4%

16. A trader bought two horses for Rs. 18500. He sold one at a loss of 25% and other at a profit of 10%. If the selling price of both horse is same, then their cost price are respectively?
(a) 12000, 8000 (b) 13000,7000 (c) 7250, 12750 (d) 13750, 6250 (e) NOT

17. If cost price of 15 articles is same as selling price of 10 articles, then find gain percent?
(a) 50% (b) 30% (c) 40% (d) 20% (e) 25%

18. A businessman sold 2/3 of his stock at a gain of 20% and the rest at a gain of 14%. The overall percentage of gain to the businessman is:
(a) 16 % (b) 18% (c) 10% (d) 15% (e) NOT

19. A house worth Rs. 180000 is sold to B by A at 5 % profit; B sells the house back to A at 3 % loss. Then in entire transaction, what A got?
(a) Loss of 2% (b) gain of 2% (c) gain of 1.85% (d) no loss, no profit (e) NOT

20. A dairyman pays Rs. 25.60 per litres of milk. He adds water and sells the mixture at Rs. 20 per litres, thereby making 35 % profit. The proportion of water to milk received by the customers is:
(a) 361/39 (b) 45/67 (c) 34/89 (d) 91/125 (e) 67/70

21. In a certain store, the profit is 280 % of the cost. If the cost increases by 25% but, the selling price remains constant, approximately what percentage of the new cost price is the profit?
(a) 70% (b) 155% (c) 255% (d) 100% (e) NOT

22. Ajay purchased 15 kg wheat @ 15 per kg & 12 kg wheat @ 14 per kg. He mixed both pulses & sold the mixture @ 20 per kg, find his profit percent?
(a) 25% (b) 37.4% (c) 20.6% (d) 40.1% (e) NOT

23. Ravi sold his goods at C.P. but in place of 1 kg he used the weights of 980 gm, and then, calculates his profit percent.
(a) 5% (b) 3.23% (c) 2.04% (d) 4.2% (e) NOT

24. A shopkeeper sold a machine with 10 % profit. If he sold it Rs. 80 less amount he gets 10 % loss. Find the cost price of a machine?
(a) Rs. 550 (b) Rs.450 (c) Rs. 440 (d) Rs. 480 (e) Rs. 400

25. Rajesh invest in two schemes, in one scheme he get 5% profit and in other scheme he get 10 % profit, what is his total profit if he invest in the ratio of 4:9 respectively?
(a) 50/3% (b) 120/7% (c) 110/3% (d) cannot be determined(e) NOT

26. David runs a shop and sold 11 toffees in Rs. 1 then he get 20% loss. How many toffees he give to a customer in a Rs. 1 to earn 10 % profit?
(a) 10 (b) 6 (c) 9 (d) 8 (e) 11

27. A shopkeeper sold his goods at cost price. By using defective weights he earns 11 1/9 % profits. Then find how much goods he given to a customer in place of 1 kg?
(a) 990 gms (b) 960 gms (c) 940 gms (d) 870 gms (e) 900 gms

28. A fruit seller consists 28 kg of apple. Some part of apple he sold at 15% profit & remaining with 10 % loss. In total transaction he gets profit of 10%, then find how much apple he sold at loss?
(a) 23 kg (b) 12.8 kg (c) 12.8 kg (d) 5.6 kg (e) NOT

29. On selling an article in Rs. 6500 in place of Rs. 7200 Herman incurred 4 % more loss, what is the cost price of articles?
(a) 18000 (b) 16500 (c) 17500 (d) 14500 (e) NOT

30. A shopkeeper purchased an article and sold it with 10% loss. If he purchased it at 20% less cost and sold it 55 Rs. more then he get 40% profit. Find the cost price of the article?
(a) Rs. 240 (b) Rs. 260 (c) Rs. 300 (d) Rs. 200 (e) NOT

31. When a person sold 20 articles in Rs. 60 then he get 25% profit, and then find how many articles he purchase in Rs. 60?
(a) 28 (b) 25 (c) 23 (d) 30 (e) NOT

32. After successive discount of 7% and 12% an article was sold for Rs. 205. What is the original price of the article?
(a) Rs. 255 (b) Rs. 260 (c) Rs. 245 (d) Rs. 234 (e) NOT

33. A man bought some fruit at the rate of 16 for Rs, 24 and sold them at the rate of 10 for 22. Find the profit percent?
(a) 70% (b) 140/3% (c) 240/7% (d) data inadequate (e) NOT

34. The ratio between cost price and loss is 6:1, what is the ratio of loss to selling price?
(a) 1:5 (b) 2:5 (c) 3:5 (d) 1:6 (e) 2:3

35. If selling price of an article is 5/4 of cost price, and the ratio between profit and selling price is 1: 2, profit is what percent of cost price?
(a) 125% (b) 120% (c) 13.5% (d) 67.5% (e) 75.5%

DIRECTION: Each of the questions below consist of a question and two statements I and II. You have to decide whether the data provided in the statement are sufficient to answer the question. Read both statement and give answer as-
(a) If data in statement I alone is sufficient to answer the question
(b) If statement II alone is sufficient to answer the question.
(c) If both statement together is required to answer the question
(d) If either of statement is sufficient to answer the question
(e) If neither of statement is sufficient to answer the question.

36. How much profit did the company earn in the year 2010?
I. The company earned 40 % profit more in the year 2011 than that of 2009.
II. The company earned a total profit of Rs. 15 crore in the year 2009 and 2010 together.

37. What is the profit earned by selling a laptop of Rs. 25600?
I. The cost price of 5 laptops is equal to selling price of 4 laptops.
II. 23 % profit is earned in selling each laptop.

38. What is the loss incurred by the shopkeeper on selling the article in his shop?
I. Labeled price of the article sold was 120 % of cost price. Discount offered was 40 %.
II. Cost price is greater than selling price.
39. Find the ratio between the two selling price of an article?
I. The loss incurred on selling the article to B by A is same as profit made by selling the article to C by A.
II. The loss incurred on selling the article to C by A is same as profit made by selling the article to B by A. loss incurred by A = 100.
40. What is the ratio of selling price and cost price of the bicycle?
I. The profit made by trader is 40% of cost price.
II. The ratio between loss and cost price is 4:5.
41. What is the loss %?
I. Loss incurred by selling the product is same as profit made by selling the same product at same cost price.
II. Loss = 20% of C.P.
42. Find cost price of the book?
I. Selling price of the book is 145% of cost price. And selling price =200
II. Ratio of selling S.P. and C.P. is 13:10.
43. Find his profit percent?
I. S.P. is 45% of C.P.
II. C.P. is 100% of S.P.
44. At what price should Rose sell the article to have 15 % profit?
I. The initial selling price is 400/-.
II. Initial profit is 5%.
45. What was the cost price of the washing machine purchased by Mary?
I. Mary got 10 % concession on the labeled price and sold the washing machine for Rs. 6000 with 20 % profit on the labeled price.
II. Mary got 10 % discount on purchasing the washing machine.
46. An item costing Rs. 45000 is sold at certain discount. Find the rate of discount offered?
I. The profit earned after discount is 5%
II. The item is marked at a price 25% above the cost price.
47. What is the marked price of bag?
I. Cost price is Rs. 500.
II. Selling price is 23% more than marked price.
48. How many articles were sold?
I. Total profit is Rs. 3530. And S.P. per article is 655/-
II. Cost price per article is 545/-
49. A shopkeeper sells some chocolates at Rs. 200 each. What percent profit does he make?
I. Number of chocolates sold is given
II. Cost price of each chocolate is given.
50. What is the ratio of C.P. to S.P.?
I. Profit % = 80%
II. Loss % = 10%.

SOLUTION AND EXPLANATION OF PROFIT & LOSS

Solution and explanation of Profit and loss:

1. (c)

Let cost price of an article is cp. Also selling price = 7600.

7600-cp = (cp-6800)/2=> cp = 22000/3.
Then selling price of article to have 20% profit = 120/100 * cp=120/100* 22000/3
Selling price= 8800 rupees.

2. (c)
Let the SP of first car be SP1 and second car be SP2, then
SP1= 120/100 * CP
SP2 = 360 +SP1 (120/100*CP) = 1806/5 CP
Total profit= (total SP- total CP)/total CP * 100
= (SP1+SP2-2CP)/2CP*100= (1812/5-2) CP/2CP *100
Then on solving CP = Rs. 9, 00,000.

3. (a)
Let CP be 100
Then Marked price= 150
After a discount of 40%, SP = 90
Loss percent = (100-90)/100*100=10%.

4. (d)
Let the cost price of wheat per kg be 100.
At a discount of 15 % the consumer pay (85 * 40) = 3400 rupees.
If retailer has not allowed discount then selling price of 40 + 6 kg wheat = 46 * 100 = 4600 rupees.
% profit = 4600-3400/3400 * 100 = 1200/3400 * 100= 35 %(approx.)

5. (c)
Initial total price= 30 * 45 = Rs. 1350
To have 28 % profit, selling price of 30 kg is Rs. 1728.
Price of 70% quantity is (1728-450)/ 70% * 30=Rs. 60.85.

6. (a)
Cost price of mobile = 1.5 of cost price of tablet
SP of mobile = 110/100 * CP of mobile
SP of tablet = 94/100 * CP of Tablet.
Total CP = 2.5 of CP of tablet
Total SP = 2.59 of CP of tablet
% profit = 4%.

7. (a)
Amount payed by Prateek =

8. (a)
Total profit = % Default 1+ % Default 2 + %Default 1 * % Default 2
= 5 + 5+ 25/100 = 10.25%

9. (b)
CP-SP = LOSS
CP – 60 = CP/11
CP = 66.

10. (a)
According to the question,
863-CP = CP-633
CP = (863 +633)/2
=1496/2 = 748.

11. (b)

12. (d)
According to the question,

97.5% of CP +100 = 107.5% of CP
10% of CP=100. CP=1000
After 12.5% profit, CP=112.5/100 * 1000
CP = 1125

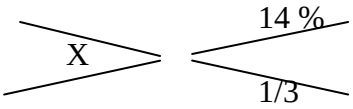
13. (a)
Total selling price = 350 * 55 = 19250
Total cost price= 14000 + 300 +1300 =15600
Rajesh profit % = 19250-15600/15600 *100 = 23.4 %

14. (c)
Commission= 23%
Profit = 56/-
Profit % = 10%
Let advertised price of the item be x
SP = x-23
CP = 100/110 *SP
Also SP-CP = 56
10/110 SP = 56
SP = 56*11
So, x = 616+23 = 639.

15. (b)
Let the price of guava be 100.
Then price of banana = 75% of guava = 75
And price of apple = 150.
After 10 % increase in all prices the new prices are
Guava = 110, banana = 82.5 and apple = 165.
% increase in cost of 4 bananas, 2 apples and 3 guavas = 990-900/900 * 100 = 10%

16. (e)
SP1 of first horse = 75% of CP1.
SP2 of second horse = 110% of CP2
Also SP1=SP2
75/100 * CP1 = 110/100 *CP2
And CP1+CP2 = 18500
On solving we get,
CP1 = 11000
CP2 = 7500.

17. (a)
18. (a)
Let x be the overall % of gain
By using the rule of alligation,



20-x: x-14 = 2:1
3x= 48
Then, x = 16%.

19. (c)
Total profit that A received = 5-3-15/100 = 1.85% of initial price
Total profit of A= 1.85% * 180000. = gain of 1.85 %.
20. (d)
Cost price =20 *100/135 = 400/27.
Proportion of water to milk = = 91/125.
21. (c)
Profit = 280/100 CP
SP-CP = 280/100 CP, SP =380/100 * CP
Also CP increases to 25%, new CPn = 125/100 * CP
But SP remain the same, new profit = 380/100 – 125/100 = 255/100 CP= 255% of CP
22. (b)
Total cost price = 15*15 + 12* 14= 393
Selling price = 27*20 = 540
Profit % = 540-393/393 * 100= 37.4%
23. (c)
Profit % = 20/980 *100 = 2.04%
24. (e)
SP OF MACHINE = 110/100 CP
Also SP -80 = 90/100 * CP
Solving above both equation we get cost price = 440/110 * 100 = 400.
25. (c)
Total price = 4/13 * 5 + 9/13 * 10
= 110/13 %
26. (d)
As per the question,
Where x = no. of toffees to get 10% profit.
110/11 * 80/100=x
Then on solving we get x = 8.
27. (a)
Let the default weight be x
=>x/100-x * 100 =100/900
Then x= 10 gms.
Correct weight = 990 gms.
28. (d)
Let x kg of apple be sold at 15 % profit
Then, 115% of x + 90% of (28-x) =20
On solving we get x = 22.4 kg.
Quantity of apples sold at loss = 28-22.4 = 5.6 kg.
29. (c)
By selling the article at Rs. 6500 Herman get 4% more loss instead of Rs. 7200.
So it is clear that
7200-6500=4% of x (cost price)
Then, cost price of the article = 17500.
30. (e)
Let CP1 be x = 100%
SP1 = 90% OF x
CP2 = 80% OF x
SP2 = 80 * 140 /100 = 112% OF x

SP2-SP1 = 55
112% of x – 90% of x = 55
22% of x = 55
Then x = 250

31. (b)
SP of an article = Rs. 3(60/20)
Profit % = 25%
CP of an article = 3 *100/125 = Rs. 2.4 per article.
In Rs. 60 the original quantity= 60/2.4 = 25 articles

32. (e)
Total discount = 7+12+12*7/100= 19.84%
Original price = 205/80.16 *10000 = 2050000/8016 = 255.75.

33. (b)
Profit percent = (22/10- 24/16)/24/16 * 100 = 140/3 %

34. (a)
CP/LOSS = 6/1
CP/CP-SP= 6/1
SP =5/6 CP
LOSS= 1/6 CP
LOSS/SP = 1/5

35. (d)
SP = 5/4 CP
PROFIT/SP = ½
PROFIT/5/4CP = ½
PROFIT/CP = ½ * 5/4 *100= 67.5%

36. (e)
From statement I, let profit in year 2009 be x, then profit in 2011 = 140%x
From statement II, total profit in 2009 +2010 = 15 crore,
Also on combining both statements we do not get the desired result.

37. (c)
From statement I, CP of 5 laptop = SP of 4 laptops, SP= 25600, CP = 4/5*25600, PROFIT = SP-CP.
From statement II, PROFIT % =23, SP=25600, PROFIT = 23/100 * 100/123 * SP
By using either of statement we can calculate the profit.

38. (e)
From statement I, loss% = 80 % CP
From statement II, CP> SP,
Also by combining both statements we do not get the required result.

39. (e)
From statement I, LOSS OF A-B = PROFIT OF A-C
From statement II, LOSS OF A-C = PROFIT OF A-B
Also on combining both statements, we do not get the required result.

40. (d)
From statement I, profit = 40% of CP, SP/CP = 140/100
From statement II, LOSS/CP = 4/5, SP/ CP = 1/5

41. (b)
From statement I, LOSS = PROFIT
From statement II, loss % = 20 %

42. (a)
From statement I, SP = 145% OF CP, SP /CP = 145/100, CP = 200*100/145

From statement II, SP/CP = 13/10

43. (e)

From statement I, loss occurred instead of profit

From statement II, loss occurred instead of profit

44. (c)

From statement I, SP = 400/-

From statement II, PROFIT = 5%

On combining both statements, SP to have 15% profit is 400*115 / 105.

45. (a)

From statement I, labeled price = 6000*100/120=5000, price at which Mary purchased = 4500/-

From statement II, discount = 10%,

46. (c)

From statement I, profit % after discount = 5%,

From statement II, 45000= 125% of CP, CP = 36000,

ON combining both statements we get, SP = 105% OF CP = 37800,

Discount offered = 45000-37800/45000 * 100 = 16%

47. (e)

From statement I, CP = 500/-

From statement II, SP = 123% MP,

Also On combining both the statement we do not get the required result

48. (c)

From statement I, SP= 655/- and total profit = 3530.

From statement II, CP = 545/-, Total articles = 3530/ (655-545) = 33

49. (b)

From statement I, if no. of chocolates is known we cannot find as cost price of each chocolate is not given.

From statement II, if cost price of each chocolate is given then we can calculate the profit % of chocolates.

50. (d)

From statement I, SP-CP/CP = 80/100, CP/SP = 100/180

From statement II, CP-SP/CP = 10/100, CP/SP = 100/90

SIMPLE INTEREST & COMPOUND INTEREST

1. The simple interest obtained when a sum of money is invested for 4 years at 18 % per annum is Rs. 427 more than the simple interest for 2 years at 22% per annum. What is the amount obtained when the same sum of money is invested for 4 years at 20 % per annum?

(a) Rs.122000 (b) Rs. 122200 (c) Rs. 112200 (d) Rs. 10000 (e) NOT

2. John invests certain sum for 2 years in scheme A offering compound interest of 20% per annum. He also invests less than previous by Rs. 1600 in scheme B for 3 years offering simple interest at 10% per annum. The interest received from scheme A was twice the interest received from scheme B. what is the sum of money invested by John in scheme B?

(a) Rs. 3400 (b) Rs. 7800 (c) Rs.4400 (d) R.s 8400 (e) NOT

3. The simple interest @ 6% per annum received on a principal of Rs. X was Rs. 482.40 when invested for 3 years in scheme A. if the scheme B offered compound interest at 10 % per annum compounded annually, what was the interest received by investing Rs. X-680 for 2 years in scheme B?

(a) Rs. 280 (b) R.s 890 (c) Rs. 840 (d) Rs. 210 (e) Rs. 420

4. An equal amount of sum is invested in scheme M and scheme N. both the schemes offer simple interest at the rate of 12% and 9% respectively. If at the end of two years the total amount received from both the schemes together was Rs. 19360, what is the amount received by investing in scheme M?
(a) Rs. 7900 (b) Rs. 5300 (c) Rs. 8000 (d) Rs. 7100 (e) Rs. 12000

5. An interest of Rs. 8384 is received when a certain sum of money is invested in scheme X for 4 years which offers interest of 8% per annum. When the same money is invested in scheme Y amount received is Rs. 39562, what is the rate of interest offered by scheme Y?
(a) 11¾% (b) 12¾% (c) 11% (d) 15% (e) 16½%

6. A sum of money was invested for 5 years in a scheme which offers simple interest at a rate of 12% per annum. The amount received after 5 years was reinvested in the same scheme for 10 years. If the amount received after reinvesting for the same period is Rs. 782 more than initial sum of money, what was the initial sum of money invested in the scheme?
(a) Rs. 190 (b) Rs. 750 (c) Rs. 20 (d) Rs. 850 (e) NOT

7. The compound interest accrued on an amount of Rs. 22000 at the end of two years is Rs. 5596.8. What would be the simple interest accrued on the same amount at the same rate in the same period?
(a) Rs.5280 (b) Rs. 6280 (c) Rs. 7820 (d) Rs. 5820 (e) Rs. 3280

8. The simple interest obtained on an amount of Rs. 45000 at the end of 4 years is Rs. 15300. What would be the approximate interest obtained on the same amount at half the initial rate and double the initial period if compounded quarterly?
(a) Rs. 18000 (b) Rs. 17809 (c) Rs.18109 (d) data inadequate (e) NOT

9. Ravi invests an amount of Rs. 39300 for 4 years at the rate of 4 % per annum. David invests Rs. 45000 at the same rate of interest for 5 years. What will be the interest they both together get by investing total amount at the rate of 6% per annum for 10 years compounded half yearly?
(a) Rs. 56020 (b) Rs. 80279 (c) Rs. 20400 (d) Rs. 70020 (e) NOT

10. Karan took a loan at simple interest rate of 6% in the first year with an increase of 0.5 % in each subsequent year. She paid interest of Rs. 3375 after 4 years. How much loan did she take?
(a) Rs. 45000 (b) Rs. 40000 (c) Rs. 56000 (d) Rs. 62000 (e) NOT

11. Mr. John invested Rs. 10000 with the rate of interest 10 % per annum. The interest was compounded half-yearly for the first one year and in the next year it was compounded annually. What will be the total interest earned at the end of two years?
(a) Rs. 3157.5 (b) Rs. 2127.5 (c) Rs. 1050 (d) Rs. 1905.5 (e) NOT

12. A loan is discharged in three equal installments of Rs. 133.10 each. If the rate of interest is 10%, find the amount of loan?
(a) Rs.100 (b) Rs. 331 (c) Rs. 1231 (d) Rs .1331 (e) Rs. 1431

13. A certain sum doubles in two years under compound interest at a certain rate of interest. In how many years would a sum becomes 16 times itself at the same rate of interest again under compound interest?
(a) 2 years (b) 6 years (c) 10 years (d) 15 years (e) NOT

14. Divide Rs. 3903 between A and B, so that A's share at the end of 7 years may be equal to B' share at the end of 9 years, compound interest being at 4%:

(a) Rs. 2300, Rs. 1303 (b) Rs. 1000, Rs. 2903 (c) Data inadequate (d) Rs. 2028, Rs. 1875 (e) NOT

15. Raj borrowed Rs. 20000 partly from a friend at 12 % SI and remaining from a bank at 15 % SI. At the end of 2 years, he paid back an amount of Rs. 25700. What is the amount borrowed from the bank?
(a) Rs. 10000 (b) Rs. 12000 (c) Rs. 16000 (d) Rs. 25000 (e) Rs. 15000

16. Ravi bought a car for Rs. 600000. He paid Rs. 100000 cash down and the rest at the end of 2 years at the rate of 15 % SI. Hoe much more did he pay?
(a) Rs. 150000 (b) Rs. 300000 (c) Rs. 200000 (d) Rs. 100500 (e) NOT

17. Which of the following is the best investment for Rs. 30000?
(a) 12% at SI for 4 years (b) 11% CI for 2 years (c) 15% SI for 2 years (d) either (a) or (b) (e) None of these

18. What are the least complete years in which a sum of money put at 20 % compound interest will be more than doubled?
(a) 2 years (b) 3 years (c) 5 years (d) 4 years (e) NOT

19. If x, y and z are three sums of money such that y is the simple interest on z and z is the simple interest on x for same rate of interest and for same period, then the relation between x, y and z is?
(a) $z = x/y$ (b) $x^2 = z*y$ (c) $x = z = y$ (d) $y = z*x^2$ (e) $z^2 = x*y$

20. Raj borrowed some money at the rate of 6% p.a. for the first three years, 9 % p.a. for the next five years and 13 % p.a. for the period beyond 8 years. If the total amount interest paid by him at the end of eleven years is Rs. 8160, how much money did he borrow
(a) Rs.8000 (b) Rs. 7500 (c) Rs. 6500 (d) Rs .8500 (e) Rs. 10000

21. A certain amount earns simple interest of Rs. 1120 after 8 years. Had the interest 3% more, how much more interest would it have earned?
(a) 3% (b) data inadequate (c) 5% (d) 5.6% (e) NOT

22. Mary borrowed Rs. 960 from John at 12% p.a. SI for 6 years. He then added some more money to the borrowed sum and lent it to Peter at 14 % p.a. If Mary gains Rs. 200 in the whole transaction, how much money did he add from his side?
(a) Rs. 1061 (b) Rs. 101 (c) Rs. 1205 (d) Rs. 1000 (e) Rs. 981

23. What interest will he had on Rs. 450 in 2 years, if an interest of Rs. 0.80 is charged on Rs. 2 for 4 years?
(a) Rs. 150 (b) Rs. 110 (c) Rs. 90 (d) Rs. 50 (e) Rs. 80

24. The simple interest accrued on a sum of money is Rs. 1200 in 4 years at the rate of 8%.what will be the compound interest on thrice that of the principal at the rate of 6 % in 3 years?
(a) Rs. 3145.6 (b) Rs. 1340.8 (c) R.s 1980.7 (d) Rs. 2148.93 (e) NOT

25. Abhishek invested Rs. 3000 into two parts in such a way that if one part be put at 5% SI and other at 6 % the yearly income may be Rs. 180. How much did he invest at 6%?
(a) Rs. 1550 (b) Rs. 180 (c) Rs. 1200 (d) data inadequate (e) NOT

26. An amount of Rs. 70000 becomes Rs. 80000 in 5 years at a certain rate of interest. If the rate becomes 1.5 times of itself, the amount of the same principle in 5 years will be.
(a) Rs. 80000 (b) Rs.85000 (c) Rs. 75000 (d) data inadequate (e) NOT

27. Ravi invested an amount for 2 years at the rate of 15 % at simple interest per annum. Had the interest been compounded, he would have earned Rs. 450 more as interest. What was the amount invested?
(a) Rs. 440 (b) Rs. 450 (c) Rs. 430 (d) Rs. 420 (e) Rs. 390

28. What amount installment will discharge a debt of Rs. 1680 due in 3 years at 12 % simple interest?
(a) Rs.500 (b) Rs. 325 (c) Rs. 525 (d) Rs. 530 (e) NOT

29. Divide Rs. 2400 in three part such that amounts after 2, 3 and 4 years respectively may be equal, the rate of interest being 4% per annum at simple interest. The third part is:
(a) Rs. 830 (b) Rs. 770 (c) Rs. 780 (d) Rs. 850 (e) Rs. 790

30. John borrowed some money at the rate of 5% p.a. for the first three years, 7 % p.a. for the next four years and 10 % p.a. for the period beyond seven years. If the total amount interest paid by him at the end of eleven years is Rs. 9296, how much money did he borrow?
(a) Rs.11025 (b) Rs. 11200 (c) Rs. 10000 (d) Rs. 12025 (e) NOT

31. The price of a washing machine worth Rs. 20,000 is to be paid in 20 installments of Rs. 1000 each. If the rate of interest be 6% per annum and the first installment be paid at the time of purchase, then the value of the last installment covering the interest as well will be:
(a) Rs.1215 (b) Rs.2200 (c) Rs.1350 (d) Rs.1050 (e) NOT

32. Radhika lent out a certain sum of money on simple interest and the same sum on compound interest at a certain rate of interest per annum. He noticed that the ratio between the difference of compound interest and simple interest of 4 years and that of 2 years is 15:8. The rate of interest per annum is:
(a) 4.5% (b) 20.3% (c) 40/3% (d) 24/7% (e) 56/9%

33. A man lent out some part of money at 5% rate of interest in compound interest compounded quarterly for four and half years. What will be the interest if the same amount is invested at simple interest at double rate of interest and thrice the time period?
(a) Rs. 10.3% (b) 15.5% (c) 7% (d) data inadequate (e) NOT

34. What will be the principal if it invested at same rate of interest of 10% for 4 years and 5 years respectively yielding interest as Rs.40 and Rs. 50 respectively?
(a) Rs.200 (b) Rs.100 (c) Rs.150 (d) Rs.125 (e) Rs.135

35. A sum of money is invested at simple interest at 14% per annum which becomes double in 4 years. In what year it will become 7 times of it?
(a) 24 years (b) 20 years (c) 15 years (d) 18 years (e) NOT

36. Ron whose income is 400000 per annum invested a sum of money at 15% per annum for 5 years at SI; the amount he received is reinvested at compound interest at the rate of 20% for 10 years. What is the total amount if he invests 25% of his monthly salary?
(a) Rs. 90296.15 (b) Rs. 98067.5 (c) Rs. 98000 (d) Rs. 96056 (e) NOT

37. What annual payment will discharge a debt of Rs. 3810 due in a year at 50/3 % per annum compound interest?
(a) Rs.1210 (b) Rs. 1710 (c) Rs. 1540 (d) Rs. 3410 (e) NOT

38. A man lends Rs. 30000 in four parts. If he gets 8% on Rs. 6000; 7.5% on Rs 12000 and 0.5 % on Rs. 2500; what % must he get for remainder, if his average annual interest is 8.6%?
(a) 10% (b) 15% (c) 12% (d) 12.5% (e) NOT

39. An amount of Rs. 50000 is invested in two parts. The first yields an interest of 9% p.a. and the second, 11% p.a. if the total interest at the end of one year is 9.75%, then the amount invested in latter parts is?
(a) Rs. 28500 (b) Rs. 52050 (c) Rs. 43750 (d) Rs. 45000 (e) Rs. 23560

40. A sum of money lent at compound interest for 2 years at 20 % per annum would fetch Rs. 482 more, if the interest was payable half-yearly than if it was payable annually. The sum is:
(a) Rs. 14000 (b) Rs. 12000 (c) Rs. 150000 (d) Rs. 100000 (e) Rs.20000

Direction: each of the questions below consists of a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statements are sufficient to answer the question. Read both statements and give answer as
(a). if the data in statement I is alone sufficient to answer the question
(b). if the data in statement II is alone sufficient to answer the question
(c). if the data in both the statements together is necessary to answer the question
(d). if the data in either statements is sufficient to answer the question.
(e). if the data in both the statements is not sufficient to answer the question.

41. What is the rate of interest p.c.p.a?
I. The difference between the compound interest and simple interest on an amount is Rs. 1060 at the end of 2 years.
II. An amount doubles itself in 5 years with simple interest.

42. What is the rate of interest on an amount of Rs. 12000 deposited in the bank?
I. The simple interest for two years is Rs. 3000.
II. The difference between the simple interest and compound interest for 2 years is Rs. 180.

43. What would be the difference between the simple interest and the compound interest on a sum of money at the end of 5 years?
I. The sum fetches a total interest of Rs. 2000 as simple interest at the end of 8 years.
II. The difference between the SI and CI at the end of 2 years is Rs.15.

44. A sum of money is put at SI and CI both, what is the difference in rate of interest?
I. SI obtained is Rs. 60.
II. CI obtained is Rs. 65.

45. A sum of money is placed at compound interest. In how many years will it amount to sixteen times of itself?
I. The sum doubles itself in 4 years.
II. The sum amounts to 8 times in 12 years.

46. How much money did Pankaj invest?
I. The sum invested gets doubled, when invested at 10 % per annum for 15 years.
II. The period of investment is 5 years.

47. What is the principal sum?

I. Ratio of SI and CI of same principal, rate of interest and time is 4:5.
II. SI is Rs. 45 for 2 years at the rate of 2%.

48. In how many years will a sum of money put at simple interest treble itself?
I. Rate of interest is 16%.
II. Interest earned in 4 years is half the sum.

49. What will be the ratio of interest of money invested in SI and CI?
I. CI on certain sum for 4 years is Rs. 30.
II. SI on certain sum for 5 years is half the CI for the same.

50. What is the total amount earned by a man investing half of its salary in SI at the rate of interest 5% for 1 year and half of the remaining amount at CI?
I. Rate of interest of CI is 4%.
II. After investment amount remained is Rs. 10000.

SOLUTION AND EXPLANATION OF SIMPLE INTEREST & COMPOUND INTEREST

1. (a)

$$\frac{P * 18 * 4}{100} = \frac{P * 22 * 2}{100} + 427$$

On solving we get P = Rs. 122000

2. (c)

Let the sum be X invested in scheme A

Then as per question, $X\left(1 + \frac{20}{100}\right)^2 = 2 * \frac{X - 1600 * 3 * 10}{100}$

Then X = 6000

Sum invested in scheme B is 4400.

3. (e)

$X = \frac{482.40 * 100}{6 * 3} = 2680$

Interest on 2680-680=Rs.2000 is $2000\left(1 + \frac{10}{100}\right)^2 - 2000 = Rs.420$

4. (c)

Let the principal be P,

Then $\frac{P * 2 * 12}{100} + P + \frac{P * 2 * 9}{100} + P = 19360$

On solving we get P = 8000

5. (b)

$$\frac{sum * 8 * 4}{100} = 8384$$

Then sum is Rs. 26200

$$\frac{26200 * 4 * r}{100} + 26200 = 39562$$

Then rate = 12.75%

6. (d)

According to question,

$\frac{\left(\frac{P*5*12}{100}+P\right)*5*12}{100} = 780 + P$

On solving we get P as Rs. 850

7. (a)

$22000\left(1+\frac{r}{100}\right)^2 - 22000 = 5596.8, then\ r = 12\%$

SI will be 22000 * 12* 2/100 = Rs. 5280

8. (c)

Rate of interest = 15300 * 100/(45000*4) = 8.5%.

CI will be $45000\left(1+\frac{\frac{8.5}{8}}{100}\right)^{32} = 18109.34 \cong 18109$

9. (b)

Amount received by Ravi is 45588

Amount received by David is 54000

Total amount = 99588

Interest= $99588(1+\frac{3}{100})^{2\circ}$ -99588 = 80279.

10. (a)

After four years, 7.5 * 1* P / 100 = 3375,

P = 45000.

11. (b)

After first investment amount = 11025,

Then interest after second investment=11025(1+10/100)-11025 = Rs. 2127.5.

12. (b)

$133.1 = \frac{amount}{\left(1-\frac{100}{110}\right)^3} * \frac{10}{100}$

On solving we get amount = Rs. 331.

13. (b)

$P\left(1+\frac{r}{100}\right)^x = 2P$

Let $1 + r/100) \cong R$

Then $R^x = 2$

Also $P\left(1+\frac{r}{100}\right)^n = 8P$

$\left(1+\frac{r}{100}\right)^n = 2^3$

$or\ R^n = 2^3$

$R^n = (R\text{^}2)^3$

$n \cong 3$

14. (d)

Let the share of A be X,

$$\frac{X}{3903-X}=\left(1+\frac{4}{100}\right)^2$$

$then\ X = Rs.2028$

Rs.3903-Rs.2028 = Rs.1875 invested in scheme B.

15. (e)

$$\frac{12*2*x}{100}+\frac{(20000-x)*15*2}{100}=25700$$

On solving we get x = 5000, so the amount borrowed from bank = Rs. 15000

16. (a)

$$\frac{500000*2*15}{100}=150000$$

17. (a)

On solving each we get that option (a) yield more interest.

18. (d)

$$P\left(1+\frac{20}{100}\right)^x>2P$$

$\left(1+\frac{6}{5}\right)^x>2$, Approximately x = 4 years.

19. (e)

According to question, z*r*t/100 =y and z = x*r*t/100

Then relationship between x, y and z is $z^2=x*y$

20. (a)

$$\frac{x*6*3}{100}+\frac{x*9*5}{100}+\frac{x*13*3}{100}=8160$$

On solving we get x = Rs. 8000.

21. (b)

$$\frac{P*r*8}{100}=1120$$

P* r = 14000

Two quantities are unknown, so data inadequate.

22. (a)

Interest = $\frac{960*12*6}{100}=691.2$

Total gain in whole transaction = 200,

Interest that Mary have while lending money to Peter = 691.2+200=891.2.

Total amount = 1061

23. (c)

$$0.8=\frac{2*r*4}{100}$$

Then rate = 10%

$\frac{450 * 2 * 10}{100} = Rs.90$

24. (d)
Principal on whom SI accrued is Rs. 1200 is Rs. 3750.
Then CI = $11250\left(1+\frac{6}{100}\right)^3 - 11250 = Rs.2148.93$

25. (d)
$\frac{x * y * 5}{100} + \frac{(3000-x) * 6 * y}{100} = 180$
Two quantities are unknown, so data inadequate.

26. (b)
Rate = $\frac{10000*100}{5*70000} = \frac{20}{7}\%$
New rate = 30/7%
Amount = 70000+ (70000*30/7*5)/100=Rs. 85000

27. (a)
$\frac{P * 15 * 2}{100} + 450 = P\left(1+\frac{15}{100}\right)^2$
$P = Rs.440$

28. (a)
Let P be the annual installment,
$\left(P + \frac{P * 12 * 1}{100}\right) + \left(p + \frac{p * 12 * 2}{100}\right) + p = 1680$
On solving we get P = Rs. 500

29. (a)
Let first part be X and second part be Y then third part = 2400-X-Y
$\left(X + \frac{X * 2 * 4}{100}\right) = \left(Y + \frac{Y * 3 * 4}{100}\right) = (2400 - X - Y) + \frac{(2400 - X - Y) * 4 * 4}{100}$
On solving we get Y = Rs. 770.7
Third part = Rs. 830

30. (b)
$\frac{x * 5 * 3}{100} + \frac{x * 7 * 4}{100} + \frac{x * 4 * 10}{100} = 9240$
On solving we get x = Rs. 11200.

31. (b)
Amount left after first installment = Rs. 19000
Each amount of installment = Rs. 1000.
Interest which is to be paid with each installment = (100*6*20)/100 = 1200
Total amount to be paid = Rs. 2200.

32. (c)

$$\frac{SI}{CI} = \frac{15}{8}$$

$$\frac{\frac{P * R * T}{100}}{P\left(1 + \frac{R}{100}\right)^{T} - P} = \frac{15}{8}$$

On putting the value of T =2 and solving the above equation we get R = 40/3%.

33. (d)
Incomplete data, so data inadequate.

34. (b)

$$principle = \frac{interest\ difference * 100}{rate * time\ difference} = \frac{10 * 100}{10 * 1} = 100$$

35. (a)

$$T2 = \frac{N2 - 1}{N1 - 1} * T1$$

On using the above equation, T2 = 24 years.

36. (a)
Monthly payment =Rs. 100000/3
Amount invested = 25% of Rs. 100000/3= Rs. 25000/3
Interest = $\frac{25000 * 15 * 5}{3 * 100} = Rs.6250$
New interest = $\left(\frac{43750}{3} * \left(1 + \frac{20}{100}\right)^{10}\right) = Rs.43750$

37. (b)
Let each installment be x

$$\frac{x}{(1 + \frac{50}{3 * 100})} + \frac{x}{\left(1 + \frac{50}{3 * 100}\right)^{2}} + \frac{x}{\left(1 + \frac{50}{3 * 100}\right)^{3}} = 3810$$

Then x= Rs.1710.

38. (d)
Total interest yield on Rs. 50000 = Rs. 2580
Interest yield from other = Rs. 1392.5
Interest required from remaining = Rs. 1187.5
Rate of interest needed= 12.5%

39. (c)
Let the first part be x,

$$\frac{x * 11 * 1}{100} + \frac{(50000 - x) * 9 * 1}{100} = \frac{9.75 * 50000}{100}$$

Then x = Rs. 6250
The amount invested in 11% interest = Rs. 43750

40. (e)
Let P be the sum of money,

$P\left(\left(1+\frac{10}{100}\right)^4-1\right)=482+P\left(\left(1+\frac{20}{100}\right)^2-1\right)$

On solving P = Rs. 20000

41. (b)

From statement I: $P\left(\left(1+\frac{R}{100}\right)^2-1\right)-\frac{P*R*2}{100}=1060$

From statement II: $\frac{P*R*5}{100}=P, R=20\%$

42. (a)

From statement I: $\frac{12000*R*2}{100}=3000, R=12.5\%$

From statement II: $P\left(\left(1+\frac{R}{100}\right)^2-1\right)-\frac{P*R*2}{100}=180$

43. (c)

From statement I: P*R=25000

From statement II: $P\left(\left(1+\frac{R}{100}\right)^2-1\right)-\frac{P*R*2}{100}=15$

On solving both equations we get R

44. (e)

From statement I: SI=Rs.60

From statement II: CI=Rs. 65

We cannot find the interest as no other information is given.

45. (d)

From statement I: $P\left(1+\frac{R}{100}\right)^4=2P, \left(1+\frac{R}{100}\right)^4=2$

From statement II: $P\left(1+\frac{R}{100}\right)^{12}=8P, \left(1+\frac{R}{100}\right)^{12}=8$

Either using (a) or (b) we can get the desired result.

46. (e)

From statement I: p*10*15/100 = p, incorrect statement

From statement II: time =5

47. (b)

From statement I: data inadequate

From statement II: 45*100/ (2*2)

48. (c)

From statement I: r=16%

From statement II: interest earned in 4 years = sum/2

On combining both statements we get desired result.

49. (b)

From statement I: CI= Rs.30

From statement II: SI/CI = 1/2

50. (c)
From statement I: let the amount invested be x
Also x/2 is invested in SI and x/4 is invested in CI, total amount = 13/50x
From statement II: x/4 = 10000, x =40000.
On combining both statements we get the required result.

PROBABILITY

1. There are two bags A and B, bag A contains 6 red balls and 10 green balls and ball B contains 4 red balls and 6 green balls. One bag is selected at random; from the selected bag one ball is drawn at random. What is the probability that the ball drawn is red?
(a) 31/80 (b) 1/4 (c) 5/13 (d) 33/65 (e) 23/60

2. An urn contains 10 black and 5 white balls. Two balls are drawn from the urn one after the other without replacement. What is the probability that both drawn balls are black?
(a) 1/5 (b) 4/7 (c) 3/7 (d) 3/4 (e) 2/3

3. John played a game where 5 dice are thrown, what is the probability of rolling not even one pair with 5 dice?
(a) $\frac{5!}{6^4}$ (b) $\frac{4!}{6^2}$ (c) $\frac{3!}{4^2}$ (d) $\frac{5!}{6}$ (e) NOT

4. The letters H, I, I, N and D are written on a slip of paper. The five slips of paper are placed in a hat. The slips are then selected one at a time from the hat, what is the probability that the order in which they are chosen spells HINDI?
(a) 1/60 (b) 1/120 (c) 1/15 (d) 1/90 (e) 1/30

5. A committee of 3 members is to be selected out of 3 men and 2 women. What is the probability that the committee has at least one woman?
(a) 27/130 (b) 12/25 (c) 9/10 (d) 20/33 (e) 14/25

6. A box contains 2 red caps and 4 blue caps and 5 green caps, if two caps are picked then what is the ratio of the probability that both are blue and probability that at least one is red?
(a) 2/3 (b) 1/4 (c) 5/11 (d) 4/11 (e) 1/3

7. What is the probability that the leap year selected at random will contains 53 Saturday?
(a) 1/7 (b) 1/2 (c) 6/7 (d) 2/7 (e) NOT

8. A bag contains 4 red balls, 6 white balls, 8 green balls and 10 black balls. If one ball is drawn at random, find the probability that it is black.
(a) 5/14 (b) 8/27 (c) 3/29 (d) 2/15 (e) NOT

9. Ron throws a dice 6 times, what is the probability of rolling a 6 on all five dice?
(a) $\frac{1}{6^6}$ (b) $\frac{3!}{6^6}$ (c) $\frac{1}{5^6}$ (d) $\frac{1}{6^1}$ (e) 6

10. There are 10 females and 8 males prepared to work in a committee. What is the probability that there are exactly three females on the committee?

(a) 1/8 (b) 2/9 (c) 3/10 (d) data inadequate (e) NOT

11. A couple plans to have five children, what is the probability that they will have 3 boys and 2 girls?
(a) 5/16 (b) 4/19 (c) 3/5 (d) 2/17 (e) NOT

12. A bag contains 50 tickets numbered from 1 to 50. Two tickets are drawn at random. What is the probability that both numbers are prime?
(a) 6/71 (b) 3/35 (c) 4/35 (d) data inadequate (e) NOT

13. A bag contains 7 blue balls and 8 yellow balls. If two balls are drawn randomly, then find the probability of no ball being yellow.
(a) 63/121 (b) 65/132 (c) 35/132 (d) 123/155 (e) 54/173

14. In a bag there are 6 red balls and 9 green balls. Two balls are drawn at random, what is the probability that at least one of the balls drawn is red?
(a) 23/124 (b) 6/17 (c) 317/455 (d) 321/456 (e) 231/314

15. One card is drawn from a pack of 52 cards. What is the probability of getting neither a king nor a heart card?
(a) 4/13 (b) 2/39 (c) 1/13 (d) 1/4 (e) 4/13

16. In a class, 30 % of the students offered English, 20% offered Hindi and 10 % offered both. If a student is selected at random, what is the probability that he has offered English or Hindi?
(a) 2/5 (b) 2/3 (c) 3/2 (d) 3/10 (e) NOT

17. From a pack of 52 cards, two cards are drawn together at random. What is the probability of both the card being kings?
(a) 1/221 (b) 1/13 (c) 2/169 (d) 2/13 (e) NOT

18. In a lottery, there are 10 prizes and 25 blanks. A lottery is drawn at random. What is the probability of getting a prize?
(a) 1/10 (b) 5/7 (c) 3/7 (d) 2/7 (e) 5/9

19. A man and his wife appear in an interview for two vacancies in the same post. The probability of husband's selection is 1/7 and the probability of wife's selection is 1/5. What is the probability that only one of them is selected?
(a) 1/3 (b) 1/35 (c) 2/7 (d) 1/25 (e) 1/49

20. A speaks truth in 75% cases and B in 80% of the cases. In what percentage of cases are they likely to contradict each other, narrating the same incident?
(a) 25% (b) 32 % (c) 35% (d) 40% (e) NOT

21. Four whole numbers taken at random are multiplied together. The chance that the last digit in the product is 1, 3, 7 or 9 is:
(a) 16/625 (b) 14/625 (c) 16/525 (d) data inadequate (e) NOT

22. When two dice are thrown , the probability that the difference of the number on the dice is 2 or 3 is:
(a) 23/36 (b) 7/18 (c) 1/9 (d) 1/4 (e) 1/2

23. A number is chosen at random among the first 120 natural numbers. The probability of the numbers chosen being a multiple of 5 or 15 is:
(a) 1/4 (b) 7/120 (c) 55/60 (d) 1/5 (e) NOT

24. In a shuffling a pack of 3 are accidently dropped then the chance that missing card should be of different suit is:
(a) 169/425 (b) 123/425 (c) 1/ 52 (d) 1/13 (e) 17/169

25. If the probability of machine failing in a day is 0.95 the probability of its working for four consecutive days without failing is:
(a) 0.05 (b) 0.05^2 (c) (0.05) ^4 (d) 5 (e) 1

26. If n integers taken at random are multiplied together then the probability that the last digit of the product is 2, 4, 6, 8 is :
(a) $\frac{4^n-2^n}{5^n}$ (b) $\frac{4^n-2^2}{5^n}$ (c) $\frac{4^n-2^n}{5^{n+1}}$ (d) $\frac{4^n-2^n}{5^n+1}$ (e) NOT

27. The probability of occurrence of a multiple of 2 on a dice and a multiple of 3 on the other dice, if both are thrown together is :
(a) 1/3 (b) 4/3 (c) 5/24 (d) 9/37 (e) NOT

28. Seven black balls and three white balls are randomly placed in a row. The probability that no two black balls are placed adjacently equals-
(a) 1/24 (b) 13/120 (c) 7/15 (d) 8/15 (e) NOT

29. 10 persons are seated at round table. What is the probability that two particular persons sit together?
(a) 3/9 (b) 2/9 (c) 1/9 (d) 4/9 (e) 4/7

30. The probability that a teacher will give one surprise test during any class meeting in a week is 1/5. If a student is absent twice. What is the probability that he will miss atleast one test?
(a) 1/15 (b) 2/11 (c) 4/17 (d) 3/4 (e) 1/15

Direction: study the following data and answer the following questions:
A box contains 2 blue caps, 4 red caps, 5 green caps and 1 yellow cap.

31. If two caps are picked at random, what is the probability that atleast one is red?
(a) 19/33 (b) 2/15 (c) 9/11 (d) 17/33 (e) NOT

32. If two caps are picked at random, what is the probability that both are blue?
(a) 1/36 (b) 1/66 (c) 1/45 (d) 1/24 (e) NOT

33. If one cap is picked at random, what is the probability that it is either blue or yellow?
(a) 1/36 (b) 2/19 (c) 3/17 (d) 4/19 (e) ¼

34. If four caps are picked at random, what is the probability that none is green?
(a) 3/125 (b) 5/44 (c) 7/99 (d) 8/99 (e) NOT

35. If three caps are picked at random, what is the probability that two are red and one is green?
(a) 3/22 (b) 6/11 (c) 4/11 (d) 5/22 (e) 7/22

Direction: study the following data and answer the following questions:
A bag contains some white balls and some red balls. The probability that two balls drawn is of same color is 7/15 and the probability when one balls are drawn the probability of getting white ball is ½.

36. What is the ratio of number of white balls to red balls?
(a) 1:1 (b) 2:1 (c) 4:1 (d) 4:3 (e) NOT

37. What is the probability when two balls are drawn and neither of them is of same color?
(a) 7/15 (b) 8/15 (c) 3/5 (d) 2/15 (e) 11/15

38. What is the probability that a ball drawn from the bag is red?
(a) 3/4 (b) 1/2 (c) 3/5 (d) 1/3 (e) NOT

39. If three balls are drawn, what is the probability that all is of same color?
(a) 1/4 (b) 1/5 (c) 1/3 (d) 2/3 (e) 4/5

40. If two balls are drawn at random, what is the ratio of probability of drawn ball is of white color to red color?
(a) 2:3 (b) 4:3 (c) 3:4 (d) 1:1 (e) NOT

Direction: study the following data and answer the following questions:
There are two boxes A and B containing 20 balloons each of three colors red, pink and yellow. The probability of picking a red balloon from both boxes is ¼. The probability of picking a pink balloon in box A is 1/10. The probability of picking a yellow balloon is box B is 9/20. Also the ratio of yellow balls in boxes A and B is 4:3.

41. What is the total number of red and pink balloon?
(a) 20 (b) 19 (c) 14 (d) 15 (e) 18

42. What is the ratio of probability of picking red balloon from box A and yellow balloon from box B?
(a) 3:2 (b) 4:5 (c) 2:1 (d) 2:3 (e) 1:2

43. How many yellow balloons are there in box A?
(a) 15 (b) 9 (c) 6 (d) 4 (e) 12

44. What is the probability of picking a Red balloon in box A?
(a) 3/10 (b) 4/9 (c) 5/11 (d) 7/10 (e) 1/2

45. What is probability of picking two balloons of same color from box B?
(a) 45/181 (b) 23/190 (c) 63/190 (d) 34/191 (e) NOT

Direction: each of the questions below consists of a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statements are sufficient to answer the question. Read both statements and give answer as
(a). if the data in statement I is alone sufficient to answer the question
(b). if the data in statement II is alone sufficient to answer the question
(c). if the data in both the statements together is necessary to answer the question
(d). if the data in either statements is sufficient to answer the question.
(e). if the data in both the statements is not sufficient to answer the question.

46. What is the probability of picking two balls of same color?
I. There are total 15 balls in a bag.

II. There are 4 red and 5 blue balls in a bag.

47. What is the probability that both numbers are not prime?

I. A bag contains 19 tickets numbered from 1-19.

II. The last ticket number is 15 more than first ticket number.

48. What is the probability when two caps are drawn and neither of them is of same color?

I. A box contains 1 blue caps, 4 red caps and 1 yellow cap.

II. A box contains 3 blue, 4 red and 5 yellow caps.

49. What is the probability of drawing both the card being kings?

I. Only Red colored cards are shuffled.

II. Only black colored cards are shuffled.

50. What is the probability that only one is selected after interview?

I. Total candidate is 20.

II. Probability of candidate clearing the written exam is ½.

SOLUTION AND EXPLANATION OF PROBABILITY

1. (a)

Bags A contains 6 red and 10 green balls
Probability to draw 1 red ball = 6C1/16C1 = 6/16 = 3/8
Bag B contains 4 red an 6 green balls
Probability to draw 1 red ball = 4C1/10C1 = 4/10 =2/5
Probability to select 1 bag = ½
Hence the required probability = ½(3/8+2/5) = 31/80

2. (c)

Probability that both balls drawn be black = 10C2/15C2 = 10*9/(15*14) = 3/7

3. (a)

The sample space when all dice are different are- (1, 2, 3, 4, 5), (1, 2, 3, 4, 6), (1, 2, 3, 5, 6), (1, 2, 4, 5, 6), (1. 2. 4. 5. 6), (1, 3, 4, 5, 6) and (2, 3, 4, 5, 6).
For each set numbers can be arranged in 5! Ways
Therefore the numbers of way is 6 * 5!
Probability = (6*5!)/ 6^5
=5! /6^4.

4. (a)

There are 5! Arrangement of the 5 letters:, total sample = 5!
Probability = 1/5! = 1/120
But there are two identical alphabet, so probability = 2/120 = 1/60.

5. (c)

Case.1- when 1 woman is selected,
Probability = (2C1*3C2)/5C3 = 3/5
Case.2- when there is 2 women and 1 man
Probability = (2C2*3C1)/ 5C3 = 3/10
Required probability = 3/5 + 3/10 = 9/10

6. (e)

$$ratio = \frac{probability\ that\ two\ ball\ drawn\ is\ blue}{probabilty\ that\ atleast\ one\ is\ red} = \frac{\frac{4C2}{11C2}}{\frac{2C1 * 9C1}{11C2}} = \frac{1}{3}$$

7. (d)
Total days in a leap year= 366 days= 52 weeks 2 days
For 53rd Saturday there are two favourable cases from 7 possible cases

Fri	sat	2 favourable cases
Sat	sun	
Sun	Mon	
Mon	Tues	
Tues	wed	
Wed	Thurs	
Thurs	Fri	

Required probability = 2/7

8. (a)
Required probability = $\frac{10C1}{28C1} = \frac{5}{14}$

9. (a)
The probability of rolling 6 on a single time= 1/6
Probability of rolling 6 in a throw of dice 6 times = $\frac{1}{6^6}$

10. (d)
Probability cannot be determined as there is no data that provide the information about how many members should be there in the committee.

11. (a)
Possible arrangement = B B B G G
Number of outcomes= 5! / (3!*2!)=10
The couple plans to have 5 children, in each case there is 2 possibility= 2*2*2*2*2 = 32
Probability = 10/32 = 5/16

12. (b)
Total prime numbers present between 1- 50 = (2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47)= 15
Probability = 15C2/50C2 = 3/35

13. (c)
Sine ball drawn should not be yellow, means all balls should be blue
Required probability = $\frac{7C2}{15C2} = \frac{35}{132}$

14. (e)
Case.1- one ball is red and one ball is green
Probability = $\frac{6C1*9C1}{15C2} = 54/105$
Case.2- both balls are red
Probability = $\frac{6C2}{15C2} = 30/105$
Required probability = 54/105 + 30/105 = 28/35

15. (a)

Probability of not getting a king nor a heart = 16C1/52C1 = 4/13

16. (a)
Probability of student offered English = 30/100 =3/10
Probability of student offered Hindi = 20/100 =1/5
Probability of student offered both = 10/100 =1/10
Probability that student has offered Hindi or English = 3/10 +1/5 – 1/10 = 2/5

17. (a)
Probability that both the card being king = 4C2/52C2 = 1/221

18. (d)
Probability of getting a prize= 10C1/35C1 = 2/7

19. (c)
Probability of man's selection is 1/7
Probability of wife's selection is 1/5
Probability that any one of them is selected = probability of man's selection and not wife selection or probability of wife's selection not man
Then probability = $\left(\frac{1}{7} * \left(1 - \frac{1}{5}\right)\right) + \left(\frac{1}{5} * \left(1 - \frac{1}{7}\right)\right) = \frac{10}{35} = \frac{2}{7}$

20. (c)
Probability that A speaks truth is 75/100 = ¾
Probability that B speaks truth = 80/100 =4/5
Probability that A and B contradict each other = probability that A speaks truth and B tell lie or A tell a lie and B speaks truth.
Required probability = $\left(\frac{3}{4} * \left(1 - \frac{4}{5}\right)\right) + \left(\frac{4}{5} * \left(1 - \frac{3}{4}\right)\right) = \frac{7}{20} * 100 = 35\%$

21. (a)
If product of all these numbers (1, 3, 7 or 9) be at the end digits
Then there are 4^4 favourable cases
Total cases = 10^4
Hence the required possible cases = $\frac{4^4}{10^4} = \frac{16}{625}$

22. (b)
The total sample space = {(1, 3), (1, 4), (2, 4), (2, 5), (3, 1), (3, 5), (3, 6), (4, 1), (4, 2), (4, 6), (5, 2), (5, 3), (6, 3), (6, 4)} = total 14
Probability = 14/36 = 7/18

23. (d)
Total sample space = (5, 10,……..1200 = total 24 cases
Probability =24/120 =1/5

24. (a)
Total ways of selection = 52C3=22100
There are 4 suits and each one has 13 cards so selection = 4C3 * 13C1 * 13C1 * 13C1 = 8788
Required probability = 8788/22100 = 169/425

25. (c)
Probability of machine failing in a day = 0.95
Then probability of machine working in a day =1-0.95 = 0.05

Probability of machine working for 4 consecutive days= (0.05) ^4

26. (a)

According to the question, if the last digit in the product is 2, 4, 6 or 8 then the last digit in all n numbers should not be 0 and 5 and the last digit of all numbers should not be selected from (1, 3, 7 or 9).

Then favourable cases = 8^n – 4^ n

And the total space can have any of 10 numbers, so total space = 10^n

Therefore probability = $\frac{8^n-4^n}{10^n} = \frac{4^n-2^n}{5^n}$

27. a)

Probability of getting a multiple of 2 in one dice= 3/6 = ½

Probability of getting a multiple of 3 in another dice is 2/6 = 1/3

Probability when both dice is thrown together= 2*1/2*1/3 = 1/3

28. (c)

Since no two black balls are placed adjacent to each other, then we have to place white balls in between them so that no black ball is adjacently equal.

So then total number of alternate place is 8

Therefore there are 8 places to place white balls therefore no. of ways to place them = 8C3=56

The number of ways to place all balls = 10! / (7!*3!) = 120

Therefore required probability = 56/120 = 7/15

29. (b)

Total no. of ways to sit 10 person in a round table = (10-1)! = 9!

Since two person sit always together, so number of ways to sit will = (9-1)! = 8!

Also the no. of ways in which the two person sit = 2!

Therefore required probability = (8!*2!)/9! = 2/9

30. (a)

The probability of student absent = 2/6 = 1/3

The probability of teacher taking a surprise test = 1/5

Therefore the probability that he student will miss the test = 1/3 * 1/5 = 1/15

31. (a)

Probability $= \frac{4C1*8C1}{12C2} + \frac{4C2}{12C2} = \frac{16}{33} + \frac{1}{11} = \frac{19}{33}$

32. (e)

Probability = $\frac{2C2}{12C2} = \frac{1}{132}$

33. (e)

Probability = probability if it is blue +probability if it is yellow = $\frac{2C1}{12C1} + \frac{1C1}{12C1}$ =3/12 = ¼

34. (c)

Probability that none of the ball is green = $\frac{7C4}{12C4} = \frac{7}{99}$

35. (a)

Probability that two are red and one is green = $\frac{4C2*5C1}{12C3} = \frac{3}{22}$

36. (a)

Let total numbers of white ball be x and red balls be y

Then given, $\frac{xC2}{(x+y)C2} + \frac{yC2}{x+yC2} = \frac{7}{15}$---- (1)

Also xC1/(x+y) C1 = ½,

Then, x/x+y = ½, => x= y

Putting x= y in equation (1)
We get y= 8 and x= 8
So there are 8 white balls and 8 red balls
Ratio of white balls to red balls = 1:1

37. (b)
Probability = 8C1 * 8C1/16C2 = 8*8/(16*15) *2 = 8/15
38. (b)
Probability of ball drawn is red= 8C1/16C1 = 8/16 = 1/2
39. (b)
Probability= (8C3 +8C3)/16C3 = (56+56)/ 560 = 1/5
40. (b)
Ratio = $\frac{probability\ \ of\ ball\ \ drawn\ \ is\ red\ \ color}{probabuility\ \ \ ofball\ \ drawn\ \ is\ white\ color} = \frac{8C1}{8C1} = 1:1$
41. (b)
According to the question, probability of red balloons if both boxes taken together = ¼, total balls = 40
Then total red balloons in A and B = x/40 = ¼ => x = 10
Probability of pink balloons in box A = 1/10
Total balloons in A is 20, pink balloons in A = 2(2/20 = 1/10)
Probability of picking a yellow balloon in Box B is 9/20, total yellow balloon in box B = 9
Also ratio of yellow balloon in A and B =4:3
Yellow balloon in A /9 = 4/3, yellow balloon in A = 12.
Therefore there are (20-12-2) = 6 red balloons in box A
And in box B we have 9 yellow balloon, 4 red balloon and 20-9-4 = 7 pink balloons.
Total no. of red and pink balloons = 6+4+2+7 = 19.
42. (d)

Ratio = $\frac{probability\ \ \ of\ getting\ \ a\ red\ \ balloon\ \ \ from\ \ A}{probabilityof\ \ \ \ getting\ \ yellow\ \ \ balloon\ \ \ from\ \ box\ \ B} = \frac{\frac{6}{20}}{\frac{9}{20}} = \frac{6}{9} = \frac{2}{3}$
43. (e)
There are 12 yellow balloons in box A.
44. (a)
Probability of picking a red balloons in box A = 6/20 = 3/10
45. (c)
Probability of getting two same balloons = $\frac{4C2+7C2+9C2}{20C2} = \frac{63}{190}$
46. (b)
From statement I, total balls = 15
From statement II, probability = (4C2/9C2 + 5C2/9C2)
47. (a)
From statement I, total number between 1-19 which are not prime = 11, probability = 11/19
From statement II, last ticket number is 15 more than first ticket, it is not given the range of numbers
So statement (a) is sufficient.

48. (d)
From statement I, probability =
$(probability\ of\ one\ blue\ caps\ +\ one\ red) or\ (probability\ of\ one\ blue\ +$
$1\ yellow or\ probability\ of\ one\ yellow + one\ red$
From statement II, $(probability\ of\ one\ blue\ caps + one\ red) or\ (probability\ of\ one\ blue\ +$
$1\ yellow or\ probability\ of\ one\ yellow + one\ red$

49. (d)

From statement I, probability = $\frac{2C2}{26C2} = \frac{1}{13*25}$

From statement II, probability = $\frac{2C2}{26C2} = \frac{1}{13*25}$

50. (c)

From statement I, total candidate = 20

From statement II, probability of candidate clearing the written exam = ½

On combining both statement,

We have 10 candidates, who cleared the exam,

So the probability that only one of them is selected after interview = 10C1/20C1 = 10/20 = ½

PERMUTATION AND COMBINATION

1. At an election, three wards of a town are to be canvassed by 4, 5 and 8 men respectively. If there are 20 men, in how many ways they can be allotted to the different wards?

(a) 4!*5!*8!/20! (b) 1240 (c)20890 (d)20!/17! (e)not

2. In how many different ways can 4 boys and 3 girls be arranged in a row such that all boys stand together and all girls stand together?

(a) 288 (b) 144 (c) 56 (d) 64 (e) NOT

3. Out of 5 men and 3 women, a committee of 3 members is to be formed so that it has 1 woman and 2 men. In how many different ways can it be done?

(a) 24 (b)30 (c) 45 (d) 72 (e) 10

4. In how many different ways can the letters of the word LONELY be arranged, so that the vowels are at the two ends?

(a) 120 (b) 720 (c) 360 (d) 48 (e) 60

5. While packing for a business trip Rajesh has packed 3 pairs of shoes, 4 pants, 3 half-pants, 6 shirts, 3 sweater and 2 jackets. The outfit is defined as consisting of a pair of shoes, a choice of 'lower wear', a choice of 'upper wear' and finally he may or may not choose to wear a jacket. How many different outfits are possible?

(a) 240 (b) 3! (c) 5*3! (d) 2!*3! (e) 378

6. The number of ways in which the letters of the word CAPSULE can be rearranged so that the even places are always occupied by consonants is:

(a) 576 (b) 6! (c) 4!*2! (d) 3!*6 (e) NOT

7. The number of ways in which 20 different flowers of two colors can be set alternatively on a necklace, there being 10 flowers of each color is:

(a) 20! (b)10! * 10! (c) 20!*10 (d) 10!*2 (e) NOT

8. Calculate the number of ways a mixed double tennis player can be arranged, if there are a total of 9 couples and no couple plays in the same game?

(a) 1244 (b) 1512 (c) 1516 (d) 1412 (e) 2342

9. In how many different ways can the letter s of the word 'PRESENTEE' be arranged?
(a) 15120 (b) 9! (c) 9! /2 (d) 9! /3 (e) NOT

10. How many four letter distinct initials can be formed using the alphabets of English language such that the last of the four words is always a consonant?
(a) 26^2 (b) 26^3 (c) 26^3*21 (d) 26^2*21 (e) 26*21

11. Find the numbers of ways in which the first, second, fourth and seventh letter of word EXHIBITION can be arranged?
(a) 4! (b) 4! – 1! (c)5!-1 (d)5! +2 (e) NOT

12. Out of 5 women and 4 men, a committee of three members is to be formed in such a way that atleast one member is a woman. In how many different ways can this be done?
(a) 150 ways (b) 200 ways (c) 196 ways (d) 120 ways (e) 156 ways

13. In how many ways can the letters of the word 'RIDDLED' can be arranged?
(a) 70 ways (b) 35 ways (c) 81 ways (d) 720 ways (e)5040 ways

14. There are five comics numbered from 1 to 5. In how many ways can they be arranged, so that part-1 and part-3 are never together?
(a) 72 (b)25 (c) 36 (d) 64 (e) NOT

15. How many words of 4 consonant and 3 vowels can be made from 12 consonants and 4 vowels, if all the letters are different?
(a) 12C4*4C3*7! (b)12C3*7! (c) 14C2 *2! (d) 13P2*7! (e) NOT

16. In how many ways can seven friends be seated in a row having 40 seats, such that no to friends occupy adjacent seats?
(a) 40P7 (b) 40C2 (c) 35C2 (d) 36P7 (e) 36P7*2!

17. Find the total number of distinct vehicle numbers that can be formed using two letters followed by two numbers. Letters need to be different.
(a) 4500 ways (b) 54000 ways (c) 65000 ways (d) 12000 ways (e) 26!

18. How many words can be formed by rearranging the letters of the word ASCENT such that A and T occupy the first and last position respectively?
(a) 4! (b) 6! (c) 5!*2 (d) 4!*2 (e) NOT

19. Each of the letters A, H, I, M, O, T, U, V, W, X and Z appears same when looked at in a mirror. They are called symmetric letters. The other letters in the alphabet are asymmetric letters. How many three letter computer password can be made without repletion with atleast two symmetric letters?
(a) 12870 (b) 12! (c) 12! /2! (d) Data inadequate (e) NOT

20. How many integers, greater 999 but not greater than 4000, can be formed with the digit 0, 1, 2, 3 and 4, if repletion of digits is allowed?
(a) 346 (b) 376 (c) 456 (d) data inadequate (e) NOT

21. In how many rearrangement of the word AMAZED, is the letter 'E' positioned in between the 2 'A's?

(a) 60 (b) 120*2! (c) 720 (d) 120 (e) 150

22. In a group of students, there are 5 freshmen, 8 sophomores and 7 juniors in a football club. A group of 6 students will be chosen to compete in a completion. How many combinations of participating students are possible if the group has to consist of all exactly 3 freshmen?
(a) 4500 (b) 5650 (c) 7240 (d) 4550 (e) 4510

23. Find the number of ways in which 8064 can be resolved as the product of two factors?
(a) 48 (b) 12 (c) 30 (d) 28 (e) 24

24. In how many different ways the letters of the word 'DETAIL' be arranged in such a way that the vowels occupy only the odd positions?
(a) 5! (b) 36 ways (c) 4! (d) 5!*2! (e) 4!*2!

25. Which of the following is the value of r, if 6Pr = 360 and 6Cr = 15.
(a) 7 (b) 4 (c) 2 (d) 5 (e) NOT

26. A class photograph has to be taken. The frontrow consists of 6 girls who are sitting. 20 boys are standing behind. The two corner positions are reserved for the 2 tallest boys. In how many ways can the students be arranged?
(a) 18!*10 (b) 18!*10! (c) 18!*1440 (d) 10!*18 (e) NOT

27. If the letters of the word LABOUR are permuted in all possible ways and the words formed by the activity are arranged in a dictionary, then calculate the rank of the word LABORU.
(a) 105 (b) 241 (c) 240 (d) 120 (e) 242

28. In IPL, there are 153 matches played, every two team played one match with each other. The number of teams participating in the championship is:
(a) 18 (b) 35 (c) 20 (d) 19 (e) 16

29. Calculate the number of diagonals which can be drawn in a hexagon?
(a) 15 (b) 9 (c) 7 (d) 12 (e) 13

30. If there are two brothers among a group of 20 people. Calculate the number of ways in which the group can be arranged in a line so that they are always together?
(a) 18! (b)18!*1! (c) 3*18! (d) 18! / 3! (e) 19! * 2

31. In how many different ways the word' REPEAT' be arranged such that first and last position is held by R and T respectively?
(a) 24 ways (b) 120 ways (c) 60 ways (d) 40 ways (e) NOT

32. Calculate the number of ways in which 6 yellow balls and 6 red balls be arranged, such that each color group is always together?
(a) 12! (b) 10!*2 (c) 2!*6!*6! (d) 15! (e) 12!*18!

33. Calculate the number of 5 digit positive numbers, sum of whose digits is odd.
(a) 45000 (b) 23000 (c) 41000 (d) 13000 (e) 35000

34. How many alphabets need to be there in a language if one were to make 1 million distinct 3 digit initials using the alphabets of the language?
(a) 1000 (b) 10 (c) 1500 (d) 100 (e) NOT

35. When four dice are rolled simultaneously, in how many outcomes will atleast one of the dice shows 3?
(a) 120 (b) 24 (c) 671 (d) 501 (e) 162

36. How many words can be formed by using all letters of the word 'INHIBITION' so that vowels always come together?
(a) 10! (b) 3600 (c) 7200 (d)1800 (e) NOT

37. From a group of 7 men and 6 women, five persons are to be selected to form a committee so that at least 3 men are there on the committee. In how many ways can it be done?
(a) 120 (b) 150 (c) 140 (d) 105 (e) NOT

38. How many 3 digit can be formed from the digits 2, 4, 6, 8, 5, 7 and 1 which are divisible by 5 and none of the digits is repeated?
(a) 120 (b) 200 (c) 250 (d) 40 (e)30

39. Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?
(a) 210 (b) 25200 (c) 210*2! (d) 70 (e) NOT

40. In how many ways a committee, consisting of 5 women and 6 men can be formed from 8 men and 15 women?
(a) 8C2*2! (b)8C6 * 15C5 (c) 8C5*15C6 (d) cannot be determined (e) NOT

Direction: each of the questions below consists of a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statements are sufficient to answer the question. Read both statements and give answer as
(a). if the data in statement I is alone sufficient to answer the question
(b). if the data in statement II is alone sufficient to answer the question
(c). if the data in both the statements together is necessary to answer the question
(d). if the data in either statements is sufficient to answer the question.
(e). if the data in both the statements is not sufficient to answer the question

41. In how many ways letter of the word can be arranged?
I. The word is RECONCILATION.
II. The total alphabet of the digit is 12.

42. The ratio of arrangement of two words is?
I. First word is PRACTICAL.
II. Second word can be arranged in 60 ways.

43. Find how many alphabets are there in the word that is arranged in 180 ways?
I. The word is LEADER
II. The word has 3 same alphabets.

44. What is the value of r?
I. 10Cr = 1.
II. nPr =2.

45. In how many ways a committee of 6 members can be selected?
I. If 3 male members should be included.

II. If only 4 female members is to be included.

46. In how many ways a batch of 10 candidates can be selected for test?

I. There are total 56 candidates who filled the form.

II. Female candidate selected is 16.

47. In how many ways English and Hindi books are arranged?

I. Two books on Hindi may not be together.

II. There are 21 English and 19 Hindi books.

48. What is the value of n?

I. nPr = 1 and nC1 = 4.

II. nC1 = 1.

49. In how many different ways total students can be arranged?

I. There are total 4 boys and 3 girls in the group.

II. Arrangement is made such that all boys stand together and all girls stand together.

50. What is the ratio of ways of arrangement of two different words?

I. The ways of arranging the two words are 45 and 95.

II. First word is TAROT.

SOLUTION AND EXPLANATION OF PERMUTATION AND COMBINATION

1. (a)

The no. of ways so that 20 men can be allotted = 20!/4!*5!*8!

As after each allotment men get reduced.

2. (a)

BBBB GGG

No. of ways in which all girls stand together and all boys stand together = 2!*4!*3! = 288.

3. (b)

No. of ways of selecting 1 woman and 2 men = 3C1 * 5C2 = 30

4. (d)

There are 6 spaces in which both ends is to be filled by vowels, to arrange vowels there are2! Ways

The left 4 places can be filled by remaining alphabets in 4! Ways

So total no. of ways= 2! * 4! = 48

5. (e)

The no. of ways in which different outfit are possible = 3C1(shoes)*7C1(pants and half-pants)*9C1(shirts and sweater)*2C1(jackets) = 3*7*9*2 = 378

6. (a)

The no. of ways in which consonant occupies even place = 4!

The no. of ways in which odd places is filled is 4! , so total ways= 4! * 4! = 576

7. (b)

Total ways in arranging flowers of one color = 10!

Total ways in which flowers of another color is arranged = 10!

Therefore total ways to arrange whole flowers = 10! * 10!

8. (b)

No. of double tennis player =9C2 = 36

No. of ways of forming a mixed double tennis player so that no couple plays in the same game =7C2=21
Total ways = 2(it is said couple) * 21 * 36 =1512

9. (a)
Total no. of ways = 9! /4! (4 E is present) = 15120

10. (c)
No. of ways of selecting consonant in the last letter = 21
Other letters can be filled by either consonant or vowel so there are 26 ways
Therefore Total ways =26*26*26*21 = 26^3*21

11. (a)
The letters are E, X, I and T
So total no. of ways = 4!

12. (b)
Case.1- woman-1 and men=2
No. of ways = 5(woman) * 4(men) * 3(men) = 60
Case.2- 2 woman and 1 man
No. of ways= 5(woman) *4(woman) * 4(man)= 80
Case.3- all are woman
No. of ways = 5*4*3 = 60
Total ways = 60+80+60 = 200

13. (b)
No. of ways to arrange the word RIDDLED = 7! / 3! = 35

14. (a)
Total no. of ways in which 5 parts of comic can be arranged = 5! =120
Total no. of ways in which part-1 and part-3 are always together= 4!*2! = 48
Therefore total no. of ways = 120-48 = 72

15. (a)
The no. of ways to have 4 consonants and 3 vowels = 12C4 * 4C3
But to have letters all different no. of ways = 12C4 * 4C3 * 7!

16. (d)
Total no. of seat left after occupying by seven friends = 40-7 = 35
Therefore there are total 36 alternate seats.
Hence seven friends can be seated in 36C7 ways so that no two friend occupy adjacent seat

17. (c)
No. of ways to select 2 distinct alphabets from 26 = 26P2
Also there are total 10 digits so to select one number we have 10 ways and two select another number we have 10 ways
So there are total 10*10 = 100 ways to select numbers
Then combinations of letters and numbers = 26P2 *100 = 65000 ways

18. (a)

First and last letter is to be filled by A and T
Then only four letters are left
So there are 4! Ways to arrange the word.

19. (e)
Case.1- two symmetric and 1 asymmetric
No. of ways = 11C2*15C1= 825
Case.2- all symmetric
No. of ways = 11C3 = 165
Total ways to have 3 letter password = 3!*(825+165) = 5940

20. (b)
The first digit is 1000, a 4 digit number
And the last digit = 4000, the only 4 digit numbers to start with 4
There fore there are four digits in each integer, and first digit can be 1, 2 and 3
Second, third and fourth cab be 0, 1, 2, 3 and 4 i.e. 5 ways
So total ways = 3*5*5*5 = 375 +1 for 4000

21. (d)
The combination of both A and E is AAE, AEA & EAA
In each case only AEA have E in between which is one-third of all combinations
Total no. of ways of arranging the word is 6! / 2! = 360
Total ways to have E in between = 360/3 = 120

22. (d)
No. of ways of have exactly 3 freshmen = 5C3 * 15C3 = 4550

23. (e)
Total pairs is (1*064), (2*4032), (3*2688), (4*2016), (6*1344), (7*1152), (8*1008), (9*896),12*672), (14*576), (16 *504), (18*448), (21*884), (24*336), (28*288), (32*252), (36*224), (42*192), (48*168), (56*144), (63*128), (68*126), (72*112) and (84*96). = 24 ways

24. (b)
Vowels to occupy odd position, no. of ways= 3!
Other positions can fill in 3! Ways
Total no. of ways = 3!*3! = 36

25. (b)
6Pr= 360, 6! / (6-r)! = 360
6Cr = 15, 6!/(6-r)!*r! = 15
So r! = 360/15 = 24(4*3*2*1)
So r= 4!

26. (c)
Two tallest boys can be arranged in 2! Ways
And other in 18! Ways
And arrangement of girls = 6!
Total ways of arrangement = 18!*2!*6! = 18! * 1440

27. (b)
The word is LABOUR
To arrange the word alphabetically, we have first word as ABLORU

So to have A as first letter there are 5! = 120 ways
Then second is B as first letters (BALORU) no . Of ways = 5! =120
Next word will be LABORU so its position = 120+120+1 = 241

28. (a)
According to the question nC2 = 153
Or n! / (n-2)! * 2! = 153=> n*(n-1)/2 = 153
On solving we get n= 18

29. (b)
Total no. of diagonals in a hexagon= 6C2=15
But there are sis sides also, so total diagonals = 15-6 = 9

30. (e)
There are total 20 people
Sine two brother always stand together so total ways = 19!*2!

31. (a)
First and last letter is to be filled by R and T
Then only four letters are left
So there are 4! =24 no. of ways to arrange the word.

32. (c)
Considering yellow balls a group and red balls a group
So no. of ways = 2!* 6! * 6!

33. (a)
There are total 9*10^4 = 90000 5 digit numbers
In 90000 numbers half will be even and half will be odd
So there are 45000 odd numbers

34. (d)
To make 3 letters word using 1 million alphabets
We have x^3 = 1million
Then x^3 = 10^6
So x = 100

35. (c)
Total no. of outcomes when 4 dice is thrown is 6^4 = 1296
Total no. of ways when none of dice shows 3 = 5^4 = 625
Total ways in which atleast one of them is 3 in four dice = 1296-625= 671

36. (d)
Total no. of ways so that vowels always come together=

37. (a)
Case.1- men-3, women = 2
No. of ways= 7C3 * 6C2= 35*15=525
Case.2- men = 4 and women = 1
No. of ways= 7C4 * 6C1 = 210

Case.2- men= 5 and women = 0
No. of ways = 7C5 = 21
Total ways = 525+210+21 = 756

38. (e)
For three digit numbers to be divisible by 5 last digits should be 5
Remaining two spaces can be filled as6 and 5 ways
So total ways to have 3 digit = 6*5*1(5) = 30

39. (b)
No. of ways of selecting (3 consonants and 2 vowels) = 7C3 * 4C2 = 210
No. of groups each having 3 consonants and 2 vowels = 210
Each group contains 5 letter, so no. of ways to arrange 5 letter among themselves =5!
There no. of words = 210 * 5! = 25200

40. (b)
No. of ways to form a committee consisting of 5 women and 6 men = 15C5 * 8C6

41. (a)
From statement I, total no. of ways = 13! / (2!*2!*2!*2!)
From statement II, total ways =12!, but alphabet is not given so it may or may not contain identical letters but we do not have confirm result by statement II.

42. (c)
From statement I, first word is PRACTICAL no. of ways to arrange = 9! / (2!*2!) = 90720
From statement II, second word arrangement = 60 ways
Ratio = 90720/60 = 1512:1.

43. (e)
From statement I, word is LEADER, arrangement =6! /2! = 360
From statement II, identical alphabet= 3
Both statementsare not sufficient to answer the question.

44. (e)
From statement I, 10Cr =1, either r= 1 or r= 9
From statement II, nPr = 2 two unknown value is given.

45. (e)
From statement I, total male member present = 3, both how many member should be there in the committee is not given
From statement II, total female members to be included = 4, not any other information is given.

46. (e)
From statement I, total candidate who filled the form = 56 dat is not given regarding the selection of candidates.
From statement II, female candidate= 16 no other information is given which hirs needed to answer the question

47. (b)

From statement I, no. of English books is not given
From statement II, there is (21+19)! Ways to arrange books.

48. (d)
From statement I, nC1 = 4 => n! / (n-1)!*1! = 4 => n= 4 and nPr = 4
From statement II, nC1 = 1=> n = 1

49. (a)
From statement I, boys= 4 and girls = 3 total ways of arrangement = 7!
From statement II, no. of boys and girls is not given

50. (a)
From statement I, ratio = 45/95 = 9/19
From statement II, first word= TAROT, no. of ways = 5! /2! = 60
Only statement (a) is sufficient to answer the question.

BOAT AND STREAMS

1. A boat running downstream covers a distance of 30 km in 2 hours while coming back the boat takes 6 hour to cover the same distance. If the speed of current is half that of the boat, what is the speed of that boat?
(a) 10 kmph (b) 15 kmph (c) 20 kmph (d) 12 kmph (e) NOT

2. The distance between A and B is 80 km. Boat P could travel from point A to B upstream and point B to A downstream in total 30 hours. Boat Q could travel from point A to B upstream and point B to A downstream in total 9 hours. If the speed of boat Q in still water is thrice of boat P in still water, what is the speed of boat Q if speed of current remains constant for both?
(a) 12kmph (b) 18 kmph (c) 15 kmph (d) 20 kmph (e) 12.5 kmph

3. A boat takes 2 hours to travel 28 km upstream. If the respective ratio between speed of boat downstream and speed of boat upstream is 9:7, what is the speed of current?
(a) 3 kmph (b) 1 kmph (c) 2.4 kmph (d) 2 kmph (e) 5 kmph

4. A boat moves down the stream at the rate of 1 km in 5 minutes and up the stream at the rate of 1 km in 10 minutes. The speed of boat is:
(a) 2.5 m/sec (b) 1.5 m/sec (c) 3.0 m/sec (d) 5.5 m/sec (e) 5.6 m/sec

5. A boat covers a distance of 30 km upstream in 2 hours while it take 1/2 hours to cover the same distance downstream, then what is the ratio of speed of the boat and rate of stream?
(a) 2:13 (b) 15:9 (c) 14:9 (d) 5:1 (e) 16:3

6. A motor boat in still water travels at a speed of 36 km/h. it goes 56 km upstream in 1 hour 45 minutes. The time taken by it to cover the same distance down the stream will be:
(a) 2 hrs (b) 1 hr 24 mins (c) 2 hrs 20 mins (d) 3 hrs (e) NOT

7. A boat can travel with a speed of 16 km/hr in still water. If the rate of the stream is 5 km/hr, then what is the time taken by the boat to cover distance of 84 km downstream?
(a) 1 hours (b) 4 hours (c) 5 hours (d) 2.5 hours (e) NOT

8. A person can row 7½ kmph in still water. It takes him twice as long as to row up a distance as to row down the same distance. Find the speed of the stream.
(a) 1½ kmph (b) 2½ kmph (c) 3½ kmph (d) data inadequate (e) NOT

9. A man rows 27 km with the stream and 15 km against the stream taking 4 hrs each time. Find his rate per still water?
(a) 21/4 kmph (b) 24/5 kmph (c) 4/3 kmph (d) 16/7 kmph (e) 15/7 kmph

10. A boat can row ¾th of a km against the stream in 11½ minutes and return in 7½ minutes. Find the speed in still water.
(a) 1.44m/sec (b) 1.21 m/sec (c) 1.38 m/sec (d) 1.56 m/sec (e) 1.38 km/hr

11. A boat takes 19 hrs for travelling downstream from point A to point B and coming back to a point C midway between A and B. if the speed of the stream is 4 kmph and the speed of the boat in still water is 14 kmph, what is the distance between A and B?
(a) 180 km (b) 240 km (c) 160 km (d) 200 km (e) 190 km

12. I row from A to B against the current in 8 hours and from B to A in 2 hours. If the speed of the river is 9 m/sec, what is the speed of the boat in still water?
(a) 12 m/sec (b) 15 m/sec (c) 8 m/sec (d) 16 m/sec (e) NOT

13. A man goes by motor boat a certain distance upstream at 15 km/ hr and returns the same downstream at 20 km/hr. the total time taken for the journey was 7 hrs. Find how far did he go?
(a) 50 km (b) 45 km (c) 60 km (d) 30 km (e) NOT

14. In one hour a boat goes 11 km along the stream and 5 km against the stream. The speed of the boat in still water is?
(a) 8 kmph (b) 16 kmph (c) 7 kmph (d) 4 kmph (e) 3 kmph

15. A man row 18 kmph in still water. It takes him thrice as long as row up as to row down the river. Find the rate of stream.
(a) 4/33 kmph (b) 3/34 kmph (c) 4 kmph (d) 2/27 kmph (e) 1/3 kmph

16. A boat against the current of water goes 9 km/hr and in the direction of the current 12 km/hr. the boat takes 4 hours and 12 minutes to move from A to B. what is the distance between A and B?
(a) 180km (b) 200km (c) 189/5 km (d) data inadequate (e) NOT

17. A man row up the stream 15 km and down the stream 35 km taking 5 hours each time. The velocity of the current is:
(a) 1½ kmph (b) 3 kmph (c) 2 kmph (d) 2¾ kmph (e) 4½ kmph

18. In a stream running at 2 kmph, a motorboat goes 6 km upstream and back again to starting point in 33 minutes. Find the speed of the motorboat in still water.
(a) 11kmph (b) 14 kmph (c) 33 kmph (d) 22 kmph (e) 16 kmph

19. A man can row 40 km upstream and 55 km downstream in 13 hours also, he can row 30 km upstream and 44 km downstream in 10 hours. Find the speed of the man in still water and the speed of the current.

(a) 8 kmph, 3 kmph (b) 3 kmph, 8kmph (c) 12 kmph, 5 kmph (d) 5 kmph, 1 kmph (e) NOT

20. A boat can row 16 km/hr along the current and 14 km/hr against the current. Find the speed of the current and speed of the boat in still water?
(a) 2 kmph, 15 kmph (b) 2 kmph, 12 kmph (c) 2 kmph, 32 kmph (d) 12 kmph, 12 kmph (e) 1 kmph, 15 kmph

21. A boat moves down the stream at the rate of 1 km in 6 minutes and up the stream at the rate of 1 km in 10 minutes. The speed of current is:
(a) 6 kmph (b) 9 kmph (c) 10 kmph (d) 4 kmph (e) 2 kmph

22. A boat goes 16 km upstream in 2 hours and downstream in 1 hour. Find how much time this boat will take to travel 32 km in all still water?
(a) 2 hrs 25 mins (b) 2 hrs 40 minutes (c) 1 hrs 56 minutes (d) 50 minutes (e) NOT

23. A man takes 3 hr and 45 minutes to row a boat 15 km with the current in a river and 2 hours 30 minutes to cover a distance of 5 km against the current. Find the ratio of the speed of the boat in still water and the speed of the current?
(a) 6:1 (b) 3:1 (c) 5:1 (d) 4:1 (e) 9:1

24. A boat crew can row a 4 mile course in 20 min in still water and in 16 min with the tide. How long will it take to row the course against the tide?
(a) 26 mins 40 sec (b) 24 mins (c) 30 mins 12 sec (d) data inadequate (e) 19 mins

25. A man rows with the stream 10 km per hour and against the stream at 5 km per hour. Man's rate in still water is:
(a) 2.5 kmph (b) 7.5 kmph (c) 5 kmph (d) 15 kmph (e) NOT

26. A boat takes 90 min less to travel 36 miles downstream then to travel the same distance upstream. If the speed of the boat in still water is 10 mph. the speed of the stream is:
(a) 3 kmph (b) 1 kmph (c) 2 kmph (d) 3.5 kmph (e) 5.6 kmph

27. At his usual rowing rate, Sameer rows 12 miles down stream in a river in 6 hrs less than it takes him to travel the same distance upstream. But if he could double his usual rowing rate for his 24 miles round the downstream 12 miles would then take only one hour less than the upstream 12 miles. What is the speed of the current in miles per hours?
(a) 8/3 miles/hr (b) 5 miles/hr (c) 5/2 miles/hr (d) data inadequate (e) NOT

28. A boat takes 21 hrs for travelling downstream from point A to point B and coming back to a point A. if the velocity of the stream is 4 kmph and the speed of the boat in still water is 14 kmph, what is the distance between A and B?
(a) 36 km (b) 45 km (c) 62 km (d) 29 km (e) NOT

29. A man row 71/2 kmph in still water. If in a river running at 1.5 km an hour, if takes him 50 min to row to place and back. How far off is the place?
(a) 2 km (b) 4 km (c) 5 km (d) 9 km (e) 3 km

30. Speed of a boat in standing water is 9 kmph and the speed of the stream is 1.5 kmph. A boy rows to place at a distance of 105 km and comes back to the starting point. The total time taken by him is:

(a) 25 hrs (b) 28 hrs (c)18 hrs (d) 24 hrs (e) 15 hrs

31. Ravi can row at 5 kmph in still water. If the velocity of the current is 1 kmph and it takes him 1 hour to row to a place and come back, how far is the place?
(a) 2400 meters (b) 24 meters (c) 24 km (d) 96 meters (e) NOT

32. Rajesh takes twice as long to row a distance against the stream as to row the same distance in favor of the stream. The ratio of the speed of the boat(in still water) and the stream is:
(a) 4:1 (b) 3:1 (c) 5:1 (d) 6:19 (e) 4:1

33. A boat can row 1/4th of a km against the stream in 11½ minutes and return in 9½ minutes. Find the speed in still water.
(a) 0.4 m/sec (b) 0.6 m/sec (c) 1.42 m/sec (d) data inadequate (e) NOT

34. A boat can row 36 km/hr along the current and 24 km/hr against the current. Find the ratio of the speed of the current and speed of the boat in still water?
(a) 7:2 (b) 5:1 (c) 6:7 (d) 1:5 (e) 2:3

35. A man can row 50 km upstream and 45 km downstream in 13 hours also, he can row 30 km upstream and 60 km downstream in 10 hours. Find the speed of the man in still water and the speed of the current.
(a) 10 kmph, 5 kmph (b) 15 kmph, 2 kmph (c) 12 kmph, 2 kmph (d) data inadequate (e) NOT

Direction: given below are two statements, you have to decide by studying the statements about the relation between them and give your answer as:
(a) I>II
(b) I<II
(c) I=II or inadequate data or relationship cannot be made.
(d) I≥II
(e) I≤II.

36.
I. A boat covers 24 km upstream and 36 km down stream in 6 hours while it covers 36 km upstream and 24 km downstream in 6 hours.
II. The velocity of the current is 4 kmph.

37.
I. Ratio of upstream speeds and downstream speeds is 4:7.
II. A man takes 3 hrs 45 mins to row a boat 15 km downstream of a river and 2 hours 20 mins to cover a distance of 7 km upstream.

38.
I. A man rows with the stream 10 km per hour and against the stream at 5 km per hour.
II. Ratio of boat in still water to velocity of current is 3:1.

39.
I. The speed of boat in still water is 20 kmph; it takes 1 hr to travel upstream.
II. Ratio of time taken in upstream to downstream is 3:2.

40.
I. The speed of current is 4kmph; it travels 6 km upstream and return back in 2 hrs. speed of boat is:
II. The speed of boat in still water is 1 kmph; it travels 6 km downstream and returns back in 2 hrs.

Direction: each of the questions below consists of a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statements are sufficient to answer the question. Read both statements and give answer as

(a). if the data in statement I is alone sufficient to answer the question
(b). if the data in statement II is alone sufficient to answer the question
(c). if the data in both the statements together is necessary to answer the question
(d). if the data in either statements is sufficient to answer the question.
(e). if the data in both the statements is not sufficient to answer the question.

41. What distance (in km) the boat can travel downstream in 36 minutes?
I. The distance travelled by the boat in 40 minutes is equal to the distance travelled by the boat downstream in 24 minutes.
II. The speed of the water current is 4 km/hr.

42. What is the speed of boat in still water?
I. The boat covers a distance of 35 km in 5 hrs in downstream.
II. The boat takes 7 hrs to cover the distance in upstream.

43. What is the speed of the boat in still water?
I. The sum of the speeds of the boat, upstream and downstream is 12 kmph.
II. The speed downstream of the boat is thrice the speed upstream.

44. A boat takes a total time of three hours to travel downstream from P to Q and upstream back from Q to P. what is the speed of the boat in still water?
I. The speed of the river current is 1 kmph.
II. The distance between P and Q is 4 km.

45. What is the speed of the stream?
I. The distance travelled upstream in 2 hours by the boat is more than the distance travelled by it downstream in 1 hr by 4 km.
II. The ratio of the speed upstream to the speed downstream of a boat is 2:3.

46. What is the ratio of speed of boat to stream?
I. A man takes twice as long to row a distance against the stream as to row distance in favour of the stream.
II. A man takes one- third times to row a distance in favour of stream as to row against the stream.

47. What is the ratio of time taken to row upstream to downstream?
I. Ratio of speed of boat in still water to velocity of current is 5:4.
II. Difference between speeds of boat to speed of current is 2 kmph.

48. What is the speed of boat in still water?
I. Upstream speed is 4 kmph.
II. Ratio of upstream speed to velocity of current is 1:2.

49. What is the percentage of upstream speed with respect to down stream speed?
I. The speed of boat in still water is twice the speed of current.
II. Ratio of speed of current to speed of boat is 2:1.

50. What is the speed of the boat in still water?
I. In a to and fro journey between two points, the average speed of boat was 6 kmph.
II. Upstream speed is 6 kmph.

SOLUTION AND EXPLANATION OF BOAT AND STREAMS

1. (a)

Downstream speed = 15kmph
Upstream speed = 5 kmph
Speed of boat = (downstream speed + upstream speed) / 2= (15+5)/2 = 10 kmph.

2. (b)

Let up be speed of boat P in still water, uq be speed of boat Q in still water and vp be speed of current.
According to the question,

$$\frac{80}{up-vp}+\frac{80}{up+vp}=30$$

$$\frac{80}{uq-vp}+\frac{80}{uq+vp}=9$$

Also it is given uq=3up, vp = vq which is already used.
Then by putting the values and solving both equation
We get speed of boat Q, uq= 18 kmph

3. (d)

Upstream speed = 28/2 kmph = 14 kmph, let downstream speed be x
Ratio given is downstream speed/upstream speed = 9/7

$$\frac{x}{14}=\frac{9}{7}, x=18\ kmph.$$

$$speed\ of\ current=\frac{downstream\ speed-upstream\ speed}{2}=\frac{18-14}{2}=2\ kmph$$

4. (a)

Downstream speed = 1000/5*60 = 10/3 m/sec
Upstream speed = 1000/10*60 = 5/3 m/sec
Speed of boat = ½ *(10/3 + 5/3) = 2.5 m/sec

5. (b)

Upstream speed = 30/2 = 15 kmph
Downstream speed = 30/1/2 = 60 kmph
Ratio of speed of the boat to rate of stream = $\frac{60+15}{60-15}=\frac{15}{9}$

6. (b)

Speed of boat in still water = 36 kmph
Time taken to go 56 km upstream = 1hr 45 mins = 1¾ hrs
Then upstream speed = 56/ (1¾) = 32 kmph
We know that speed of boat in still water – rate of stream =upstream speed
So we get the rate of stream = 36-32 = 4 kmph
Then downstream speed = 36+4 kmph = 40 kmph
Time taken to cover 56 km downstream = 56/40 =1 hrs 24 mins

7. (b)

Speed of boat = 16 kmph
Speed of stream = 5 kmph
Downstream speed = 16+5 kmph = 21 kmph
Time take to go 84 km downstream = 84/21 = 4 hours

8. (b)

Let speed of boat = u and speed of stream = v

Speed of boat in still water = u= 7½ kmph
Upstream time = 2 * downstream time
Or, upstream speed = ½ * downstream speed
i.e. u-v = ½*(u+v)
on solving we get u = 3v, also u= 7½ kmph
Speed of stream = v = 5/2 kmph

9. (a)
Upstream speed = 15/4 kmph and downstream speed = 27/4 kmph
Speed of boat in still water = (15/4 + 27/4)/2 = 21/4 kmph
10. (c)
Upstream speed = 750 meters/ 690 sec (23/2 *60)
Downstream speed = 750 meters/ 450 sec (15/2 *60)
Speed of boat in still water = $\frac{\left(\frac{750}{690}+\frac{750}{450}\right)}{2} = 1.38\ m/sec$
11. (a)
According to the question, Speed of boat = 14 kmph
Speed of stream = 4 kmph
Let the distance be x
Therefore upstream speed = 14-4 = 10 kmph
Downstream speed = 14+4 = 18 kmph
Then we have,
$\frac{\frac{x}{2}}{10}+\frac{x}{18} = 19$
$on\ solving\ we\ get\ x = 180\ km$
12. (b)
Time taken to row upstream = 8 hrs
Time taken to row downstream = 2 hours
Speed of stream = 2.5 m/sec
Let distance travelled be x and speed of boat be u
Then u+2.5 = x/2 and u-2.5 = x/8
On solving both equation,
We have u = 15 m/sec and distance = 35 km
13. (c)
According to the question,
Let distance be x
Then, x/15 + x/20 = 7
On solving we get x = 60
14. (a)
Upstream speed = 5 kmph
Downstream speed = 11 kmph
Speed of boat = (11+ 5) /2 = 8 kmph
15. (d)
Time take to row upstream (Tu) = 3 * time taken to row downstream (Td)
Speed to row upstream = 1/3 * speed taken to row downstream.
Given Tu + Td = 18
1/Su + 1/Sd = 18
Putting Su = 1/3 * Sd
We have Sd = 4/ 18 kmph

Su = 4/54 kmph
Speed of stream = (Sd-Su)/2 = 2/27 kmph

16. (c)

Upstream speed = 9km/hr
Downstream speed = 12 km/hr
Time taken = 4 hrs 12 mins
Distance = 9*21/5 = 189/5 km

17. (c)

Upstream speed = 15/5 = 3 kmph, downstream speed =35/5 = 7 kmph
Speed of current = (7-3)/2 = 2 kmph

18. (d)

Let speed of boat be y
And distance be x

$$\frac{x}{y-2}+\frac{x}{y+2}=\frac{33}{60}$$

Also x = 6 km
Then by solving the above equation,
We have y = 22 kmph

19. (a)

Let speed of boat = u and speed of stream be v
According to the question

$$\frac{40}{u-v}+\frac{55}{u+v}=13$$

$$\frac{30}{u-v}+\frac{44}{u+v}=10$$

Let 1/(u-v) be x and 1/(u+v) be y
40x + 55y = 13 and 30x + 44 y = 10
On solving we get x = 1/5 and y = 1/11
Then we get u = 8 kmph
And v =3 kmph

20. (e)

Speed of boat = (speed against the current + speed in favour of current)/2 = (16+14)/2 = 15 kmph
Speed of current = (speed in favour of current _ speed against the current)/2 = (16-14)/2 = 1 kmph

21. (e)

Downstream speed = 1/6 * 60 = 10 kmph
Upstream speed = 1/10 * 60 = 6 kmph
Speed of current = ½ *(10-6) = 2kmph

22. (b)

Upstream speed = 16/2 = 8kmph
Downstream speed = 16/1 = 16 kmph
Speed of boat in still water =1/2 * (16+8) = 12 kmph
Time taken to travel 32 km = 32/12 = 8/3 hours

23. (b)

Time taken to row downstream = 3 hr 45 mins = 15/4 hrs
Downstream speed = 15/15/4 = 4 kmph

Similarly upstream speed = 2 kmph
Ratio = 4+2/(4-2) = 6/2 = 3:1

24. (a)
Speed of boat crew = 4/20*60 = 12 miles/hour
Downstream speed = 4/16*60 = 15 miles/hr
Speed of tide = 15-12 = 3 miles/hr
Upstream speed = 12-3 = 9 miles/hour
Time taken = 4/9 hours = 26 mins 40 sec

25. (b)
Man's rate in still water = (10+5)/2 = 7.5 kmph

26. (c)
$\frac{36}{10+v}+\frac{3}{2}=\frac{36}{10-v}$
On solving we get v = 2kmph
Speed of stream = 2 kmph

27. (a)
According to the question,
$\frac{12}{U+v}+6=\frac{12}{U-v}$
And
$\frac{12}{2U-v}+1=\frac{12}{2U-v}$
By solving above equation,
Then v = 8/3 miles/hr

28. (e)
According to the question,
$\frac{x}{u-v}+\frac{x}{u+v}=21$
Where u = 14 kmph and v = 4 kmph
Then we get x = 135 km

29. (e)
Speed of boat = 7.5 kmph
Speed of stream = 1.5 kmph
$\frac{x}{9}+\frac{x}{6}=\frac{50}{60}$
Then x = 3 km

30. (d)
Speed of boat in standing water = 9 kmph
Speed of stream = 1.5 kmph
Upstream speed = 7.5 kmph and downstream speed = 10.5 kmph
Time taken = $\frac{105}{10.5}+\frac{105}{7.5}=24\ hours$

31. (a)
We have x/4 + x/6 = 1

x = 12/5 km= 2400 meters

32. (b)
Let speed of boat be u and speed of stream be v
Upstream time = 2 * downstream time
Upstream speed = ½ * downstream speed
Or, u-v= (u+v)/2
We get u/v = 3/1.

33. (a)
Upstream speed = 250/ (11.5*60)
Downstream speed = 250/ (9.5*60)
Speed of boat in still water = (25/69 + 25/57)/2 = 0.4 m/sec

34. (d)
Ratio = $\frac{36-24}{36+24} = \frac{1}{5}$

35. (a)
$$\frac{50}{u-v} + \frac{45}{u+v} = 13$$
$$\frac{30}{u-v} + \frac{60}{u+v} = 13$$
Let 1/(u-v) be x and 1/(u+v) be y
50x + 45y = 13 and 30x + 60 y = 10
On solving we get x = 1/5 and y = 1/15
Then we get u = 10 kmph
And v =5 kmph

36. (b)
I.
$$\frac{24}{u-v} + \frac{36}{u+v} = 6$$
$$\frac{36}{u-v} + \frac{24}{u+v} = 6$$
Let 1/ (u-v) be x and 1/(u+v) be y
24x + 36y = 6 and 36x + 24y = 6
On solving we get x = 1/10 and y = 1/10
Then we get u = 10 kmph
And v =0 kmph
II. Velocity of current = 4 kmph
So I<II

37. (b)
I. Upstream speed /downstream speed = 4/7
II. Downstream speed = 15/ 3hrs 45m in = 4 kmph and upstream speed = 7/ 2 hrs 20 mins = 3 kmph
Ratio = ¾
II>I

38. (c)
I. Ratio can be calculated = (10+15)/(15-10) = 3/1
II. Ratio = 3/1

So I=II

39. (c)

I. We cannot determine upstream speed as more data is required

II. Ratio = 3:2

So data inadequate

40. (c)

I. $\frac{6}{x-4} + \frac{6}{x+4} = 2$

$on\ solving\ we\ get\ x = 2km/h$

II. $\frac{6}{1-x} + \frac{6}{1+x} = 2$ we are not able to determine the value of x

$so\ data\ inadequate$

41. (c)

I. 40 * u = (u+v) *24

Or, 2u = 3v

II. Also v = 4 kmph

By combining both statement we have u= 6 kmph

42. (c)

I. Downstream speed = 35/5 = 7 kmph

II. Upstream time = 7 hrs

By combining both equation,

We have speed of boat = (7+35/7)/2 = (7+5)/2 = 6 kmph

43. (a)

I. Let the speed of boat be u

Then, u+ (u+v) + (u-v) = 12, Then, u= 4 kmph

II. (u+v) = 3(u-v)

Only statement (a) is required to answer the question.

44. (c)

I. $\frac{x}{u-1} + \frac{x}{u+1} = 3$

II. $x = 4\ km$

On combining both statement,

Then u = 3 kmph

45. (b)

I. Upstream distance in 2 hours is more than downstream distance in 1 hr by 4km

II. (u-v)/(u+v) = 2/3

Then, u/v = 5/1,

So speed = 5 kmph.

46. (c)

I. Tu = 2 Td, Su=1/2 * Sd, u-v = ½*(u+v) u/v = 3/1

II. Tu = 3* Td, Su = 1/3 * Sd, u-v = 1/3*(u+v), 2/1.

47. (a)

I. Speed of boat : velocity of current = 5:4,

Upstream speed: downstream speed= 1/9
Upstream time/downstream time = 9:1
II. Speed of boat- speed of current = 2 kmph

48. (c)
I. Upstream speed = 4 kmph
II. Upstream speed / velocity of current = ½
Om combining both statement, speed of boat = 8+4 = 12 kmph

49. (d)
I. Speed of boat = 2 * speed of current
Then, Upstream speed / downstream speed = 1/3
II. Ratio is 2/1
III. Ratio can be calculated by using either statement.

50. (c)
I. (Up + down)/2 =6

$$\frac{2x}{\frac{x}{down}+\frac{x}{up}} = 6$$

Down speed = 6 kmph and
II. upstream speed = 6kmph
By combining both statement we have speed of boat = (6+6) /2 = 12/2 = 6 kmph

SIMPLIFICATION

1). What will come in place of the question mark (?) in the following questions?

$$\frac{(?)^{\frac{4}{5}}}{36} = \frac{9}{(?)^{\frac{1}{5}}}$$

a) 324 b) 342 c) 18 d) 361 e) 4

Directions (2-6): what will come in place of the question mark (?) in the following equations?
2). √2900 × √498 ÷ √251 = ? ÷ 8
(a) 600 (b) 670 (c) 770 (d) 750 (e) 730

3). 56% of 450 + ? = 300
a) 52 b) 48 c) 42 d) 56

4). $27^{1.5} \times 27^{3.5} = 27^{?}$
a) 5 b) 7 c) 3 d) 2

5). 27.06 × 25 -? = 600
a) 76.3 b) 76.7 c) 76.5 d) 76.2

6). ×2= ?
a) 12.5 b) 11 c) 13 d) 14 e) 11.25

Directions (7 -11): what should come in place of the question mark (?) in the following questions?

7).

$$1\frac{8}{9} + 3\frac{2}{7} - 2\frac{1}{7} + 11\frac{1}{6} = ?$$

a) 7 b) 14 c) 14.26 d) 15 e) None of these

8). 56% of 958 +67% of 1008 = ? % of 2000

a) 60.592 b) 47.622 c) 42.86 d) 91.455 e) None of these

9). $7^{2.3} \times 49^{4.7} \times 63^{3.4} \times 81^{5.85} \times 63^{?}$

a) 16.25 b) 15.1 c) 13.4 d) 18.9 e) None of these

10). $(?)^2 + (164)^2 = (307)^2 - 272$

a) 151 b) 189 c) 211 d) 259 e) None of these

Directions (Q. 11 -15): What Value should come in place of question mark (?) in the following questions?

11). (3 / 5) of (2 / 7) of (35 / 18) of ? = 405

a) 1375 b) 1275 c) 1285 d) 1215 e) 1325

12). 24 % of 6550 – 175 % of ? = 697

a) 500 b) 475 c) 675 d) 825 e) 975

13). (1/7) of 254 of (1/8) = ? ÷ 21

a) 96(1 / 4) b) 95(1 / 7) c) 98(2 / 7) d) 96 (3 / 7) e) 95(1 / 4)

14). (2892 ÷12) × 13 = ? % of 2410

a) 241 b) 342 c) 230 d) 130 e) 150

15). $[(\sqrt{(81 \times 64)} / (4.5)] \times 18 = (?)^2 - 153$

a) 21 b) 23 c) 17 d) 19 e) 22

Directions (Q. 16 -20): What approximate value should come in place of question mark (?) in the following questions ? (Note: you are not expected to calculate the exact value.)

16). 799.99 ÷ 12.492 = ? – 323.469

a) 380 b) 382 c) 388 d) 378 e) 372

17). $(\sqrt{728.68} \div 2.7)^2 + 224 = (18)^{?}$

a) 2 b) - 2 c) 4 d) – 5 e) - 4

18). (4429 ÷ 44.3) × 18.75 – 289.59 = ?

a) 1485 b) 1585 c) 1425 d) 1685 e) 1365

19). (1 / 8) of 2768 + 2835.42 = ? - 297

a) 3528 b) 3478 c) 3472 d) 3078 e) 3178

20). 238.49 + 69 % of 791.213 = $(?)^2$

a) 27 b) 28 c) 30 d) 31 e) 29

Directions (Q. 21–25): What approximate value will come in place of question mark (?) in the given question? (you are not expected to calculate exact value).

21). 105.27 % of 1200.11 + 11.80% of 2360.85 = 21.99% of ? + 1420.99
a) 500 b) 240 c) 310 d) 550 e) 960

22). 0.98% of 7824 + 4842 ÷ 119.46 - ? = 78
a) 30 b) 60 c) 40 d) 50 e) 70

23). $(41.99^2 – 18.04^2)$ - ? = 13.11^2 – 138.99
a) 4004 b) 1200 c) 1720 d) 8432 e) 1410

24). 24.96^2 / (34.11 + 20.05) + 67.96 + 89.11 = ?
a) 884 b) 546 c) 252 d) 424 e) 170

25). √(2025.11) ×√(256.04) + √(399.95) × √(?) = 33.98 × 40.11
a) 1682 b) 1024 c) 1582 d) 678 e) 1884

Directions(26-30): What approximate value should come in place of the question mark (?) in the following questions? (You are not expected to calculate the exact value.)

26). $(24/9)^2$ × (399/39) ÷ (41/899) = ?
a) 1600 b) 1650 c) 1700 d) 1550 e) 1750

27). – $(4.99)^3$ + $(29.98)^2$ – $(3.01)^4$ = ?
a) 550 b) 590 c) 620 d) 650 e) 690

28). [$(7.99)^2$ – $(13.001)^2$ + $(4.01)^3$]^2 = ?
a) -1800 b) 1450 c) -1660 d) 1660 e) -1450

29). √(675.001) + $(4.005)^3$ = ?
a) 17 b) 57 c) 43 d) 47 e) 27

30). √(727.99950) + $(5.1961)^2$ = ? ÷ (2/10.7960)
a) 53 b) 44 c) 5 d) 15 e) 10

31). $(72)^2$ ÷ ∛(46650) = ?
a) 169 b) 196 c) 144 d) 136 e) 124

32). √(6148) – 4 × ? = 726 ÷ 11
a) 3 b) 5 c) 7 d) 9 e) 11

33). √(5378) × √(3360) ÷ √(360) = ?
a) 200 b) 250 c) 300 d) 225 e) None of these

34). √(624.98) + √(729.25) = ?

a) 58 b) 56 c) 52 d) 63 e) 61

35). $\sqrt{(6550)} \div 3.005 \times 4.99901 = ?$
a) 135 b) 142 c) 153 d) 128 e) 155

Directions(36-45): What approximate value should come in place of question mark (?) in the following questions?

36). (789.689÷25)% of 2160 = ?+180.892
a) 509 b) 502 c) 620 d) 590 e) 420

37). $(17.85)^2 \times 6.05 + (43.02)^2 \times 7.49 = ?$
a) 15728 b) 18728 c) 16728 d) 14728 e) 12728

38). 67.485%of 6480-(2342.87÷65)=?
a) 4070 b) 4270 c) 4770 d) 4370 e) 4170

39). $68\%\text{of}4096+17\%298.878-1875=(?)^2$
a) 21 b) 541 c) 461 d) 31 e) 331

40). $(\sqrt{3968.659})\%\text{of}7300\div149.569=?+2086$
a) 2013 b) 2453 c) 2513 d) 2813 e) 2523

41). $1439\div16\times14.99+\sqrt{228}=?$
a) 1315 b) 1365 c) 1215 d) 1465 e) 1265

42). $(11.92)^2+(16.01)^2=?^2\times(3.85)^2$
a) 15 b) 2 c) 4 d) 55 e) 5

43). (19.97%of781)+?+(30%of87)=252
a) 40 b) 50 c) 25 d) 70 e) 80

44). $820.01\div21\times2.99+?=240$
a) 105 b) 173 c) 123 d) 234 e) 143

45). $299\div12\times13.95+?=(24.02)^2$
a) 285 b) 225 c) 325 d) 150 e) 185

46). $92 \times 576 \div 2\sqrt{1296} = (?)^3 + \sqrt{49}$
a) 3 b) $(9)^2$ c) 9 d) 27 e) None of these

47). $(\sqrt{8} \times \sqrt{8})^{(1/2)} + (9)^{(1/2)} = (?)^3 + \sqrt{8} - 340$
a) 7 b) 19 c) 18 d) 9 e) None of these

48). $(15 \times 0.40)^4 \div (1080 \div 30)^4 \times (27 \times 8)^4 = (3 \times 2)^{?+5}$
a) 8 b) 3 c) 12 d) 16 e) None of these

49).

$\sqrt{217+\sqrt{52+\sqrt{144}}}=?$

a) 18 b) 16 c) 12 d) 15 e) None of these

50).

$\frac{\sqrt{1156}}{\sqrt{289}}=\frac{?}{12.5}$

a) 24 b) 25 c) 23 d) 22 e) None of these

SOLUTION AND EXPLANATION OF SIMPLIFICATION

Explanation:

1). (a)

$\frac{(?)^{\frac{4}{5}}}{36}=\frac{9}{(?)^{\frac{1}{5}}}$

$(?)^{\frac{4}{5}}\times(?)^{\frac{1}{5}}=9\times36$

$?^{4/5+1/5}=324$

$?=324$

2). (d)

$?=\frac{5}{8}\text{ of }\frac{4}{9}\text{ of }\frac{3}{5}\text{ of }222$

$=\frac{5}{8}\times\frac{4}{9}\times\frac{3}{5}\times222=37$

3).(b) 56% of 450 + ? = 300

$\frac{56\times450}{100}+?=300$

252 + ? = 300

? = 300-252 = 48

4). (a)

$27^{?}=27^{1.5}\times27^{3.5}$

$27^{?}=27^{1.5+3.5}$

$27^{?}=27^{5}$

?=5

5). (c)

27.06 ×25 – ? = 600

676.5 – ? = 600

? = 676.5 – 600= 76.5

6). (e)

$?=4\frac{7}{8}\times 2\frac{4}{13}$

$=\frac{39}{8}\times\frac{30}{13}=\frac{45}{4}=11\frac{1}{4}$

7). (c)

$? = 1+\frac{8}{9}+3+\frac{2}{7}-2-\frac{1}{7}+11+\frac{1}{6}$

$=(1+3-2+110)+\left(\frac{8}{9}+\frac{2}{7}-\frac{1}{7}+\frac{1}{6}\right)$

$=13+\left(\frac{112+18+21}{126}\right)$

$13+\frac{151}{126}=14\frac{256}{126}$

8). (a)

? % of 2000 = 56% of 958+67% of 1008

? × 2000 = 53648+67536

? = = 60. 592

9). (b)

$63^{?}=7^{2.3}\times(7\times7)^{4.7}\times(7\times9)^{3.4}\times(9\times9)^{5.85}$

$=7^{2.3}\times7^{9.4}\times7^{3.4}\times9^{3.4}\times9^{11.70}$

$=7^{15.1}\times9^{15.1}=(7\times9)^{15.1}$

$=63^{?}=63^{15.1}$

$?=15.1$

10). (b)

$(?)^2+(164)^2=(307)^2-272$

$(?)^2=(307)^2-(164)^2-272$

$(?)^2=471\times143-272$

$(?)^2\ 67353-272$

$?=\sqrt{67081}=259$

Answers:

11). d) 12). a) 13). e) 14). d) 15). a) 16). c) 17). a) 18). b) 19). b) 20). b)

11. (3 / 5) × (2 / 7) × (35 / 18) × ? = 405

Or, ? = [(405 × 5 × 7 ×18) / (3 × 2 × 35)] = 1215

Answer: d)

12. 24 % of 6550 – 175 % of ? = 697
Or, [(24 × 6550) / 100] – [175 × ?/ 100] = 697
or, [(1572 - 697) × 100] / 175 = ?
:. ? = (87500 / 175) = 500
Answer: a)

13. 254 × (1 / 7) × (1 / 8) = ? ÷ 21
Or, ? = [(254 × 21) / 56] = 95 (1 / 4)
Answer: e)

14. [(? × 2410) / 100] = (2892 ÷ 12) × 13
= 241 × 13 = 3133
:.? = [(3133 × 1000) / 2410] = 130
Answer: d)

15. $[(\sqrt{(81 \times 64)} \div (4.5))] \times 18 = (?)^2 - 153$
Or, $(9 \times 8 \div 4.5) \times 18 = (?)^2 - 153$
Or, $16 \times 18 + 153 = (?)^2$
:. $? = \sqrt{(288 + 153)} = \sqrt{441} = 21$
Answer: a)

16. ? – 323.5 ≈ 800 ÷ 12.5
Or, ? ≈ 64 + 323.5 = 387.5 ≈ 388
Answer: c)

17. $(18)^? \approx (27 \div 2.7)^2 + 224$
$=100 + 224 = 324 \approx (18)^2$
Or, $(18)^? \approx 18^2$
:. ? ≈ 2
Answer: a)

18. ? ≈ (4430 ÷ 44. 3) × 18.75 – 290
=100 × 18.75 – 290
= 1875 – 290 = 1585
Answer: b)

19. ? – 297 = (1/8) × 2768 + 2835.42
≈ 346 + 2835 = 3181
:. ? = 3181 + 297 = 3478
Answer: b)

20. $(?)^2 \approx 69$ % of 791 + 238.5
= [(69 * 791) / 100] + 238.5
= 546 + 238.5 = 784.5 ≈ 784
:. $? = \sqrt{784} = 28$
Answer: b)

Answers:
21). d) 22). c) 23). e) 24). e) 25). b)

21). 105.27% of 1200.11+ 11.08% of 2360.85 = 21.99% of ? + 1420.99
=> 105% of 1200 + 12% of 2360 = 22% of ? + 1421
=> 1260 + 2832 = 022 × ? + 1421
=> 022 × ? = 122.2 => ? = (122.2 / 0.22) = 555.45 ≈ 550
Answer: d)

22). 0.98% Of 7824 + 4842 ÷ 119.46 - ? = 78
=> 1% Of 7824 + 4842 ÷ 126 - 78 =?
=> ? = 7824 + 40.35 – 78 = 40.59 ≈ 40
Answer: c)

23). $(41.99^2 – 18.04^2)$ - ? = 13.11^2 – 138.99
=> $(42^2 – 18^2)$ - ? = 13^2 – 139
=> {(42 + 18) (42 - 18)} - ? = 169 – 139
=> {60 × 24} - ? = 30
=> 1440 - ? = 30 => ? = 1410
Answer: e)

24). 24.96^2 / (34.11 + 20.05) + 67.96 + 89.11 = ?
= $(25^2$ / 54.16) + 67.96 + 89.11 = (625 / 54) + 67.96 + 89.11
= 11.5 + 68 + 89 = 168.5 ≈ 170
Answer: e)

25). √(2025.11) ×√(256.04) + √(399.95) ×√(?) = 33.98 × 40.11
=>√(2025) ×√(256) + √(400) ×√(?) = 34 × 40
=> 45 × 16 + 20 ×√(?) = 34 × 40
=> 720 + 20 × √(?) = 1360
=> 20 × √(?) = 1360 – 720 => 20 ×√(?) = 640
? = (32)2 = 1024
Answer: b)

Answers:
26).a) 27).e) 28).d) 29).c) 30).e) 31).c) 32).a) 33).d) 34).c) 35).a)

26). ?= $(24/9)^2$ × (399/39) ÷ (41/899)
=> ? = $(24/9)^2$ × (399/39) × (899/41)
=> ?= 7.11 × 10.23 × 21.92
=> ? = 1594.35 = 1550 (approx.)
Answer: a)

27). ?= $-(4.99)^3 + (29.98)^2 – (3.01)^4$
=> ? = $- (5)^3 + (30)^2 – (3)^4$
=> ? = - 125 + 900 – 81
=> ?= 900 – 206
=> ?= 694
=> ?= 690 (approx.)
Answer: e)

28). $[(7.99)^2 – (13.001)^2 + (4.01)^3]^2$
=>$[(8)^2 – (13)^2 + (4)^3]^2 = ?$
=>$[64 – 169 + 64]^2 = ?$
=> $(-41)^2 = ?$
:. ? = 1681 (:. – x- => +)
≈1660
Answer: d)

29). $\sqrt{(675.001)} + (4.005)^3 = ?$
=> $? \approx \sqrt{(26\times26)} + (4)^3$
= 26 + 64 = 90
Answer: c)

30). $\sqrt{(727.9995)} + (5.1961)^2 = ? \div (2/10.7960)$
=> $\sqrt{729} + 5^2 \approx ? \div (2/11)$
=> 27 + 25 = ? ÷ (2/11)
=> 52 × (2/11) = ? ≈ 10
Answer: e)

31). $? = (72)^2 \div \sqrt[3]{(46650)}$

$\sqrt[3]{(46650)} \approx \sqrt[3]{(36\times36\times36)} \approx 36$
=> ? = [(72×72)/36] = 144
Answer: c)

32). $\sqrt{(6148)} – 4 \times ? = 726 \div 11$

	78
7	6148
	49
148	1248
	1184
	64

:. $\sqrt{6148} \approx 78$
=> 78 – 4 × ? = (726/11) = 66
=> [(78-66)/4] = ?→ ? ≈ 3
Answer: a)

33). $? \approx \sqrt{[(5400\times6400)/360]} = 225$
Answer: d)

34). ?= $\sqrt{625} + \sqrt{729}$ = 25 + 27 = 52
Answer: c)

35). $\sqrt{6550} + 3.005 \times 4.9901 = ?$

$\sqrt{6550} \approx \sqrt{(81 \times 81)} \approx 81$
Now, $81 + 3 \times 5 \approx [(81 \times 5)/3] \approx 135$
Answer: a)

Answers:
36).b) 37).c) 38).d) 39).d) 40).c) 41).b) 42).e) 43).d) 44).c) 45).b)

36. $? + 180.892 = (789.689 \div 25)\%$ of $2160 \approx (790 \div 25)\%$ of 2160
$= [(31.6 \times 2160) / 100] = 682.56 \approx 683$
Or, $? \approx 683 - 181 = 502$
Answer: b)

37. $? = (17.85)^2 \times 6.05 + (43.02)^2 \times 7.99$
$\approx 320 \times 6.05 + 1849 \times 8 = 1936 + 14792$
$= 16728$
Answer: c)

38. $? \approx 68\%$ of $6480 - (2342 \div 65)$
$\approx 4406.4 - 36 \approx 4370$
Answer: d)

39. $(?)^2 \approx 68\%$ of $4096 + 17\%$ of $298.878 - 1875 \approx 2785 + [(17 \times 300) / 100] - 1875$
$= 2785 + 51 - 1875 = 961$
$\therefore ? = \sqrt{(31 \times 31)} = 31$
Answer: d)

40. $? + 2086 = (\sqrt{3968.659})\%$ of 7300
$\approx [(63 \times 7300) / 100] = 4599$
$\therefore ? \approx 4599 - 2513$
Answer: c)

41. $1439 \div 16 \times 14.99 + \sqrt{(228)}$
$\approx 1440 \div 16 \times 15 + 15$
$= 90 \times 15 + 15 = 1350 + 15 = 1365$
Answer: b)

42. $?^2 \times (3.85)^2 = (11.92)^2 + (16.01)^2$
$\approx (12)^2 + (16)^2 = 144 + 256 = 400$
Or, $?^2 \times 16 \approx 400$
Or, $?^2 \approx (16 / 400) = 25$
$\therefore ? \approx \sqrt{(5 \times 5)} = 5$
Answer: e)

43. (19.97% of 781) + ? + (30% of 87) = 252
Or, $[(20 \times 780) / 100] + ? + [(30 \times 87) / 100] \approx 252$
Or, $? \approx 252 - 156 - 26 = 70$
Answer: d)

44. $820 \div 21 \times 3 + ? \approx 240$

Or, 39 × 3 + ? ≈ 240
Or, ? ≈ 240 – 117 = 123
Answer: c)

45. ? ≈ $(24.02)^2$ – 299 ÷ 12 × 13.95
≈ 576 – 25 × 14 = 576 – 350 = 226 ≈ 225
Answer: b)

Answers:
36).b) 37).c) 38).d) 39).d) 40).c) 41).b) 42).e) 43).d) 44).c) 45).b)

36. ? + 180.892 = (789.689 ÷ 25)% of 2160 ≈ (790 ÷ 25)% of 2160
= [(31.6 × 2160) / 100] = 682.56 ≈ 683
Or, ? ≈ 683 – 181 = 502
Answer: b)

37. ? = $(17.85)^2$ × 6.05 + $(43.02)^2$ × 7.99
≈ 320 × 6.05 + 1849 × 8 = 1936 + 14792
= 16728
Answer: c)

38. ? ≈ 68% of 6480 – (2342 ÷ 65)
≈ 4406.4 – 36 ≈ 4370
Answer: d)

39. $(?)^2$ ≈ 68% of 4096 + 17% of 298.878 – 1875 ≈ 2785 + [(17 × 300) / 100] – 1875
= 2785 + 51 – 1875 = 961
∴ ? = √(31 × 31) = 31
Answer: d)

40. ? + 2086 = (√3968.659)% of 7300
≈ [(63 × 7300) / 100] = 4599
∴ ? ≈ 4599 – 2513
Answer: c)

41. 1439 ÷ 16 × 14.99 + √(228)
≈ 1440 ÷ 16 × 15 + 15
= 90 × 15 + 15 = 1350 + 15 = 1365
Answer: b)

42. $?^2$ × $(3.85)^2$ = $(11.92)^2$ + $(16.01)^2$
≈ $(12)^2$ + $(16)^2$ = 144 + 256 = 400
Or, $?^2$ × 16 ≈ 400
Or, $?^2$ ≈ (16 / 400) = 25
∴ ? ≈ √(5 × 5) = 5
Answer: e)

43. (19.97% of 781) + ? + (30% of 87) = 252
Or, [(20 × 780) / 100] + ? + [(30 × 87) / 100] ≈ 252

Or, ? ≈ 252 – 156 – 26 = 70
Answer: d)

44. 820 ÷ 21 × 3 + ? ≈ 240
Or, 39 × 3 + ? ≈ 240
Or, ? ≈ 240 – 117 = 123
Answer: c)

45. ? ≈ $(24.02)^2$ – 299 ÷ 12 × 13.95
≈ 576 – 25 × 14 = 576 – 350 = 226 ≈ 225
Answer: b)

Answers:
46). c) 47). a) 48). b) 49). d) 50). b)

46). $(?)^3 + \sqrt{49} = 92 \times 876 \div 2\sqrt{1296}$
$(?)^3 + 7 = 92 \times 576 \div 2 \times 36$
$(?)^3 + 7 = 92 \times 576 \div 72$
$(?)^3 + 7 = 92 \times 8$
$(?)^3 + 7 = 736$
$(?)^3 = 736\text{-}7 = 729$
$= \sqrt[3]{729}$
?=9
Answer: c)

47). $(?)^3 + \sqrt{8} - 340 = (\sqrt{8} \times \sqrt{8})^{(1/2)} + (9)^{(1/2)}$
$(?)^3 + \sqrt{8} - 340 = \sqrt{8} + 3$
$(?)^3 = \sqrt{8} + 3 - \sqrt{8} + 340$
$(?)^3 = 343$
$? = \sqrt[3]{343}$
? = 7
Answer: a)

48). $(3 \times 2)^{? + 5}$
$= (15 \times 0.40)^4 \div (1080 \div 30)^4 \times (27 \times 8)^4$
$(3 \times 2)^{? + 5} = (6)^4 \div (36)^4 \times (216)^4$
$(6)^{?+5} = (6)^4 \div (62)^4 \times (63)^4$
$(6)^{?+5} = (6)^{-4} \times (6)^{12}$
? + 5 = 8
? = 8 – 5 = 3
Answer: b)
49).

$$\sqrt{217 + \sqrt{52 + \sqrt{12}}} = \sqrt{217 + \sqrt{64}}$$

$$\Rightarrow \quad \sqrt{217 + 8} = \sqrt{225} = 15$$

Answer: d)

50). 34 / 17 = ?/12.5
? = 25
Answer: b)

PROBLEMS ON PERCENTAGES

1. An entry fee in a fair is Re. 1. Later, this was increased by 20% which decreases the sale by 25%. The percentage decrease in the number of visitors is?
(a) 35% (b) 62.5% (c) 45% (d) 37.5 (e) NOT

2. A's average expenditure is 140% of sum of average savings of B and C both, if total saving of C is double of B and A's average income to average saving ratio is 5/3 and saving of A is 36000 in a year, then what is total saving of B?
(a) 1000 (b) 1200 (c) 1500 (d) 2000 (e) NOT

3. Peter earned 50% more than sum of Ravi and Rajesh whereas Rajesh earnings are one third of that of peter. What is the percentage earning of Ravi more than Rajesh?
(a) 10% (b) 15% (c) 50% (d) 0% (e) 100%

4. In a fraction the numerator is 5 more than denominator and the sum of two numbers is 20% more than difference of two numbers. By what percentage numerator is greater than denominator?
(a) 200% (b) 500% (c) 1100% (d) 1000% (e) 100%

5. Two peoples P and Q invest their savings in the ratio of 4/9, by what percent P's investment is less than the sum of their saving?
(a) 25% (b) 45% (c) 35% (d) data inadequate (e) NOT

6. In year 2013, the number of students in school A was half that of in school B. In the year 2014, the number of students was more than that in previous year by 20% in each of the schools. In the year 2015, the number of students in school A was one-fourth of the sum of those in schools A and B together in the year 2014. The number of students in the school A in the year 2015 was what percent less than that in the year 2014?
(a) 20% (b) 10% (c) 25% (d) 46% (e) 0%

7. The population of a town grows at the rate of 20% in every 6 years. In how many years it will double itself?
(a) 5 (b) 6 (c) 4 (d) data inadequate (e) NOT

8. A man invests equal sums in 6% and 8% stock, and gets 10% for his money. The 6% stock is at Rs. 60. What is the sum in which he purchased the 8% stock?
(a) 80 (b) 50 (c) 60 (d) 70 (e) None

9. In an election, A wins over B by a margin of 280 votes, which is 14% of total number of votes. If 1% votes are invalid, how many votes were valid?
(a) 2000 (b) 1890 (c) 1450 (d) 1790 (e) 1980

10. A uniform cylindrical tank is initially filled to 40 % of its capacity. The radius of the base of the tank is increased by 15%. By what percentage (approx.) of the height of the tank does the level of water fall?

(a) 5% (b) 10% (c) data inadequate (d) 9% (e) NOT

11. A gave 10% salary to mother. Out of remaining half in insurance and PPF in the ratio 5: 7. If total of what he gave to mother and what invested in PPF is 10,400. Find A's salary?
(a) 28000 (b) 30000 (c) 28690 (d) 30500 (e) NOT

12. Mohan invests 21% of her monthly salary, i.e., Rs.9996 in Fixed Deposits. Later he invests 27% of her monthly salary on Life Insurance Policies; also he invests another 9% of his monthly income on Mutual Funds. What is the total annual amount invested by Mohan?
(a) 22500 (b) 22372 (c) 22547 (d) 21000 (e) 24000

13. Meera's English test consist of 75 questions from three sections- i.e. A, B and C. 20 questions from section A, 15 questions from section B and 40 question from section C. Although, she answered 80% of section A, 60% of section B and45% of section C correctly. She did not pass the test because she got less than 60% of the total marks. How many more questions she would have to answer correctly to earn 60% of the marks which is passing grade?
(a) 4 (b) 1 (c) 5 (d) 2 (e) NOT

14. 450 chocolates were distributed equally among children in such a way that the number of chocolates received by each child is 20% of that of total number of children. How many chocolates did each child receive if 10% of chocolates are taken back by teacher?
(a) 10 (b) 45 (c) 15 (d) 5 (e) 9

15. In 2014, the population of village X was 20% more than the population of village Y. the population of X in 2015 increased by 10% as compared to the previous year. If the population of village X in 2015 was 5610. What was the population of village Y in 2014?
(a) 4000 (b) 5008 (c) 4300 (d) 4250 (e) NOT

16. In 2010, the total monthly salary of Kailash and Deepak together was Rs. 30000. In 2011, monthly salary of both increased by 15% and 20% respectively from previous year. After the given increment, Kailash salary becomes 75% of Deepak's salary. What was Kailash salary in 2010?
(a) 13171 (b) 15000 (c) 16731 (d) 5400 (e) 10020

17. Ram gave 25% of salary to Rakesh. From the money Rakesh received, he spent 20% on buying stationary and books and 35% on clothes. After the mentioned expenses, he was left with Rs. 2700, and then what is the sum of 65% of ram and the money Rakesh received?
(a) 15600 (b) 6000 (c) 14000 (d) 21000 (e) 21600

18. A shopkeeper sold an article at 20% discount and earned a profit of 4%. By what percent the marked price of the article more than the cost price?
(a) 40% (b) 30% (c) 45% (d) 50% (e) NOT

19. Akash scored 73 marks in subject B. he scored 56% marks in subject X and Y marks in subject C. Maximum marks in each subject were 150. The overall percentage marks obtained by his brother is what percent, if it is known that he has 4% more than his brother?
(a) 56% (b) 45% (c) Data inadequate (d) 35% (e) 76%

20. Mr. Gagan spends 50% of his monthly income on household items and out of the remaining he spends 50% on transport, 25% on entertainment, 10 % on sports and remaining amount is Rs. 900 is saved. What is the percent of saved amount with respect to entertainment?
(a) 60% (b) 50% (c) 70% (d) 105% (e) 10%

21. A man purchased a plot of Rs. 729000 and constructed a building over it of cost Rs. 1331000. If the cost of plot is increases by 10% per year and the cost of building is decreased by 10 % per year. Then find after how many years the cost of both plot and building become the same?
(a) 1 (b) 3 (c) 3/2 (d) 4 (e) 5

22. 300gm of sugar solution contains 40% sugar. How much sugar is mixed into it such that new solution consist 50% sugar?
(a) 40 gm (b) 30 gm (c) 60 gm (d) 10 gm (e) NOT

23. When the price of eggs is decreased by 35% then a person can purchase 4 dozen more eggs in Rs. 152. What is the difference between the initial price and reduced price per dozen of the eggs?
(a) 113/6 (b) 266/131 (c) 133/10 (d) 560/93 (e) 939/130

24. In a recent survey, 40% houses contained two or more people. Of those houses containing only one person, 25% were having only a male. What is the percentage of all houses, which contain exactly one female and no males?
(a) 45% (b) 20% (c) 30% (d) 40% (e) 10%

25. In a restaurant, 50% had vegetarian lunch while 40% had non-vegetarian lunch and 30% had both types of lunch. If 110 people were present, how many did not eat either type of lunch?
(a) 55 (b) 44 (c) 66 (d) 77 (e) 10

26. A car travel at a speed 40% more than a bike, if the bike had travel 10 km in 10 minutes, then its speed will be what percent of car?
(a) 300/7 % (b) 700/9% (c) 550/7% (d) 560/9% (e) 500/7%

27. What percentage of numbers from 1 to 80 have squares that end in the digit 4?
(a) 75% (b) 25% (c) cannot be determined (d) 0% (e) 20%

28. The sum of two numbers is 40% of sum of third and fourth number, by what percent is the average of third and fourth number is greater than average of first and second number?
(a) 60% (b) 40% (c) 50% (d) 75% (e) 100%

29. A uniform cylindrical tank is initially filled to 60 % of its capacity. The radius of the base of the tank is increased by 5%. By what percentage (approx.) of the height of the tank does the level of water fall?
(a) 9% (b) 10% (c) 12% (d) 6% (e) 11%

30. A's weight is 120% more than E and 20% less than D. by how much percent D's weight is greater than E?
(a) 100% (b) 150% (c) 200% (d) 10% (e) NOT

31. A lab assistant notice that .08% of solution is curbed so he removed it from the container. How many will he notice to remove 2ml of solution?
(a) 250ml (b) 2.5 ml (c) 250 liters (d) 2.5 liters (e) 25 liters

32. A batsman score 130 runs which include 4 sixes and 5 fours, what is the difference between the percentages of total runs he made while running between the wickets and sixes?
(a) 45% (b) 57% (c) 29% (d) 50% (e) 48%

33. The length, breadth and height of a room is in the ratio of 7:9:3, if the builder increase each quantity by 5% then the percentage increase in the cost of painting the room will be if it known that total cost of initial measurement was Rs. 15000?
(a) 10% (b) data inadequate (c) 6% (d) 9% (e) NOT

34. The height of Fatima is 40 % less than Damini, and Damini is 45% more than average height of Suman and Fatima. Calculate the difference in percentage of height of Damini with respect to other girls?
(a) 70% of Damini's height (b) 10% of Damini height (c) 55% of Damini's height
(d) 78% of Damini's height (e) none of these (NOT)

35. A man invest 20% of his monthly income in mutual funds, 15% of remaining to other two schemes, also his monthly expense is one-third of what he invest in mutual funds, how much percent is saving of the man in a month?
(a) 42% (b) 52% (c) 12% (d) 22% (e) 14%

36. If cost of wheat increase to Rs. 18 from Rs. 16 per kg, then by how much percentage a family reduces his consumption to maintain the same cost?
(a) 80% (b) 60% (c) 20% (d) 70% (e) not

37. If income tax is reduced by 23%, the net income increase by 2%, what is the rate of income tax?
(a) 4% (b) 5% (c) 2% (d) 10% (e) 8%

38. A sum is divided between A and B in the ratio of 1:2. A purchased a car from his part, which depreciates 14*2/7% per annum and B, deposited his amount in a bank, which pays him 20% interest per annum compounded annually. By what percentage will the total sum of money increase after two years due to this investment pattern (approximately)?
(a) 21% (b) 20% (c) 15% (d) 29% (e) 23%

39. A class consists of three departments in which 50, 60 & 70 students are enrolled. If 10%, 20% & 10% are declared passed, and then find the total % of failed students?
(a) 68.33% (b) 57.97% (c) 78.67% (d) 86.67% (e) 90%

40. The radius and circumference of a circle is in ratio 7:9, there is increase in radius and area of the circle by 50% both, what is the percentage of circumference is of to area of circle?
(a) 50% (b) 25% (c) cannot be determined (d) 60% (e) NOT

Directions (41-50): Each question below is followed by two statements I and II. You are to determine whether the data given in the statement is sufficient to answer the question. You should use the data and your knowledge of Mathematics to choose between the possible answers. Give answer—
(a) If the question can be answered by using statement I alone but cannot be answered by statement II alone.
(b) If the question can be answered by using statement II alone but cannot be answered by statement I alone.
(c) If both statements I and II together are required to answer the question.
(d) If the answer can be found by using any of the two statements alone.
(e) If both the statements together are not sufficient to answer the question.

41. The original quantity is:
I. In some quantity, 60% is alcohol and 40% water.
II. If 10 liters of pure alcohol is added, the strength of water is 20%.
42. How many boys play both football and hockey?
I. There are 600 boys in hostel.
II. 75% boys play hockey and 45% play football
43. Find the percentage change in tax collection?
I. Water tax is increased by 20% and consumption decreased by 20%.
II. Water tax is increased by 10%.
44. How many bags are made in March?
I. The production of bags gets reduced by 10% from month of February.
II. There are total 2000 bags in January.
45. What percentage of people watches neither two channels A and B?
I. 40% of the people watch channel A and 50% watches channel B. and 10% of people watches both channel.
II. 45% of the people watch channel B and 50% watches channel A. and 5% of people watches both channel.
46. What percentage of science student passes the exam?
I. There are total 150 boys and 100 girls in the class.
II. Ratio between the passed boys in geography to science is 7:9.
47. 56% of A is what percentage of B?
I. A is 2.5 times of C
II. C is 6 times of B.
48. By what percentage the areas of a trapezium decrease?
I. The difference between the two parallel side increases by 1 %.
II. The area is 3/5 times of previous area.
49. Find the number of valid votes obtained by other candidate?
I. 7500 total votes are polled between two candidates; among them 20% votes are declared invalid, and also one candidate get 55% vote.
II. 8000 total votes are polled and the ratio of valid votes between candidates is 3/7.
50. 45% of 56% of D is E which is average of 25% of C and A. calculate A?
I. D is half of C
II. A is double of D

SOLUTION AND EXPLANATION OF PROBLEMS ON PERCENTAGES

1. (d)
Let total sale be 100 units, original visitor be 100.
Reduced visitor = 100*100/120, % decrease in number of visitor = 100-75/1.2 = 37.5%.

2. (d)
Let Ea be average expenditure of A and Sb & Sc be total savings of B & C.
Then Ea/12 = 140% * (Sb/12 +Sc/12)
Also Sb =Sc/2, and Ia/Sa = 5/3.
On solving we get Sb = 2000.

3. (e)
Peter = 150/100 * (Ravi + Rajesh), Rajesh =1/3 * peter.
On solving we get earnings of Ravi is same as Rajesh. I.e. 100%.

4. (c)
Let the fraction be X/Y.
X = Y+5, X + Y = 120% of (X-Y).
On solving we get X= 5.5 & Y= 0.5, percentage = 1100%

5. (d)
Ratio between savings of P and Q is 4:9, more data is need to answer the question, so data inadequate

6. (c)
In 2013, A = B/2
In 2014, A & B becomes 1.2 times the value in 2013.
In 2015 A = ¼ *(A+ B) in 2014.
So A = 9/20 B
%= (3/5-9/20)*100*5/3

7. (c)
Let the population be P and x be number of years
P (1+20/100) ^x= 2P
1.2^x=2
Therefore x is approximately = 2

8. (c)
Let the investment be x
6x/60+8x/y= .1*2x
Then y = 80.

9. (e)
Valid votes = 280*100*90/ (2000*100)= 1980.

10. (b)
The tank is filled to 40% of capacity, so let height of the tank be h= 0.4h.
Also radius increases to 15%, new radius is r= 1.15r.
$\pi * r^2 * (0.4h) = \pi * (1.15r)^2 * h'$
$h' = \frac{0.4}{1.3225}$
% height of tank is $\left(0.4 - \frac{0.4}{1.3225}\right) * 100 \cong 10\%$

11. (c)
A's salary = 10400*400/145= 28690(approx.)

12. (b)
Mohan monthly salary is (9996*100)/21 = 47600,
Total annual amount invested by Mohan is$(21 + 27 + 9)\% * 47600 = RS.27132.$

13. (d)

Let x be the mark that Meera get on attempting the question correctly.
$(0.8 * 20 + 0.6 * 15 + .45 * 40)x = 43x$
Since 43x < 0.6*75x
There Meera should attempt 2 more questions to pass the test

14. (e)
Total distributed chocolate is 0.9 * 450 = 405
Let no. of children be x
405/x=20%x
Then, x=45

15. (d)
The population of village Y in 2014 = $\frac{5610*100*100}{110*120} = 4250$

16. (a)
In 2010, Kailash + Deepak = 30000
In 2011, after increment,
Kailash's salary = 75% of Deepak's salary
115/110 K = 75% * 120/100 D=> K = 90/115 D
Kailash salary in 2010 = $\frac{(30000*115*90)}{205*115} \cong 13171$

17. (e)
Total amount = $6000 * \frac{65}{25} + 6000 = 21600$

18. (b)
$\frac{80\% of\ marked\ price - cost\ price}{cost\ price} = 4\%$
Marked price = 1.3 * cost price
Marked price is 0.3*100 = 30% of cost price

19. (c)
$\frac{73 + 84 + x}{450} * 100 = \frac{157 + x}{450} * 100$
No more data is given by which x can be found.

20. (a)
Let x be the monthly income of Gagan
Then, 15*50*x= 900*100*100
X = 12000
% of saved amount with respect to entertainment = 900/12.5%*12000 = 3/5 *100 = 60%

21. (b)
According to the question,
$729000\left(1 + \frac{10}{100}\right)^x = 1331000\left(1 - \frac{10}{100}\right)^x$

$\left(\frac{11}{9}\right)^{x} = \left(\frac{11}{9}\right)^{3}$
Then, x = 3

22. (c)
Ratio of sugar and water in new solution is $\frac{40\%\ of\ 300+x}{60\%of\ 300} = 1/1$
$x = 60\ gms$ of sugar should be mixed.

23. (e)
Reduced price per kg = 35% * 152/4= 133/10
Initial price pre kg = (133/10 *100)/65=266/13
Difference in price is 133/10 – 266/13= 939/130

24. (a)
Let the no. of house be x
Houses having one female = (100-25) % *(100-40) % *x=9/20x
$\frac{\frac{9x}{20}}{x} * 100 = 45\%$

25. (b)
It is given n (A) = 50% *110 (vegetarian lunch)
And n (B) = 40% * 110 (non vegetarian lunch)
$n(A \cap B) = 30\% * 110$ (both type of vegetarian lunch)
So $n(A \cup B) = n(A) + n(B) - n(A \cap B) = 66$
No. of people not eating either type of lunch is 110-66=44

26. (a)
Speed of bike /speed of car = 60/140 *100=300/7 %

27. (b)
Only two numbers are their in the range having 4 in unit place so, 2/8*100=25%

28. (c)
(a+b) = 40% * (c+d)
Required % = (a+b)/(c+d) * 100 = 50%

29. (d)
The tank is filled to 60% of capacity, so let height of the tank be h= 0.6h.
Also radius increases to 5%, new radius is r= 1.05r.
$\pi * r^2 * (0.6h) = \pi * (1.05r)^2 * h'$
$h' = \frac{0.6}{1.1025}$
% height of tank is $\left(0.6 - \frac{0.6}{1.1025}\right) * 100 \cong 6\%$

30. (b)
A= 120%E
A = 80% D
D/E*100
120/80 *100 = 150%

31. (d)
0.08% *x = 2ml
Then x= 2500 ml=2.5 liters

32. (e)
Total runs made by batsman by running between the wickets = 130-(4*6 + 5*4)=86
Required % = (86-24)/130 *100=620/13%

33. (b)
Length, breadth and height are in the ratio of 7:9:13
5% increase in each quantity take place
Then the ratio remains same
From the given data, it is not cleared about the cost of painting the wall per square cms. So we cannot get the increase percentage of cost of painting.

34. (e)
Fatima's height= 60% Damini's height
Also, Damini's height = 145 %*(suman height + 60% Damini's height)
Then the difference in percentage of height of Damini with respect to other girls = (138-100) %= 38%

35. (a)
Total money invested in a month is 58% of monthly income
Therefore total saving is (100-58) %=42%

36. (c)
Percentage increase in cost of wheat is 25%
% decrease in consumption = 25/125 * 100 %.

37. (e)
Let income be 100
Then income tax be x%
Net income in month = 100-x
23% of x=2 %(100-x)
Then x= 8%

38. (b)
Let the sum distributed be 300
A=100 and B = 200
Value of the car after 2 years = 100(1- 100/7/100) ^2=100*6/7*6/7= 73(approx.)
Interest % = 20%
B' amount after 2 year = 200(1+20/100) ^2=288
Increase in value = 73+288-300=61

39. (d)
Total student passed in all department together = 24
Total failed student = 180-24=156
Failed percentage = 156/180 * 100 = 86.67%

40. (c)
Radius/circumference= r/2*pi*r=7/9 (incorrect), % cannot be calculated

41. (c)
From statement I, alcohol =60 % of x and water is 40% of x
From statement II, x+10 then water is 20% of (x +10)
From both statement we get 0.6x +10/ 0.4x=4/1 so original quantity is 10 liters

42. (e)
From statement I, total boys =600
From statement II, hockey playing boys = 450 and 270, we cannot find the boys playing both games so (e) is correct answer

43. (d)
From statement I, % change in tax = 20%
From statement II, % change in tax = 10%

44. (c)
From statement I, bags in February is 90% of January
From statement II, bags in January = 2000,
On combining both we get 90% * 2000 bags are made in March

45. (d)
From statement I, 0.9x-0.1x=0.8x, % of people watches neither two channels is (100-80) %
From statement II, 0.45x+.5x- .05x=0.9x, % of people watches neither two channels is (100-90) %

46. (e)
From statement I, total student = 250
From statement II, we ratio of boys passed in geography to science = 7:9
Also on combining both we do not get the desired result.

47. (c)
From statement I, A=2.5 *C
From statement II, C= 6*B
On combining we get, 56%*A/B *100, also A=15B, A=840% of B

48. (b)
From statement I, the difference between two parallel side = 101%
From statement II, 3/5 *100=60%

49. (a)
From statement I, valid votes by other candidate= 45% *80% *7500=2700
From statement II, no valid vote % is given so data inadequate

50. (e)
From statement I, D= C/2
From statement II, A=2D
On combining both statement we requires more data regarding E .

MIXTURE ALLEGATION

1. A Jar contains a mixture of milk and water in the ratio of 3:1. When 4 litres of the mixture is taken out and therefore 3 litres of milk is added to the remaining mixture. The respective ratio of milk and water in the resultant mixture thus formed is 4:1. What was the initial quantity of water in the mixture?
(a) 5 L (b) 6 L (c) 4 L (d) 2 L (e) NOT

2. Vessel A contains a mixture of apple juice and orange juice in the respective quantity of 16 litres and 4 litres. Vessel B contains a mixture of orange juice and apple juice in the respective quantity of 24 litres and 6 litres. Mixture from vessel A and B, are both mixed together in vessels C. what is the resultant percentage of apple juice in the vessel C?
(a) 60% (b) 70% (c) 50 % (d) 80% (e) 40%

3. The concentration of spirit in three different vessels A, B and C are 45%, 30% and 25% respectively. If 4 liters from vessel A, 5 litres from vessel B and 6 litres from vessel C are mixed, find the concentration of spirit in the resultant solution.
(a) 32 % (b) 55% (c) 24% (d) 10 % (e) 16%

4. Two solutions of 90% and 97% purity are mixed resulting in 21 litres of mixture of 94% purity. How much is the quantity of the first solution in the resulting mixture?
(a) 3 L (b) 9 L (c) 15 L (d) 11 L (e) 12 L

5. Vessel A contains a mixture of milk and water in the respective quantities of 20 litres and 4 litres. Vessel B contains a mixture of milk and water in the ratio of 3:1. Mixture from vessel A and B are both mixed together in the vessel C. if the resultant percentage of water in vessel C was 20%, what was the initial quantity of the mixture in vessel B?
(a) 50/3 L (b) 8/3 L (c) 20/ 3 L (d) cannot be determined (e) 32 /3 L

6. Jar A contain X litres of pure milk only. A 27 litres of mixture of milk and water in the ratio of 4:5 is added to jar A. the new mixture thus formed in Jar A contains 70 % milk, what is the value of X?
(a) 23 L (b) 31 L (c) 17 L (d) 40 L (e) NOT

7. A vessel was containing 80 litres of pure milk. 16 litres of pure milk was taken out and replaced with equal amount of water. 16 litres of newly formed mixture of water and milk was taken out and then 24 litres of water was added to the mixture. What is the respective ratio between the quantity of milk and water in the final mixture?
(a) 32:23 (b) 23:32 (c) 25:27 (d) 69:56 (e) NOT

8. In what ratio should two qualities of coffee powder having the rates of Rs. 47 per kg and Rs. 32 per kg be mixed in order to get a mixture that would have a rate of Rs. 37 per kg?
(a) 5:7 (b) 9:14 (c) 1:2 (d) 2:1 (e)1:3

9. A mixture of 125 gallons of wine and water contains 20% of water. How much water must be added to mixture in order to increase the percentage of water to 25% of the new mixture?
(a) 25 gallons (b) 12.5 gallons (c) 50 gallons (d) 10 gallons (e) 25/3 gallons

10. A cistern contains 50 litres of water. 5 litres of water is taken out of it and replaced by wine. The process is repeated again. Find the propagation of wine and water in the resulting mixture.
(a) 19/81 (b) 12/17 (c) 19/82 (d) 81/19 (e) NOT

11. In what ratio should a 20% methyl alcohol solution be mixed with a 50% methyl alcohol solution so that the resultant solution has 40% methyl alcohol in it?
(a) 1:5 (b) 2:5 (c) 1:2 (d) 4:5 (e) NOT

12. In a mixture of milk and water 270 L, there is milk and water in ratio 7:5. How much water is added to get ratio 9:5 finally.
(a) 121 L (b) 143 L (c) 30 L (d) 171 L (e) 111 L

13. A shopkeeper consist 2000 kg of sugar, some part of it he sold with 8% profit & the remaining with 18 %. In total transaction he gets 14 % profit, then find how much sugar he sold with 18 % profit?
(a) 1500 kg (b) 1000 kg (c) 1200 kg (d) 1020 kg (e) 800 kg

14. In what ratio must a person mix three kinds of wheat costing him Rs. 1.20, Rs. 1.44 and Rs. 1.74 per kg., so that the mixture may be worth Rs. 1.41 per kg?
(a)1:7:11 (b)17:11:8 (c) 11:77:7 (d) 21:79:11 (e) 11:17:77

15. A butler stole wine from a butt of sherry which contained 40% of spirit and he replaced what he had stolen by wine containing only 16% spirit. The butt was then of 24% strength only. How much of the butt did he steal?
(a) 2/3 (b) 1/3 (c) 1/2 (d) 1/4 (e) 2/7

16. A man possessing Rs. 8400 lent a part of it at 8% simple interest and the remaining at 6 2/3% simple interest .His total income after 1 ½ years was Rs. 882. Find the sum lent at different rates.
(a) 2200, 6200 (b) 1200, 7200 (c) 5600, 1800 (d) 2100, 6300 (e) NOT

17. A man travelled a distance of 80 km. in 7 hours partly on foot at the rate of 8 km. per hour and partly on bicycle at 16 km. per hour. Find the distance travelled on foot.
(a) 32 (b) 48 (c) 36 (d) 50 (e) 41

18. In what ratio must water be mixed with milk to gain 16 % on selling the mixture at cost price?
(a) 4:29 (b) 4:25 (c) 17:4 (d) 1:9 (e) NOT

19. A jar full of whisky contains 40% alcohol. A part of this whisky is replaced by another containing 19% alcohol and now the percentage of alcohol was found to be 26%. The quantity of whisky replaced is:
(a) 2/3 (b) 5/3 (c) 1/3 (d) 2/5 (e) 3/4

20. A bar is creating a new signature drink. They are using two alcoholic ingredients in the drink: vodka and gin. They are using two non-alcoholic ingredients in the drink: orange juice and cranberry juice. The alcoholic ingredients contain 40% alcohol. The non-alcoholic ingredients contain no alcohol. How many liters of non-alcoholic ingredients must be added to 6 liters of alcoholic ingredients to produce a mixture that is 15% alcohol?
(a) 15 (b) 20 (c) 5 (d) 10 (e) 16

21. A sum of Rs.312 was divided among 100 boys and girls in such a way that the boy gets Rs.3.60 and each girl Rs.2.40 the number of girls is?
(a) 50 (b) 20 (c) 40 (d) 80 (e) 55

22. A woman sold 100 oranges at $12.10, some at the rate of 3 for 35 cents and the rest at 7 for 85 cents. How many were sold at the first rate?
(a) 10 (b) 12 (c) 26 (d) 30 (e) 9

23. Two brands of detergent are to be combined. Detergent X contains 20 percent bleach and 80 percent soap, while Detergent Y contains 45 percent bleach and 55 percent soap. If the combined mixture is to be 35 percent bleach, what percent of the final mixture should be Detergent X?
(a) 40% (b) 20% (c) 45% (d) 29% (e) 75%

24. From the container of wine, containing 40 liters, 25/4 liters are drawn out and the cask is filled up with water. If the same process is repeated once again, what will be the number of liters of wine left in the container?
(a) 29.16 L (b) 32 L (c) 28.5 L (d) 25 L (e) NOT

25. Ram buys some bananas at 5 per rupee from one trader and a similar quantity at 7 rupee from another trader. He mixed both the varieties and sells the entire lot at 6 per rupee. What is the profit or loss % that he makes?
(a) No loss, no profit (b) 1% loss (c) 1% profit (d) 25% profit (e) NOT

26. 5 liters are drawn from a cask full of alcohol and it is then filled with water. 5 liters of the mixture are drawn and the cask is again filled with water. The quantity of wine now left in the cask to that of the water in it is in the ratio 361:39. How much does the cask hold?
(a) 150 L (b) 300 L (c) 180 L (d) 200 L (e) 100 L

27. 3 glasses equal in measurements are filled with a mixture of alcohol and water in the ratio of 2:1, 3:1 and 2:3 respectively. The contents of the three glasses are emptied into a single empty vessel. What is the proportion of alcohol and water into it?
(a) 61/109 (b) 109/71 (c) 109/47 (d) cannot be determined
(e) NOT

28. Vessel A contains two types of cooking oil in the ratio 4:3 and vessel B contains the two type of oil in the ratio of 7:2. In what proportion should they be mixed to get a mixture which contains the two cooking oil in ratio of 3:2?
(a) 2 :9 (b) 5:63 (c) 56:9 (d) 3:5 (e) 4:11

29. A mixture contains spirit and water in the ratio of 7:3. How much should be withdrawn and water substituted in its place, so that in the resulting mixture, there may be half spirit and half water?
(a) 2/3 (b) 1/5 (c) 2/5 (d) 1/7 (e) 3/7

30. Ravi purchase 20 dozen copies @ Rs. 108 per dozen. He sold 8 dozen copies with 10% profit and the remaining 12 dozen with 20% profit. Then find his profit in total transaction?
(a) 16% (b) 15% (c) 20% (d) 32% (e) NOT

31. A shopkeeper mixed 125 kg of type I wheat is with two other type II and III of wheat whose quantity is in ratio 5:7 respectively. Calculate the quantity of type II wheat if the total cost of wheat is 24 rupees per kg?
(a) 36 kg (b) 120 kg (c) 100 kg (d) 146 kg (e) data inadequate

32. Approximately how much rice of cost Rs. 23 /kg is mixed with 70 kg of rice of cost Rs. 17 /kg, such that on selling the mixture at the rate 20 /kg shopkeeper gets 15% profit?

(a) 6 kg (b) 5 kg (c) 15 kg (d) 25 kg (e) NOT

33. In what ratio water & milk is mixed such that on selling the mixture at cost price shopkeeper get 20% profit?
(a) 1:4 (b) 1:6 (c) 1:5 (d) 1:7 (e) 1:3

34. How many kilograms of sugar costing Rs 9 per kg must be mixed with 36 kg of sugar costing Rs 7 per kg so that there may be a gain of 10% by selling the mixture at Rs. 9.24 per kg?
(a) 16 kg (b) 84 kg (c) 15 kg (d) 48 kg (e) 30 kg

35. In what ratio must water be mixed with milk to gain 16 2/3 % on selling the mixture at cost price?
(a) 1:9 (b) 2:3 (c) 1:2 (d) 1:6 (e) NOT

36. The ratio of quantity of acid and water in a mixture is 1:3. If 5 litres of acid is further added to the mixture, the new ratio becomes 1:2. The quantity of new mixture in litres is :
(a) 40 L (b) 50 L (c) 45 L (d) data inadequate (e) NOT

37. A shopkeeper buys 2/3rd of goods with 5 % profit and remaining with 2 % loss. In total transaction he get 4000 profit, then find the cost price of total good?
(a) 150000 (b) 20000 (c) 50000 (d) 250000 (e) 210000

38. A shopkeeper buys wine of type I with 30 % profit and wine of type II with 15% profit, in what ratio the shopkeeper mixed the two wines to get 50 % profit on selling the wine at the average price of both type of wine?
(a) 3:8 (b) 24:29 (c) 2:9 (d) data inadequate (e) NOT

39. Coffee worth Rs 200 per kg and Rs 175 per kg is mixed with a third variety in the ratio 1:1:3. If the mixture is worth Rs 225 per kg, the price of the third variety per kg will be?
(a) 185 kg (b) 150 kg (c) 120 kg (d) 205 kg (e) 600 kg

40. A lump of two metals weighting 20 grams is worth Rs. 85 but if their weights be interchanged, it would be worth Rs. 80, if price of one metal is Rs 5 per gram, find the weight of other metal?
(a) 10 gms (b) 20 gms (c) 15 gms (d) 8 gms (e) NOT

Direction: Given below are questions followed by statements, choose the statement or statements that give the answer of the question. And give answer as:
(a) If statement I alone is required.
(b) If statement II alone is required to answer the question
(c) If both statement is required to answer the question.
(d) If either of statement can give the answer to the question.
(e) If both statement together cannot give the appropriate result and more data is needed.

41. What is ratio in which both type of wheat is mixed?
I. Quantity of Wheat of type A is 45 kg.
II. Quantity of wheat of both type is in ratio = 9:13.

42. In what quantity tea of type A is mixed with tea of type B?
I. 40 kg of type B is mixed with type A in the ratio of 4:5.
II. Rs 4 per kg of tea of type A is mixed with Rs. 6 per kg of tea of type B.

43. How much quantity of alcohol remains in the container?

I. A container contains 55 liters of pure alcohol.
II. 11 litres of alcohol is replaced with water twice.

44. What is the respective ratio between the quantity of milk and water in the final mixture?
I. The mixture is sold at 20 % profit.
II. The mixture contains 20 % water.

45. In what amount wheat of X variety is brought by shopkeeper?
I. 45 kg of wheat of X variety is mixed with Y variety in ratio 6:7.
II. Total quantity of mixture is 80 kg.

46. How much water must be added to get ratio 19:5 finally?
I. Total quantity of alcohol is 5 L more than water.
II. A mixture contains alcohol and water in the ratio of 14:5.

47. What was the initial quantity of water in the mixture?
I. If 5 L of water is removed the concentration of alcohol is 5%.
II. If 10 litres of water is removed the concentration of alcohol is 5 % more than water.

48. How many liters of non-alcoholic ingredients must be added to 10 liters of alcoholic ingredients to produce a mixture that is 25% alcohol?
I. A bar is using two alcoholic ingredients in the drink: vodka and gin.
II. They are using two non-alcoholic ingredients in the drink: orange juice and cranberry juice. The alcoholic ingredients contain 60% alcohol. The non-alcoholic ingredients contain no alcohol.

49. What is the resultant percentage of apple juice in the vessel C?
I. Apple juice is in first container is half of its concentration in second container.
II. Ratio of apple juice and mango juice in 1st container is 4:9.

50. Calculate the quantity of type II wheat if the total cost of wheat is 30 rupees per kg?
I. Type I is more in quantity as compared to type II.
II. 45 kg of type I brought at 20 Rs per kg is mixed with type II in the ratio 4:5.

SOLUTION AND EXPLANATION OF MIXTURE ALLEGATION

1. (c)
Let Jar has contained milk and water 3x and x respectively. Total mixture in jar = 3x +x =4x.
Now, quantity of milk in 4 L mixture = 3x/4x * 4 = 3 L, and quantity of water is 4-3 = 1 L. according to question $\frac{3x-3+3}{x-1} = \frac{4}{1} => 3x = 4x - 4$
Therefore x = 4 L.

2. (d)
Total quantity of vessel C is 16+4+6+24 = 50 L.
Resultant percentage of apple juice in vessel C is 16 + 24/50 * 100 =80 %

3. (a)
Spirit concentration in vessel A = 45% * 4 L=1.8 L
Spirit concentration in vessel B = 30% * 5 L= 1.5 L
Spirit concentration in vessel C = 25% * 6 L= 1.5 L
Total concentration of spirit all vessels concentrations are mixed = (1.8L +1.5L + 1.5L)/15 L * 100 = 32%.

4. (b)

By using rule of alligation,

90% 97%

94%

3(97-94) 4(94-90)

Therefore the quantity of first solution in the resulting mixture is 3/7 * 21 = 9 litres

5. (c)

According to the question the concentration of water in vessel A = 1/6.

The concentration of water in vessel B = ¼

Concentration of water in vessel C = 20 % = 1/5.

Therefore, 1/6 ¼

1/5

½ 1/3

Ratio in which both vessels water is mixed is 3:2.

6. (a)

Quantity of milk and water in 27 L of mixture is 12 L and 15 L.

According to question, the new mixture contain 70% milk so 30% is water

Let the pure milk in Jar A be X

Then, $\frac{X+12}{15} = \frac{70}{30}$

$3X = 69$

X = 23 L.

7. (a)

Pure milk = 80 L

Replaced water = 16 L

Now, in mixture ratio of milk to water = 64:16 = 4:1

Milk pure water

4/5 0

X

X-0 4/5-X

X/4/5 – X=64/24

3X = 32/5-8X

X = 32/55 – milk

Hence water to milk = 32:23.

8. (c)

1st quality 2nd quality

47 32

37

5 10

Ratio is 5:10 i.e. 1:2.

9. (e)

According to question,

$$\frac{20\% * of\ 125\ gallons + x}{125\ gallons + x\ gallons} = 25\% = \frac{1}{4}$$

On solving we get x = 25/3 gallons.

10. (a)

The quantity of water left = $50\left(1-\frac{5}{50}\right)^2 = 40.5$ L

Propagation of wine and water in the resultant mixture = 9.5/40.5=19/81.

11. (c)

By using rule of alligation,

1st solution		2nd solution
20%		50%
	40%	
10%		20%

So the ratio is 1:2.

12. (d)

The quantity of water in the mixture = 5/12 * 270 L=112.5 L.

Let x be the quantity of water to be added to the mixture.

According to question,

$$\frac{112.5 + x}{270 - 112.5} = \frac{9}{5}$$

Then x = 171 L.

13. (e)

Let x kg of sugar is sold at 8% and (2000-x) kg at 18 %

Then,

8%		18%
	14%	
4%		6%
2		3

Quantity of sugar sold at 8 % profit is

$$\frac{x}{2000 - x} = \frac{2}{3},$$

on solving we get $x = 800$ kg

14. (c)

Let mix the first and third kind of wheat to get a mixture worth Rs 1.41 per kg

I.e. wheat of 1st kind per 1 kg wheat of 2nd kind per 1 kg

120 paisa — 174 paisa

141 paisa

33 paisa — 21 paisa

By alligation rule, quantity of 1st kind: quantity of 3rd kind = 33:21=11:7.

Let mix quantity of first and second kind of wheat to get a mixture worth Rs. 1.41 per kg

I.e. wheat of 1st kind per 1 kg wheat of 2nd kind per 1 kg

120 paisa — 144 paisa

141 paisa

3 paisa — 21 paisa

So the ratio of quantity of 1st kind: quantity of 2nd kind = 33:21 = 1:7.

Om combining both ratios we get

Quantity of 2nd kind: quantity of 3rd kind = 11/7 * 7/1 = 11/1

Ratio of 1st kind: quantity of 2nd kind: quantity of 3rd kind = 1:7:7/11 = 11:77:7.

15. (a)

As per the question and by using rule of alligation,

Spirit concentrations are

40% — 16%

24%

8% — 16%

So the ratio = 8:16 = 1:2

Therefore the butler steals 2/(2+1) = 2/3 of the butt.

16. (d)

Rate of interest on Rs. 8400 = $\frac{100*882*2}{8400*3} = 7\%$

Rate % of 1st sum rate of 2nd sum

8% — 6 2/3%

7%

1/3 — 1

Therefore the ratio is 1:3

Money lent at 8% and 6 2/3 % are Rs. 2100 and Rs. 6300 respectively.

17. (a)

By using rule of alligation

8 km/hr — 16 km/hr

80/7 km

(In 1 hr)

32/7 — 24/7

Therefore time taken on foot: time taken on bicycle = 32:24 = 4:3

Thus in 7 hours, he took 4 hour to travel on foot, distance travel in 4 hours = 4* 8 = 32 km.

18. (b)

By using rule of alligation,

Water milk

So 0 1

25/29

4/29 25/29

So the ratio is 4:25.

19. (a)

Alcohol concentrations are in the ratio of,

40% 19%

26%

7 14

The ratio is 7:14 = 1:2.

Therefore the quantity of whisky replaced is 2/3.

20. (d)

According to the question

Alcohol ingredients contain 40% alcohol and resultant mixture needs to have 15% alcohol only.

Let the concentration of non-alcoholic ingredients be x liters

Then we have

(6+x) *15% = 6*40% + x * (0% alcohol concentration)

On solving we get x =10 liters.

21. (c)

Let amount received by each student be x, then x= 312/100 = 312 paisa.

Then by using rule of alligation, 360 paisa 240 paisa

312 paisa

72 48

3 2

So no. of girls = 2/5 * 100 = 40.

22. (e)

Let 21 orange at each rate is sold

Then for 21 oranges, rate of 1st type = 35*7=245 cents

Rate of 2nd type = 85 *3 = 255 cents

For the total 1210/100 *21 = 254.1 cents

By using rule of alligation,

245 255

254.1

0.9 9.1

Therefore the ratio in which they are sold is 9:91

According to the question, 9/91 = x/100-x

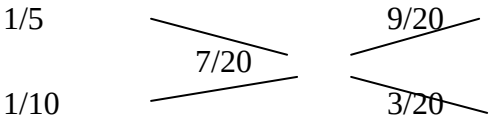
Then x = 9.

23. (a)

Ratio of bleach in X is 1:5

Ratio of bleach in Y is 9:20

By using rule of alligation



The percentage of detergent X is 2/5 * 100 = 40%

24. (c)

The number of liters of wine left in the container is,

By using formula,

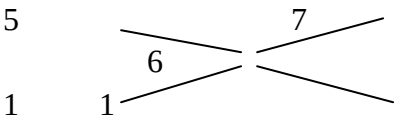
Quantity of liquid remains in the container after n operation = $X\left(1-\frac{Y}{X}\right)^n$

Where X is original quantity, Y is the quantity taken out, n= times of operation.

$$40\left(1-\frac{\frac{25}{4}}{40}\right)^2 \cong 28.5\ L$$

25. (a)

By using rule of alligation,



They are mixed in equal proportion, say if 6 bananas are brought from both trader each, then total amount ram pays = 5*6 + 7*6 = 72 (COST PRICE)

At 6 per rupee = 6*12 = 72(SELLING PRICE), so no loss and no profit.

26. (e)

$$\frac{Quantity\ of\ wine\ left}{quantity\ of\ water}=\frac{X\left(1-\frac{5}{X}\right)^2}{X}=\frac{361}{400}$$

Where, X is the volume of cask.

Then X = 100 L.

27. (b)

The three ratios are 2:1, 3:1 and 2:3

When they are mixed and put in new vessel then the ratio will be

Alcohol quantity in each glasses are 2/3, ¾ and 2/5. Taking LCM of denominator we get 60,

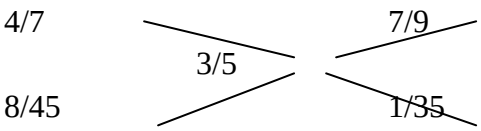
2/3 * 60, ¾ * 60 and 2/5 * 60 = 40, 45 and 24 liters.

Adding three of these = 40+45+24=109 liters.

Similar method will be applied for quantity of water then after adding we get 71 liters as answer so the ratio of alcohol and water in the large glass is 109:71.

28. (c)

Using quantity of type I cooking oil, then by using rule of alligation,



So the ratio is 8/45: 1/35 = 56:9.

29. (b)

$$\frac{quantity\ of\ spirit}{quantity\ of\ water} = \frac{7}{3}$$

Let x be the quantity of spirit to be drawn out and x water to be added to the mixture.

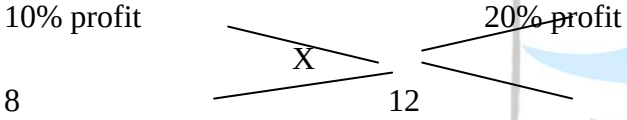
$$\frac{7-x}{3+x} = \frac{1}{1}$$

Then x = 2 L.

Total liters = 7+3 = 10, quantity withdrawn = 2/ 10 = 1/5.

30. (d)

By using rule of alligation.



$$\frac{X-10}{20-X} = \frac{8}{12}$$

X = 16 %.

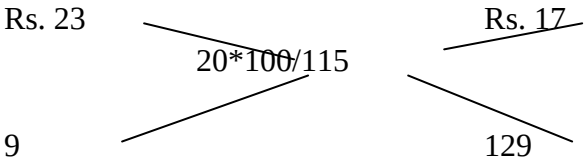
31. (e)

The ratio of all types of wheat is 125: 5x: 7x.

Cost of mixed wheat per kg = Rs. 24. By using this data we cannot calculate the quantity of type II wheat.

32. (b)

By using rule of alligation,

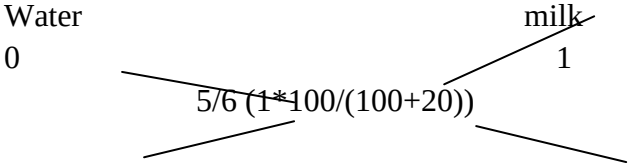


So the ratio is9:129= 3:43

3/43 = x/70

Then, x = 5 kg (approx.)

33. (c)

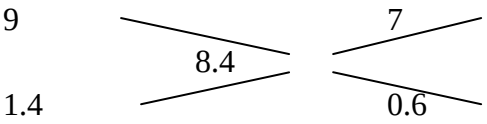


1/6 5/6

So the ratio = 1:5.

34. (b)

Using alligation rule,

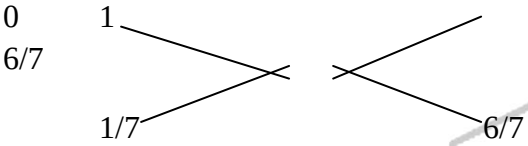


Ratio is 7:3

7/3 = x/36, x = 84 kg.

35. (d)

Water milk



Ratio is 1:6.

36. (c)

According to the question,

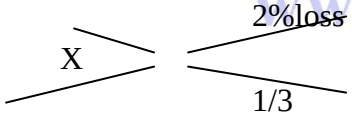
$$\frac{\frac{1}{4x}+5}{\frac{3}{4x}}=\frac{1}{2}$$

Then x = 40 L.

So new quantity is (40 +5) L =45 L.

37. (a)

5% profit 2%loss

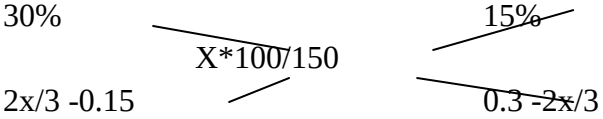


$$\frac{5-x}{x-2}=1/2$$

Then x = 8/3, the cost price of total goods is 4000 *3/8 *100 = 150000.

38. (d)

By using rule of alligation,



Ratio is

$$\frac{\frac{2x}{3} - 0.15}{0.3 - \frac{2x}{3}}$$

so data inadequate.

39. (b)

Since coffee worth Rs. 200 and R.s 175 is mixed in equal ratio.

So the average of both = 200 + 175 / 2 = 187.5

By using rule of alligation,

187.5 — 3rd quantity(x)

225

x- 225 — 37.5

Then, x-225/37.5 =2/3

Third quantity price is, x = 150 kg.

40. (e)

Since it is given in the question that the price changes when their weight get exchanged,

So total quantity of both metals will be same

Then cost of type I metal + cost of type II metal = (80 + 85)/20= 8.25.

Cost of type II metal = 8.25-5 = 3.25.

Mean of lump = 85/20

By using rule of alligation, 5 — 3.25

17/4

So, 1 — ¾

The weight of type II metal = 3/7 * 20 =60/7 gms.

41. (b)

From statement I, quantity of wheat of type A = 45 kg

From statement II, quantity of wheat of both type is in ratio = 9:13.

Quantity of 2nd type is 5*13 = 65.

Both type of wheat is mixed in ratio 9:13.

42. (a)

From statement I, quantity of type B =40kg, B: A = 5:4. 40/x = 5/4 then a = 32 kg.

From statement II, ratio is 6-x/x-4

43. (c)

From statement I, total quantity = 55 litres

From statement II, no. of operation = 2, quantity replaced = 11.

On combining both statement, 55(1-11/55) ^2 = 176/5 L of alcohol remains.

44. (d)

From statement I, by using alligation rule we can find the ratio of water and milk.

From statement II, 20 % water is present so ratio of milk and water is 4:1.

45. (e)

From statement I, data is not sufficient to answer the question.

From statement I, no rice of wheat is given

On combining both statements we are not getting the desired result.

46. (c)

From statement I, alcohol = 5L +water,
From statement II, initial ratio = 14:5,
14x/5x +y = 19/5.
14x = 5 + 5x.
On combining both statements we get the answer.

47. (e)

From statement I, let x be total quantity of mixture, then x-5, alcohol concentration =5%.
From statement II, x-10L, alcohol = 10 L = water concentration,
Also on combining we do not get the desired result.

48. (c)

From statement I, data inadequate to answer the question,
From statement II, Alcohol ingredients contain 60% alcohol and resultant mixture needs to have 65% alcohol only.
Hence we have
(10+x) *25% = 10*60% + x * (0%)
On solving we get x =70/13.

49. (e)

From statement I, quantity of apple juice in 1st container =quantity of apple juice in 2nd container/2.
From statement II, apple juice/mango juice = 4:9.
By combining both statements we do not get the required result.

50. (b)

From statement I, type I>type II
From statement II, quantity of type II wheat is 45/x = 4/5, x=45*5/4 = 225/4 kg.

DATA INTERPRETATION

Directions (01 to 05): Study the given table carefully and answer the questions asked below.
The given table represents the no. of candidates appeared and qualified during 1991 to 1996 from 6 states.

Year / State	1991		1992		1993		1994		1995		1996	
	App.	Qual.	App.	Qual.	App.	Qual.	App.	Qual.	App.	Qual.	App.	Qual.
A	5600	840	7250	925	8250	876	7856	824	8349	932	7964	853
B	7200	864	8100	640	7865	792	8425	896	7658	878	8107	940
C	4850	588	6450	650	7120	685	7763	735	6984	792	7058	827
D	6325	745	7185	795	8545	842	6987	898	5896	685	6754	746
E	5200	640	6225	685	7962	934	7645	888	7389	843	7766	812
F	6500	820	7380	860	6895	788	7844	762	8105	798	8934	911

1). In which of the given years the No. of candidates appeared from state D has maximum percentage of qualified candidates.
a. 1992 b. 1995 c. 1993 d. 1994 e. None of these

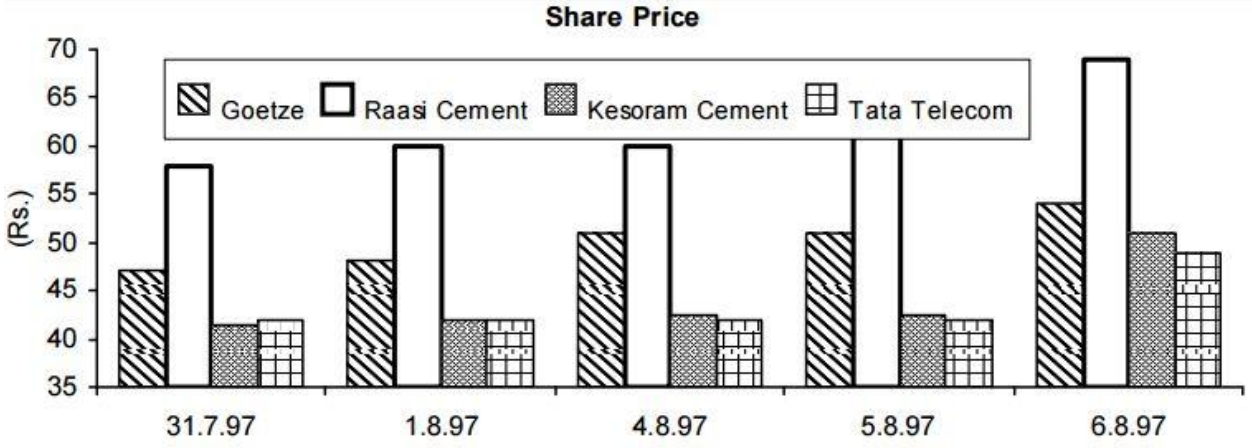
2). What is the difference between total candidates appeared in six states in the year 1991 and 1993?
a. 6915 b. 10692 c. 10962 d. 9615 e. None of these

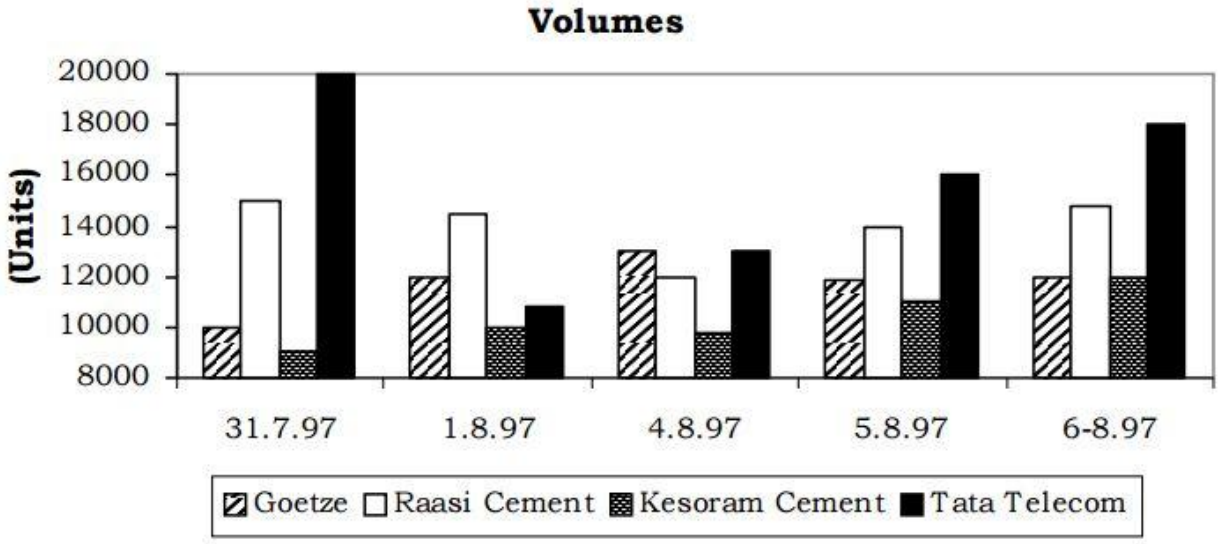
3). The percentage increase/decrease in the number of the appeared to the qualified candidates in the state B is _____ in 1991.
a. 1.25 b. 2.25 c. 2.50 d. 1.00 e. 1.50

4). What is the difference between total qualified candidates in six states in the years 1993 and 1996?
a. 217 b. 172 c. 168 d. 226 e. None of these

5). What is the percent of the total qualified candidates to the total number of appeared candidates among all the six states in 1996?
a. 15 b. 11 c. 19 d. 13 e. 14

Directions (Q. 6-10): Refer to the bar-graphs below and answer the questions that follow.
Movement of share prices of four companies in five trading sessions and the volumes on these.





6). Which of the following scrips shows the highest increase in the share price between 31/7 and 6/ 8 and by how much?
a) Goetze ® 9.5 b) Raasi ®11 c) Tata Telecom ® 7d) Kesoram ®10 e) None

7). Which of the following scrips clocks the highest turnover on 31/7? (Turnover = Volume × Share price)
a) Goetze b) Raasi c) Kesoram d) Tata Telecom e) None of these

8). Which of the following sets of scrips has shown an increase in volumes from 31/7 to 6/8?

a) Goetze, Raasi b) Raasi, Kesoram c) Kesoram, Goetze d) Raasi, Tata Telecom
e) None of these

9). What is the percentage change in the turnover of Tata Telecom from 31/7 to 6/8?
a) -5% b) -9% c) 5% d) 9% e) None of these

10). The price of which of the following scrips shows the highest percentage increase from 31/7 to 6/ 8?
a) Goetze b) Raasi c) Kesoram d) Tata Telecom e) None of these

Directions (11 – 15): Read the following table carefully to answer these questions:
A committee prepared a list of twenty players each in Test, ODI and T20 cricket tournaments, out of 39 players. Three players are there who are in Test and ODI list but not in T20. Four players are there who are in Test and T20 list but not in ODI, and same number of players are there who are in all the three lists.

11. How many players are there who are in exactly one list?
(a) 18 (b) 20 (c) 22 (d) 24 (e) 32

12. How many players are there who are in exactly two lists?
(a) 13 (b) 15 (c) 17 (d) 19 (e) 20

13. How many players are there who are in at least in two lists?
(a) 11 (b) 14 (c) 17 (d) 21 (e) 28

14. How many players are there who are in at most in two lists?
(a) 33 (b) 35 (c) 37 (d) 39 (e) 41

15. How many players are there who are in ODI and T20 list but not in Test lists?
(a) 10 (b) 8 (c) 6 (d) 4 (e) 2

Direction (16 to 20): Answer the questions on the basis of the following information.
Prakash has to decide whether or not to test a batch of 1000 widgets before sending them to the buyer. In case he decides to test, he has two options: (a) Use test I ; (b) Use test II. Test I cost Rs. 2 per widget. However, the test is not perfect. It send bad ones to the buyer as good. Test II costs Rs. 3 per widget. It brings out all the bad ones. A defective widget identified before sending can be corrected at a cost of Rs. 25 per widget. All defective widgets are identified at the buyer's en per defective widget has to be paid by Prakash.

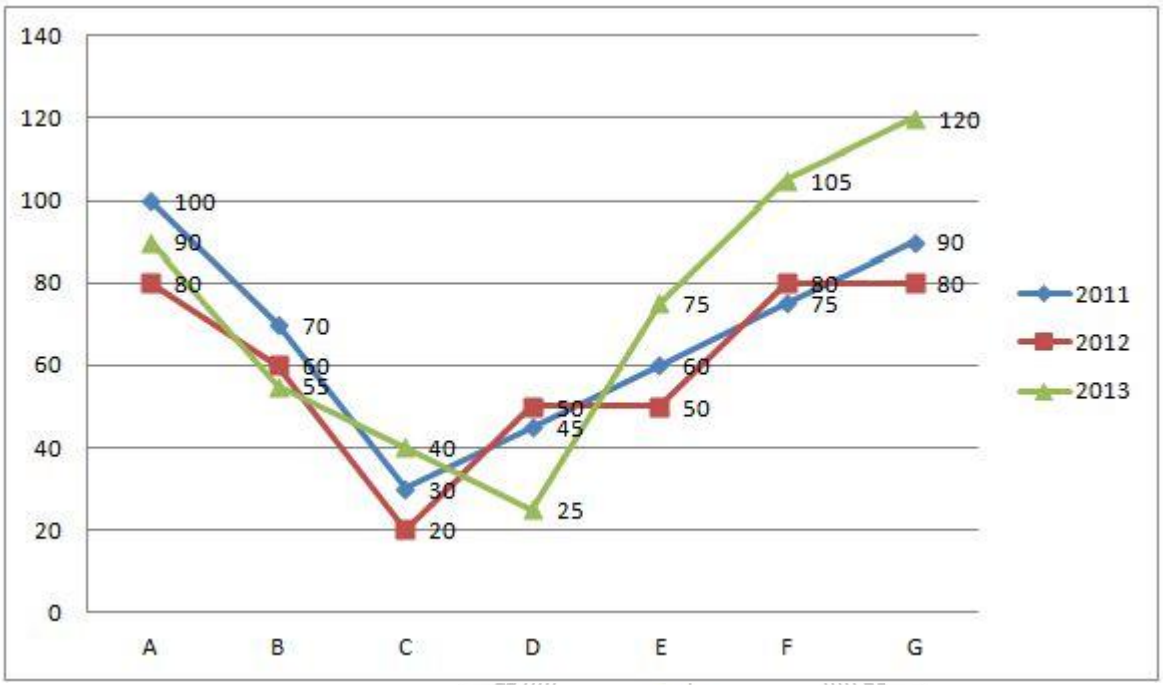
16). Prakash should not test if the number of bad widgets in the lot is:
(a) less than 100 (b) more than 200 (c) between 120 & 190 (d) Cannot be found out.
end and penalty of Rs. 50

17). If there are 120 defective widgets in the lot, Prakash:
(a) should either use Test I or not test. (b) should either use Test II or not test.
(c) should use Test I or Test II. (d) should use Test I only.

18). If the number of defective widgets in the lot is between 200 and 400, Prakash:
(a) may use Test I or Test II (b) should use Test I only.
(c) should use Test II only (d) cannot decide.

19). If Prakash is told that the lot has 160 defective widgets, he should:
(a) use Test I only (b) use Test II only.
(c) do no testing. (d) either use Test I or do not test.
20). If there are 200 defective widgets in the lot, Prakash:
(a) may use either Test I or Test II (b) should use Test I or not use any test
(c) should use Test II or not use any test. (d) cannot decide.

Directions (Q. 21-25): Study the following graph carefully and answer accordingly:
The following graph shows the production of rice (in million tonnes) in seven states from 2011 to 2013.



21). Which of the following states show the maximum percentage increase in the production of rice from 2011 to 2013?
a) C b) G c) E d) A e) None of these

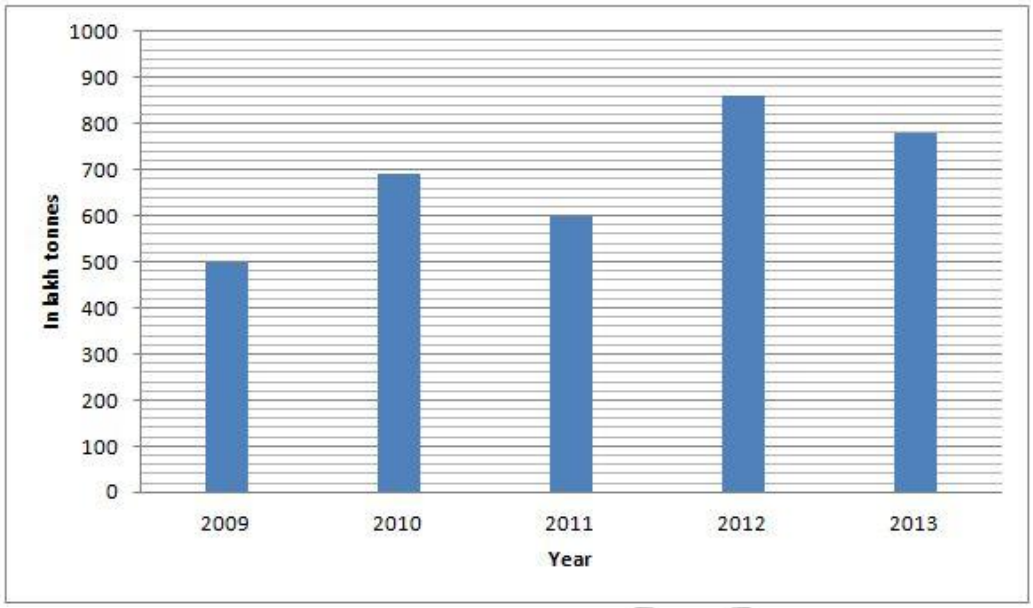
22). By what per cent the production of rice in 2011 produced by state B is less than that by state F in 2013?
a) 50% b) 33 1/3 % c) 40% d) 25% e) None of these

23). Find the average production of rice (in million tonnes) by all states in 2012.
a) 55.42 b) 65 c) 60 d) 50.82 e) 70.67

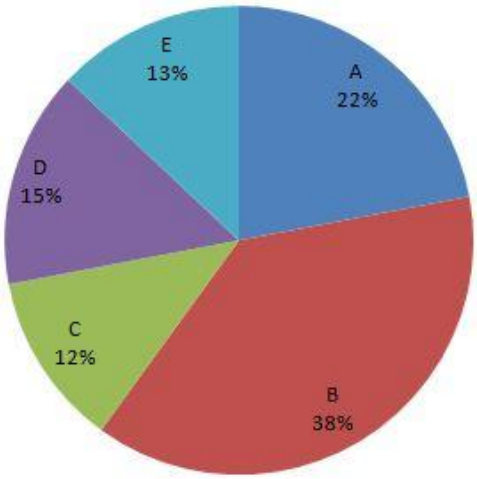
24). The rice produced by states D and F together in 2011 is what per cent more than that by state B and D together in 2013?
a) 50% b) 33.33% c) 40% d) 60% e) None of these

25). Which of the following states shows a continuous decrease in the production of rice over the years?
a) A b) B c) C d) G e) None of these

Directions (Q. 26-30): Study the following information carefully and answer the questions given below:
The bar-graph shows the production of steel in a country (in lakh tonnes) in different years.



The pie-chart shows the production of steel (in lakh tonnes) by five different companies in 2012. These companies are the only ones to produce steel in all the given years..



26). In the year 2012, what was the production of steel by Company C (in lakh tonnes)?
a) 98.6 b) 103.2 c) 112.6 d) 123.4 e) 132.5

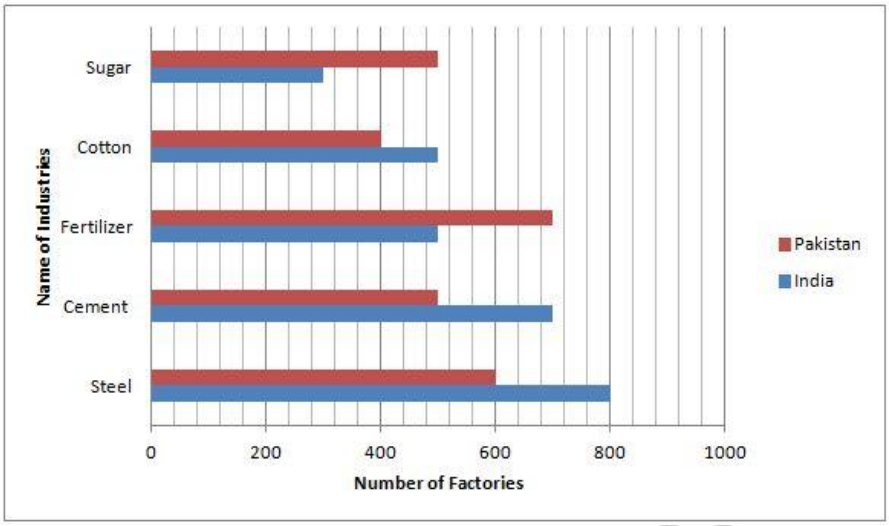
27). In how many years is the production of steel more than 10% more/less than the previous year 's production?
a) 1 b) 2 c) 3 d) 4 e) 5

28). Company A produced 18% of the total steel produced every year except in 2012. What was the total production of steel by Company A for the given years (in lakh tonnes)? (Do not take 2012 into account.)
a) 462.60 b) 531.20 c) 591.70 d) 651.8 e) 720.6

29). In how many years was the production of steel more than the average production for the given years?
a) 1 b) 2 c) 3 d) 4 e) 5

30). What is the angle subtended by Company D in the steel production in 2012?
a) 18° b) 36° c) 144° d) 72° e) 54°

Directions (Q. 31-35): Study the bar chart carefully to answer the questions given below:
The number of factories of various industries in India and Pakistan



31). If the ratio of production of Steel in India to that in Pakistan is 5 : 3 and the production of Steel in India is 1000 tonnes, what is the ratio of the productivity (production/no. of factories) of Steel in India to that of Pakistan?
a) 5 : 4 b) 4 : 3 c) 3 : 2 d) 2 : 1 e) None of these

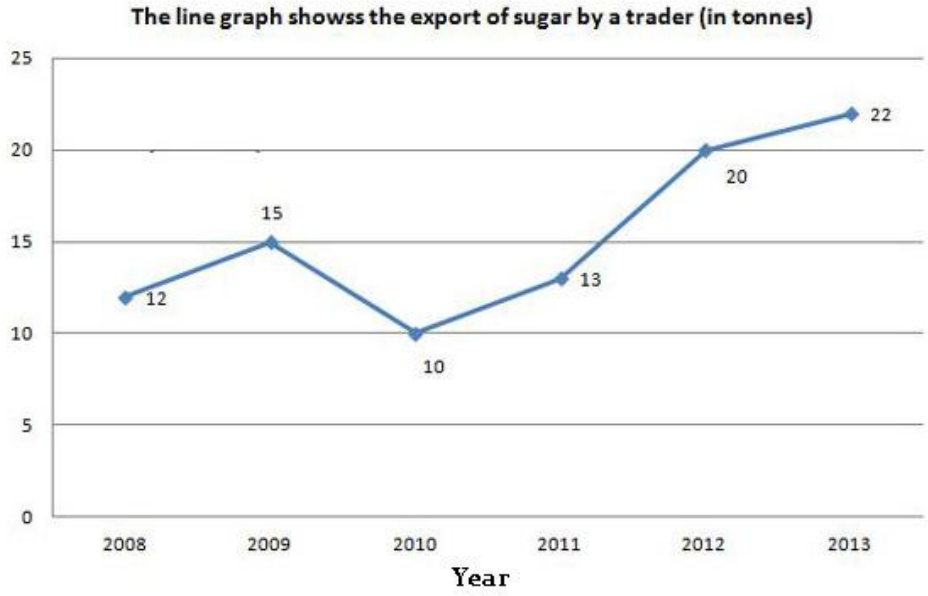
32). What is the difference between the total number of factories in India and that in Pakistan?
a) 250 b) 150 c) 50 d) 5 e) 100

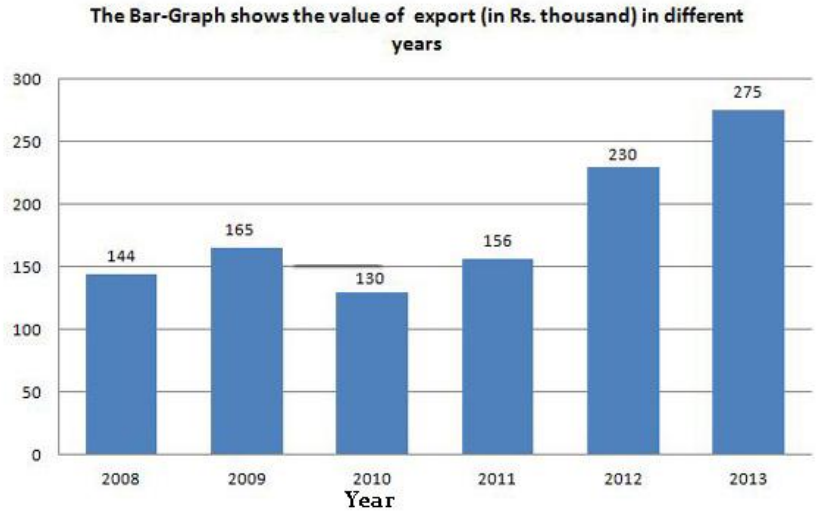
33). The number of Cotton factories in Pakistan is what per cent of the total number of Cement factories in India?
a) 53.5% b) 59.9% c) 57.14% d) 50% e) 48.7%

34). If Pakistan and India export 40% and 30% respectively of their production of Fertilizer, then what is the difference between the amounts of Fertilizer theyused for themselves? (The production of Pakistan is 50 tonnes per factory and that of India is 60 tonnes per factory)
a) 15 tonnes b) 0 tonne c) 35 tonnes d) 32 tonnes e) 11 tonnes

35). If the production of Cement in India is 24500 tonnes and that in Pakistan is 14500 tonnes, then what is the difference between their productivity (production/ number of factories)?
a) 4.3 tonnes b) 6 tonnes c) 5.714 tonnes d) 8.2 tonnes e) 7.9 tonnes

Directions(Q36-40) Study the following graph carefully and answer the questions given below it:





36). In which year is the value of sugar exported per tonne the highest?
(a)2009 (b)2008 (c)2010 (d)2012 (e)2013

37). In which of the following years is the percentage increase in the value of sugar exported over the previous year the minimum?
(a) 2009 (b)2011 (c)2012 (d)2013 (e)2010

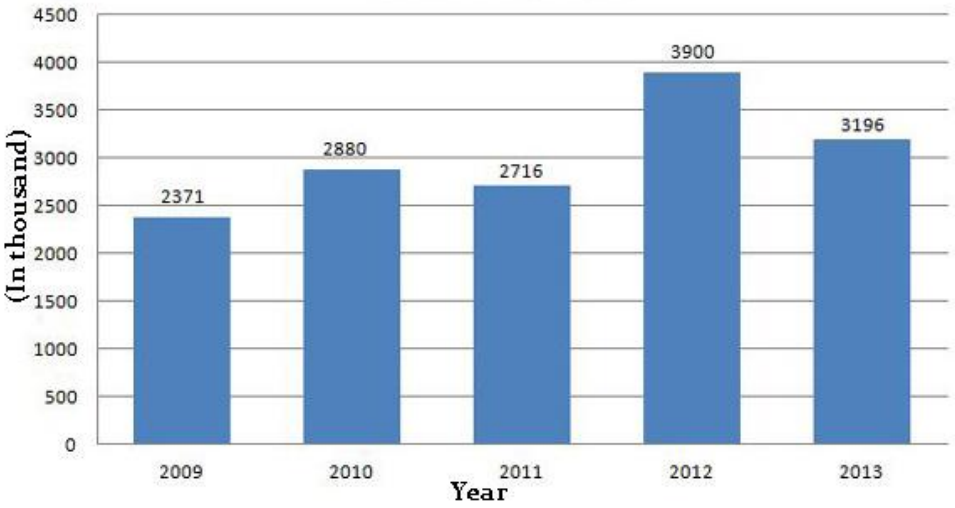
38). In how many years the quantity of sugar exported is more than the average quantity of sugar exported for the given period?
(a)1 (b)2 (c)3 (d)4 (e)5

39). What is the difference in the value of sugar per kg exported in 2009 and that in 2012?
(a)Rs 2 (b)Rs 1.50 (c)Rs 1 (d)Rs 5 (e)Rs 2.50

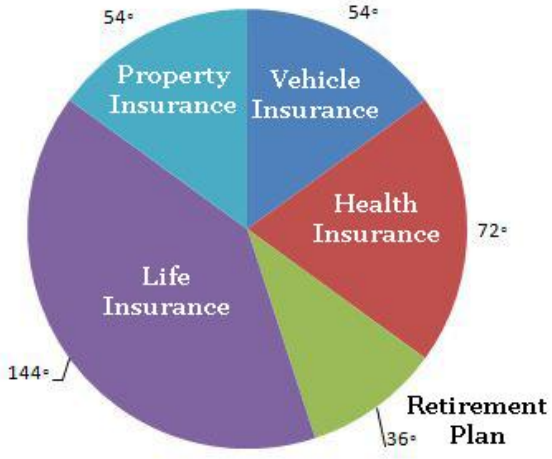
40). From 2013 to 2014, if there is a 2.5% increase in the quantity of sugar exported and 40% increase in the value, then what is the value of sugar exported per kg in 2014?
(a)Rs 11 (b)Rs 12 (c)Rs 13 (d)Rs 14 (e)Rs 15

Directions (41-45) Read the Pie-chart and table carefully and answer the questions that follow:

The Bar-Graph shows the number of customers of an inssurance company (2009 to 2013)



The Pie-Charts shows the classification of customers for the year 2012



41). In which year is the increase in the number of customers of the company highest over the previous year?
(a)2010 (b)2011 (c)2012 (d)2013 (e)2009

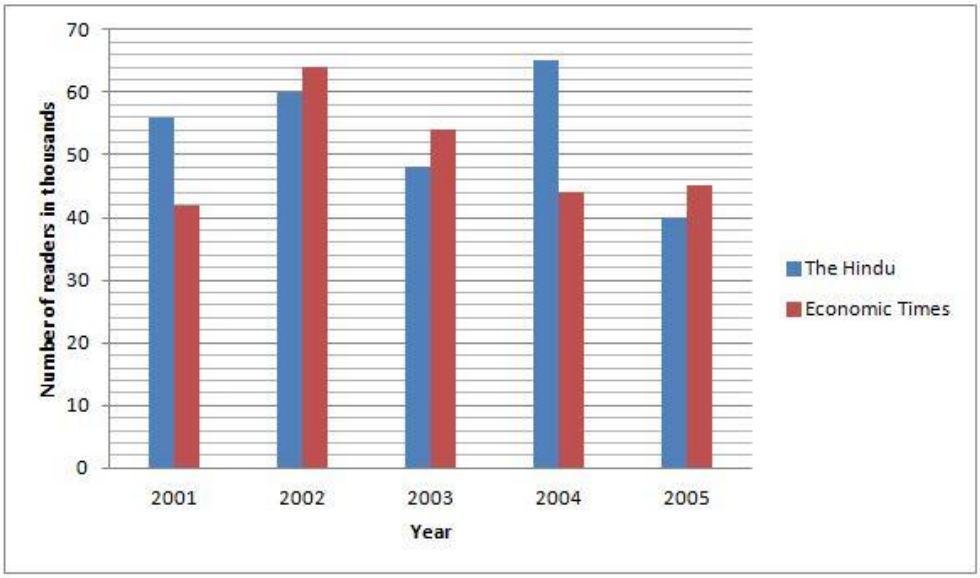
42). How many customers took vehicle insurance in 2012?
(a)46500 (b)58500 (c)78000 (d)47800 (e)64000

43). What % of the total customers for the year 2012 do the customers covered under the health insurance and property insurance together form?
(a)15% (b)20% (c)30% (d)35% (e)45%

44). The pie-chart for various schemes is the same for all the years. When was the number of life insurance customers the highest?
(a)2010 (b)2009 (c)2013 (d)2012 (e)2011

45). From the data of question 9, what is the approximate % increase in the number of customers under retirement plan from 2010 to 2012?
(a)25% (b)30% (c)35% (d)40% (e)45%

Directions (Q. 46-50): The following bar chart shows the total number of readers of newspaper The Hindu and Economic Times over the period of 2001 to 2005 and the table shows the percentage of female readers among them.



Years	The Hindu	Economic Times
	% Female	% Female
2001	43%	51%
2002	37%	45%
2003	45%	48%
2004	52%	54%
2005	39%	56%

46). What is the total number of female readers of newspaper Economic Times in the year 2004?
a) 21480 b) 22320 c) 23760 d) 24850 e) 25200

47). What is the difference between the total male readers of newspaper The Hindu and its total female readers in the year 2001?
a) 8620 b) 7840 c) 7450 d) 7280 e) 7060

48). What is the ratio of the total male readers of newspaper The Hindu in the year 2003 to the total female readers of newspaper Economic Times in the year 2005?
a) 22 : 21 b) 13 : 22 c) 24 : 23 d) 25 : 24 e) 16 : 15

49). What is the average number of male readers of newspaper Economic Times over the years?
a) 21320 b) 22640 c) 23450 d) 24780 e) 25160

50). The total number of female readers of newspaper The Hindu in the year 2002 is approximately what per cent of the total number of male readers of newspaper Economic Times in the year 2002?
a) 65% b) 63% c) 61% d) 59% e) 57%

SOLUTION AND EXPLANATION OF DATA INTERPRETATION

Answer:
1). d) 2). c) 3). a) 4). a) 5). b)

1). In 1994 – 898 (maximum)

2). In 1991 – 5600 + 7200 + 4850 + 6325 + 5200 + 6500 = 35675
In 1993 – 8250 + 7865 + 7120 + 8545 + 7962 + 6895 = 46637
Difference = 46637 – 35675 = 10962

3). Decrease is by 24
Increase is by 1900
Required percentage = (24 ×100)/ 1900 = 1.25%

4). In 1993 – 876 + 792 + 685 + 842 + 934 + 788 = 4917
In 1996 – 853 + 940 + 827 + 746 + 812 + 911 = 5089
Difference = 5089 – 4971 = 172

5). Required percentage
= (5089/46583) × 100 = 10.92% = 11%

Answers:
6)b 7)b 8)c 9)c 10)c

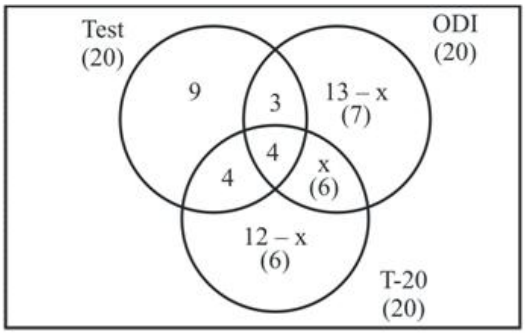
6). By observation, Raasi Cement shows the highest increase in the share price.
Answer: b)

7). By observation, it is either Tata or Raasi. Tata's turnover = 20,000 × 42 = Rs 840,000 Raasi's turnover = 15,000 × 58 = Rs 870,000 Hence, Raasi's turnover is highest on 31/7.
Answer: b)

8). By observation, it is Goetze and Kesoram.
Answer: c)

9). Tata's turnover on 31/7 was Rs 840,000. On 6/8, it was 49 × 18,000 = Rs 882,000. Percentage change = (882000-840000)/840000 = 5%
Answer: c)

10). By observation, it is either Raasi or Kesoram. For Raasi, % increase = (69-58)/58 » 19%
For Kesoram, % increase = (50-41.5)/41.5 = 20%
Answer: c)



$9 + 3 + 13 – x + 4 + 4 + x + 12 – x = 39$
$45 – x = 39$
$x = 45 – 39 = 6$

11. (c) $9 + 7 + 6 = 22$
12. (a) $6 + 4 + 3 = 13$
13. (c) $6 + 4 + 3 + 4 = 17$
14. (b) $6 + 4 + 3 + 22 = 35$
15. (c)

16). (a)
Total number of batches = 1000
Let p be the total number of bad widgets
Therefore the total number of good ones will be (1000 –p).
On test I his total cost will be = Rs.2 (1000) + 25 x 0.8p + 50 x 0.2p
On test 2 his total cost will be = Rs. 3(1000) + 25 x p
Now, it will be worth testing if the cost of testing is less than the cost of penalty levied on the defective pieces. Let us check all the choices:

No. of defectives	Cost of Test I	Cost of Test II	Penalty if not tested
100	Rs.5000	Rs.5500	Rs.5000
120	Rs.5600	Rs.6000	Rs.6000
160	Rs.6800	Rs.7000	Rs.8000
190	Rs.7700	Rs.7750	Rs.9500
200	Rs.8000	Rs.8000	Rs.10000
400	Rs.14000	Rs.13000	Rs.20000

Above 100 defectives cost is cheaper than the penalty.
But for 100 defectives the cost of penalty is the same as that for testing.
Therefore we come to this conclusion that below 100 defectives, the penalty will be less than the cost of testing and hence it is not worth testing.

17).d)
If there are 120 widgets, he should go for test I as it is cheaper

18).(c)
From the table we can say that if the number of defectives is between 200 & 400, he should go for Test II as it is cheaper.

19).(a)
In case of 160 defectives he should use test I as it is cheaper.

20). (a)
As the cost of both the Tests is same = Rs.8000.
Prakash may use either Test I or Test II for 200 widgets

Answers:
21).e 22).b 23).c 24).a 25).b

21). There is maximum gap between 2011 and 2013 for state F. And maximum percentage increase is also for state F.
Answer: e)

22). Required less % = 105 – 70 / 105 = 33 1/3 %
Answer: b)

23). Avg. production = 80 + 60 + 20 + 50 + 50 + 80 + 80 / 7 = 60 million tonnes
Answer: c)

24). Required more % = (45 + 75 – 55 + 25) / (55 + 25) × 100 = 50%
Answer: a)

25). Given data shows that B state shows a continuous decrease in the production of rice over the years.
Answer: b)

Answers:
26)b 27)c 28)a 29)c 30)e 31)a 32)e 33)c 34)b 35)b

26). Required production = 12 / 100 × 860 = 103.2 lakh tonnes.
Answer: b)

27). Production increase from 2009 to 2010 = (690 – 500) / 500 × 100 = 38% increase
From 2010 to 2011 = 90 / 690 × 100 = 13.04% decrease
From 2011 to 2012 = 260 / 600 × 100 = 43.33% increase
From 2012 to 2013 = 80 / 860 × 100 = 9.30% decrease
Thus these years are 2010, 2011 and 2012.
Hence, there are only three years.
Answer: c)

28). Total production of steel by Company A in year 2009, 2010, 2011 and 2013 = 500 × 18 / 100 + 690 × 18 / 100 + 600 × 18 / 100 + 780 × 18 / 100
= 18 / 100 × (500 + 690 + 600 + 780)
= 18 / 100 × 2570 = 462.6 lakh tonnes.
Answer: a)

29). Average production = 500 + 690 + 600 + 860 + 780 / 5 = 686 lakh tonnes
Hence the production of steel is more than average production in the year 2010, 2012 and 2013.
Thus, there are only three years in which production of steel is more than average production.
Answer: c)

30). Let the angle be x°.
Then, x / 360 × 860 = 129
(15% of 860 = 129)
x = 129 – 360 /860 = 54°.
Answer: e)

31). Production of Steel in India = 1000 tonnes
Productivity of Steel in India = 1000 / 800 = 1.25 tonnes per factory
P = 600 tonnes
Productivity of Steel in Pakistan = 600 / 600 = 1 tonnes per factory
Required ratio = 1.25: 1 = 125 : 100 = 5 : 4.
Answer: a)

32). Total factories in India = 300 + 500 + 500 + 700 + 800 = 2800
Total factories in Pakistan = 500 + 400 + 700 + 500 + 600 = 2700
Required difference = 2800 – 2700 = 100.
Answer: e)

33). Total number of Cotton factories in Pakistan = 400
Total number of Cement factories in India = 700
Required % = 400 × 100 / 700 = 57.14 % of the number of Cement factories in India.
Answer: c)

34). Production of fertilizer in Pakistan = 50 × 700 = 35000 tonnes
Export of Pakistan is 40% of its production.
Then, the Fertilizer used by Pakistan itself = 35000 × 60 / 100 = 21000 tonnes
Production of Fertilizer in India = 60 × 500 = 30000 tonnes
India exports 30% of its production. So, Fertilizer used by India itself = 30000 × 70 / 100 = 21000 tonnes
Required difference = 21000 – 21000 = 0 tonne.
Answer: b)

35). Productivity of Cement = Production per factory
Productivity of Cement in India = 24500 / 700 = 35 tonnes
Productivity of Cement in Pakistan = 14500 / 500 = 29 tonnes
Required difference = 35 – 29 = 6 tonnes.
Answer: b)

36). Value per tonne = Value/tone
Answer- c)

37). % increase = (difference/Previous year) × 100
Now 2009 to 2010 = [(165 - 144)/144] × 100
Answer- a)

38). Average quantity of export of sugar
= (12 + 15 + 10 + 13 + 20 + 22)/6
=92/6, = 15.33 tonne

Thus, in the year 2012 and 2013, the export quantity of sugar was more than average quantity of sugar export.
Answer- b)

39). Difference = [(230×1000)/ (20 × 1000)] - [(165×1000)/ (15 × 1000)]
= 11.5 – 11, = Rs. 1.5
Answer- b)

46).c 47).b 48).a 49).d 50).b

46). Total number of female readers of newspaper Economic Times in the year 2004
= 44000 × 54 / 100 = 23760
Answer: c)

47). Difference = 56000 × (57 – 43) / 100
= 560 × 14 = 7840
Answer: b)

48). Required ratio = 48000 × 55 / 100 ÷ 45000 × 56 / 100
= 48 × 55 / 45 × 56 = 66 : 63 = 22 : 21
Answer: a)

49). Average number of male readers of newspaper Economic times
= 1000 / 5 × 100 × (42 × 49 + 64 × 55 + 54 × 52 + 44 × 46 + 45 × 44)
= 2 × (2058 + 3520 + 2808 + 2024 + 1980)
= 2 × 12390 = 24780
Answer: d)

50). Total number f male readers of newspaper The Hindu in the year 2002
= 60000 × 37 / 100 = 22200
Total number f male readers of newspaper Economic Times in the year 2002
= 64000 × 55 / 100 = 35200
Required % = 22200 / 35200 × 100 = 63.068 = 63%
Answer: b)

40). Quantity of sugar exported in 2014 = 1.25 × 22 tonnes = 27.5 tonnes
Value of sugar exported in 2014 = 1.4 × 275
= Rs. 385 thousand
Therefore value per kg in 2014 = [(1.4×275)/ (1.25 × 22)] = Rs. 14
Answer- d)

41). From the graph we see increase in the number of customers only in the year 2010 and 2012.
So, in 2010 □ 2880– 2371 = 504 thousand
In 2012 □ 3900– 2716 = 1184 thousand
Answer- c)

42). Required number of customers
= (54/360) × 3900 thousand = 585 thousand
Answer- b)

43). Health insurance cover customers = (72/360)×3900 = 780
Properly insurance cover customers
= (54/360) ×3900 = 585
Total = 780 + 585 = 1365
Required % = (1365/3900) × 100 = 35%
Answer- d)

44). Answer- d)

45). Number of customers under retirement plan in 2010 □ (36/360) × 2880 = 288
Similarly, 2012 □ (36/360) × 3900 = 390
Answer- c)

Answers:
46).c 47).b 48).a 49).d 50).b
46). Total number of female readers of newspaper Economic Times in the year 2004
= 44000 × 54 / 100 = 23760
Answer: c)

47). Difference = 56000 × (57 – 43) / 100
= 560 × 14 = 7840
Answer: b)

48). Required ratio = 48000 × 55 / 100 ÷ 45000 × 56 / 100
= 48 × 55 / 45 × 56 = 66 : 63 = 22 : 21
Answer: a)

49). Average number of male readers of newspaper Economic times
= 1000 / 5 × 100 × (42 × 49 + 64 × 55 + 54 × 52 + 44 × 46 + 45 × 44)
= 2 × (2058 + 3520 + 2808 + 2024 + 1980)
= 2 × 12390 = 24780
Answer: d)

50). Total number f male readers of newspaper The Hindu in the year 2002
= 60000 × 37 / 100 = 22200
Total number f male readers of newspaper Economic Times in the year 2002
= 64000 × 55 / 100 = 35200
Required % = 22200 / 35200 × 100 = 63.068 = 63%
Answer: b)

NUMBER SERIES

1). 17, 17, 34, 20, 20, 31, 23
a) 26 23 b) 34 20 c) 23 33 d) 27 28 e) 23 28

2). 6, 20, 8, 14, 10, 8, 12
a) 14 10 b) 2 18 c) 4 12 d) 2 14 e) 14 14

3). 21, 25, 18, 29, 33, 18
a) 43 18 b) 41 44 c) 37 18 d) 37 41 e) 38 41

4). 75, 65, 85, 55, 45, 85, 35
a) 25 15 b) 25 85 c) 35 25 d) 85 35 e) 25 75

5). 21, 9, 21, 11, 21, 13, 21, ... What number should come next?
a) 14 b) 15 c) 21 d) 23 e) None of these

6). 32, 34, 37, 46, 62, 87, 123
a) 34 b) 37 c) 62 d) 87 e) 46

7). 7, 18, 40, 106, 183, 282, 403
a) 18 b) 282 c) 40 d) 106 e) 183

8). 850, 843, 829, 808, 788, 745, 703
a) 843 b) 829 c) 808 d) 788 e) 745

9). 33, 321, 465, 537, 573, 590, 600
a) 321 b) 465 c) 573 d) 537 e) 590

10). 37, 47, 52, 67, 87, 112, 142
a) 47 b) 52 c) 67 d) 87 e) 112

11). 850, 600, 550, 500, 475, 462.5, 456.25
a) 600 b) 550 c) 500 d) 462.5 e) None of these

12). 2, 10, 18, 54, 162, 486, 1458
a) 18 b) 54 c) 162 d) 10 e) None of these

13). 13, 25, 40, 57, 79, 103, 130
a) 25 b) 40 c) 57 d) 79 e) None of these

14). 8, 12, 24, 46, 72, 108, 216
a) 12 b) 24 c) 46 d) 72 e) None of these

15). 142, 119, 100, 83, 65, 59, 52
a) 65 b) 100 c) 59 d) 119 e) None of these

16). 18, 119, 708, 3534, 14136, 42405
a) 708 b) 3534 c) 14136 d) 42405 e) 119

17). 5, 7.5, 11.25, 17.5, 29.75, 50, 91.25
a) 7.5 b) 17.5 c) 29.75 d) 91.25 e) 50

18). 35, 118, 280, 600, 1238, 2504, 5036
a) 118 b) 280 c) 600 d) 1238 e) 5036

19). 10, 12, 28, 90, 368, 1840, 11112

a) 1840 b) 368 c) 90 d) 28 e) 12

20). 7, 4, 5, 9, 20, 51, 160.5
a) 4 b) 5 c) 9 d) 20 e) 51

21). 1788, 892, 444, 220, 112, 52, 24
a) 52 b) 112 c) 220 d) 444 e) None of these

22). 7, 12, 40, 222, 1742, 17390, 208608
a) 7 b) 12 c) 40 d) 1742 e) 208608

23). 80, 42, 24, 13.5 8.75, 6.375, 5.1875
a) 8.75 b) 13.5 c) 24 d) 6.375 e) 42

24). 2, 9, 32, 105, 436, 2195, 13182
a) 436 b) 2195 c) 9 d) 32 e) 105

25). 4, 2.5, 3.5, 6.5, 15.5, 41.25, 126.75
a) 2.5 b) 3.5 c) 6.5 d) 15.5 e) 41.25

26). 2, 5, 11, 23, ?
a) 46 b) 52 c) 47 d) 57 e) 48

27). 198, 194, 185, 169, ?
a) 92 b) 136 c) 144 d) 112 e) None of these

28). 101, 100, ?, 87, 71, 46
a) 92 b) 88 c) 89 d) 96 e) None of these

29). 100, 50, 52, 26, 28, ?, 16, 8
a) 30 b) 36 c) 14 d) 32 e) None of these

30). 462, 420, 380, ?, 306
a) 322 b) 332 c) 342 d) 352 e) None of these

31). 0, 6, 24, 60, 120, 210, ?
a) 290 b) 240 c) 336 d) 504 e) None of these

32). 3, 15, 35, 63, ?, 143
a) 120 b) 110 c) 99 d) 91 e) None of these

33). 4, 9, 19, 39, 79, ?
a) 159 b) 119 c) 139 d) 169 e) None of these

34). 5, 10, 8, 12, 11, 14, ?, 16
a) 17 b) 13 c) 20 d) 14 e) None of these

35). 3, 6 18, 72, ?
a) 144 b) 216 c) 288 d) 360 e) 152

36). 24, 60, 120, ?, 110
a) 300 b) 336 c) 420 d) 525 e) 250

37). 5, 16, 51, 158, ?
a) 1452 b) 483 c) 481 d) 1454 e) 1500

38). 4, ?, 144, 400, 900, 1764
a) 25 b) 36 c) 49 d) 100 e) 120

39). 8, 3, 11, 14, 25
a) 50 b) 39 c) 29 d) 11 e) 12

40). 980, 392, 156.8, ?, 25.088, 10.0352
a) 66.04 b) 61.28 c) 63.72 d) 64.85 e) None of these

41). 77, 59, 55, 35, 25, ?
a) 24 b) 28 c) 20 d) 27 e) 29

42). 99, 82, 18, 11, ?
a) 5 b) 10 c) 2 d) 9 e) 8

43). 17, 36, 74, 150, ?, 606
a) 250 b) 303 c) 300 d) 302 e) 305

44). 51975, 9450, 2100, 600, 240, 160, ?
a) 80 b) 120 c) 320 d) 240 e) None of these

45). 17, 36, 52, 63, 67, ?
a) 71 b) 72 c) 62 d) 63 e) None of these

46). 10, 28, 64, 115, 175, ?
a) 252 b) 272 c) 232 d) 300 e) None of these

47). 64, 72, 79, 93, 103, ?
a) 104 b) 105 c) 107 d) 110 e) None of these

48). 5, 20, 53, 112, 205, ?
a) 320 b) 330 c) 340 d) 350 e) None of these

49). 20, 20, 10, 30, 7.5, ?
a) 32.5 b) 37.5 c) 41.25 d) 43.25 e) None of these

50). 64, 66, 72, 88, 128, ?
a) 256 b) 246 c) 224 d) 226 e) None of these

SOLUTION AND EXPLANATION OF NUMBER SERIES

1). e)
This is an alternating subtraction series with repetition. There are two different patterns here. In the first, a number repeats itself; then 3 is added to that number to arrive at the next number, which also repeats. This gives the series 17, 17, 20, 20, 23, and so on. Every third number follows a second pattern, in which 3 is subtracted from each number to arrive at the next: 34, 31, 28.

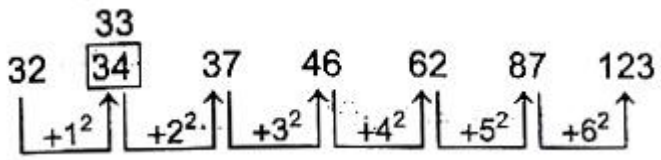
2). d)
This is an alternating addition and subtraction series. In the first pattern, 2 is added to each number to arrive at the next; in the alternate pattern, 6 is subtracted from each number to arrive at the next.

3). d)
This is a simple addition series with a random number, 18, interpolated as every third number. In the series, 4 is added to each number except 18, to arrive at the next number.

4). b)
This is a simple subtraction series in which a random number, 85, is interpolated as every third number. In the subtraction series, 10 is subtracted from each number to arrive at the next.

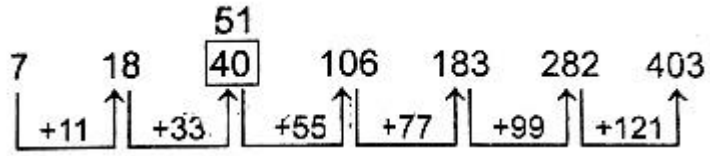
5). b)
In this alternating repetition series, the random number 21 is interpolated every other number into an otherwise simple addition series that increases by 2, beginning with the number 9.

6). a)



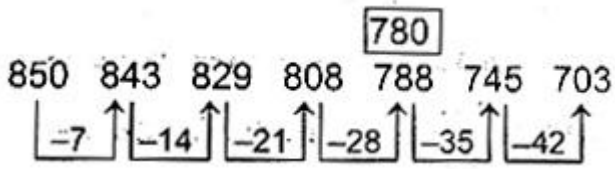
So the wrong number is 34 which must be 33.

7). c)



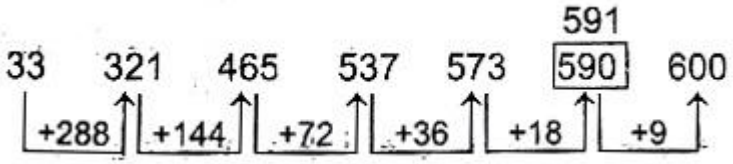
So, the wrong number is 40 which must be 51.

8). d)



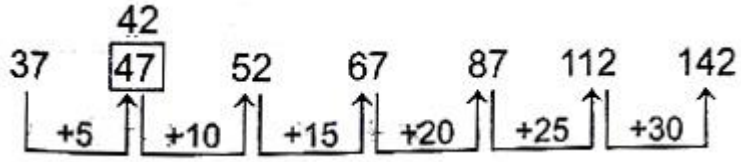
So, the wrong number is 788 which must be 780.

9). e)



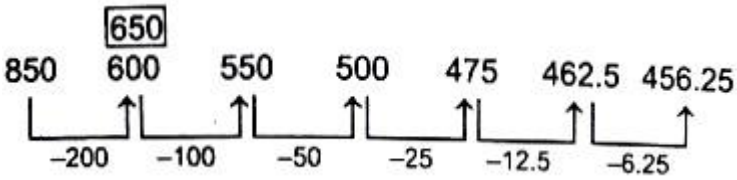
So, the wrong number is 590 which must be 591.

10). a)



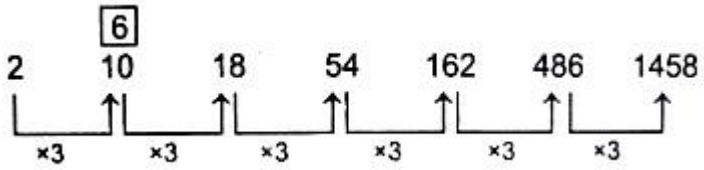
So, the wrong number is 47 which must be 42.

11). a)



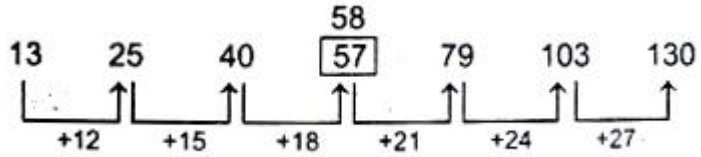
So, wrong number = 600
Correct number = 850 – 200 = 650

12). d)



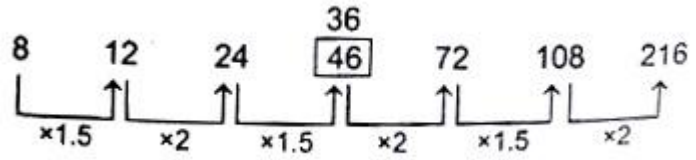
So, wrong number = 10
Correct number = 2 × 3 = 6

13). c)



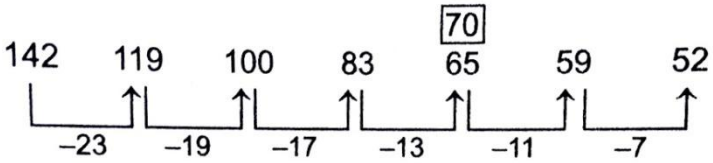
So, wrong number = 57
Correct number = 40 + 18 = 58

14). c)



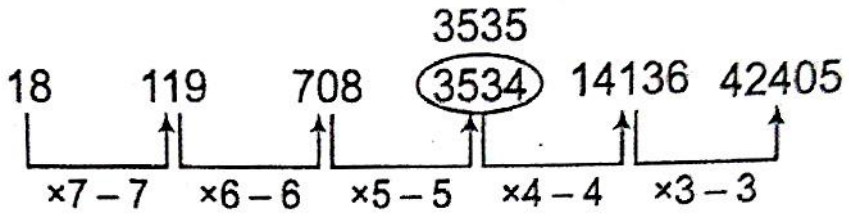
So, wrong number = 46
Correct number = 24 × 1.5 = 36

15). a)



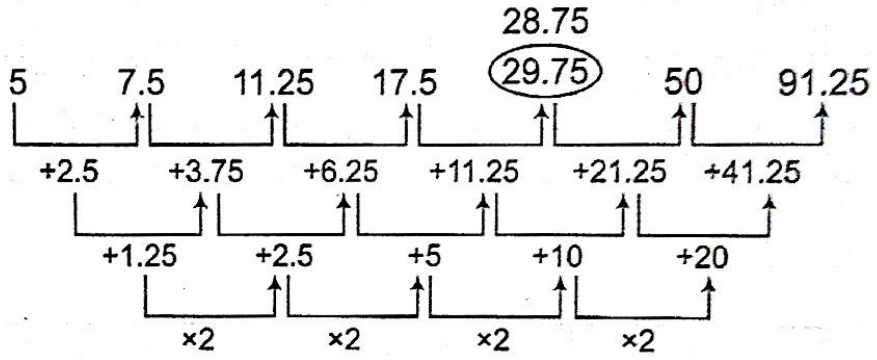
So, wrong number = 65
Correct number = 83 – 13 = 70

16). b)
The Pattern is as follows



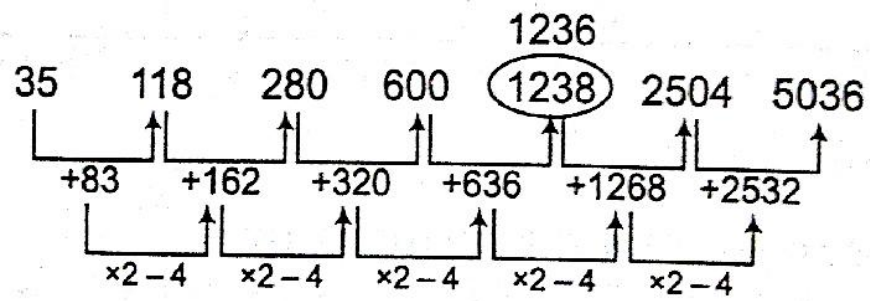
Hence, number 3534 is wrong and should be replaced by 3535.

17). c)
The pattern is as follows



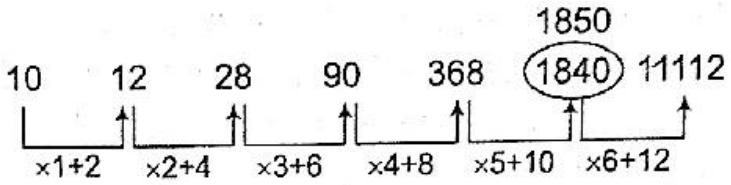
Hence, number 29.75 is wrong and should be replaced by 28.75.

18). d)
The pattern is as follows



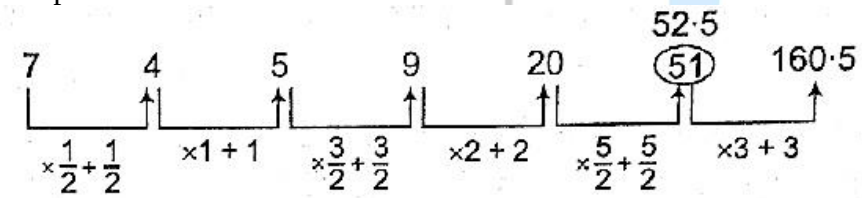
Hence, number 1238 is wrong and should be replaced by 1236.

19). a)
The pattern is as follows



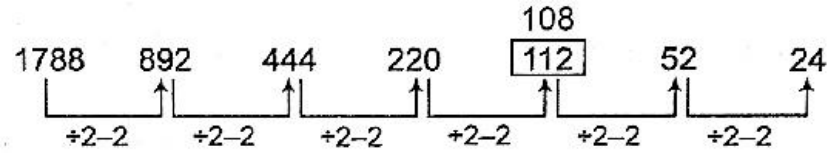
Hence, number 1840 is wrong and should be replaced by 1850.

20). e)
The pattern is as follows



Hence, number 51 is wrong and should be replaced by 52.5.

21). b)
The pattern is as follows

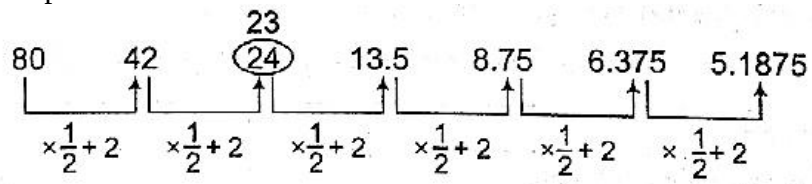


Hence, number 112 is wrong and should be replaced by 108.

22). b)
The pattern is as follows
7×2-2×1=12
12×4-(4×2)=40
40×6-(6×3)=222
222×8-(8×4)=1742=1744
1744×10-(10×5)=17390
17390×12-(12×6)=208608
Hence, number 1742 is wrong and should be replaced by 1744.

23). c)

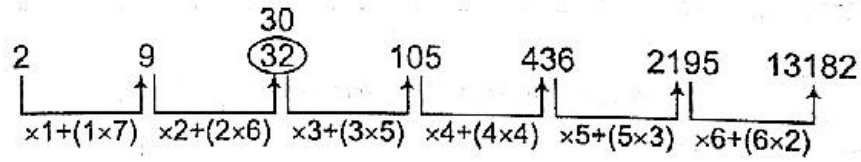
The pattern is as follows



Hence, number 24 is wrong and should be replaced by 23.

24). d)

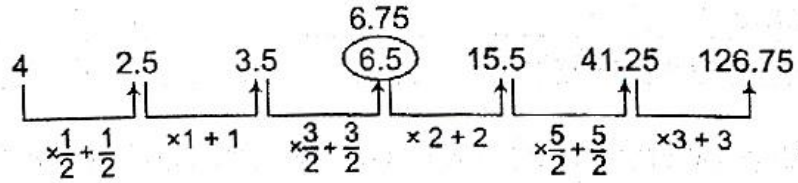
The pattern is as follows



Hence, number 32 is wrong and should be replaced by 30.

25). c)

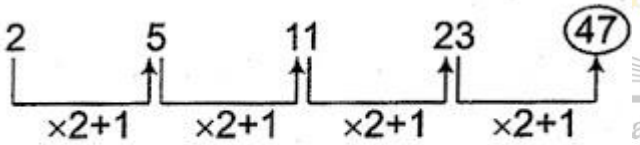
The pattern is as follows



Hence, number 6.5 is wrong and should be replaced by 6.75.

26). c)

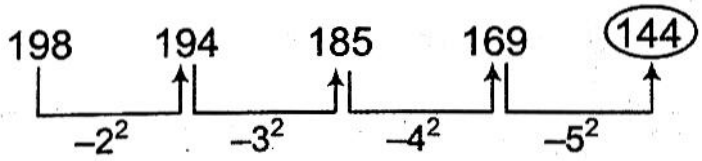
The pattern is as follows



∴ ? = 47

27). c)

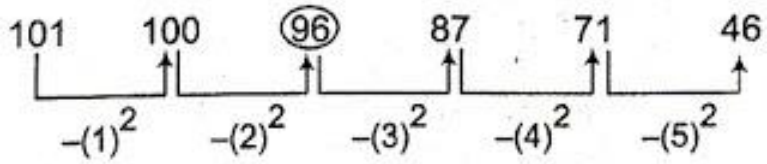
The pattern is as follows



∴ ? = 144

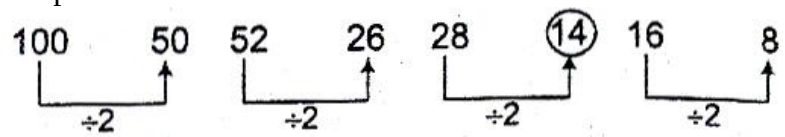
28). d)

The pattern is as follows



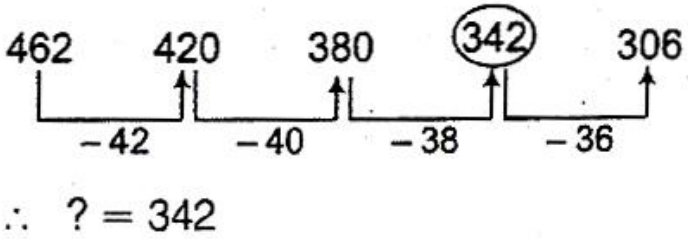
Missing number = 100 – (2)2 = 100 – 4 = 96

29). c)
The pattern is as follows



Missing number = 28 / 2 = 14

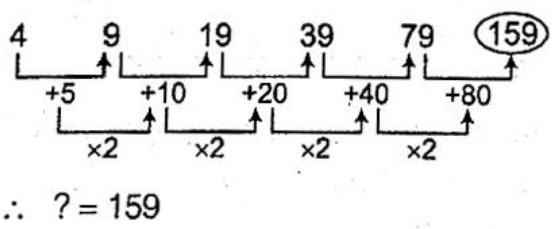
30). c)
The pattern is as follows



31). c)
The pattern is as follows
03 – 0 = 0
23 – 2 = 6
33 – 3 = 24
43 – 4 = 60
53 – 5 = 120
63 – 6 = 210
73 – 7 = 336
? = 336

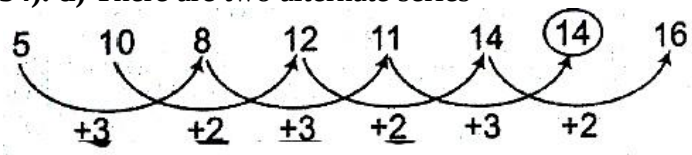
32). c) The pattern is as follows
3 = 1 × 3 à 15 = 3 × 5
35 = 5 × 7 à 63 = 7 × 9
99 = 9 × 11à 143 = 11 × 13
? = 99

33). a) The pattern is as follows

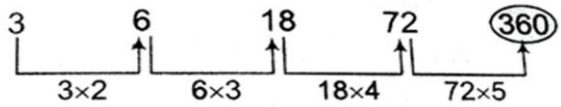


? = 342

34). d) There are two alternate series

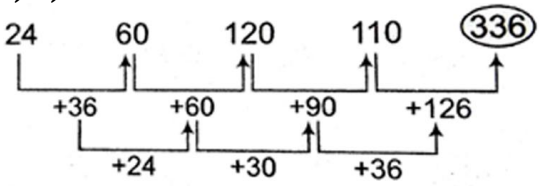


35).d)



$\therefore$? = 360

36).b)



$\therefore$? = 336

37).c)

$5 \times 3 + 1 = 16$

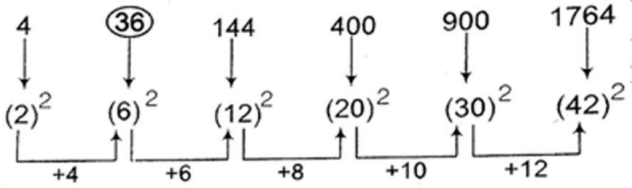
$16 \times 3 + 3 = 51$

$51 \times 3 + 5 = 158$

$158 \times 3 + 7 = (481)$

? = 481

38).b)



$\therefore$? = 36

39).b)

Every third element is the sum of previous two elements.

$8 + 3 = 11$

$\Rightarrow \quad 3 + 11 = 14$

$11 + 14 = 25$

$\Rightarrow \quad 14 + 25 = (39)$

$\therefore \quad ? = 39$

40).e)

41).c)

Every third element is the sum of previous two elements.

$8 + 3 = 11$

$\Rightarrow \quad 3 + 11 = 14$

$11 + 14 = 25$

$\Rightarrow \quad 14 + 25 = (39)$

$\therefore \quad ? = 39$

42).a)

Digits of each element are multiplied and then 10 is added to this multiplication to obtain the next element.

77 → 59 → 55 → 35 → 25 → (20)

$7 \times 7 + 10$ $\quad 5 \times 9 + 10$ $\quad 5 \times 5 + 10$ $\quad 3 \times 5 + 10$ $\quad 2 \times 5 + 10$

$\therefore \; ? = 2 \times 5 + 10 = 10 + 10 = 20$

43).d)

The pattern is as follows

17 → 36 → 74 → 150 → (302) → 606

$\times 2 + 2$ $\quad \times 2 + 2$ $\quad \times 2 + 2$ $\quad \times 2 + 2$ $\quad \times 2 + 2$

$\therefore \; ? = 150 \times 2 + 2 = 302$

44).c)

51975 → 9450 → 2100 → 600 → 240 → 160 → (320)

$\times \frac{2}{11}$ $\quad \times \frac{2}{9}$ $\quad \times \frac{2}{7}$ $\quad \times \frac{2}{5}$ $\quad \times \frac{2}{3}$ $\quad \times \frac{2}{1}$

$\therefore \quad ? = 320$

45). c)

17 + (5*4 -1) = 36
36 + (5*4 – 4) = 52
52 + (5*4 – 9) = 63
63 + (5*4 – 16) = 67
67 + (5*4 – 25) = 62

46). c)

10 + (21 – 3) = 28
28 + (42 – 6) = 64
64 + (63 – 12) = 115
115 + (84 – 24) = 175
175 + (105 – 48) = 232

47). b)
64 + (6+4 – 2) = 72
72 + (7 +2 – 2) = 79
79 + (7 + 9 – 2) = 93
93 + (9 + 3 -2) = 103
103 + (1 +0 +3 -2) = 105

48). c)
5 + (4^2 – 1) = 20
20 + (6^2 -3) = 53
53 + (8^2 -5) = 112
112 + (10^2 – 7) = 205
205 +(12^2 – 9) = 340

49). b)
20*1 = 20
20 ÷ 2 = 10
10 * 3 = 30
30 ÷4 = 7.5
7.5 * 5 = 37.5

50). c)
64 + (1*2) = 66
66 + (2*3) = 72
72 + (4*4) = 88
88 + (8*5) = 128
128 + (16*6) = 224

PROBLEMS AREAS

1. The side of a square is equal to the length of a rectangle: also the side of square is twice the breadth of the rectangle. If the sum of the areas of square and rectangle is 54 cm², what is the length of the rectangle?
(a) 6 cm (b) 8 cm (c) 7 c m (d) 10 cm (e) 4 cm

2. The numeric value of the perimeter of a rectangular field is less than that of its area by 128. If the breadth of the same field is halved, then the numeric value of the perimeter of the field becomes 40 less than its area. What is the area of the rectangular field?
(a) 196 cm² (b) 216 cm² (c) 144 cm² (d) 176 cm² (e) NOT

3. A rectangular garden of length 12 m is surrounded by a 2 m wide path. If the area of the garden is 84 m² and the cost of gravelling is Rs. 8 per m², what is the total cost of gravelling the path?
(a) Rs. 680 (b) Rs. 736 (c) Rs. 820 (d) Rs. 450 (e) NOT

4. The circumference of circle is 74 m more than its diameter. If the radius of another circle is 3.5 m more than the radius of first circle, what is the circumference of the second circle?

(a) 215 m (b) 110 m (c) 135 m (d) 90 m (e) 120 m

5. The cylinder of radius 8m and height 10 m is melted down and all the metal is used to recast a new solid cylinder with radius 12 m. what is the height of the new cylinder?
(a) 3 m (b) 4 m (c) 4.44 m (d) 5 m (e) 6 m

6. A circular copper wire of radius 35 cm is bent to form a rectangle. If the length and breadth of the new figure form are in ratio of 5:2, what is the length of the rectangle?
(a) 78.55 cm (b) 68 cm (c) 55 cm (d) 67 cm (e) NOT

7. The length and breadth of a rectangular lawn are 36 m and 20 m respectively. It has two roads, each 3 m wide and one parallel to the breadth and the other parallel to the length. What is the cost of gravelling the two roads at the rate of Rs. 38?
(a) Rs. 6014 (b) Rs. 6720 (c) Rs. 6042 (d) Rs. 1245 (e) Rs. 5678

8. The sum of the side of a square and the length of a rectangle is 30 m and the sum of the side of the square and breadth of the rectangle is twice its breadth, what is the respective ratio of the area of the square and the area of the rectangle?
(a) 3:4 (b) 5:6 (c) 7:8 (d) data inadequate (e) NOT

9. The length of a rectangular shaped metal is thrice its breadth. If the area of the rectangular plot is 7744 sq. m, what is the radius of the circular loop formed using the rectangular loop?
(a) 28 m. (b) 42 m (c) 36 m (d) 34 m (e) 44 m

10. A cylinder, a hemisphere and a cone stand on the same base and have the same height and also both quantities are equal to each other. The ratio of the area of their curved surface is :
(a) 1:2:3 (b) 6:2:$\sqrt{3}$ (c) $3\sqrt{2}:\sqrt{2}:1$ (d) both (b) and (c) (e) NOT

11. The sum of the side of a square and the length of a rectangle is 36 m and the sum of the side of the square and breadth of the rectangle is 24 cm the length of rectangle is twice the breadth, what is the respective ratio of the area of the square and the area of the rectangle?
(a) 2:1 (b) 1:2 (c) 3:4 (d) 6:1 (e) NOT

12. The area of a square is 1444 cm^2. The breadth of a rectangle is $1/4^{th}$ the side of the square and the length of the rectangle is thrice of the breadth. What is the difference between the area of the square and the area of the rectangle?
(a) 1100 cm^2 (b) 567 cm^2 (c) 1173.75 cm^2 (d) data inadequate (e) NOT

13. A ladder 2 m long is placed in a street so as to reach a window 1.6 m high and on turning the ladder to the other side of a street, it reaches a point 1.2 m high. The width of the street is:
(a) 3 m (b) 2.8 m (c) 5 m (d) 6 m (e) 10 m

14. A rectangular lawn is 80 meters long and 60 meters wide. The total time taken by a man to walk along its diagonal at the speed of 18 km. per hour is:
(a) 45 second (b) 20 second (c) 10 sec (d) 15 sec (e) 30 sec

15. If the diameter of the base circle of a cone is equal to 45 cm and the generator is 23 cm, then the length of the axial section will be:
(a) 4.8 cm (b) 9.6 cm (c) 12 cm (d) 7,2 cm (e) 3.6 cm

16. If the lateral surface of a cylinder is developed in a square whose diagonal is 2^½ cm long, then the surface area of a cuboid whose volume is equal to that of cylinder is?
(a) 45 cm² (b) 81 cm² (c) data inadequate (d) 56 cm² (e) 49 cm²

17. If in an isosceles triangle, 'a' is length of the base and 'b' is the length of one of equal sides, then its area is:
(a) $a * \sqrt{(b^2 - \frac{a2}{4})}$ (b) $\frac{a}{2} * \sqrt{(b^2 - \frac{a2}{4})}$ (c)$b * \sqrt{(b^2 - \frac{a2}{4})}$ (d) a*b (e) NOT

18. A plot of land is the shape of a right angled isosceles triangle. Length of the hypotenuse side is 50 and cost of fencing is Rs. 3 per meter. The cost of fencing the plot will be:
(a) Rs. 567 (b) Rs. 689 (c) data inadequate (d) Rs. 450 (e) Rs. 510

19. Length of the largest rod that can be placed in a room 30m long,25 meter broad and 18m high is:
(a) 43 m (b) 51 m (c) 44 m (d) 55 m (e) NOT

20. A reservoir in the form of frustum of a right circular cone. It is 8 cm across at the top and 4 cm across at the bottom. It is 6 cm deep. Its capacity is:
(a) 196 cm³ (b) 176 cm³ (c) 216 cm³ (d) data inadequate (e) NOT

21. A metal sheet 27 cm long, 8 cm broad and 1 cm thick is melted into a cube. The difference between the surface areas of the two solids will be:
(a) 35 cm² (b) 75 cm² (c) 29 cm² (d) 36 cm² (e) NOT

22. The perimeter of a rhombus is 200 cm. if the diagonals are in ratio 5:6, what will be the area of rhombus?
(a) 4918 cm² (b) 5234 cm² (c) 6124 cm² (d) 4561 cm² (e) 5462 cm²

23. A circular disc of area 3.43π m² rolls down an incline of 8.8 km length. What is the number of revolution it makes during this journey?
(a) 400 (b) 756 (c) 440 (d) 770 (e) 660

24. Find the length of the canvas 4 meters in width required to make a cylindrical form of 12 meters in diameter and 5.6 m in height?
(a) 34.8 m (b) 28.2 m (c) 4.8 m (d) 54 m (e) 52.8 m

25. The adjacent sides of a parallelogram are 4 cm and 8 cm and the angle between them is 45°. The area of the parallelogram is?

(a) 16 (b) 32 (c) $16\sqrt{2}$ (d) 8 (e) NOT

26. Four circular plates are placed in such a way that each circle touches the other two. What will be the area of the portion enclosed by the circles if all circles has same radius?

(a) $4r^2$ (b) r^2 (c) $3r^2$ (d) $2r^2$ (e) NOT

27. If the height of triangle is decreased by 40 %, and its base remains same, then what percent area of new triangle is with respect to the original?

(a) 70% (b) 40% (c) 35% (d) 60% (e) 25%

28. A same length of wire is used to make rhombus, square and rectangle, what will be the ratio of area of these figures?

(a) 2:3 (b) 4:1 (c) data inadequate (d) 1:2 (e) NOT

29. A cow is tethered in the middle of a field with a 14 feet long rope. If the cow grazes 220 sq. ft. per day, then approximately what time will be taken by the cow to graze twice the whole field?

(a) $3\frac{5}{3} days$ (b) $5\frac{3}{5}\ days$ (c) 5 days (d) 7 days (e) 10 days

30. An equilateral triangle is described on the diagonal of a square. What is the ratio of the area of the triangle to that of the square?

(a) $\frac{\sqrt{3}}{2}$ (b) 1:2 (c) $\sqrt{3}:1$ (d) $1:\sqrt{2}$ (e) 1:1

31. If every side of an equilateral triangle is doubled, the area of the new triangle is how much times more than the old area?

(a) 3 times (b) 4 times (c) remains same (d) 10 times (e) 2 times

32. ABC is a triangle with base AB. D is the point on AB such that AD = 5 and DB = 3. What is the area of triangle ADC and triangle ABC?

(a) 212 cm^2 (b) 45 cm^2 (c) 56 cm^2 (d) Data inadequate (e) NOT

33. An error of 1 % in excess is made while measuring the side of a square. The percentage of error in the calculated area of the square is?

(a) 3% (b) 2.01% (c) 1.01% (d) 1% (e) 2%

34. A took 20 seconds to cross a rectangular field diagonally walking at the rate of 68 m/min and B took the same time to cross the same field along its side walking at the rate of 50 m/min. the area of the field is?

(a) 234 m^2 (b) 256 m^2 (c) 256 cm^2 (d) 189 cm^2 (e) NOT

35. A towel when bleached was found to have lost 10 % of its length and 8% of breadth. The percentage of decrease in area is :

(a) 17.2% decrease (b) 15 % decrease (c) 18% decrease (d) data inadequate (e) NOT

Direction: each of the questions below consists of a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statements are sufficient to answer the question. Read both statements and give answer as

(a). if the data in statement I is alone sufficient to answer the question

(b). if the data in statement II is alone sufficient to answer the question

(c). if the data in both the statements together is necessary to answer the question

(d). if the data in either statements is sufficient to answer the question.

(e). if the data in both the statements is not sufficient to answer the question.

36. What is the height of the cylinder (in m)?

I. The volume of the cylinder is 4158 m^3.

II. The total surface area of the cylinder is 1485 m^2

37. What is the capacity of the cylindrical tank?

I. Radius of base is half of the height.

II. Area of base is 616 cm^2

38. What is the area of circular ground?

I. The circumference of the ground is x cm.

II. The diameter of the ground is y cm.

39. What is the cost of flooring the rectangular hall?

I. The area of the hall is same as that of the parallelogram.

II. The cost of flooring is Rs. 350 per square meter.

40. What is the area of the trapezium?

I. Adjacent side of trapezium is in ratio of 4:5.

II. Difference between the opposite sides is 4 cm.

41. What will be the area of the uncovered region?

I. The area of rectangular hall is 605 cm^2.

II. A circular bed is placed in the hall at the centre.

42. The area of parallelogram is equal to the area of a circle. What is the length of the rectangle?

I. Radius of circle is equal to height of parallelogram.

II. Perimeter of parallelogram is 15 cm more than circle.

43. What is the area of circle?

I. A chord of length 5 cm subtended an angle of 90° at the centre.

II. Perimeter of circle is equal to length of the rectangle.

44. A path around a circular ground is made. What is the area of the path?

I. The difference between the perimeters of both circular grounds is 44 cm.

II. The difference between areas of both circular grounds is 56 cm^2.

45. What is the area of a right-angled triangle?

I. One of the angle measures 60°.

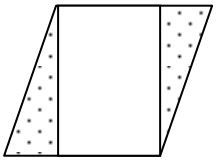
II. Difference between length and height of a triangle is 3 cm.

DIRECTION: given below is the question followed by two statements. Study the statements and predict the relation between both the statements as:

(a) I>II

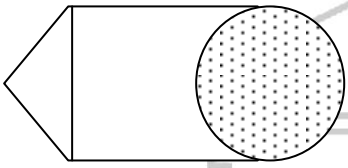
(b) I<II
(c) I=II, no relation can be made or data in adequate
(d) I≤II
(e) I≥II

46. Given below are a parallelogram and a rectangle.



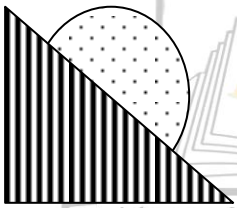
I. Area of the shaded region is 56 cm² and length and breadth of rectangle is 8 cm and 5 cm.
II. Difference of areas is 16 cm².

47. The radius of circle is 7 cm.



I. Perimeter of the rectangle is 44 cm and perimeter of figure excluded circle is 48 cm.
II. Perimeter of the triangular part is 36 cm.

48. The sides of a triangle are 4cm, 3 cm and 5 cm.



I. The area of semi circle is 22 cm².
II. The ratio of area of triangle to total area is 6:7

49. A sphere is placed at the top of a cylinder such that it closed the cylinder from the top.
I. The radius of the base and height of cylinder is 7cm and 12 cm respectively.
II. The total surface area of figure is 90 cm²

50. A cone is placed at the top of a cuboid covering the upper surface are of cuboid.
I. The curved surface area of cone is 550 m² and radius of base of the cone is 7 cm.
II. The height of the cone is 20 cm.

SOLUTION AND EXPLANATION OF PROBLEMS ON AREAS

1. (a)

Let the side of square be a and length & breadth of rectangle be l and b.
Then according to the question, a=l and a= 2b, so l=2b.
Total area = 54 sq. cm

$a^2 + l*b = 54$
Or $3l^2/2 = 54$, on solving we get length of rectangle = 6 cm.

2. (d)
Let length and breadth of rectangular field be l and b,
Given that perimeter of rectangular field (P) = area (A) -128
P = l*b -128--- (1)
Also new breadth = b/2
New P = New A – 40
P = l*b/2 – 40--- (2)
Solving eq. (1) and (2), we get P = 48
So area = 48 + 128 = 176 sq. cm.

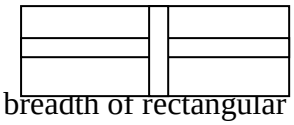
3. (b)
Area of rectangle = 84 sq. m
Breadth of rectangle = 84/12 = 7 m
Measurement of new rectangle after wide path made is 16mx11m
Area of new rectangular garden = 16 * 11 = 176 sq. m.
Area of path = 176- 84 = 92 sq. m
Cost of gravelling the path = 92* 8 = Rs. 736.

4. (b)
According to the question,
Circumference of circle = 74 + diameter
2 * π* radius = 74 + radius
Then radius = 14 m
Radius of another circle = 14 + 3.5 m = 17.5 m
Circumference of circle = 2*π* 17.5 = 110 m.

5. (c)
Volume of old cylinder = volume of new cylinder
$\Pi * r^2 * h = \pi * R^2 * H$
Given values, r= 8 m, h =10 m and R = 12 m
By putting the above value in the equation,
We get Height of new cylinder = 4.44 m.

6. (a)
Perimeter of circular wire = perimeter of rectangle
2* π* 35 = 2(length +breadth)
Also length: breadth = 5x: 2x
On solving we get length = 78. 55cm

7. (c)



Length and breadth of rectangular lawn = 36 m and 20 m.
Area of the path = 36*3 + 20 * 3 – (3*3) = 159 sq. cm
Cost of gravelling the path = 159 * 38 = Rs. 6042.

8. (d)
Let length and breadth of rectangle is l and b and side of square = a
Then according to the question, a +l = 30 and a+b = 2b=>a+b
Ratio = area of square: area of rectangle = a^2: lb
More data is required to answer the question

9. (a)
Let length and breadth of rectangular shaped metal be l and b,
Then, l= 3b
And area = 7744 sq. cm, l*b =7744
By using above data we get b = 44 cm and l = 132 cm
Perimeter of rectangle = circumference of circle
2(l +b) = 88= 2*π*r
Then radius of circle = 28 cm.

10. (d)
The ratio of curved surface of cylinder, hemisphere and cone is
$2*\pi*r*h: 2/3*\pi*r^2: \pi*r*\sqrt{(h^2 + r^2)}$
Where r= h, then ratio is 6: 2: $3\sqrt{2}$ or $3\sqrt{2}: \sqrt{2}: 1$

11. (b)
Let a be the side of square and l and b be length and breadth of rectangle
According to the question, l+ a = 36 and a+b = 24
Also l = 2b
Using given data we get l = 24 cm and b = 12 cm and a = 12 cm.
Ratio = 12*12: 12*24 = 1:2.

12. (c)
Breadth of rectangle = $\frac{\sqrt{1444}}{4} = 9.5\ cm$
Length = 3 * breadth = 28.5 cm
Area = 28.5 * 9.5 = 270 .75 sq. cm
Difference in area = 1444- 270.75 = 1173.25 sq. cm

13. (b)
The width of the street = $\sqrt{2^2 - 1.6^2} + \sqrt{2^2 - 1.2^2} = 2.8\ m$

14. (b)

The diagonal of the rectangular lawn = $\sqrt{80^2 + 60^2} = 100\ m$

Speed =18 km/ hr = 5m/sec

Time taken by man = 100/5 = 20 second.

15. (a)

Generator = slant height = 23 cm and radius = 45/2 cm

Height of axial section = $\sqrt{23^2 - 22.5^2} =$ 4.8 cm.

16. (c)

Diagonal of square = $\sqrt{2}$

Let a be the side of the square, a = 1cm.

Lateral surface of cylinder = perimeter of square = 4

2*π*r*h = 4

Two entities remain unknown, so data inadequate

17. (a)

Height of the isosceles triangle = $\sqrt{b^2 - \left(\frac{a}{2}\right)^2}$

Area = base * height = a* $\sqrt{b^2 - \left(\frac{a}{2}\right)^2}$

18. (c)

For fencing perimeter of land i.e. isosceles triangle is required which needed more data

So data inadequate

19. (a)

Length of the longest rod = $\sqrt{30^2 + 25^2 + 18^2} = 43\ m$

20. (b)

Capacity of frustum = $\frac{1}{3} * \pi * height\ (r^2 + r * R + R^2) = \frac{1}{3} * \pi * 6 * (2^2 + 4^2 + 2 * 4)$

Capacity = 176 cm³.

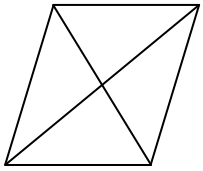
21. (a)

Surface area of cuboid = 27*8 + 8*1 + 1*27 = 251 cm²

Surface area of cube = 6 * a * a = 216 cm²

Difference in area = 251-216 = 35 cm².

22. (a)



According to the question,

$$\sqrt{\left(\frac{5x}{2}\right)^2 + \left(\frac{6x}{2}\right)^2} = 50$$

On solving we get x = $100/\sqrt{61}$

Diagonals are $500/\sqrt{61} and\ 600/\sqrt{61}$

Area = product of diagonals = 4918 sq. cm

23. (b)

According to the question,

Area = 3.43π m² = $\pi * r^2$

Then r = $0.7\sqrt{7}$

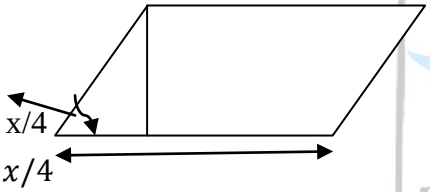
Circumference of circular disc = $44\sqrt{7}/10$

Number of revolution = $8800/44\sqrt{7} * 10 \cong 756$

24. (e)

Length of the canvas = $\frac{(2*\pi*5.6*6)}{2*\pi*4}$ = 52.8 m

25. (c)



45°

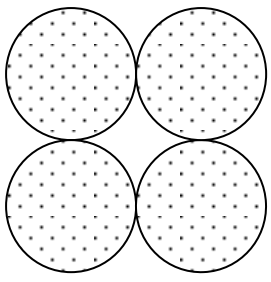
Sin 45 = x/4

$1/\sqrt{2} = x/4$

Then height of parallelogram = x = $2\sqrt{2}cm$

Area of parallelogram = base * height = $8 * 2\sqrt{2} = 16\sqrt{2}sq.cm$

26. (c)



Area of shaded region = 4 * r*r

Area of unshaded region = 4*r*r – r*r = 3*r².

27. (a)

Area of triangle = ½ * base * height

New height h' = 60/100 * h = 0.6h
New area = ½ *base * 0.6 h = 3/10 * old area
% of areas = 30%

28. (c)
Let a be side of square, x be side of rhombus and l and b be length and breadth of rectangle
Then 4a=4x=2(l+b)
No more data is given which is required to answer the question, hence data inadequate.

29. (b)
Time taken by the cow to cover twice the whole field = $\frac{\pi*14*14*2}{220} = \frac{28}{5} = 5\frac{3}{5} days$

30. (a)
Let side of square = a
Then area of square = a^2
Side of equilateral triangle will be $\sqrt{2}a$
Area of equilateral triangle = $\frac{\sqrt{3}}{2}a^2$
Ratio of areas = $\frac{\sqrt{3}}{2}$

31. (b)
Old area of equilateral triangle = $\frac{\sqrt{3}}{4}a^2$
Where a be side of triangle
When a becomes double,
New area = $\frac{\sqrt{3}}{4} * (2a)^2 = 4 * old\ area$

32. (d)
More data is needed to answer the question

33. (b)
Total error = 1% +1% + 1%*1% = 2.01%

34. (b)
Distance travelled by A = 68 *20/60 = 68/3 meters
Distance travelled by B = 50 * 20/60 mins = 50/3 meters
Other side = $\sqrt{\left(\frac{68}{3}\right)^2 - \left(\frac{50}{3}\right)^2} = 2\sqrt{59}$
Area = $2\sqrt{59} * \frac{50}{3} \cong 256\ cm^2$

35. (a)

Total decrease in area = -10%-8% + 10%*8% = -17.2%

36. (c)
From statement I, volume = 4158 cu. m
From statement II, surface area = 1485 sq. cm
Combining both statement we get r = 28/5 cm and height = 42.2 cm

37. (c)
From statement I, radius= height/2
From statement II, area= 616 cm^2=> radius = 14 cm
Combining both statement height = 28 cm
Then volume = $\pi*14^2*28 = 17248\ m^3$.

38. (d)
From statement I, circumference = x cm, $2*\pi*r = x$, $r= x/(2*\pi)$, area = $x^2/4\pi$
From statement II, diameter = y cm, radius = y/2 cm, area = $\pi*(y/2)^2$
By using either data we can get the required result.

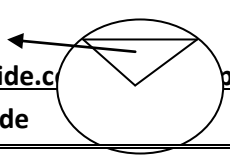
39. (e)
From statement I, area of hall = area of parallelogram
From statement II, cost of flooring per sq. meter= Rs. 350
More data is needed to answer the question.

40. (e)
From statement I, let the adjacent sides be 4x and 5x
From statement II, altitude = 4 cm.
More data is needed to answer the question.

41. (e)
From statement I, area of rectangular hall = 605 cm^2
From statement II, circular bed has covered the area, but its measurement or data regarding it is not given so neither I nor II can give the answer.

42. (e)
From statement I, area of parallelogram = base * height = area of circle also r = h
From statement II, perimeter of parallelogram = 15 + circumference of circle
By combining both statement we get l = 7.5 cm,
More data is needed to answer the question.

43. (a)
From statement I, let the radius = $R^2+R^2 = 5^2$
$R^2= 25/2$, area = $\pi*25/2$



From statement II, 2*π*r = length of rectangle
Only statement I is needed to answer the question.

44. (b)
From statement I, 2*π*(R-r) = 44cm, R-r = 7 cm
From statement II, area of path = difference between the outer to inner circle = 56 cm².
Only statement II is sufficient to answer the question,

45. (e)
From statement I, one angle = 60°
From statement II, length- height = 3 cm
More data is required to answer the question.

46. (c)
From statement I, area of shaded region = 56cm², area of rectangle = 8*5 = 40 cm²
So difference in area = 56-40 = 16 cm².
From statement II, difference in area =16 cm²
Relation between both statement is I=II

47. (b)
From statement I, perimeter of rectangle = 44cm, perimeter of excluded part = 48 cm
Perimeter of triangle = 48-half perimeter of circle-2*length of rectangle +diameter of circle
= 48-22-16+14= 24 cm
From statement II, perimeter = 36 cm
Statement I<statement II

48. (b)
Area of triangle can be calculated by using data and formula $\sqrt{s*(s-a)*(s-b)*(s-c)}$ $where\ s = \frac{a+b+c}{3}$
From statement I, area of semicircle = 22 cm² ratio = 6/6+22 = 3/14
From statement II, ratio = 6/7
So, statement II> statement I.

49. (a)
From statement I, total surface area = $2\pi * r * h + \frac{2}{3} * \pi * r^2 = 630\ cm^2$
From statement II, total surface area = 90 cm²
Statement I > statement II

50. (a)

From statement I, $\pi * r * \sqrt{h^2 + r^2} = 550$ *and* $r = 7$ *cm, on solving we get height* $= 24$ *cm*
From statement II, height = 20 cm
We can say that Statement I >statement II

QUADRATIC EQUATION

Directions (1-5) : In each of these questions, two equations are given. You have to solve these equations and find out the values of x and y and Give answer

a) If x>y
b) If x ≥ y
c) If x<y
d) If x ≤ y
e) If x=y or relationship cannot be established

1). I. $6x = 4y + 186$
II. $y = \sqrt[3]{46656}$
2). I. $(81)^{1/4}x + (343)^{1/3} = 0$
II. $\frac{3^5+9^3}{6}\ 6 = y^3$
3). I. $3x + 5y = 34.5$
II. $4x - 9y = -1$
4). I. $3x - \frac{32}{x} - 4 = 0$
II. $3y - \frac{14}{y} = 19$
5). I. $x^2 + 16x + 64 = 0$

Directions (6-10) : In each of these questions, two equations are given. You have to solve these equations and find out the values of x and y and Give answer

a) If p > q
b) If p ≥ q
c) If p < q
d) If p ≤ q
e) If p = q or relationship cannot be established

6). I. $p^2 + 13p + 40 = 0$
II. $q^2 + 7q + 12 = 0$
7). I. $p = (-10)^2$
II. $q^2 + q - 9900 = 0$
8). I. $p^2 - 5p + 6 = 0$
II. $q^2 - 4q + 3 = 0$
9). I. $p \times 35\% - p/20 = 6$
II. $q^2 = 400$
10). I. $17p^2 - 14p - 43 = -40$
II. $q^2 = 5q + 204$

Directions (Q. 11–15): In each of these questions, two equations numbered I and II with variables x and y are given. You have to solve both the equations to find the value of x and y. Give answer
(a) if x > y
(b) if x ≥ y

(c) if x < y
(d) if x ≤ y
(e) if x = y or relationship between x and y cannot be determined.

11).
I. $5x^2 - 8x + 3 = 0$
II. $3y^2 + 5y - 2 = 0$

12).
I. $x^8 - (3 * 8)^{17/2} / \sqrt{x} = 0$
II. $11/\sqrt{y} + 18/\sqrt{y} = \sqrt{y}$

13).
I. $\sqrt{169}\ x^2 - 2197 = 0$
II. $\sqrt{(484)}\ y + 132 = 0$

14).
I. $(625)^{(1/4)}\ x + \sqrt{(1225)} = 155$
II. $225y^2 + 18 = 279$

15).
I. $x^2 - 7x + 12 = 0$
II. $y^2 - 9y + 20 = 0$

Directions (Q.16-20): In each of these questions, two equations (I) and (II) are given. You have to solve both the equations and give answer

(a) if x > y
(b) if x < y
(c) if x ≥ y
(d) if x ≤ y
(e) if x = y or relationship between x and y cannot be determined.

16). I. $8x+y = 10$
II. $4x + 2y = 13$

17). I. $(x+3)(y+2) = 12$
II. $2xy + 4x + 5y = 11$

18). I. $(3x-2)/y = (3x+6)/(y+16)$
II. $(x+2)/(y+4) = (x+5)/(y+10)$

19). I. $x^2 + 20x + 4 = 50 - 25x$
II. $y^2 - 10y - 24 = 0$

20). I. $(x^2-10x + 16) / (x^2 - 12x + 24) = 2/3$
II. $y^2 - y - 20 = 0$

Directions (21 - 25): In each of these questions, two equations (I) and (II) are given. You have to solve both the equations and give answer

(a) if x < y
(b) if x > y
(c) if x ≤ y
(d) if x ≥ y
(e) if x = y or relationship between x and y cannot be determined.

21). I. $6x^2 - 49x + 99 = 0$
II. $5y2 + 17y + 14 = 0$

22). I. $5x^2 = 19x-12$
II. $5y^2 + 11y = 12$

23). I. $x^3 = (1331)^{1/3}$
II. $2y^2 - 21y + 55 = 0$

24). I. $5x = 7y + 21$

II. $11x + 4y + 109 = 0$

25). I. $2x^2 - 11x + 12 = 0$

II. $2y^2 - 17y + 36 = 0$

Directions (Q. 26-30): In the following questions, two Equations I and II are given. You have to solve both the equation.

Give Answer

a) If $x > y$

b) If $x \geq y$

c) If $x < y$

d) If $x \leq y$

e) If $x = y$ or the relationship cannot be established

26). I. $5x^2 - 18x + 9 = 0$

II. $20y^2 - 13y + 2 = 0$

27). I. $x^3 - 878 = 453$

II. $y^2 - 82 = 39$

28). I. $3/\sqrt{x} + 4/\sqrt{x} = \sqrt{x}$

II. $y^3 - (7)^{7/2} / \sqrt{y} = 0$

29). I. $9x - 15.45 = 54.55 + 4x$

II. $\sqrt{(y + 155)} - \sqrt{36} = \sqrt{49}$

30). I. $x^2 + 11x + 30 = 0$

II. $y^2 + 7y + 12 = 0$

31). I. $x^2 - 19x + 84 = 0$

II. $y^2 - 25y + 156 = 0$

32). I. $x^3 - 468 = 1729$

II. $y^2 - 1733 + 1564 = 0$

33). I. $9/\sqrt{x} + 19/\sqrt{x} = \sqrt{x}$

II. $y^5 - (2 \times 14)^{11/2} / \sqrt{y} = 0$

34). I. $\sqrt{(784)x} + 1234 = 1486$

II. $\sqrt{(1089)y} + 2081 = 2345$

35). I. $12/\sqrt{x} - 23/\sqrt{x} = 5\sqrt{x}$

II. $\sqrt{y}/12 - 5\sqrt{y}/12 = 1/\sqrt{y}$

Directions (Q. 36-44) In each question, two equations numbered I and II have been given. You have to solve both the equations and mark the appropriate option.

36). I. $2x^2 + 19x + 45 = 0$

II. $2y^2 + 11y + 12 = 0$

a) $x > y$

b) $x \geq y$

c) $x < y$

d) Relationship between x and y cannot be determined

e) $x \leq y$

37). I. $3x^2 - 13x + 12 = 0$

II. $2y^2 - 15y + 28 = 0$

a) $x \geq y$

b) Relationship between x and y cannot be determined

c) $x > y$

d) $x < y$

e) $x \leq y$

38). I. $x^2 = 16$

II. $2y^2 - 17y + 36 = 0$

a) x < y
b) Relationship between x and y cannot be determined
c) x > y
d) x ≥ y
e) x ≤ y

39). I. $6x^2 + 19x + 15 = 0$
II. $3y^2 + 11y + 10 = 0$
a) x ≤ y
b) x < y
c) x ≥ y
d) x > y
e) Relationship between x and y cannot be determined

40). I. $2x^2 - 11x + 15 = 0$
II. $2y^2 - 11y + 14 = 0$
a) x ≤ y
b) x > y
c) x ≥ y
d) x < y
e) Relationship between x and y cannot be determined

41). I. $x^2 + 9x - 36 = 0$
II. $y^2 - 2y - 24 = 0$
a) x = y or relationship cannot be established
b) x < y
c) x ≥ y
d) x ≤ y
e) x > y

42). I. $6x – 5y = 17$
II. $3x – 4y = 13$
a) x > y
b) x ≤ y
c) x = y or relationship cannot be established
d) x ≥ y
e) x < y

43). I. $x = (-3)^2$
II. $y^{2/3} = 64$
a) x > y
b) x < y
c) x ≥ y
d) x ≤ y
e) x = y or relationship cannot be established

44). I. $x^2 - 20x + 99 = 0$
II. $y^2 - 18y + 72 = 0$
a) x < y
b) x > y
c) x = y or relationship cannot be established
d) x ≤ y
e) x ≥ y

Directions (Q. 45-49) In the following questions, two equations I and II are given. You have to solve both the equations.

Give Answer

a) If $x > y$

b) If $x \geq y$

c) If $x < y$

d) If $x \leq y$

e) If $x = y$ or the relation cannot be established

45). I. $(25 / x^2) - (12 / x) + (9 / x^2) = (4 / x^2)$

II. $9.84 - 2.64 = 0.95 + y^2$

46). I . $\sqrt{(900)}x + \sqrt{(1296)} = 0$

II. $(256)^{1/4}\, y + (216)^{1/3} = 0$

47). I. $[(3)^5 + (7)^3 / 3] = x^3$

II. $7y^3 = - (15 \times 2) + 17y^3$

48). I. $(x^{1/4} / 16)^2 = 144 / x^{3/2}$

II. $y^{1/3} \times y^{2/3} \times 3014 = 16 \times y^2$

49). I. $3x^2 - 9x + 28 = 0$

II. $5y^2 - 18y + 16 = 0$

Directions (Q. 50-54) In the following questions, two equations I and II are given. You have to solve both the equations.

Give Answer

a) If $x > y$

b) If $x \geq y$

c) If $x < y$

d) If $x \leq y$

e) If $x = y$ or the relationship cannot be established

50). I. $x^2 - 1200 = 244$

II. $y + 122 = 159$

SOLUTION AND EXPLANATION OF QUADRATIC EQUATION

Solutions

1). a) x=55, y=36 x>y

2). c) x = -7/3, y=5.45 x<y

3). a) x = 13/2, y=3 x>y

4). e) x = 4, -8/3, y = 7, -2/3 No relation

5). e) x = -8, -8, No relation

6). c) p = -8, -5, q = -4, -3 p<q

7). a) p = 100, q = - 100, 99 p>q

8). e) p = 3,2 q = 3, 1 No relation

9). b) p = 20 q = ± 20 $p \geq q$

10). e) p = 1, -3/17 q = -12, 17 No relation

Solutions

11). a)

I. $5x^2 - 5x - 3x + 3 = 0$

$5x(x-1)-3(x-1)=0$

$x = 1, 3/5$

II. $3y^2 + 6y - y - 2 = 0$

$3y(y+2)-1(y+2)=0$

$(y+2)(3y-1)=0$

$y = -2, 1/3$

$x > y$

12. c)

I. $x^{17/2} = (24)^{17/2}$

$x = 24$

II. $y = 29$

$y > x$

13). a)

I. $13x = 2197$

$x = 169$

II. $22y = -132$

$y = -6$

$x > y$

14). a)

I. $\sqrt{(25)x} + 35 = 155$

$x = 120/5 = 24$

II. $15y = 261$

$y = 17.4$

$x > y$

15). d)

I. $x2 - 4x - 3x + 12 = 0$

$(x-4)(x-3)=0$

$x = 4, 3$

II. $y2 - 5y - 4y + 20 = 0$

$(y-5)(y-4)=0$

$y = 5, 4$

$y \geq x$

16). b)

From both equations

$x = 7/12, y = 16/3$

$y > x$

17). e)

$xy + 3y + 2x + 6 = 12$

$2xy + 6y + 4x = 12$ ---- (i)

$2xy + 5y + 4x = 11$ ---- (ii)

From eq. (i) – (ii)

$y = 1$

From eq. (i)

x = 1
x = y

18). b)

(3x-2)/y = (3x+6)/(y+16)
48x-8y = 32 ----- (i)
(x+2)/(y+4)= (x+5)/(y+10)
y = 2x ---- (ii)
from Equations (i) & (ii)
x=1, y=2
y>x

19). e)

From the given Equation
x=1, -46
y = -2, ½
No relation

20). e)

From 1st equations
$x^2 – 6x = 0$
x=0, 6
From 2nd equation
(y+4) (y-5)
y= -4, 5
No relation

21). b)

$6x^2-49x+99=0$
(3x-11)(2x-9) =0
x=11/3, 9/2
$5y^2 + 17y + 14 = 0$
(5y+7)(y+2) = 0
y=-2, -7/5
x>y

22). d)

$5x^2-19x+12 = 0$
x=3, 4/5
$5y^2+11y=12$
y=4/5, -3
x≥y

23). b)

x=11
2y2 – 21y + 55 = 0
(2y-11)(y-5)=0
y=5, 11/2
x>y

24). b)

From given equations

x=-7

y=-8

x>y

25). c)

$2x^2-11x+12 = 0$

x=3/2, 4

$2y^2-17y+36 = 0$

y= 4, 9/2

y≥x

26).a)

I. $5x^2 – 18x + 9 = 0$

$5x^2 – 15x – 3x + 9 = 0$

$5x (x -3) – 3(x - 3) = 0$

$(x - 3) (5x – 3) = 0$

x = 3 or 3/5

II. $20y^2 – 13y + 2 = 0$

$20y^2 – 8y – 5y + 2 = 0$

$4y(5y - 2) -1(5y - 2) = 0$

$(4y - 1) (5y - 2) = 0$

y = 1/4 or 2/5

Clearly x > y

27).b)

I. $x^3 – 878 = 453$

$x = 3\sqrt{1331} = 11$; x = 11

II. $y^2 – 82 = 39$

$y^2 = 82 + 39 = 121$

y = ±11

x ≥ y

28).e)

I. $3/\sqrt{x} + 4/\sqrt{x} = \sqrt{x}$

3 +4 = x

x = 7

II. $y^3 – (7)^{7/2} /\sqrt{y} = 0$

$y^3+1/2 – (7)^{7/2} = 0$

$y7/2 = 7^{7/2}$; y = 7

Clearly, x = y

29).e)

I. 9x – 15.45 = 54.55 + 4x

9x - 4x = 70

5x = 70 ; x = 14

II. $\sqrt{(y + 155)} - \sqrt{36} = \sqrt{49}$

$\sqrt{(y + 155)} = 6 + 7$; $\sqrt{(y + 155)} = 13$

$y + 155 = 169$

$y = 169 - 155 = 14$

Clearly, $x = y$

30).c)

I. $x^2 + 11x + 30 = 0$

$x^2 + 6x + 5x + 30 = 0$

$x(x + 6) + 5(x + 6) = 0$

$(x + 5)(x + 6) = 0$

$x = -5$ (or) -6

II. $y^2 + 7y + 12 = 0$

$y^2 + 4y + 3y + 12 = 0$

$y(y+4) + 3(y+4) = 0$

$(y+3)(y+4) = 0$

$y = -3$ (or) -4

$x<y$

31).d)

I. $x^2 - 19x + 84 = 0$

$x^2 - 12x - 7x + 84 = 0$

$x(x - 12) - 7(x - 12) = 0$

$x = 7$ (or) 12

II. $y^2 - 25y + 156 = 0$

$y^2 - 12y - 13y + 156 = 0$

$y(y - 12) - 13(y - 12) = 0$

$(y - 12)(y - 13) = 0$

$Y = 12$ (or) 13

Clearly, $x \leq y$

32).b)

I. $x^3 - 468 = 1729$

$x^3 = 1729 + 468 = 2197$

$x = 3\sqrt{2197} = 13$

II. $y^2 - 1733 + 1564 = 0$

$y^2 - 169 = 0$

$y = \pm 13$

$x \geq y$

33).e)

I. $9/\sqrt{x} + 19/\sqrt{x} = \sqrt{x}$

$(9 + 19) / \sqrt{x} = \sqrt{x}$

$28 = \sqrt{x} \times \sqrt{x}$; $x = 28$

II. $y^5 - (2 \times 14)11/2 / \sqrt{y} = 0$

$[y^5 \sqrt{y} - (28)11/2] / \sqrt{y} = 0$ a $y11/2 - (28)11/2 = 0$

$y = 28$

Clearly, x = y

34).a)

I. √(784)x + 1234 = 1486

√(784)x = 1486 – 1234 ; √(784)x = 252

x = 252 / 28 ; x = 9

II. √(1089)y + 2081 = 2345

√(1089)y = 2345 – 2081 ; √(1089)y = 264

y = 264 / 33 ; y = 8

x > y

35).a)

I. 12/√x - 23/√x = 5√x

(12 - 23) / √x = 5x ; -11

x = -11/5

II. √y/12 - 5√y/12 = 1/√y

(√y-5√y) / 12 = 1/√y ; -4√y ×√y = 12

-4y = 12 ; y = -3

Clearly, x>y

36). c) I. $2x^2 + 19x + 45 = 0$

2 × 45 = 90 = (10 × 9)

(10 + 9 = 19) x = (-10/2), (-9/2) (dividing by co efficient of x2 and changing signs)

x = -5, -4.5

II. $2y^2 + 11y + 12 = 0$

2 × 12 = 24 (8 × 3 = 24) (8 + 3 = 11)

y = (-8/2), (-3/2)) (dividing by co efficient of y2 and changing signs)

y = -4, -1.5

Hence x < y

37). d) I. $3x^2 - 13x + 12 = 0$

12 × 3 = 36 (-9 × -4 = 36) (-9 – 4 = -13)

x = 9/3, 4/3 (dividing by co efficient of x2 and changing signs)

x = 3, 4/3

II. 2y2 - 15y + 28 = 0

2 × 28 = 56 (-8 × -7 = 56)

(-8 -7 = -15) (dividing by co efficient of y2 and changing signs)

y = 4, 3.5

Hence = x < y

38). e) I. x2 = 16

x = ±4

II. $2y^2 - 17y + 36 = 0$

2 × 36 = 72 (-9 × -8 = 72)

(-9 -8 = -17) y = 9/2, 8/2

(dividing by co efficient of y2 and changing signs)

y = 4.5, 4

Hence = x ≤ y

39). c) I. $6x^2 + 19x + 15 = 0$
$6 \times 15 = 90$ ($10 \times 9 = 90$) ($10 + 9 = 19$)
$x = -10/6, -9/6$ (dividing by co efficient of x2 and changing signs)
$x = -5/3, -3/2 = -1.66, -1.5$
II. $3y^2 + 11y + 10 = 0$
$3 \times 10 = 30$ ($6 \times 5 = 30$) ($6 + 5 = 11$)
$y = -6/3, -5/2$ (dividing by co efficient of y2 and changing signs)
$y = -1.6, -2$
Hence $x \geq y$

40). e) I. $2x^2 - 11x + 15 = 0$
$2 \times 15 = 30$ ($-6 \times -5 = 30$) ($-6 - 5 = -11$)
$x = -6/2, -5/2$ (dividing by co efficient of x2 and changing signs)
$x = 3, 2.5$
II. $2y^2 - 11y + 14 = 0$
$2 \times 14 = 28$ ($-7 \times -4 = 28$) ($-7 -4 = -11$)
$y = 7/2, 4/2$ (dividing by co efficient of y2 and changing signs)
$y = 3.5, 2$
Hence relationship cannot be established.

41). a) I. $x^2 + 9x - 36 = 0$
$x^2 + 12x - 3x - 36 = 0$
$x (x + 12) - 3 (x + 12) = 0$
$(x - 3) (x + 12) = 0$
$x = 3, -12$
II. $y^2 - 2y - 24 = 0$
$y^2 - 6y + 4y - 24 = 0$
$y (y - 6) + 4 (y - 6) = 0$
$(y + 4) (y - 6) = 0$
$y = -4, 6$
Hence relationship cannot be established

42). a) I. $6x - 5y = 17$ ..(i)
II. $3x - 4y = 13$ ..(ii)
Solving (i) × 3 – (ii) × 6, we get
$18x - 15y = 51$
$-18x + 24y = -78$
We get $9y = -27$
$y = -3$
Putting the value of y in equation (i), we get
$6x = 2$, $x = 1/3$
Hence $x > y$

43). b)
I. $x = (-3)^2 = 9$
II. $y^{2/3} = 64$
$y^{1/3} = 8$; $y = 8^{2\times(3/2)} = 512$

Hence x < y

44). c) I. $x^2 - 20x + 99 = 0$

$x^2 – 11x – 9x + 99 = 0$

$x(x - 11) -9 (x - 11) = 0$

$(x - 9) (x - 11) = 0$

$x = 9,11$

II. $y^2 - 18y + 72 = 0$

$y^2 – 12y – 6y +72 = 0$

$y(y - 12) -6 (y - 12) = 0$

$(y - 6) (y - 12) = 0$

$y = 6, 12$

Hence relationship cannot be established.

45).b)

I. $(25/x^2) + (9/x^2) – (4/x^2) = (12/x)$

$(25 + 9 - 4) / x^2 = 12/x = 30/x^2 = 12/x$

$12x = 30$

$x = 30 / 12 = 5/2 = 2.5$

II. $9.84 -2.64 = 0.95 + y^2$

$7.2 – 0.95 = y^2$

$y = \sqrt{(6.25)} = \pm (2.5)$

clearly $x \geq y$

46).a) I. $\sqrt{(900)}x + \sqrt{(1296)} = 0$

$\sqrt{(900)}x = -\sqrt{(1296)}$

$30x = -36$

$x = -36 / 30 = -1.2$

II. $(256)^{1/4} y = (216)^{1/3}$

$(44)^{1/4} y = - (63)^{1/3}$; $4y = -6$

$Y = -(6/4) = -1.5$

Clearly, x > y

47).a) I. $[(3)^5 + (7)^3] / 3 = x^3$

$(243 + 343) / 3 = x3$

$(586 / 3) = x^3$

II. $7y^3 = -30 + 17y^3 = 10y^3 = 30$

$y^3 = 30/10 = 3$

clearly, x > y

48). c) I. $(x^{1/4} / 16)^2 = (144 / x^{3/2}) = (x^{1/2} / 256) = (144 / x^{3/2})$

$(x^{1/2}) \times (x^{3/2}) = 256 \times 144$

$x2 = (256 \times 144)$

$x = \sqrt{(256 \times 144)}$

$x = \pm (16 \times 12) = \pm 192$

II. $y^{1/3} \times y^{2/3} \times 3104 = 16y^2$

$y \times 3104 = 16y^2$

$3104 = 16y$

Y = 3104 / 16 = 194
Clearly, x > y

49). a) I. $3x^2 – 9x + 28 = 0$
$3x^2 - 12x – 7x + 28 = 0$
3x (x - 4) – 7 (x - 4) = 0
(x - 4) (3x - 7) = 0
x = 4, 7/3
II. $5y^2 – 18y + 16 = 0$
$5y^2 – 10y – 8y + 16 = 0$
5y (y - 2) – 8 (y - 2) = 0
(y - 2) (5y - 8) = 0
Y = 2, 8/5
Clearly, x > y

50). e) I. $x^2 = 1200 + 244$
$x^2 = 1444$
x = √(1444) = ± 38
II. y = 159 – 122 = 37
Clearly, x > y or x < y
Hence, the relationship cannot be established.

51). a) I. 14x + 7x = 59 + 25
21x = 84; x = 4
II. √(y + 222) = √(36) + √(81)
√(y + 222) = ± 6 ±9
√(y + 222) = ± 15
Taking (+ve) sign,
√(y + 222) = 15
y + 222 = 225
y = 225 – 222 = 3
Taking (-ve) sign,
√(y + 222) = -15
(y + 222) = 225
Y = 225 – 222 = 3
Clearly, x > y

52). e) I. $144x^2 = 16 + 9$
$144x^2 = 25 ; x^2 = 25 / 144$
x = ± 5 / 12
II. 12y = √49 - √4
12y = ± 7 – (± 2)
12y = ± 5
y = ± 5 / 12
clearly, x = y

53).c) $x^2 – 9x + 20 = 0$
$x^2 – 5x -4x +20 = 0$

$x(x - 5) - 4(x - 5) = 0$
$(x - 5)(x - 4) = 0$
$x = 5$ or 4
II. $y^2 - 13y + 42 = 0$
$y^2 - 7y - 6y + 42 = 0$
$y(y - 7) - 6(y - 7) = 0$
$(y - 7)(y - 6) = 0$
$Y = 6$ (or) 7
Clearly, $x < y$

54).e) I. $(2\sqrt{x} + 3\sqrt{x}) / 10 = 1 / \sqrt{x}$
$2x + 3x = 10$
$5x = 10$
$x = 2$
II. $(10 - 2) / \sqrt{y} = 4\sqrt{y}$
$8 = 4y$
$y = 8 / 4 = 2$
Clearly, $x = y$

PROBLEMS ON PARTNERSHIP

1). HarshaBhogle started a business by investing Rs. 36000. After 4 months Raghu joined him with some investment. At the end of the year, the total profit was divided between them in the ratio of 9 : 7. How much capital was invested by Raghu in the business?
a) Rs 40000 b)Rs 42000 c) Rs 35000 d) None of these

2). K started some business with Rs 26000. After 3 months H joined him with his money of Rs 16000. After some time R joined them with Rs 25000. At the end of the year, out of a total profit of Rs 15453, R gets Rs 3825 as his share. How many months after H joined the business did R join?
a) 3 months b) 6 months c) 4 months d) 5 months

3). X, Y and Z started a business with their investments in the ratio 1:2:4. After 6 months X invested the half amount more as before and Y invested twice the amount as before while Z withdraw 1/4th of their investments. Find the ratio of their profits at the end of the year.
a) 6:13:15 b) 3:15:16 c) 5:12:14 d) None of these

4). Ranbir started a business with Rs 52000 and after 4 months Randheer joined him with Rs 39000. At the end of the year, out of total profits Randheer received total of Rs 20000 including 25% of the profits as commission for managing the business. What amount did Ranbir receive?
a) Rs 10000 b) Rs 40000 c) Rs 30000 d) Rs 20000

5). A company makes a profit of Rs 9,00,000, 20% of which is paid as taxes. If the rest is divided among the partners A, B and C in the ratio of 1 : 3/2 : 2, then the shares of A, B and C are respectively.
a) 2,40,000 : 3,20,000 : 1,60,000 b) 3,20,000 : 2,40,000 : 1,60,000

c) 1,60,000 : 3,20,000 : 2,40,000 d) 1,60,000 : 2,40,000 : 3,20,000

Q (6 – 7): Four friends P, Q, R & S have some money among them one day they decided to equate the money, so first P gave Q what Q had initially, then Q gave R what R had initially. Again R gave S what S had initially and finally S had doubled the money of P. Thus each of them had equal sum of Rs 48.

6). What was the initial amount of Q?

a) Rs 36 b) Rs 54 c) Rs 45 d) Rs 42

7). What was the amount with R after second transaction?

a) Rs 45 b) Rs 69 c) Rs 72 d) Rs 84

8). Divide Rs 6940 in such a way that X gets 2/3rd of what Y gets and Ygets3/5th of what Z gets? What is the share of X & Y?

a) Rs 1982 b) Rs 1388 c) Rs 3470 d) None of these

9). The ratio of income of Kamlesh and Rathi is 2 : 3. The sum of their expenditure is Rs 8000 and the amount of savings of Kamlesh is equal to the amount of expenditure of Rathi. What is the sum of their savings?

a) Rs 22,000 b) Rs 4,000 c) Rs 16,000 d) Rs 12,000

10). Airtel and Vodafone entered into a partnership just 5 months ago. The ratio of profit claimed by Airtel and Vodafone is 6 : 17. If Vodafone had just started his business 12 months ago with Rs 1275, what is the amount contributed by Airtel?

a) Rs 980 b) Rs 1080 c) Rs 1200 d) Rs 998

11). L& M enter into a partnership for a year. L contributes Rs 3000 and M Rs 4000. After 4 months, they admit N, who contributes Rs 4500. If M withdraws his contribution after 6 months, how would they share a profit of Rs 1000 at the end of the year?

a) Rs 250, Rs 200, Rs 550 b) Rs 150, Rs 200, Rs 650

c) Rs 375, Rs 250, Rs 375 d) None of these

12). X, Y & Z are in a partnership. X contributes Rs 3,20,000 for 4 months, Y contributes Rs 5,10,000 for 3 months and Z contributes Rs 2,70,000 for 5 months. If the total profit be Rs 1,24,800 then X'share of profit is

a) Rs 38400 b) Rs 45900 c) Rs 41500 d) None of these

13). P, Q , R enter into partnership with capitals in the ratio 5 : 6 : 8. At the end of the businessterm, they received the profits in the ratio 5 : 3 : 12. Find the ratio of time for which they contributed their capitals?

a) 2 : 1 : 3 b) 8 : 15 : 30 c) 2 : 3 : 1 d) 3 : 2 : 1

14). R & S invested Rs 16,000 and Rs 12,000 respectively. After 3 months, R withdrew Rs 5000, while S invested Rs 5000 more. After 3 months more, T joins the business with a capital of Rs 21,000. After a year, they obtained a profit of Rs 26,400. By what amount does the share of S exceed the share of T?

a) Rs 3600 b) Rs 3800 c) Rs 4600 d) None of these

15). A & B enters into a speculation. A puts in Rs 50 and B puts in Rs 45. At the end of 4 months A withdraws half his capital and at the end of 6 months B withdraws half of his capital. C then enters with a capital of Rs 70. At the end of 12 months, in what ratio will the profit be divided?
a) 60 : 51 : 34 b) 70 : 61 : 44 c) 80 : 61 : 54 d) 80 : 81 : 84

16). Four milkmen hires a pasture. A has 18 cows that graze for 4 months, B has 25 cows that graze for 2 months, C has 28 cows that graze for 5 months and D has 21 cows that graze for 3 months. If A pays Rs 360 then what is the rent of the pasture?
a) Rs 1625 b) Rs 1240 c) Rs 1340 d) Rs 2260

17). P & Q rent a pasture for 10 months; and Q puts in 90 oxen for 7 months. How many oxen can Q put in for the remaining 3 months, if he pays half as much as P?
a) 105 b) 110 c) 115 d) 120

18). Two partners invest Rs 125000 and Rs 85000 respectively in a business and agree that 60 % of the profit should be divided equally between them and the remaining profit is to be treated as interest on capital. If one partner gets Rs 300 more than the other, find the total profit made in the business.
a) Rs 3739.50 b) Rs 3937.50 c) Rs 3749.50 d) Rs 3947.50

19). The investments made by P & Q are in the ratio 3 : 2. If 5% of total profit is donated and P gets Rs 8550 as his share of profit then what is the amount of total profit?
a) Rs 14000 b) Rs 15000 c) Rs 11050 d) Rs 12020

20). MrArjun opened a workshop investing Rs 40000. He invested additional amount of Rs 10000 every year. After two years his brother Sukesh joined him with an amount of Rs 85000. Thereafter Sukesh did not invest any additional amount. On completion of for years from the opening of workshop they earned an amount of Rs 195000. What will be Arjun share in the earning?
a) Rs 85000 b) Rs 110000 c) Rs 135000 d) Rs 95000

21). P, Q &R are in a partnership. P advances one – fourth of the capital for one – fourth of the time. Q contributes one – fifth of the capital for half of the time. R contributes the remaining capital for the whole time. How should they divided a profit of Rs 1140?
a) Rs 100, Rs 160, Rs 880 b) Rs 110, Rs 140, Rs 860
c) Rs 120, RS 150, Rs 840 d) Rs 140, Rs 170, Rs 830

22). R, P, G start a business jointly. Twice the capital of R is equal to Thrice the capital of P and the capital of P is four times the capital of G. Find the share of P in an annual profit f Rs 148500.
a) Rs 54000 b) Rs 64000 c) Rs 56000 d) Rs 55000

23). A, B & C invested capitals in the ratio of 4 : 6 : 9. At the end of the business term, they received the profit in the ratio of 2 : 3 : 5. Find the ratio of their time for which they contributed their capitals.
a) 1 : 1 : 9 b) 2 : 2 : 9 c) 10 : 10 : 9 d) 9 : 9 : 10

24). Akshita, Maneesha, Ankita take a car on rent and they use that car for 14h, 16h and 22h, respectively. What amount will be paid by Ankita, if total rent of the car is Rs 2080?
a) Rs 880 b) Rs 1280 c) Rs 1040 d) Rs 960

25). Sajid invested 10% more than the investment of Monika and Monika invested 10% less than the investment of Ravi. If the total investment of all the three persons is Rs 5780, find the investment of Ravi.
a) Rs 2010 b) Rs 2000 c) Rs 2100 d) Rs 2210

26). Suman&Kanika invest Rs 3000 and Rs 4000 respectively in a business. Suman receives Rs 10 per month out of the profit as a remuneration for running the business and the rest of the profit is divided in proportion to the investments. If in a year Suman totally receives Rs 390, what does Kanika receive?
a) Rs 630 b) Rs 360 c) Rs 480 d) Rs 380

27). Kritika, Amisha&Anisha became partners in a business by investing money in the ratio of 5 : 7 : 6. Next year, they increased their investments by 26%, 20% and 15% respectively. In what ratio should profit earned during 2nd year be distributed?
a) 21 : 28 : 23 b) 23 : 28 : 21 c) 28 : 23 : 21 d) 35 : 41 : 7

28). Akash and Virat started a joint business. Akash's investment was thrice the investment of Virat and the period of his investment was twice the period of investment of Virat. If Virat got Rs 6000 as profit, then what will be the 20% of the total profit?
a) Rs 5000 b) Rs 8400 c) Rs 3500 d) Rs 4500

29). Pamela and Nicole started a business with Rs 20000 and Rs 35000 respectively. They agreed to share the profit in the ratio of their capital. Rachel joins the partnership with the condition that Pamela, Nicole and Rachel will share profit equally and pays Rs 220000 as premium for this, to be shared between Pamela & Nicole. This is to be divided between Pamela and Nicole in the ratio of
a) 10 : 1 b) 1 : 10 c) 9 : 10 d) 10 : 9

30). Tatsat and Mohan invested an amount of Rs 16000 &Rs 12000 respectively. After 3 months Tatsat takes out Rs 5000, while Mohan puts in Rs 5000 more. After 3 months more, Rohan joins the business with a capital of Rs 21000. After a year, they earned a profit of Rs 13200. By what value does the share of Mohan exceeds the share of Rohan?
a) Rs 1600 b) Rs 1800 c) Rs 2100 d) Rs 2300

31). Rs 171 are divided among four friends in the ratio of (1/3) : (1/4) : (1/5) : (1/6). What is the amount of the person who got the greatest share?
a) 14 b) 40 c) 36 d) 60

32). Rs 4536 is divided among 4 men, 5 women & 2 boys. The ratio of share of a man, a woman and a boy is 7 : 4 : 3. What is the share of a woman?
a) Rs 336 b) Rs 498 c) Rs 166 d) Rs 256

33). J, K and L enters into a partnership with an amount of Rs 10000 each. After 4 months, J invests an additional Rs 2000. Three months later, K invests Rs 4000 and L at the same time withdraws Rs 2000. Profit at the end of the year is Rs 217000. What are their respective shares if L is to be allowed Rs 2000 as monthly salary from profits at the end?
a) Rs 68000, Rs 70000, Rs 55000 b) Rs 70000, Rs 75000, Rs 50000
c) Cannot be determined d) None of these

34). Rs 535 is divided among P, Q , R so that if Rs 15, Rs 10, Rs 30 be subtracted from their respective shares, the remainders would have been in the ratio 4 : 5 : 7. What was their initial shares(in Rs)?
a) Rs 136, Rs 155, Rs 230 b) Rs 130, Rs 150, Rs 225
c) Rs 135, Rs 160, Rs 240 d) None of these

35). Three men rent a farm for Rs 7000 per annum. One man puts 110 cows for 6 months, the second puts 50 cows for 9 months and the third puts 440 cows for 3 months. What part of the rent should the second person pay?
a) 1/13 b) 5/14 c) 5/27 d) None of these

36). An amount of money is distributed amongst A, B & C such that A gets half that of B and B gets twice that of C. what is the ratio of the share of B to that of the sum of the shares of A & B?
a) 2 : 5 b) 2 : 3 c) 3 : 2 d) 4 : 3

37). P, Q & R started a business in which Q and R were sleeping partners. They invested Rs 4,000, Rs 3,000 and Rs 7,000 respectively for a period of one year. P is paid 10% of the profit as compensation for his work, and then the rest is shared in the ratio of their investments among all the three. If P gets Rs 6,000 as his share of profit, find out the amount that Q and R together receive.
a) Rs 9,000 b) Rs 7,500 c) Rs 9,600 d) Rs 10,800

(38 – 40) Harsh invested some money with the bookies. He invested on the odds of England winning which was 1 : 3(for every Re1 invested he gets Rs 3 if the result is in his favour). He knew about fixing of the matches played by India and invested some amount at odds of 1 : 4 of India losing the match. Both India & England won their respective matches. England played Australia while India played Sri Lanka. The following questions are independent of each other.

38) If Harsh's profit on his investment wsa 150% what is the ratio of investments in the two cases?
a) 5 : 1 b) 1 : 5 c) 1 : 4 d) 4 : 1

39). If Harsh gained on the whole $2,00,000 and his investments were in the ratio 3 : 4, find the total amount invested.
a) $7,00,000 b) $2,80,000 c) $3,00,000 d) $4,00,000

40). If the ratio of investment was 1: 2 in the two cases, and India lost the match, what would the gain on investment be?

a) 466.66% b) 133.33% c) 266.66% d) 233.33%

41). R, S & T had different amounts of money with them. R had an amount equal to the average of the total. R spent half of what he had, S two – thirds of what he had, and T spent all the money he had. What was remaining with them was half of S had originally. What was the percentage of total amount spent by the three together?
a) 90% b) 80% c) 75% d) 60%

42). Tina, Ishan, Abhishek& Fatima have a total of Rs 80. If Tina's share increases by Rs 3, Ishan's share increases by one – third of his share, Abhsishek's share decreases by 20% and Fatima's share decreases by Rs 4, all of them would have equal amounts of money. Fatima's original share is
a) Rs 24 b) Rs 24.75 c) Rs 23.75 d) Rs 20

43). Raghini deposited Rs 1,000 at the start of year 2002 in a bank offering interest of 10%compounded annually. However, she used to withdraw a fixed amount at the end of every year. When she withdrew that fixed amount at the end of 2004, she discovered that no money is left in her deposit. Find that fixed amount.
a) Rs 364.61 b) Rs 402.11 c) Rs 430.25 d) Rs 492.95

44). P, Q and R invested their money in the ratio 3 : 4 : 5 respectively. The total amount invested by them was Rs 4,60,000 and the profit earned was 40% of the amount invested. If they invested for the time period in the ratio 5 : 4 : 3, then what was the profit (in Rs) received by Q?
a) 56,000 b) 60,000 c) 64,000 d) 68,000

45). Jack started a business with Rs 52000 and after 4 months Rajeev joined him with Rs39000. At the end of the year, out of the total profit Rajeev received total of Rs 20000 including 25% of the profits as commission for managing the business. What amount did Jack receive?
a) 20500 b) 21000 c) 20000 d) 30000

46). Riya, Shamita and Shilpa invest Rs 50000 for a business. Riya invests Rs 4000 more than Shamita and Shamita invests Rs 5000 more than Shilpa. Out of the total profit of Rs 70000, what is the share received by riya?
a) Rs 29400 b) Rs 30000 c) Rs 35000 d) Rs 40000

47). Raghav began a business with Rs 2250 and was joined afterwards by Raman with Rs 2700. If the profits at the end of the year were divided in the ratio of 2 : 1, after how much time Raman joined the business?
a) 5 months b) 6 months c) 3 months d) 7 months

48). Jayesh, Gyanesh, Brijesh form a company. Jayesh invests half of Brijesh expecting a return of 10%. Gyanesh invests three – fourths of Brijesh, expecting a return of 15% on it. Brijesh invests Rs 3000 and the profit of the firm is 25%. How much would Gyanesh share of profit be more than that of Jayesh's share if Gyanesh gets an additional 8% for managing the business? (Assume that their expectations with rest to returns on capital invested are met before profit is divided in the ratio of capitals invested).
a) 20% b) 18% c) 15% d) Cannot be determined

49). MrSinghania after selling 5.5% stock at Rs 92 realizes 32200. Then he invested (1/3) of the amount in 4.5% stock at Rs 92(2/5) of the amount at Rs 115 in 5% stock and the remaining in 6% stock at rs 56. The change in his income.
a) Rs 56 loss b) Rs 78 profit c) Rs 80 profit d) None of these

50). P, Q, R & S purchased a cineplex for Rs 56 lakhs. The contribution of Q, R and S together is 460% that of P, alone. The contribution of P, R & S together is 366.66% that of Q's contribution and the contribution of R is 40% that of P, Q and S together. The amount contributed by S is :
a) 10 lakh b) 12 lakh c) 16 lakh d) 18 lakh

SOLUTION AND EXPLANATION OF PROBLEMS ON PARTNERSHIP

1). b) (36,000 * 12)/(x * 8) = 9/7 So x = 42,000
2). a) Ratio (of share) of profits
= (26,000 * 12) : (16000 * 9) : (25000 * R)
=312 : 144 : 25R
Now R's share = 25R/(456 + 25R) = 3825/15453
R = 6
Therefore R joined 3 months later than H joined.

3). c) Let us assume their initial investments were x, 2x and 4x respectively.
Therefore, ratio of their investments during the whole year
= [(x * 6) + (3x/2 * 6)] : [(2x * 6) + (4x * 6)] : [(4x * 6) + (3x * 6)]
= 15x : 36x : 42x
= 5 :12 :14

4). d) Profit's share of Ranbir and Randheer are = [(52,000 * 12) : (39,000 * 8)] = 2 : 1
Let the profit be Rs x, then Randheer receives 25% as comparison for managing business, the remaining 75% of the total profit x is shared between Ranbir and Randheer in the ratio 2 :1. Hence Randheer will get $1/3^{rd}$ part of this in addition to his commission. Hence his total earning = 0.25x + 1/3 * 0.75x S o 0.5x = 20,000 we get x=40,000
So, the remaining profit goes to Ranbir, hence the profit of Ranbir is Rs 20,000

5). amount left after paying 20% taxes is = 7,20,000 = the amount invested to earn further profit
adding the ratios of their shares we get sum as = 9/2
their profits are in the ratio
= [(1 * 2/9 * 7,20,000) : (3/2 * 2/9 * 7,20,000) : (2 * 2/9 * 7,20,000)]
= 1,60,000 : 2,40,000 : 3,20,000

6 – 7) **6) Ans is option c)** **7) Ans is option d)**

	P	Q	R	S
Initially	**69**	**45**	**42**	**36**
P → Q	**24**	**90**	**42**	**36**
Q → R	**24**	**48**	**84**	**36**
R → S	**24**	**48**	**48**	**72**
S → P	**48**	**48**	**48**	**48**

8) c) X : Y = 2 : 3 & Y : Z = 3 : 5

X : Y : Z = 2 : 3 : 5

So, (X + Y) + Z = 5 : 5 = 1 : 1

Hence, Share of (X + Y) = (1/2) * 6940 = Rs 3470

9) d) Let the incomes of K and R is 2x and 3x

Let the savings of K be S, then the expenditure of R be S

Also expenditure of K = 2x – S

Given (2x – S) + S = 8000 x = 4000

Total income of

K &R = 2x + 3x = 5 * 4000 = 20000

Total savings of K &R = 20,000 – 8000 = Rs 12,000

10) b) **(**Profit of Airtel)/(Profit of Reliance)

= (time period * amount of Airtel invested)/(time period * amount of reliance invested)

Which gives 6/17 = (5 * K)/(12 * 1275)

We get K = 1080

11) c)

	L		M		N		
	30 * 12	:	40 * 6	:	45 * 8		
	3	:	2	:	3	=	8
Multiply with *	125		* 125		* 125		* 125
	375	:	250	:	375		1000

So we get the answer as 375 : 250 : 375

12) a)

X	Y	Z	
32	51	27	
4 *	3 *	5 *	
128	153	135	= 416

(128 * 124800)/416 = Rs 38400

13) b) Since the ratio of shares of the profits are directly proportional to that of ratio of product of investment nd time for which sum is invested.

So applying this we get –: (2 * 4) : (3 * 5) : (5 * 6) = 8 : 15 : 30

14) a) [(16000 * 3) + (11000 * 9)] : [(12000 * 3) + (17000 * 9)] : [21000 * 6]
(48000+ 99000) : (36000 + 153000) : (126000)
147 : 189 : 126
49 : 63 : 42
Total of the terms of ratios = 154
S's share – T's share = 63 – 42 = 21
(21 * 26400)/154 = 3600

15) d)

	A		**B**		**C**
(50 * 4 + 25 * 8)	:	(45 * 6 + 45/2 * 6)	:	(70 * 6)	
400	:	405	:	420	
80	:	81	:	84	

16) a)

	A	:	**B**	:	**C**	:	**D**	
No of cows	18		25		28		21	
Month	4		2		5		3	
	72		50		140		63	= 325
	*5							*5
	360							Rs 1625

Total rent =325 * 5 = Rs 1625

17) a) (90 * 7)/(x * 3) = 2/1 x = (90 * 7)/(2 * 3) =105

18) b) The ratio of profit = 125000 : 85000 = 25 : 17
Therefore 60% is divided equally. So the difference between 40% of their profit is 300
i.e. (40*25x)/100 – (40*17x)/100 = 300
10x – 6.8x = 300
3.2x = 300 So x =93.75
Total profit = 25x + 17x = 42x
= 42 * 93.75 = Rs 3937.50

19) b) Let the Total profit = 100
Donation = 5% of 100 = Rs 5 Remaining is Rs 95
3 : 2 of 95
57 : 38
P's share is Rs 57
57 * 150 = Rs 8550 (actual profit of P)
38 * 150 = 5700 (profit of Q)
Total profit of (P + Q) = 8550 + 5700
= 14250
95% = 14250
100% = (100 * 14250)/95 = 15000

20) b)

	Arjun	Sukesh
1st year	40	0
2nd year	50	0
3rd year	60	85
4th year	70	85
	220	170 = 22 : 17
	195000	

22 **17**

110000 **85000**

21) a) **P's share : Q's share : R's share**

= (¼ * ¼) : (1/5 * 1/2) : {1 – (1/4 +1/5)} * 1

= 1/16 : 1/10 : 11/20

Multiplying each fraction by LCM of 16, 10 and 20 i.e. 80

We have 5 : 8 : 44

P's share = (5/57) * 1140 = Rs 100

Q' share = (8/57) * 1140 = Rs 160

R's share = (44/57) * 1140 = Rs 880

22) a) Let G's capital = 1

Then, P's capital = 4

2(R's capital) = 3(P's capital)

= 3 * 4 = 12

Therefore, R's capital = 12/2 = 6

So, R's share : P's share : G's share = 6 : 4 : 1

Thus, P's share profit = [4/(6 + 4 + 1)] * 148500

= (4/11) * 148500 = 4 * 13500 = Rs 54000

23) d) Let required ratio of time be t1 : t2 : t3

Then using

Ratio of investments = Ratio of profits

4 t1 : 6 t2 : 9 t3 = 2 : 3 : 5

Take first two terms of the ratio,

4 t1/(6 + t2) = 2/3 t1/t2 = 1/1 = 9/9

t1 : t2 = 9 : 9

taking last two terms of the ratio,

(6 t2)/(9 t3) = 3/5 t2/t3 = 9/10

Hence, t1 : t2 : t3 = 9 : 9 : 10

24) a) Akshita's share : Maneesha's share : Ankita's share
= 14 : 16 : 22 = 7 : 8 : 11
Amount paid by Ankita = [11/(7 + 8 + 11)]* 2080 = (11 * 2080)/26 = 11* 80 = Rs 880

25) b) let share of Ravi be 100
. then share of Monika = 90 and share of Sajid = 99
Sajid : Monika : Ravi = 99 : 90 : 100
Therefore investment of Ravi = [5780/(99 + 90 + 100)] * 100 = Rs 2000

26) b) Let the annual profit be Rs x.
Then Rs(x – 120) will be distributed between Suman and Kanika as their shares of profit.
Ratio of profits = Ratio of investments
So, Suman :Kanika = 3000 : 4000 = 3 : 4

Therefore 120 + (x – 120)*(3/7) = 390
Which gives (x – 120) = 630
So, B's share = (4/7) * (x – 120) = Rs 360

27) a) Let the investment of Kritika during first year = 5x
Investment of Amisha during first year = 7x
Investment ofAnisha during first year = 6x
Then, their investment during second year are
(126% of 5x) : (120% of 7x) : (115% of 6x)
= 630 : 840 : 690 = 21 : 28 : 23

28) b) Let investment of Virat be x for y months.
Then Akash's investment = 3x for 2y months
Therefore Akash's :Virat's= (3x * 2y)/(x * y)= 6xy : xy = 6 : 1
Let the total profit = m
Then, m *(1/7) = 6000 So m = 6000 * 7 = Rs 42000
Therefore, 20% of 42000 = Rs 8400

29) a) Ratio of total capital of Pamela and Nicole
= 20000 *12 : 35000 *12
= 240000 : 420000
Now, Rachel gives Rs 220000 to both to make the capital equal.
Therefore Pamela's capital : Nicole's capital
= 240000 : 420000
+200000 :20000
= 440000 : 440000
If Pamela takes Rs 200000 and Nicole takes Rs 20000 from Rachel
Then, both have the equal capital
Therefore required ratio of dividend amount

= 200000 : 20000 = 20 : 2 = 10 : 1. Hence Pamela & Nicole should divide amount in the ratio 10:1

30) b) Tatsat's share : Mohan's share : Rohan's share
= [16000 * 3 +(16000 – 5000) * 9] : [12000 * 3 + (12000 + 5000) * 9] * [21000 * 6]
= [(16 * 3 + 11 * 9) : (12 * 3 + 17 * 9) : (21 * 6)
= 147 : 189 : 126 = 7 : 9 : 6
Hence, Mohan's share exceeds Rohan's share by
[(13200) * (9 – 6)]/(7 + 9 +6) = rs 1800

31) d) LCM of 3, 4, 5 & 6 is 60 so the amounts are invested in the ratio 20 : 15 : 12 : 10 whose total is = 60
The first share gives (20/57) * 171 = Rs 60. Hence this one is has got the greatest share.

32) a) given ratio of a share of a man, woman and a boy is 7 : 4 : 3. So ratio of share of 4 men, 5 women and 2 boys is
= 7 * 4 : 4 * 5 : 4 * 2 = 28 : 20 : 6 so sum total becomes 54
And the share of a woman becomes [(5 * 4)/54] * 4536 = Rs 336

33) a) J's capital investment in that year = 10000 * 4 + 12000 * 8 = 1,36,000
K 's capital investment in that year = 10000 * 7 + 14000 * 5 = 1,40,000
L's investment in that year = 10000 * 7 + 8000 * 5 = 1,10,000
Ratio in which profits are to be shared = 68 : 70 : 55
Annual salary of L = 2000 * 12 = Rs 24,000
Profit to be shared = 217000 – 24000 = Rs 193000
J's share = (193000 * 68)/193 = Rs 68000
K's share = Rs 70000
L's share = Rs 55000

34) c) Total amount deducted is 15 + 10 + 30 = 55
Amount left = 535 – 55 = 480
Now Rs 480 is divided in the ratio 4 : 5 : 7
So after deduction –: share of P = (4/16) * 480 = 120
Share of Q = (5/16) * 480 = 150
Share of R = (7/16) * 480 = 210
Therefore, initial share of P = 120 + 15 = Rs 135
Initial share of Q = 150 + 10 = Rs 160
Initial share of R = 210 + 30 = Rs 240

35) c) Ratio of contributions expected from the three men
= (110 * 6) : (50 * 9) : (440 * 3) = 22 : 15 : 44
Therefore secondman must pay 15/81th or 5/27th of the total

36) b) A = ½ B, B = 2C or A/B = ½, B/C = 2/1
A : B : C = 1 : 2 : 1
Shares of A, B and C are x, 2x, x

B/(A + B) = 2x/(x + 2x) = 2x/3x = 2/3

37) d) P, Q & R are to share profit in the ratio 4 : 3 : 7.
But since P is to receive 10% profit, only 90% is to be shared.
P's total share = 10% of profit + (4/14) * 90% of profit = 6000
Or (10 + 180/7)% of profit(p) gives p = 6000
Or (250/7)% of Profit(p) gives p = Rs 16800
Q and R's share combined = (10/14) of 90% profit = (10/14) * (90/100) * 16800 = Rs 10800

38) a) Supose he invested Rs 'x' and Rs 'y' in the matches of England and India respectively. From the first match he will get 3x, but from the second he will get nothing.
Now, 3x = (x + y) + (x + y)(150/100) or x/y = 5/1

39) a) Suppose he invested 3X on the first match and 4X on the second match. He will get back 3X * 3 = 9X
So again = 9X – 7X = 200000 or X = 100000
Therefore Total investment = 7X = 7 * 100000 = 700000

40) c) Investment = x + 2x = 3x
He gets back 3x + 8x = 11x. So gain = 8x
Gain percentage = (8x/3x)*100 = 266.66%

41) c) T = (R + S + T)/3 So, Originally S had an amount = 2T – R
Now R' = R/2, S' = S/3, T' = 0
Therefore R/2 + S/3 = (1/2)(2T – R) = S/2
Therefore S = 3R, T = 2R
= (R + 3R +2R) – 3R/2 = 4.5R
Percentage of amount spent = 75%

42) c) Let Tina's share be T, Ishan'sbe I, Abhishek be A and Fatima's be F
Given that T + 3 = I + I/3 = 80A/100 = F – 4
We get
T = F – 7
I = (3/4)(F – 4) and A = (5/4)(F – 4)
Also given that T + I + F + A = 80
Substituting the values from 1), 2) and 3) in 4), we get
[F + 3F/4 + 5F/4 + F] – 7 – 3 – 5 = 80 or F = 23.75

43) b) Let the fixed amount be Rs x.
Amount at the end of 2002 = Rs 1000 * 1.1 – x
Amount at the end of 2003 = Rs [(1000 * 1.1 – x) * 1.1 – x], because interest would be calculated upon the remaining amount. Amount at the end of 2004 = Rs [(1000 *1.1 – x) * 1.1 – x] * 1.1 – x
But the amount at the end of 2004 was zero.
Thus, [(1000 * 1.1 – x) * 1.1 – x] * 1.1 – x = 0
So, $1000 = (x/1.1^3) + (x/1.1^2) + (x/1.1)$

i.e. 1331 = 3.31x which gives x = Rs 402.11

44) c) Amount invested = Rs 4,60,000
Profit earned = Rs 1,84,000
Ratio of shares of profit for, Q & R = 15 : 16 : 15
So, Q receives 16 * 4,000 = Rs 64,000

45) c) Ratio of profit of Jack & Rajeev = Amount of capital invested * Time period of investment
= 52000 * 12 : 39000 * 8 = 2 : 1
Let the total profit = Rs x
Rajeev receives 25% as commission for managing business. Then, the remaining 75% of the total profit x is shared between Jack & Rajeev in the ratio 2 : 1
Hence, Rajeev will get 1/3rd part of 75% in addition to his commission.
Hence, Rajeev total earning = 25% of total profit + (1/3) * 75% of total profit
= 0.25x + (1/3) * 0.75x
20000 = 0.25x + 0.25x
Which gives x= 40000
So, the remaining amount of profit goes to Jack.
Hence, Jack's total earning = Total profit - Rajeev's total earning = 40000 – 20000 = Rs 20000.

46) a) Let investment of Shilpa = Rs x
Then, investment of Shamita = Rs(x + 5000)
And investment of Riya = Rs (x + 9000)
According to the question,
x + (x + 5000) + (x + 9000) = 50000
3x + 14000 = 50000
3x = 36000
x = 12000
clearly, investment of Shilpa = Rs12000
investment of Shamita = Rs (x + 5000)
= 12000 + 5000 = Rs 17000
Investment of Riya = rs(x + 9000) = 12000 + 9000 = Rs 21000
So, Riya'sshare :Shamita's share : Shilpa's share = 21000 : 17000 : 12000 = 21 : 17 :12
Hence, Riya's share
= [21/(21 +17 + 12)] * 70000 = Rs 29400

47) d) Let Raman remained in the business for 'x' months. Then,
Raghav : Raman = (2250 * 12) : (2700 * x)
2 : 1 = (27000 : 2700x) = (10 : x)
Therefore, 10/x = 2/1 [since Ratio of profit is 2 :1]
So, 2x = 10 x = 10/2 we get x =5
Hence, Raman joined after (12 – 5)= 7 months

48) d) The total investment will be Jayesh + Gyanesh + Brijesh.
Brijesh being 3000, Gyanesh will be 2250 and jayesh will be 1500
The total investment is : 6750
Returns to be given on their expectations :
Jayesh = 150, Gyanesh = 337.5 and Brijesh = 0
From this point calculate the total profit, subtract Jayesh's andGyanesh's expected returns and Gyanesh's share of profits for managing the business before dividing the profits in the ratio of capital invested.

49) c) Let MrSinghania has 'x' shares of 5.5%
x * 92 = 32,200
x = 350 shares
income = 350 * 5.5 = 1925
Now, after investment his income is
[(1/3) * (32200/92) * 4.5] + [(2/5) * (32200/115) * 5] + [(4/15) * (32200/56) * 6]
= 525 + 560 + 920 = 2005
Profit = 2005 – 1925 = Rs 80

50) d) P + Q + R + S = 56
Q + R + S = 4.6 P
P + Q + R + S = 5.6 P [adding P on both sides]
56 lakh = 5.6P
P = 10 lakh
Similarly 4(P + R + S) = (11/3)Q
P + Q + R + S = (14/3)Q
Q = 12 lakh
Similarly 4(P + Q + R + S) = R
P + Q + S = 2.5 R
P + Q + R + S = 3.5 R
We get R = 16 lakh
Therefore, S = (P + Q + R + S) – (P + Q + R) = 18 lakh

PROBLEMS ON AGES

Q 1 – 3) Eight years ago there were 5 members in the Robin's family and then the average age of the family was 36 years. Mean while Robin got married and gave birth to a child. Still the average age of his family is same now.
Q 1) The present age of his wife is:
a) 25 years b) 26 years c) 32 years d) Data insufficient

Q2) The age of his wife at the time of his child's birth was. If the difference between the age of her child and herself was 26 years:
a) 25 years b) 26 years c) 20 years d) Data insufficient

Q 3) The age of Robin at the time of his marriage was:
a) 22 years b) 23 years c) 26 years d) Can't be determined

Q 4) Eleven years earlier the average age of a family of 4 members was 28 years. Now the age of the same family with six members is yet the same, even when 2 children were born in this period. If they belong to the same parents and the age of the first child at the time of birth of the younger child was same as there were total family members just after the birth of the youngest members of this family, then the present age of the youngest member of the family is:
a) 3 years b) 5 years c) 6 years d) None of these

Q 5) The average age of all the 100 employees in an office is 29 years, where 2/5th of the number of employees are ladies and the ratio of average age of men to women is 5:7. The average age of female employees is :
a) 18 years b) 35 years c) 25 years d) None of these

Q 6) There are two houses in parliament. One is LokSabha and the other one is RajyaSabha and the member of parliaments (MPs) in both the houses is 300 & 200 respectively. The average age of the members of LokSabha and RajyaSabha is 40 years and 50 years respectively. A member of the RajyaSabha is 40 years & 50 years respectively. A member of the RajyaSabha when elected for the LokSabha also, he left the RajyaSabha and becomes the member of the LokSabha. Thus the average age of both the houses increases. Which one of the following statements is tr
a) The age of this member is greater than 50 years b) The age of this member is less than 40 years
c) The age of this member is greater than 40 but less than 50 years d) None of these

Q 7) The average weight of all the 11 players of Indian cricket team is 50 kg. If the average of first six lightest weight of players is 49 kg and that of the six heaviest players is 52 kg. The average weight of the player which lies in the sixth position in the list of players when all the 11 players are arranged in the order of increasing or decreasing weights:
a) 56 kg b) 52 kg c) 51 kg d) None of these

Q 8) The total age of all guests in the party was 540 years. If a South Indian couple(guests) left the party, then the average of the remaining guests still remained unchanged, where the age of both the husband and wife(the South Indian couple) was same, then the average age of this couple and the total number of guests in the party, respectively, can be:
a) 18, 27 b) 20, 27 c) 15, 38 d) Can't be determined

Q 9) In the PGI hospital Muradnagar, the sum of the ages of all the 29 people i.e. Physicians, surgeons and nurses is 696. If the age of each physician, each surgeon and each nurse be 1 year, 6 years and 3 years more, then the average age of the whole staff would have been 3 years more. If the number of surgeon is a square root of a two digit number which is also a perfect cube, then the number of nurses in the hospital is:
a) 12 b) 15 c) 16 d) None of these

Q 10) The average age of board of directors of a company, having 10 directors was 48 years. Coincidentally when a director aged 53 resigned from the board of directors, another director died on the same day. So a new director joined the board of directors aged 34. Next year in the same month the average age of all the 9 directors was found to be 46 years. The age of the late(i.e. dead) director at the time of his death was :
a) 56 years b) 53 years c) 57 years d) None of these

Q 11) The average age of all the 20 students of a class is 24. The minimum age of a student is 18 and the maximum age of another student in the same class is 30 years. When the two students whose average age was 26 years rusticated from the class but later on one of the rusticated student was readmitted. Now the average age of the class is:
a) 23.89 years b) 28.39 years c) 25 years d) Can't be determined

Q 12) The ratio between the present ages of Raj & Ravi is 3:7, respectively. After 4 yr, Ravi's age will be 39 yr. what wasRaj's age 4 yr ago?
a) 12 yr b) 13 yr c) 19 yr d) None of these

Q 13) Four years ago Rajeev was 3/4th times of Rakesh. Four year hence, Rajeev's age will be 5/6 times that of Rakesh. What is the present age of Rajeev?
a) 15 yr b) 16 yr c) 18 yr d) None of these

Q 14) The present age of Kailash's father is four times of Kailash's age. Five years back, Kailash's father was seven times as old as Kailash was at that time. What is the present age of Kailash's father?
a) 84 yr b) 70 yr c) 40 yr d) 35 yr

Q 15) Ajay's brother is 3 year elder to him. His father was 28 year of age when his sister was born, while his mother was 26 year of age when he was born. If his sister was 4 year age when his brother was born, the ages of Ajay's father and mother respectively when his brother was born were
a) 32 yr& 23 yr b) 32 yr& 29 yr c) 35 yr& 29 yr d) 35 yr& 33 yr

Q 16) There are 3 members in a family, mother, father and son. The average age of the three members was 42 years on the day of their son's marriage. After 6 years of the marriage, the average age of the family will be 36 years when a grandson was born after 2 years of the marriage. Find the age of the daughter – in – law at the time of marriage.
a) 26 yrs b) 27 yrs c) 28 yrs d) 29 yrs

Q 17) Savita's present age is 6/5 times of her age at the time of her marriage and she got married 6 years ago. Age of her son is 1/12 of her current age. Find the age of her son.
a) 2 yrs b) 5 yrs c) 4 yrs d) 3 yrs

Q 18) At present, the sum of the ages of R, S & T is 150 years, whereas 10 years ago, the ratio of their age was 5:4:3. Find the ratio of their ages 10 years hence.
a) 7 : 5 : 3 b) 7 : 6 : 5 c) 4 :3 : 5 d) 6 :9 : 5

Q 19) The average age of a family of 10 members is 20 years. If the age of the youngest member of the family is 10 years, then the average age of the members of the family just before the birth of the youngest members was approximately –
a) 9(1/11) yrs b) 9(1/10) yrs c) 11(1/9) yrs d) 9(1/8) yrs

Q 20) 5 years ago, the average age of J, K, L & M was 45 years with N joining them now, the average age of all the five is 49 years. How old is N?
a) 40 yrs b) 45 yrs c) 50 yrs d) 55 yrs

Q 21) If 6 years are subtracted from the present age of Raghav and the remainder is divided by 18, then the present age of his grandson Arav is obtained. If Arav is 2 years younger to Rahul whose age is 5 years, then what is the age of Raghav?
a) 96 years b) 84 years c) 48 years d) 60 years

Q 22) At present age of his father is five times that of the age of his son. Three years hence, the father's age would be four times that of his son's age. Find the present ages of the father and the son.
a) 35 yrs, 7 yrs b) 35 yrs, 11 yrs c) 45 yrs, 9 yrsd) 25 yrs, 12 yrs

Q 23) The age of man is 4 times that of his son. 5 years ago, the man was nine times as old as his son was at that time. What is the present age of that man?
a) 28 yrs b) 32 yrs c) 34 yrs d) 36 yrs

Q 24) Carmella got married 9 years ago. Today her age is 1(1/3) times of her age at the time of marriage. At present her daughter's age is 1/6th of her age. What was her daughter's age two years ago?
a) 6 years b) 7 years c) 3 years d) Can't be determined

Q 25) The ratio between the ages of a father and a son respectively. Four years hence the ratio between the ages of the son and his mother will be 1:2 respectively. What is the ratio between the present ages of the father and the mother respectively?
a) 3:4 b) 5:4 c) 4:3 d) Can't be determined

Q 26) If the ages of A & C are added to twice the age of B, the total becomes 59. If the ages of B and C are added to thrice the age of A, the total becomes 68. And if the age of A is added to thrice the age of B and thrice the age of C, the total becomes 108. What is the age of A?
a) 15 yrs b) 19 yrs c) 17 yrs d) 12 yrs

Q 27) Present age of Rahil is 8 years less than Reena's age. If 3 years ago Reena's age was 'x', which of the following represents Rahil's present age?
a) x + 3 b) x – 5 c) x – 3 + 8 d) x + 3 + 8

Q 28) M said to N "I am twice as old as you were when I was as old as you are" The sum of their ages is 63 years. Find the difference of their ages.
a) 27 years b) 21 years c) 9 years d) 6 years

Q 29) There are 6 students in a class. The ages (in years) of exactly three students are prime numbers and the ages (in years) of the other three students are even numbers. If the ages (in years) of all the six students in the class are in arithmetic progression, then what is the average age(in years) of the students in the class?
a) 5.5 b) 6 c) 4.5 d) Cannot be determined

Q 30) A man's age is 150% of what it was 10 years ago, but 75% of what it will be after 10 years. What is his present age?
a) 25 years b) 30 years c) 35 years d) None of these

Q 31) The average age of Riya's family consisting of 5 members 3 years ago was 35 years. One year ago a new baby was born in this family. Three years hence the average age of the family will be:
a) 36 years b) 34(5/6) years c) 35(4/5) years d) None of these

Q 32) 10 years ago the average age of all the 25 teachers of the girls college was 45 years. 4 years ago, the principal has retired from her post at the age of 60 year. So after one year a new principal whose age was 54 years recruited from outside. The present average age of all the teachers is, if principal is also considered as a teacher:
a) 54(18/25) b) 55(17/25) c) 49(1/2) d) None of these

Q 33) The ratio of the ages of the father and the daughter at present is 3:1. Four years ago the ratio was 4:1. The average age of her father and daughter 2 years hence will be:
a) 24 b) 26 c) 25 d) 36

Q 34) The average age of a family of 6 members 4 years ago was 25 years. Mean while a child was born in this family and still the average age of the whole family is same today. The present age of the child is :
a) 2 years b) 1(1/2) years c) 1 year d) Data insufficient

Q 35) There are only five people in Aryan Verma's family. Aryan, his wife, a son and two daughters. The daughter's age is 4/5th of the elder daughter's age. The age of eldest daughter is 3/8th times of her father Aryan and the age of the son is 1/5th that of his father Aryan. 4 years ago the age of her wife was 8 times that of his son and now the sum of the ages of the younger daughter and wife is same as the sum of the ages Aryan and his son. The average age of the family is:
a) 22.22 years b) 25,4 years c) 21.2 years d) None of these

Q 36) In a combined family the average age of 4 males and 7 females is 42 and 20 years respectively. If two persons whose average age is 13 years have left the family and other three people joined the family whose respective ages are 11, 15 and 28 years, then the average age of the new family is increased by:
a) 4 years b) 1 year c) 3 years d) None of these

Q 37) The ratio of age of X & Y is x:y. if X's age is increased by 3 years and Y's age is increased by 2 years then new ratio of their ages becomes 24 : 25. Given that the sum of their actual ages is 93 years. Find the actual ratio of their ages.

a) 21:22 b) 42:45 c) 45:48 d) Can't be determined

Q 38) The ratio of age between S:T is 6:5 and the age of each U and V is 9/10 times that of T. Age of X is less than S but greater than T . The ratio ages between T & W is 2:3 also age of S is 3 years less than W. What is the ratio of ages of S and X if all the ages are in integers?
a) 12:11 b) 9:7 c) 24:19 d) 12:13

Q 39) Arya, Sansa& Lisa are three sisters. Arya and Sansa are twins. The ratio of sum of the ages of Arya&Sansa is same as that of Lisa alone. Three years earlier the ratio of age of Arya and Lisa was 2:7. What will be the age of Sansa 3 years hence?
a) 21 years b) 16 years c) 8 years d) 12 years

Q 40) A couple got married 9 years ago when the age of wife was 20% less than her husband. 6 years from now the age of wife will be only 12.5% less than her husband. Now they have its children including single, twins and triplets and the ratio of their ages is 2:3:4 respectively. What can be the maximum possible value for the present age of this family?
a) 110 years b) 103 years c) 105 years d) 83 years

Q 41) The average age at present of Charles, Kate, their daughter and their son, who is just born, is 22.5 years. Their daughter was born 10 years ago. The average age of Charles, his parents and Kate 15 years back, was 38.75 years. The average age of Charles and his parents, 20 years back, was 38(1/2) years. What is Kate's age at present?
a) 20 years b) 25 years c) 40 years d) 35 years

Q 42 –44) People of all ages enjoy visiting an children's exhibition, especially children(people below the age of 15. On a Sunday, many people visited the exhibition. All of them came as a family of two people or more than two people, where there was at least one child per family. The entry details of some families as recorded by the exhibition's ticketing system is given below. The age of any person is taken as the integral number of years he/she has lived so far.

Family	Age of the eldest member (in years)	Age of the youngest Member(in years)	Average age of all the Children(in years)
Chowdhary family	50	8	10.4
Agarwal family	19	4	11.5
Devgan family	15	6	12.3

Q 42) Devgan family came with 25 people out of which 20 were children. What is the average age of members of Devgan family?
a) 21.25 years b) 13.04 years c) 12.84 years d) 11.65 years

Q 43) What is the minimum possible number of people of Agarwal family who visited the exhibition?

a) 4 b) 5 c) 6 d) 3

Q 44) If the average age of members of Chowdhary family visiting the exhibition is 14 years, then what is the least number of members in Chowdhary family?
a) 7 b) 8 c) 11 d) 10

Q 45) The ratio of present age of Satyam to that of sahil is 3:11. Sahil is 12 yr younger than Reshma. Reshma's age after 7 yr will be 85 yr. What is the present age of Satyam's father, who is 25 yr older than Satyam?
a) 43 yr b) 67 yr c) 45 yr d) None of these

Q 46) The average age of a man and his son is 27 yr. the ratio of their ages is 8:1, respectively. What will be the son's age after 6 yr?
a) 6 yr b) 14 yr c) 12 yr d) 8 yr

Q 47) Atpresent, Prateek is three times Anoop's age. After 7 yr, Prateek will be twice Anoop's age. Then how many times will Prateek's age be in another 14 yr time with respect to Anoop's age then?
a) 1 b) 3 c) 2 d) 1.5

Q 48 – 49) In the parliament, in a particular session all the women which constitutes 1/5th strength of the LokSabha, left the house due to the rejection of their demand. Actually they were asking for the 50% reservation of seats in the Loksabha. Thus the average age of the remaining members of the house(i.e. the LokSabha) increases by 1/4th than it was earlier when all the members(i.e. men & women) were present.

Q 48) The total strength of the LokSabha is:
a) 300 MPs b) 475 MPs c) 526 MPs d) None of these

Q 49) If the average age of women b 30 years then the average age of male members in the LokSabha will be:
a) 26 b) 34 c) 40 d) None of these

Q 50) The average age of 100 nurses in a nursing home in 1982 was 50 years. In 1984, 20 nurses retired from their job, whose average age was 60 years. After a huge gap in 1987, 40 nurses were mployed whose average age was 38 years. The average age of all the nurses in 1990 was:
a) 53 years b) 51 years c) 48.5 years d) Data insufficient

SOLUTION AND EXPLANATION OF PROBLEMS ON AGES

(1 – 3)

	No of family members	Average	Total
8 years ago	**5**	**36**	**180**
Presently	**(If) 5**	**(36 + 8) = 44**	**220**
	7	**36**	**252**

1). d) it is clear from the above table that data is insufficient.

2). b) Since we know that the difference between the age of any two persons remains always constant, while the ratio of their ages gets changed as the time changes.
So, if the age of his child be x (presently)
Then the age of wife be x + 26 (presently)
Thus, the total age = x + (x + 26) = 32 [252 – 220 =32]
x=3. Therefore the age of her child is 3 years and herself is 29 years. Hence her age at the time of birth of her child was 26 years.

3). d) Since there is no clue there so it can't be determined.
4). a)

	No of family members	Average	Total
Eleven years earlier	**4**	**28**	**112**
Presently	**If 4**	**39**	**156**
	6	**28**	**168**

Since it is obvious that just after the birth of the youngest member (i.e. child) was 6 family members in the family. Therefore at the time of the birth of the youngest child the elder child's age was 6 years. Now the sum of their ages = x + (x +6) = 12 = (168 – 156) ; x =3 & (x + 3) = 9

5). b) going through the options : (40 * **35**) + (60 * 25) = 29 * 100
since there are 40 ladies and 60 gents.

6). c)

	Lok Sabha	Rajya Sabha
No of Mp's	**300**	**200**
Ave age	**40**	**50**

Since when a member of Rajya Sabha joins the Lok Sabha and the average age of both the house increases, it means the average of this member must lie between 40 & 50. When the age of this member is greater than 40, then the average age of the Lok Sabha increases. Again when the age of this member is less than 50, then after leaving it, the average age of the Rajya Sabha increases.

7). a) Let J, K ,L, M, N, O, P, Q, R, S, T be the 11 players in the order of increasing weight then,

J + K + L + M + N + O = 49 * 6 = 294

O + P + Q + R + S + T = 52 * 6 = 312

And J + K + L + M + N + O + P + Q + R + S + T = 50 * 11 = 550

Therefore O = (J + K + L + M + N + O) + (O + P + Q + R + S + T) – (J + K + L + M + N + O + P + Q + R + S + T)

= 294 + 312 – 550 = 56

Hence the average weight of O = 56 kg.

Q 8) b) Solving through option we get

540/27 = 20

[540 – (2 * 20)]/25 = 20

Hence option b) is correc.

Q 9) d)

	Physician	Surgeon	Nurse
No of members	(21 – x)	8	x
Increase in average age	1	6	3
Increase in total age	(21 – x)	48	3x

(Number of members in the staff) * (average age) = total age

29 * 24 = 696

29 * 27 = 783

Hence change in total age = 87

Since P + S + N = 29

Therefore if there would be x nurses then there must be (21 – x) physicians.

Again total change(or increase) in age = (21 – x) + 48 + 3x = 87 ; x = 9

Q 10) a)

	No of directors	Average age	Total age
Just before death and resignation	10	48	480
Just after death and resignation	9		{480 – (53 + x) +34}
One year later	9	46	414

So one year later, after the incident

Total age = { 480 – (53 + x) + 34} + 9 * 1 = 414

x = 56 years.

Q 11) d) Since we don't know their ages individually so we cannot calculate the average of a class when a student of unknown age readmitted in the class.

Q 12) d) let Raj and Ravi's ages are 3x yr and 7 yr respectively.
Therefore 7x + 4 = 39; x=5
Hence, Raj's age 4 yr ago = 11 yr

Q 13) b) 4 yr ago, let Rakesh's age = x yr and Rajeev's age = 3x/4 yr
Now, Rakesh present age = (x+4) yr
And Rajeev present age = (3x/4 + 4) yr
According to the question,
5(x + 4 + 4)/6 = (3x/4 + 4 + 4) ; x = 16 ; so Rajeev present age = 16 yrs

Q 14) c) Let the present age of Kailash be x.
Then the present age of Kailash's father = 4x
Now, 5 yr ago,
Kailash's father's age = 7 * Kailsh's age
4x – 5 = 7(x – 5)
3x = 30
x = 10
Kailash's present age = x= 10 yr
So Kailash's father present age 4x = 4 * 10 = 40 yr

Q 15) a) When Ajay was born, his mother's age was 26 yr and his elder brother was 3 yr elder to him.
Mother's age when brother was born = 26 – 3 = 23 yr
Ajay's father was 28 yr of age when his sister was born and his sister was 4 yr of age when his brother was born.
So age of father when brother was bron = 28 + 4 = 32 yr

Q 16) a) At the time of marriage = Mother + father + son = 42 * 3 = 126 yrs
After 6 yrs = 126 + 6 + 6 +6 = 144 yrs
Current :- M + F + Son + Daughter – in – law + child = 36 * 5 = 180 yrs
144 + Daughter – in – law + 4 = 180(as child was born after 2 yrs of marriage so he is of 4 yrs now)
Daughter – in – law = 180 – 148 = 32 yrs
At the time of marriage = 32 – 6 = 26 yrs.

~~Q 17) d)~~ (6/5) * 6 36 – current age and 6/5 *6 30 – at the time of marriage
Hence son's age = 36/12 = 3 yrs
Savita's current age is 6/5 times of her age at the time of her marriage which means her current age is 6 units and her age at the time of marriage was 5 units. But she got married 6 years ago which means 1 unit is equal to 6 years so her current age is 36 years and her son's age is 1/12 of her current age i.e. 3 years

Q18) b) current sum of ages = 150;
Sum of ages 10 years ago
= 120 (as 10 + 10 + 10 yrs of 3 persons will be reduced from 150)

	R		S		T
Ratio of ages 10 yrs ago =	5	:	4	:	3
= 12 yrs					
	50	:	40	:	30
= 120 yrs					
Ratio of ages after 10 yrs					
	= 70	:	60	:	50
[Add 20 yrs to each]	= 7	:	6	:	5

Q19 c) Sum of present ages of 10 members = 20 * 10 = 200 yrs
Total age of members 10 yrs ago = 100 yrs[200 – (10 * 10)]

Q 19 c) Sum of present ages of 10 members = 20 * 10 = 200 yrs
Total age of members 10 yrs ago = 100 yrs[200 – (10 * 10)]
Required average = 100/9 = 11(1/9)yrs

Q 20) b) sum of present ages of J, K , L, M is
= 45 * 4 + 5 *4 = 200 yrs
Sum of present ages J, K , L, M & N = 49 * 5 = 245 yrs
Present age of N = 245 – 200 = 45 yrs

Q 21) d) Rahul present age = 5 yrs
So, Arav's age present age = (5 – 2) = 3 yrs
According to the question, (R – 6)/18 = 3
Raghv's age = 18 * 3 + 6 = 60 yrs

Q 22) c) let the present age of son = x years
present age of his father = 5x years
3 years hence, son's age will be (x+3) years & his father's age will be (5x + 3) years
According to question
5x + 3 = 4(x + 3)
X = 9
Present age of father = 5x = 5 * 9 = 45 years and present age of son = x = 9 years

Q 23) b) Let the age of man be 4x years and age of his son be x years
5 years ago the ages of man and his son were (4x – 5) years and (x – 5) years respectively.
According to question,
(4x – 5) = 9(x – 5)
4x – 5 = 9x – 45
5x = 40
x = 8

Present age of father = 4x = 4 * 8 = 32years

Q 24) d) Let the present age of Carmella be 'x' years.
9 years ago, the age of Carmella
= (x – 9) years
According to question
x = 1(1/3) * (x – 9)
x = 4/3 (x – 9)
3x = 4 (x – 9)
x = 36
present age of Carmella = 36 years
present age of her daughter
= 1/6 of present age of Carmella
= 1/6 * 36 years = 6 years
Her daughter age two years ago = (6 – 2) = 4 years

Q 25) d) Let the present ages of father and son be '5x' and '2x' years respectively.
after 4 years, son's age = (2x + 4) years
according to question
after 4 years -:
(age of son)/(age of mother) = ½
(2x + 4)/age of mother = ½
Age of mother = 2 * (2x + 4) = (4x + 8) years
Present age of mother = 4x + 8 – 4 = 4x + 4
Ratio between the present age of the father and mother = 5x : (4x + 4)
We cannot find the exact value of ratio.

Q 26) d) Let the present ages of A, B & C be A years, B years and C years respectively.
According to 1st condition of question –: A + 2B + C = 59 ------- 1)
According to 2nd condition of question –: 3A + B + C = 68 ------- 2)
According to 3rd condition of the question –: A + 3B + 3C = 108 ------- 3)
From 2), we get
B + C = 68 – 3A ----- 4)
From 3), we get
A + 3(B + C) = 108
Using 4), we get A + 3(68 – 3A) = 108
A + 204 – 9A = 108
So 8A = 96 ; A = 12
A's present age = 12 years

Q 27) b) According to question,
Present age of Reena = (x + 3) years
Present age of Rahil

= (x + 3) – 8 = (x – 5) years

Q 28) c)

	M	N
Present age:	**2x**	**y**
Some years before :	**y**	**x**

Here , 2x – y = y – x
2x + x = y + y
x/y = 2/3

Now	M	:	N
	2x		y
	2 * 2		3

Present age 4 : 3
Now, the required difference in ages = [63 * (4 – 3)]/ (4 + 3) = 9 years

Q 29) d) arrangements possible are (3, 4, 5, 6, 7, 8), (7, 10, 13, 16, 19, 22) & (4, 7, 10, 13, 16, 19).
Hence cannot be determined.

Q 30) b)let the man's present age be 'x' years, so 10 years ago he will be = x – 10
So equation becomes –: 150% of (x – 10) = x which gives x= 30.

Q 31) b) 3 years ago total age of 5 members = 5 * 35 = 175 years
At the time of birth of new baby the total age of family = 175 + (2 * 5) = 185 years
The present age of family = 185 + (1 * 6) = 191 years
3 years hence, the average age of family = [191 + (3 * 6)]/6 = 34(5/6)

Q 32) a) 10 years ago average age of 25 teachers = 45 years
4 years ago (just before the retirement of principal) average age of 25 teachers = 45 + 6 = 51 years
And the same total age of 25 teachers = 51 * 25 = 1275 years
And the total age of remaining 24 teachers when just the principal has retired = 1275 – 60 = 1215 years
1 year later(i.e. 3 years ago from present) total age of 24 teachers (just before the recruitment of new principal)
= 1215 + (1 * 24) = 1239 years
And the total age of 25 teachers including new principal just after the recruitment
= 1239 + 54 = 1293 years
Thus the present age of all the 25 teachers
= 1293 + (3 * 25) = 1368 years
Hence, the present average age of the 25 teachers = 1368/25 = 54(18/25)

Q 33) b) Given the present age of father and daughter is 3 : 1 so their age let it be 3k & k respectively. four years ago their ages were in the ratio 4 : 1 so equation becomes
(3k – 4)/(k – 4) = 4/1 we get k = 12 years. So the present ages of father and daughter is 36 years and 12 years respectively.
Therefore 2 years their average will be –: [(36 + 2) + (12 + 2)]/2 = 26 years

Q 34) c)

	No of family members	Average age	Total age
4 years ago	6	25	150
Presently	6	29	174

But the no of family members (presently) = 7
And average age (presently) = 25
Therefore the total age = 25 * 7 = 175
Hence, the age of child = 175 – 174 = 1 year

Q35) a)

Aryan	Wife	Son	El.D	Yg.D
5x		x	5z	4z
8y			3y	
40k	W	8k	15k	12k

Again since Yg.D + W = A + S (k = x.y)
12k + W = 40k + 8k W – Age of Wife
W = 36 k
Thus 4 years ago – :
(36k – 4) = 8(8k – 4)
K = 1
Therefore, the age of Aryan = 40 ; Wife = 36 ; Son = 8 ; Elder daughter = 15 ; Younger daughter = 12
Hence, the average age of the family = 111/5 = 22.22 years

Q 36) d) Initially, the total age of family = 4 * 42 + 7 * 20 = 308
and the average age = 308/11 = 28
now, the total age of family = 308 – (2 * 13) + (11 + 15 + 28) =336
Now, the new average of the family = 336/12 = 28
Since the average age of the original family and that of new family is same (i.e. 28)
Hence, the average age of the new family is increased by 0 year.

Q 37) c) x + y = 93
and (x+3)/(y+2) = 24/25
25x – 24y = (-27)
From equations number 1) & 2)
x= 45 & y = 48

Q 38) a) T = 5/6 S
and U = V = 9/10 T
also T = (2/3) W
and W – S = 3
from 1) & 2) S/W = 4/5 or W = (5/4) S
therefore W – S = 5S /4 – S = 3 from 4) & 5)

S = 12 & W = 15 & T = 10
Also U = V = 9 and X = 11, since T < X < S and X is integer
Therefore S : X = 12 : 11

Q 39) c) Since Arya and Sansa are twins so their ages be same. Let their ages be x and age of Lisa be y, then,
x + x = y
and (x – 3)/(y – 3) = 2/7
7x – 2y = 15
Now, from equation 1),
7x – 4x = 15 ; x = 5
So the age of Sansa 3 years hence will be 5 + 3 = 8 years.

Q 40) b) (H – 9)/(W – 9) = 5/4 and (H + 6)/(W + 6) = 8/7
Therefore the present age of husband is 34 and present age of his wife is 29 years.
Now, the maximum age of any child must be less than 9 years.
Hence their ages can be 2, 3 and 4 years or 4, 6 and 8 years.
So the max possible sum of age of this family
= 34 + 29 + (1 * 4 + 2 * 6 + 3 * 8)
= 103 years

Q 41) c) Let Charles present age be c
Let Kate present age be k
Let daighter's present age be d
Let Charles's parents cumulative present age be p
Therefore c + k + d = 22.5 (4) = 90
As d = 10 years,
Therefore c + k = 80 years ------1)
The average age of Charles's parents, Charles and Kate 15 years ago was 38.75 years
[(c – 15) + (p – 30) + (k – 15)]/4 = 38.75
c + k + p – 60 = 155
So c + k + p = 215 ----------2)
From 1) & 2)
p = 135---------3)
The average age of Charles's parents and Charles 20 years ago was 38.5 years
[(c – 20) + (p – 40)]/3 = 38(1/3)
c + p – 60 = 115
c = 175 – 135 = 40 --------4)
from 1) & 4) we get k = 40 yrs.

Q 42 – 44)
Q 42) c) Age of eldest member = 15 yrs. Hence, all adults are 15 yrs of age.(less than 15 means child)
average age per member

= [(15 * 5) + (12.3 * 20)]/25 = 12.84 yrs

Q 43) b) Let there be n children in Agarwal family. Youngest child = 4 yrs. Maximum age that a child can have = 14 years .
To minimize the number of people, we assume that there is only one adult having the age of 19 yrs and all the children except the youngest one are 14 yrs old.
Total age of all the children = 11.5n = 4 + 14(n – 1)
n = 4
total members = 5

Q 44) c) Average age of all members = 14 years
Age of youngest member = 8 yrs
Age of eldest member = 50 yrs
Since average age of all members is 14 yrs, we must make sure there is only one adult in Chowdhary family to minimize the number of members.
For n children in Chowdhary family, 50 + 10.4n = 14(n + 1)
n= 10. Least number of members = 10 + 1 = 11

Q 45) a) Let the present age of Satyam and Sahil are 3x yr & 11x yr respectively.
According to question,
11x = 85 – 7 – 12
x = 6
Therefore present age of Satyam = 3 * 6 = 18 yr
Hence, present age of Satyam's father = 18 + 25 = 43 yrs

Q 46) c) Let ages of man and his son are 8x yr and x yr, respectively.
According to the question,
(8x + x)/2 = 27 ; x= (27 * 2)/9 = 6
Hence, age of son after6 yr = 6 + 6 = 12 yr

Q 47) a) Let Anoop's age = x yr
Then Prateek's age = 3x yr
According to the question,
3x + 7 = 2(x + 7)
x = 7
Therefore Age of Anoop after 14 yr = 7 = 14 = 21 yr
And Prateek's present age = 21 yr
Hence, Prateek's age is one yime that of Anoop's age

Q 48 – 49)
Q 48) d) Let the number of Total Mps = n and their average age be x
Then –:
n * x = 4n/5 * 5x/4 + ny/5 we get either n = 0 or y =0

[Since there are only 80% MPs remained in the house which is equal to 4n/5 and the increase in average age = 20% = 5x/4]
Thus, there cannot be any possible value of n.

Q 49) d) nx = 4n/5 * 5x/4 * (n*30)/5 we get n =0 (which is impossible)
So, there is not any woman MP in the Lok Sabha.

Q 50) b)

	Year/Time	No of Nurses	Average Age	Total Age
	1982	100	50	5000
Just before Retirement	1984	100	52	5200
Just after Retirement	1984	80	50	(5200 – 20*60) = 4000
Just before Retirement	1987	80	53	4240
Just after Retirement	1987	(80 + 40) = 120	48	(4240 + 38*40) = 5760
	1990	120	51	6120

TIME, SPEED & DISTANCE

Q (1 to 4) Arya is going to cover a distance of 360 km from Lucknow to Varanasi. The first one – third of the distance she covers on a cycle. The second one – third she covers by an auto – rickshaw and the remaining distance she travels by car. The average speed of the journey by a car is 5 times the average speed by cycle and 20 kmph more than the average speed by an auto – rickshaw, but she took 1 hour more by auto – rickshaw than by car.

Q 1) What is the average speed of the whole journey?
a) 15 kmph b) 24 kmph c) 20 kmph d) None of these

Q 2) What is the time taken in the whole jouney?
a) 10 h b) 12 h c) 15 h d) None of these

Q 3) What is the distance covered by her in last five hours of her journey?
a) 250 km b) 240 km c) 200 km d) Can't be determined

Q 4) Instead of travelling the first one – third by cycle if she travels by same auto – rickshaw with the same average speed, then what is the percentage decrease/ increase in time taken during the entire journey?
a) 46.66% b) 33.33% c) 50% d) 25%

Q 5) Jennifer and Jacqueline leave towns Delhi and Bihar at 6 am and travels towards Bihar and Delhi respectively. Speed of Jennifer is 60 kmph and speed of Jacqueline is 120 kmph. Kyla leaves Delhi for Bihar sometime later and travels at a speed of 90 kmph. If the distance between Delhi and Bihar is 1080 km and all three meet at the same point on theway, at same time, then at what time did Kyla leave Delhi?

a) 7 am b) 8 am c) 7.30 am d) 10 am

Q 6) A boy while walking diametrically across a semicircular playground, takes 3 minutes less than if she had kept walking round the circular path from P to Q. If she walks 60 metres a minute, what is the diameter of the play ground:

a) 60 m b) 48 m c) 84 m d) 315 m

Q 7– 8) Raju& Ravi went from Agra to Delhi by an E-car which is on the way to Kanpur . Rakesh goes from Kanpur to Delhi. The distance between Agra to Kanpur is 700 km and the distance between Kanpur & Delhi is 300 km. speed of Raju and Ravi E-car is 25 kmph and speed of Rakesh is 10kmph. All the three persons start their journey at 10 am. After travelling some miles Ravi sees Rajesh going(by riding on his horse) at 20 kmph to Delhi. Raju& Ravi go ahead meet Rakesh and pick him up. Then they return immediately to Delhi and thus all the four reach at the same time.

Q 7) What is the total distance travelled by Raju?

a) 400 b) 500 c) 600 d) Can't be determined

Q 8) What is the total time taken to reach kurukshetra?

a) 10 h b) 15 h c) 18 h d) 24 h

Q 9) The speed of a truck during the second hour of its journey is 3 times to that in the first hour. Also its third hours speed is the average speed of the first two hours. Had the car travelled at the second hours speed during all the first three hours, then it would have travelled 150 km more. Find the percentage reduction in time in the second case for first three hours:

a) 33(1/3) % b) 40% c) 25% d) 50%

Q 10) There are three runners Raja, Ram, Mohan with their respective speeds of 10 kmph, 20 kmph and 30 kmph. They are initially at A and they have to run between the two points A & B which are 10 km apart from each other. They start their race at 6 am and end at 6 pm on the same day. If they run between A & B without any break, then how many times they will be together wither at A & B during the given time period?

a) 5 b) 7 c) 4 d) 12

Q 11) Aprajita, Akash&Sachin started out on a journey to which the newly released movie "Sultan"which was shown at waves multiplex. The multiplex was 120 km away from their starting point of journey. Aprajita&Sachin went by car at the speed of 50 kmph, while Akash travelled by rickshaw at 10 kmph. After a certain distance Sachin got off and travelled the rest distance by another rickshaw at 10 kmph, while Aprajita went back for Akash and reached the destination at the same time that Sachin arrived. The number of hours required for the trip was:

a) 4 h b) 5 h c) 4.8 h d) Can't be determined

Q 12 – 13) Anuj&Arushi start towards each other at the same time from Allahabad and Kanpur for their destinations Kanpur & Allahabad respectively which are 300 km apart. They meet each other 120 km away from Allahabad.

Q 12)Salim starts from Allahabad to Kanpur, 1 hour after Anuj starts. Salim meets Arushi 1.5 hours after Salim starts. If the speed of Salim is atleast 20 kmph faster than the speed of Arushi. Which of the following statements is true?

a) The minimum possible speed of Anuj is 45 kmph
b) The maximum possible speed of Anuj is 45 kmph
c) The minimum possible speed of Arushi is 60 kmph
d) The maximum possible speed of Arushi is 60 kmph

Q 13) What is the minimum speed of Salim to overtake Anuj, before he meets Arushi? (Use the data from previous question, if necessary)

a) 30 b) 40 c) 60 d) None of these

Q 14 – 16) Rajeev goes at a speed of 60 kmph. Mohan can go from Chennai to Bengaluru in 2 hours. The distance between Chennai to Bengaluru is equal to the distance between Chennai to Pondicherry. Raghav takes the same time travelling from Bengaluru to Chennai as from Bengaluru to Pondicherry at his regular speed which is twice the speed of Mohan.

Q 14) What is the distance between Chennai and Bengaluru?

a) 60 km b) 27 km c) 36 km d) 18 km

Q 15) How much time will Rajeev take to complete a round trip of the three cities?

a) 1 h 12 min b) 1 h 48 min c) 1 h 30 min d) 1 h 36 min

Q 16) If Rajeev and Mohan travel towards each other from Bengaluru and Pondicherry respectively, how far from Bengaluru will they meet each other?

a) 60/13 b) 27(9/13) c) 37(9/13) d) 360/9

Q 17 – 18) Raghu, Pramod and Patil travel from Allahabad to Lucknow. They have a two seeter bike which can be driven by only Raghu. It is known that due to a very stringent traffic rules only two persons can ride at a time. Lucknow is 180 km away from Varanasi. All of them can walk at 6 kmph, but reach to Lucknow simultaneously also they started their journey simultaneously.

Q 17) If the speed of the bike is 36 kmph, then what is the total distance that the bike travels?

a) 400 km b) 380 km c) 200 km d) 320 km

Q 18) If the speed of the bike is 42 kmph, then what is the shortest possible time in which all three of them can complete the journey?

a) 7(1/3) b) 9(4/7) c) 9(3/7) d) Can't be determined

Q 19 – 20) The ratio of the speeds at which Raj & Manish walk is 3:4. Raj takes 30 minutes more than the time taken by Manish in reaching the destination.

Q 19) If Raj drives the car at twice the speed of his walking then the time required his destination by car is:

a) 45 min b) 60 min c) 1.5 h d) 1 h 20 min

Q 20) What is the total distance travelled by each of them, if the average of speeds of Raj and Manish is 28 kmph?

a) 48 km b) 60 km c) 17 km d) 70 km

Q 21) A busP left Kanpur for Delhi. Two hours later bus Q left from Kanpur to Delhi. Both trucks reached Delhi simultaneously. If the truck had started from Delhi at the same time and travelled towards each other they would meet in 1 h 20 min. Find the time by truck to travel from Kanpur to Delhi(in hours):
a) 2 b) 4 c) 5 d) 6

Q 22) Ramesh & Ajay setout at the same time to walk towards each other respectively from Lucknow and Mathura 144 km apart. Ramesh walks at the constant speed of 8kmph, while Ajay walks 4 km in the first hour, 5 km in the second hour, 6 km in the third hour and so on. Then the Ramesh and Ajay will meet:
a) In 6 h b) In 8 h
c) Midway between Lucknow& Mathura d) 80 km away from Mathura

Q 23) Rajshree&Leela started from Varanasi and Gwalior for Gwalior & Varanasi, which are 645 km apart. They meet after 15 hours. After their meeting, Rajshree increased her speed by 3 kmph, they arrived at Gwalior & Varanasi respectively at the same time. What is their initial speeds?
a) 24 kmph& 30 kmph b) 25 kmph& 18 kmph
c) 18 kmph& 21 kmph d) 20 kmph& 23 kmph

Q 24) Los Angeles & San Francisco are two famous cities 300 km apart. Ronaldo starts from Los Angeles at 8 : 24 am. An hour later Rivaldo starts from Los Angeles. After travelling for 1 hour, Rivaldo reaches San Andreas that Ronaldo had passed 40 minutes earlier. San Andreas falls on the way from Los Angeles to San Francisco. If Rivaldo and Ronaldo just reaches San Francisco at the same time, what are the speeds of the Ronaldo and Rivaldo respectively?
a) 100 kmph, 125 kmph b) 60 kmph, 80 kmph
c) 60 kmph, 75 kmph d) 75 kmph, 100 kmph

Q 25) Aburgular sees a jeep at a distance of 250m, coming towards him at 36 kmph. Burgular takes 5 seconds to realize that there is nothing but the a cop is approaching him by jeep and start running away from that cop at 54 kmph. But cop realize after 10 seconds, when the burgular starts running away, that he is actually a burgular and gives a chase at 72 kmph. How long after burgular saw the cop did cop catchup with him and what is the distance cop had to travel to do so?
a) 50 s, 1000 m b) 65 s, 1150 m c) 65 s, 1300 m d) 45 s, 1050 m

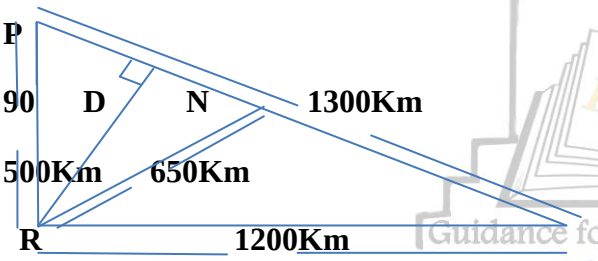
Q 26) Inspired by the 'Golden Quadrilateral project' UP government recently accomplished a diamond triangular project. Under this project the State Government laid down 6 lane roads connecting three cities Ayodhya, Vranasi&Chitrakoot, which are equally separated from each other i.e. in terms of geometry they form an equilateral triangle. Ramu and Shyam start simultaneously from Ayodhya and Banaras respectively, towards Chitrakoot. When Ramu covers 100 kms, Shyamu covers such a distance that the distance between Ramu&Shyamu makes 90 degree angle with the road joining Bnaras and Chitrakoot. What is the distance between Ayodhya& Banaras?
a) 250 km b) 450 km c) 300 km d) None of these

Q 27) Two buses R and S simultaneously started on two parallel tracks from Varanasi &Lucknow, which are 390 km apart. The ratio of the speed of R & S is 6:7. After how long (inkms) travelling, S exchanges the speed with R so that both the trains reach at their destination simulataneously:
a) 150 km b) 190 km c) 210 km d) Can't be determined

Q 28) In a circus there was a cheetah and a Lion walking in the two different rings of same radii. There I observed that when cheetah moved 3 steps, Lion moved 5 steps in the same time, but the distance traversed by cheetah in 5 steps is equal to the distance traversed by Lion in 4 steps. What is the number of rounds that a cheetah made when Lion completed 100 rounds?
a) 120 b) 48 c) 75 d) None of these

Q 29 – 32) In the following figure the route is shown which is followed by Professor Ajay & Professor Priya, who are visiting faculty at IIM – K and IIM – R respectively. P, Q denote IIM – K & IIM – R respectively and R denotes the residence of Prof. Ajay. They leave home for classes at the same time and their driving speeds are 500/13 kmph& 1200/13 kmph respectively. Also they finish the classes at the same time to reach home.

In the figure given below the path adopted by Ajay and Priyais RPQR and RQDR respectively. Prof. Ajay and Prof. Priya are husband and wiferespectively.



Q 29) If both of them start and finish the classes at the same time, then who returned home earlier than other, if no one of them halts for anywhere in the route and they just leave the institution as soon as they finish the lectures?
a) Prof Ajay b) Prof Priya c) Return at the same time d) Can't be determined

Q 30) In the shown figure N & D denotes Gurugram& Faridabad respectively, who returned home late and by how much time, if Priya turned from Gurugram instead of Faridabad:
a) Ajay, 9h 10 min b) Ajay, 9h 50 min c) Ajay, 2h 55 min d) Ajay, 16h 10 min

Q 31) In the above question how many percent time Priya saved in going via Gurugramof the total time taken previously:
a) 10% b) 25% c) 50% d) 17%

Q 32) If Mrs. Priya wants to watch the premier show of a movie at Pvr cinema in Gurugramwhile returning from institute through KBG. When will she return home given that she spends total time 3 hours at Pvr cinema?
a) At the same time as normalb) 5 min late than her husband
c) At the same time when her husband returns d) Can't be determined

Q 33) Two persons start from the opposite ends of a 90 km straight track and run to and fro between the two ends. The speed of first person is 30 m/s and the speed of other is 125/6 m/s. they continue their motion for 10 hours. How many times they pass each other?
a) 10 b) 9 c) 12 d) None of these

Q 34) Rekha and Bharti start swimming toward each other from the deep end and shallow end respectively of a swimming pool in funcity. They start their swimming simultaneously in the length of 300m pool. The ratio of their speeds is 1:2 respectively. Each swimmer rests for 6 seconds once she reaches the other end and starts swimming back. Where will they meet for the second time in the still water of swimming pool?
a) 30 m from the shallow end b) At the shallow end c) At the deep end
d) Can't be determined

Q 35 – 37)A person A started 3 hours earlier at 40 kmph from a place K, then another person B followed him at 60 kmph started his journey at 3O' clock, afternoon.
Q 35) At what time will they meet to each other(or at what time B will overtake A)?
a) 4.30 pm b) 5 pm c) 6 pm d) 9 pm

Q 36) At what time the difference between A & B was 30 km, but before B overtakes A?
a) 6.30 pm b) 7.30 pm c) 8.75 pm d) None of these

Q 37) At what time B will be 30 km ahead of A, after overtaking it?
a) 6.45 pm b) 7.30 pm c) 10.30 pm d) 8 pm

Q 38) Anisha was travelling in her boat when the wind blew her cap off and the cap started floating back downstream. The boat continued to travel upstream for 12 more minutes before Anisha realized that her cap fallen off and turned back downstream. She caught up with that as soon as it reached the starting point. Find the speed of river if Anisha cap flew off exactly 3 km from where she started:
a) 5 kmph b) 6 kmph c) 7.5 kmph d) Can't be determined

Q 39) P, Q & R participated in a race. P covers the same distance in 49 steps, as Q covers in 50 steps and R in 51 steps. P takes 10 steps in the same time as Q takes 9 steps and R takes 8 steps. Who is the winner of the race?
a) P b) Q c) R d) Can't be determined

Q 40) Raghav drives his truck very fast at 360 kmph. Moving ahead for some hours he finds some problem in headlights of the truck. So he takes 20 seconds in changing in the bulb of the headlight by stopping the

truck. Mean while he notices that another truck which was 400 m back is now 200 m ahead of his truck. What is the speed of this truck?
a) 100 kmph b) 92 kmph c) 108 kmph d) 300 kmph

Q 41) Two four wheelerVehicle A& Vehicle B travel at 120 kmph and 110 kmph respectively. Points P & Q are marked on the road tracks such that PQ is a straight line. Time taken by vehicle A to completely cross a stationary pole seconds. Time taken by vehicle B and vehicle A to completely cross the line PQ from the instant the front end of respective vehicles cross point P is 36 seconds and 31 seconds respectively. What is the length of the vehicle B?
a) 200 m b) 240 m c) 180 m d) 250 m

Q 42) Rakesh&Soham are brothers whose shops are located at a distance of 20 km and 24 km respectively from their home. Both of them start at the same time from home every day and reach their respective shops exactly at 10 a.m. When they decided to swap shops for a day.Rakesh started 8 minutes earlier than Soham. If both of them reached on time, what is the speed of Soham?
a) 66 kmph b) 60 kmph c) 54 kmph d) 48 kmph

Q 43) Dheeraj&Neeraj started biking at 4:00 am and 6:00 am respectively from the opposite ends on a highway 240 km long. On the way, Dheeraj's bike got punctured and it took him 2 hours to mend his vehicle. Neeraj also faced an engine malfunction at some point on the way because of which her bike slowed down to 50% of her initial speed of the remaining part of the journey, they finally et each other at 10:00 am. If Neeraj's speed was 28 kmph and her speed reduces after integer number of hours, which of the following could not be the speed of Dheeraj's?
a) 30 kmph b) 35.5 kmph c) 39 kmph d) 42.5 kmph

Q 44) In a 100m straight tunnel PQ made on a river, boat A enters from end P and boat B enters from the opposite end Q at the same time. There is a safety point H inside the tunnel at which boat B should reach before boat A to avoid collision. The speed of boat A, boat B and the stream is 60 m/s, 30 m/s and 10 m/s respectively. Find the minimum possible distance HP.
a) 77.78 m b) 63.79 m c) 52.48 m d) 55.56 m

Q 45) A man walks from A to B and cycles from B to A, a distance of 37.5 km in all spending 2 hours and 40 minutes. He would have taken 2/3rd hour less had he chosen to cycle the entire distance of 37.5 km. what would have been the time taken by him If he had chosen to walk both the ways?
a) 3.5 hours b) 3.33 hours c) 3.66 hours d) 3.75 hours

Q 46) Sujoy covers a certain distance with his own speed , but when he reduces his speed by 10 kmph his time duration for the journey increases by 40 hours, while if he increases his speed by 5 kmph from his original speed he takes 10 hours less than the original time taken. Find the distance covered by him.
a) 1200 km b) 1500 km c) 1600 km d) None of these

Q 47) Two horses started simultaneously towards each other and meet each other 3 h 20 min later. How much time will it take the slower horse to cover the whole distance if the first arrived at the place of departure of the second 5 hours later than the second arrived at the point of departure of the first?
a) 10 hours b) 5 hours c) 15 hours d) None of these

Q 48) A motorcyclist left point L for point M. Two hours later, another motorcyclist left L for M and arrived at M at the same time as the first motorcyclist. Had both motorcyclists started simultaneously from L and M travelling towards each, they would have met in 80 minutes. How much time did it take the faster motorcyclist to travel from L to M?
a) 6 hours b) 3 hours c) 2 hours d) None of these

Q 49) Three cars leave Rajkot for Gandhinagar after euqla time intervals. They reach Gandhinagar simultaneously and then leave for Surat, which is 120 km away from Gandhinagar. The first car arrives there an hour after the second car, and the third car, having reached Surat, immediately reverses the direction and 40 km from Surat meets the first car. Find the speed of the first car.
a) 30 kmph b) 19 kmph c) 32 kmph d) 22 kmph

Q 50) Sarbajeet and Ajit take a straight route to the same terminal point and travel with constant speeds. At the initial moment, the positions of the two and the terminal point form an equilateral triangle. When Ajit covered a distance of 80 km, the triangle becomes right- angled. When Ajit was at a distance of 120 km from the terminal point, the Sarbajeetarrived at the point. Find the distance between them at the initial moment assuming that there are integral distances throughout the movements described.
a) 300 km b) 240 km c) 200 km d) 225 km

SOLUTION AND EXPLANATION OF TIME, SPEED & DISTANCE

1 b)

	Cycle	Auto	Car	
Speed	x	(5x – 20)	5x	
Time		(t + 1)	t	
Distance	120	120	120	(in km)

$120/(5x – 20) – 120/5x = 1$
$x^2 - 4x – 96 = 0$
$x = 12$
average speed = 360/(10 + 3 + 2) = 24 kmph
2 c) Time taken by cycle = 120/12 = 10 h
Time taken by auto = 120/40 = 3 h
Time taken by car = 120/60 = 2 h
Total time = 15 h
3 b) In last 5 hours she covers 240 km (120 + 120)
4 a) New time = 3 + 3 + 2 = 8 h

Hence, decrease in time = 7 h
Therefore Percentage = (7/15) * 100 = 46.66%
5 b) time taken to meet Jennifer and Jacqueline = 1080/(60 + 120) = 6 h
So, in 6 hours Jennifer covers 360 km and this 360 km distance Kyla covers in 360/90 = 4 h
Hence, Kyla leaves Delhi 2 hours later than Jennifer i.e. at 8 am. Kyla leaves Delhi

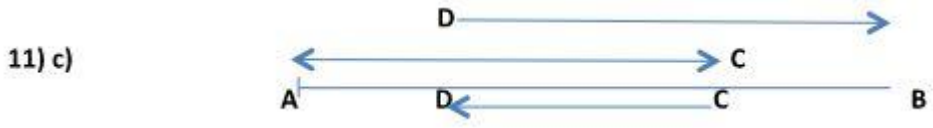
6). c) (speed of wind)/(speed of car) = (time utilized)/(time saved)
332/x = 332/28 we get x = 28 m/s

Consider only one person either Raju or Ravi since their speed is same and move together.
Now, the distance covered by Raju and Rakesh is in the ratio of their speeds. So Raju will cover 500 km to meet Rakesh and thus Raju has to return back 100 km for Delhi. Therefore, Raju will cover 600 km distance.
8). d) Total time = 600/25 = 24 h

9 a)	**First**	**Second**	**Third**	**Total**
hourhourhour				
Initial speed	x	3x	2x	6x
New speed	3x	3x	3x	9x

Percentage increase in speed = (3x/6x) * 100 = 50 %
Since speed is increased by (50%)1/2
Therefore, time taken will reduce by (33)(1/3)

10) b) **A** ——————————— **B**
They will be together at every two hours. Therefore in 12h they will be(6 + 1) = 7 times together at A and they will never meet altogether at B.



A is the starting point of journey.
B is the destination.
C --- whereSachin has got off
D --- whereAprajita picks up Akash
Let AD = l and BC = k and CD = x
Then (CD + DB)/BC = 50/10
(2x + k)/k = 5/1
x/k = 2/1
(AC + CD)/AD = 50/10

(2x + l)/l = 5/1

x/l = 2/1 which gives x = 2k = 2l or k = l = x/2

k + x + l = 120

k = 30 km; x = 60 km and l = 30 km

total distance travelled = AC + CD + DB = l + x + x + x + k = 240 km

time required = 240/50 = 4.8 hr

12) b)

Let the speeds of Anuj, Arushi and Salim be x, y and z respectively, then

x/y = 180/120 which gives x = 2y/3

Note Arushi is faster since she covers 180 km while Anuj covers only 120 km in the same time.

Salim meets Arushi 1.5 hours after Salim himself starts and 2.5 hours after Arushi starts

Hence, 2.5y + 1.5 z = 300 which gives z= (600 – 5y)/3

Since $z \geq (y + 20)$ so $(600 – 5y)/3 \geq (y + 20)$

So $y \leq 67.5$ kmph& $x \leq 45$ kmph

13) d) let 't' be the time after Arushi starts, when she meets Anuj, then

t = 300/(x + y)

this should be less than 2.5 or (x + y) > 120

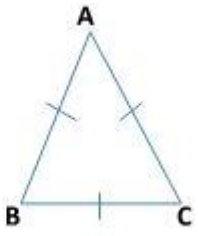
since y = 3x/2 y > 72

this (y>72) is greater than 67.5 kmph and hence Salim will always overtake Anuj before Arushi.

14) c) Speed of Rajeev (Rp) = 60 kmph

Speed of Raghav(Rv) = 36 kmph

Speed of Mohan(Rr) = 18 kmph



AB = AC = BC

Time taken to cover AB by (Rr) is 2 hours

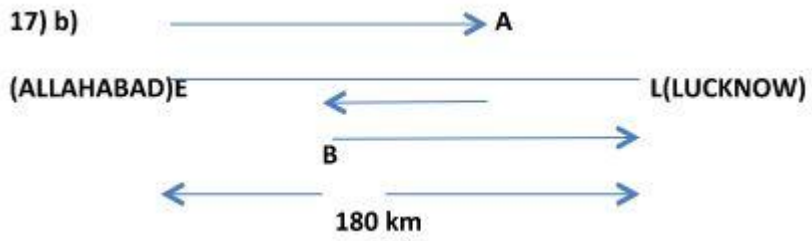
Time taken to cover AB by Raghav is 1 hour

Time taken to cover by Rajeev is 36 min [t1(of Rp) : t2(of Rv) : t3(of Rr) = (1/S1) : (1/S2) : (1/S3)]

t ---- Time, S --- Speed AB = 2 * 18 = 36 km

15) b) Time = (3 * 36)/60 = 9/5 h = 1 h 48 min

16) b) Distance from Bengaluru = [60/(60 + 18)] * 36 = 360/13 = 27(9/13) km



Since the speed of bike and walking are different. So, two people partially travelled by bike and rest by walking since all the three persons take equal time to reach the destination. It means initially Raghu will carry either Pramod or Patil to a point A, then this person reach to L by walking and Raghu return to B where he will pick up the third person and reach at L at the same time as the second person.

Let EB = k, AB = x , AL = l
Now, (EA + AB)/EB = 36/6
(2x + k)/k = 6/1
x/k = 5/2
and (AB + BL)/AL = 36/6
(2x + l)/l = 6/1
x/l = 5/2
x : k : l = 5 : 2 : 2
x + k + l = 180
x = 100, k = 40 and l =40 km
total distance travelled by bike = EA + AB + BL = k + 3x + l = 380 km

18) b) (2x + k)/ k = 42/6 = 7/1
x/k = 3/1
similarly x/l = 3/1 so x : k : l = 3 : 1 : 1
therefore x= 108, k = 36, l = 36 km
total distance travelled = k + 3x + l = 396 km
required time = 396/42 = 9(3/7) h

19) b)

	Raj		Manish
Speed →	**3**	**:**	**4**
Time →	**4**	**:**	**3**

But 4x – 3x = ½ h

So $4x = 2h$ and $3x = 1.5h$

Now, since Raj doubles the speed so time will be half of the actual time. Hence, new time will be 1 hour.

20) a) Average speed of Raj & Manish = $(3x + 4x)/2 = 28$

$x = 8$

speed of Raj = $3 * 8 = 24$

Distance travelled = $2 * 24 = 48$ km

21) b) Let bus P Takes 'x' hours, then Q takes (x – 2) hours.

$1/x + 1/(x - 2) = 60/80$ so $x = 4$ h

22) c) Distance travelled by them in first hour = 12 km

Distance travelled by them in second hour = 13 km

Distance travelled by them in 3rd hour = 14 km and so on

Thus, in 9 hours they will cover exactly 144 km and in 9 h each will cover half – half the total distance

$(8 * 9 = 72$ and $4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 = 72)$

23) d) The sum of their speeds = 615/15 = 43 kmph

Notice that they are actually exchanging their speeds. Only then they can arrive at the same time at their respective destinations. It means the difference in speeds is 3 kmph

Thus, $x + (x + 3) = 43$ so $x = 20$ & $x + 3 = 23$

The concept is very similar to the case when after meeting each other they returned to their own places of departure. It can be solved through option also.

24) d) Let Rivaldo covers 'x' km in 1 hour. So Ronaldo takes (2h – 40 min) = 1 h 20 min to cover 'x' km. let speed of Ronaldo and Rivaldo be M & P respectively than.

$x = M * (4/3)$ and $x = p * 1$

$M/P = ¾$ again $300/M – 300/P = 1$

$300/3k – 300/4k = 1$ so $k = 25$

$M = 3k = 75$ kmph and $P = 4k = 100$ kmph

25) b) Initial speed of cop = 10 m/s

Increased speed of cop = 20 m/s

Speed of burgular = 15 m/s

Initial difference between burgular and cop = 250 m

After 5 seconds difference between burgular& cop = $200 + (5 * 10) = 200$ m

After 10 seconds more the difference between burgular and cop = $200 + (5 * 10) = 250$ m

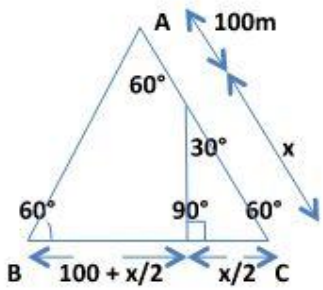
Now, the time required by cop between to catch the burgular = 250/5 = 50 s

Distance travelled = $50 * 20 = 1000$m

Total time = $50 + 15 = 65$ s

Total distance = $1000 + (15 * 10) = 1150$ m

26) c)



(100 + x/2)/100 = (100 + x)/ (100 + x – 150)
= (speed of Shyamu)/(speed of Ramu)

So, (200 + x)/200 = (100 + x)/(x – 50)

Solving the above equation we get – :

(x – 200) (x + 150) = 0 x = 200 km

Therefore distance between Ayodhya and Mirzapur is 300 k since AB = BC = AC

27) c) Basically they will exchange their speeds just after half of the time required for the whole journey. It means after covering 210 km distance they will exchange their speeds. Check it out graphically for more clarification.

28) b) The ratio of speeds = the ratio of distances, when time is constant
Therefore the ratio of distances covered by cheetah to the Lion = 12 : 25
Again, ratio of rounds made by cheetah to the Lion = 12 : 25. Hence, cheetah makes 48 rounds, when Lion
makes 100 rounds.

29) c) Length of DR = 6000/13(Refer to the triangle drawn in the question)
Total distance covered in the returning by Ajay = PD + RD = 2500/13 + 6000/13 = 8500/13KM

Required time = (8500/13)/(500/13) = 17 h

Total distance covered by Priya while returning = QD + DR = 14400/13 + 600/13

Required time = (20400/13)/(1200/13)= 17

Hence, we can see that both reach at the same time

30) c) The distance of route PDR = 8500/13 and the distance of route QNR = 1300
and the time taken by Ajay is (8500/13)/(500/13) = 17 h
and the time taken by Priya is 1300/(1200/13) = 169/12 h = 14 h 05 h. so option c is correct

31) d) Time saved in percentage = (175/1020) * 100 = 17.15%

32) b) Husband takes 17 hours and she takes 14 hours 05 min + 3 h = 17 h 05 min

33) c) The speeds of two persons is 108 kmph and 75 kmph. The first person covers 1080 km in 10 hours and thus he makes 12 rounds. Thus, he will pass over another person 12 times in any one of the direction.

34) b) Since both rest for 6 seconds so when Bharti is just about to start the journey Rekha reaches there at the shallow end so they meet at the shallow end.

35) d) A started at 12 : 00 noon.
B started at 3 pm
Required time = (Distance advanced in 3 h)/(Relative speed) = (40 * 3)/20 = 6h (20 = 60 – 40)
Hence, B will overtake at 9 pm. (3 + 6 = 9)

36) b) Required time = [(Distance advance) – (Required – difference)]/(Relative speed)
= (120 – 30)/20 = 90/20 = 4.5 h
Thus, at 7.30 pm A & B wil be 30 km apart.

37) c) Required time = (Distance advanced + Required difference)/Relative speed
= (120 + 30)/20 = 150/20 = 7.5h
Thus at 10 : 30 pm A & B will be 30 km apart

38) c) Let the speed of boat be B and that of river be R. In 12 minutes the distance between boat and hat = 12(B – R) + 12R = 12 B
Now time taken by boat to reach to hat = 12 B/[(B + R) – R] = 12 min
Total time = 24 min
In 24 minutes had flown off = 3 km
Therefore, (24 * R)/60 = 3 So R = 7.5 kmph

39) a) The ratio of speeds of P, Q, R = (10/49) : (9/50) : (8/51)
Hence, P is the fastest.

40) c) Speed of this car = [(400 + 200)/20] * [18/5] kmph = 108 kmph

41) a) Train A traveling at 120 kmph = (100/3) m/s
Length of the vehicle A = (100/3) * 4 =(400/3) m
Since, vehicle B and vehicle A take 36 sec and 31 sec to completely cross the line PQ.
So, total distance traveled by vehicle A = (100/3)* 31 = (3100/3) m
Therefore, length of the line PQ = (3100/3) – (400/3) = 900 m = 0.9 km
Vehicle B travelling at 110 kmph = 110(5/18) = (275/9)m/s
Now, total distance traveled by vehicle B = (275/9) * 36 = 1100 m
So the length of train B = 1100 – 900 = 200 m

42) a) Since they cover 20 & 24 km in equal time, their speeds will be in the same ratio as their distance covered .
Speed = R/S = 20/24 = 5/6

Hence, 20/6x + 8/60 = 24/5x so x = 11
Soham's speed = 66 kmph

43) a) Dheeraj started at 4 : 00 am and his bike broke down for 2 hours. Neeraj started at 6:00am. It is equivalent to 4 hours of journey for both of them.
Neeraj's initial speed = 28 kmph
Distance travelled by Neeraj = 28t +14(4 – t) = 14(t + 4)km, where t is the number of hours post 6:00am at which her bike slowed down. Hence 't' could be 1, 2 or 3. So, Dheeraj's speed (inkmph) could be 35.5, 39 or 42.5.
44) d) In 5 seconds kokilaben runs 85 m.
So, the speed of kokilaben = 17 m/s

45) b) He takes 40 minutes less to cycle than to walk. Thus, on the whole he takes 40 more.
Required time = 3 hours 20 minutes or 3.33 hours

46) b) D = S * T
With 1st condition when speed decreases eq is–: 4S – T = 40 ------1)
With 2nd condition when speed increased eq is –: (– 2S) + T = 10 --------2)
Solving the aabove two eq we get S = 25 kmphand T = 60 h hence, distance = 25 * 60 = 1500 km

47) c)speed of tiger = 40 m/min
Speed of deer = 20 m/min
Relative speed = 40 – 20 = 20 m/min
Differences in distances = 50 * 8 = 400 m
Therefore, time taken in overtaking (or catching) = 400/20 = 20 min
Therefore, distance travelled in 20 min = 20 * 40 = 800 m

48) c) Given that they meet in 80 minutes, when moving towards each other, the sum of their speeds should be such that they cover 1.25% of the distance per minute (i.e. 75% of the distance per hour).

49) a) Let S1, S2 and S3 be the speeds of the three cars.
Then : (120/S1) – (120/S2)hour--------1)
It is also known that the speed of the third car is double the speed of the first car.
With these realisations, check for factors of 120 which can satisfy the equation above
[Note that in equations like 1) above, normally the respective values of S1 & S2 will be factors of 120.]

50) b) If the side of the initial equilateral triangle is S1, then Ajitcovers (S – 120) kms. Sarbajeet covers S kilometres. Also, when Ajit covers a distance of 80 kilometres.Sarbajeet covers a distance such that the resultant triangle is right angled. Check these conditions through options.

TIME & WORK

Q 1) P, Q and R work together for a particular time to do a certain amount of work.R needs one hour less than P to complete the work. Working together, they require 30 minutes to complete 50% of the job. The work also gets completed if P &Q start working together and P leaves after 1 hour and Q works for a further 3 hours. How much work does R do per hour?
a) 16.67% b) 50% c) 66.67% d) 25%

Q 2) The total number of men, women & children working in a factory is 18. They earn Rs 4000 in a day. If the sum of the wages of all men, all women and all women and all children is in the ratio of 18:10:12 and if the wages of an individual man, woman and the child is in the ratio 6:5:3, then how much a woman earn in a day?
a) Rs 400 b) Rs 250 c) Rs 150 d) Rs 120

Q 3) Two women Radhika&Usha are working together on an embroidery design. If Usha worked alone, she would need eight hours more to complete the design than if they both worked together. Now if Radhika worked alone, it would need 4.5 hours more to complete the design than they both working together. What time would it take Radhika alone to complete the design?
a) 10.5 hours b) 12.5 hours c) 14.5 hours d) 18.5 hours

Q 4) 'A' takes 4 days to complete 1/3rd of a job. 'B' takes 3 days to complete 1/6th of the same work and 'C' takes 5 days to complete half of the job. If all of them work together for 3 days and 'A' & 'C' quit, how long will it take for 'B' tocomplete the remaining work done.
a) 6 days b) 8.1 days c) 5.1 days d) 7 days

Q 5) At Call tech solutions Pvt Ltd. There are some engineering students employed as graduate engineer trainee, belonging to two eminent institutions of india.one group belong to MIT and another to NIT. Each student of MIT works for 10 hours a day till 60 days and each student of NIT works for 8 hours till 80 days on the two same projects. The ratio of number of students of MIT and that of NIT is 4:5 respectively. Students of which institution is slower in work and by how much?
a) Each student of MIT is 20% less efficient than that of NIT
b) Each student of NIT is 33.33% less efficient than that of MIT
c) Each student of NIT is 25% less efficient than that of MIT
d) Each student of MIT is 33.33% less efficient than that of NIT.

Q 6) Consider three friends A, B and C who work at differing speeds. When the slowest two work together they take n days to finish a task. When the quickest two work together they take m days to finish a task. One of them, if he worked alone would take thrice as much time as it would take when all three work together. How much time would it take if all three worked together?
a) 3mn/2(m+n) b) 2mn/(m+n) c) 4mn/3(m+n) d) 5mn/(3(m+n)

Q 7) Number of units of a good that can be produced by a factory is directly proportional to the square of the number of workers, square root of the number of machines and to the number of hours put in. The factory

produces 200 goods when 4 people work for 8 hours each with 4 machines. When 3 people work for 12 hours each with 9 machines, how many goods will be produced?
a) K= 25/32 b) K= 100/163 c) K= 25/256 d) K= 16/29

Q 8) A can complete a task 4 hours lesser time than B takes to complete the same. If A and B together can complete the task in 288 minutes, how long does B alone take to complete the task?
a) 1 hr b) 2 hr c) 3 hr d) 12 hrs

Q 9) A can do ¼ th of a work in 10 days, B can do 40% of the same work in 40 days and C can do 1/3rd of the work in 13 days. Who will complete the work first?
a) A b) B c) C d) Both A & C

Q 10) 5 men start working to complete a work in 15 days. After 5 days, 10 women are accompanied by them to complete the work in next 5 days. If the work is to be done by women only, when could the work e over, if 10 women have started it?
a) 10 days b) 18 days c) 15 days d) 12 days

Q 11) 6 children can do a piece of work in 12 days while 8 men can do the same work in 18 days. The same work can be done by 18 women in 10 days. 4 children, 12 men and 20 women work together for 2 days. If only children have to complete remaining work in 1 day, then find the required number of children?
a) 36 b) 24 c) 18 d) None of these

Q 12) P can complete a work in 20 days and Q in 30 days. P worked alone for 4 days and then Q completed the remaining work along with R in 18 days. In how many days can R working alone complete the work?
a) 12 b) 68 c) 72 d) 90

Q 13) X and Y each working alone can do a work in 15 days and 25 days respectively. They started the work together but Y left after sometime and X finished the remaining work in 7 days. After how many days from start did Y leave?
a) 3 b) 5 c) 7 d) 9

Q 14) S & T can do a piece of work in 9 days and 18 days respectively. As they were ill they could do 90% and 72% of their efficiency respectively. How many days will they take to complete the work together?
a) 50/7 b) 8 c) 5 d) 10

Q 15) The Niagara Dam has four inlets. Through the first three inlets, the dam can be filed in 12 hours; through the second, the third and the fourth inlet, it can be filled in 15 hours; and through the 1st and the fourth inlet, in 20 hours. How much time will it take all the four inlets to fill up the dam?
a) 8 hours b) 10 hours c) 12 hours d) None of these

Q 16) A tank of 425 litres capacity has been filled with water through two pipes A & B, pipe A having been opened five hours longer than the pipe B. If the pipe A were open as long as the pipe B and the pipe B was open as long as the pipe A was open, then the pipe A would deliver half the amount of water delivered by

the pipe B; if the two pipes were opened simultaneously, the tank would be filled up in 17 hours. How long was the second pipe open?
a) 10 hours b) 12 hours c) 15 hours d) 18 hours

Q 17) Two pipes P & Q can fill up half full tank in 1.2 hours. The tank was initially empty. Pipe Q was kept open for half the time required by pipe P to fill the tank by itself. Then, Pipe Q was kept open for as much time as was required by pipe Q to fill up 1/3rd of the tank by itself. It was then found that the tank was 5/6th full. The least time in which any of the pipes can fill up the tank fully is
a) 4.8 hours b) 4 hours c) 3.6 hours d) 6 hours

Q 18) Ridhima and Vijay are quiz masters preparing for a quiz. In 'a' minutes, Ridhima makes 'b' questions more than Vijay. If it were possible to reduce the time needed by each to make a question by two minutes, then in 'a' minutes Ridhima would make 2b questions more than Vijay. How many questions does Ridhima make in a minutes?
a) ¼[2(a+b) - √(2a^2 + 4b^2)] b) ¼[2(a-b) - √(2a^2 + 4b^2)]
c) Either a or b d) ¼[2(a-b) - √(2a^2 – 4b^2)]

Q 19) A tank of 3600 cubic m is being filled with water. The delivery of the pump discharging the tank is 20% more than the delivery of the pump filling the same tank. As a result, twelve minutes more time is needed ti fill the tank than to discharge it. Determine the delivery of the pump discharging the tank.
a) 40m^3/min b) 50m^3/min c) 60m^3/min d) 80m^3/min

Q 20) Two forest officials in their respective divisions were involved in the harvesting of tendu leaves. One division had an average output of 21 tons from a square meter and the other division, which had 12 square meter of land less, dedicated to tendu leaves, got 25 tons of tendu from a square meter. As a result, the second division harvested 300 tons of tendu leaves more than first. How many tons of tendu leaves did the first division harvest?
a) 3150 b) 3450 c) 3500 d) 3600

Q 21) A pipe can fill a tank in 'k' hours and another can empty it in 'm' hours. If the tank is 1/3rd full then the number of hours in which they will together fill it in is
a) (3km)/2(m-k) b) (3km)/(m-k) c) km/3(m-k) d) 2km/3(m-k)

Q 22) A tank holds 100 litres of water. Its inlets is 7 cm in diameter and fills the tank at 5 litres/min. The outlet of the tank is twice the diameter of the inlet. How many minutes will it take to empty the tank if the inlet is shut off, when the tank is full and the outlet is opened?
a) 7.14 min b) 0.7 min c) 5 min d) 10.0 min

Q 23) L takes 4 days to complete one-third of a job, M takes 3 days to complete 1/6th of the same work and N takes 5 days to complete half the job. If all of them work together for 3 days and L & N quit, how long will it take for M to complete the remaining work done.
a) 6 days b) 8.1 days c) 5.1 days d) 7 days

Q 24) Threeduggers dug a ditch of 324 meter deep in 6 days working simultaneously. During one shift, the third digger digs as many meters more than second as the second digs more than the first. The third digger's work in 10 days is equal to the first digger's work in 14 days. How many meters does the first digger dig per shift?

a) 15 m b) 18m c) 21m d) 27m

Q 25) P, Q & R working together completed a job in 10 days. However, R only worked for the first three days when 37/100 of the job was done. Also, the work done by P in 5 days is equal to the work done by Q in 4 days. How many days would be required by the fastest worker to complete the entire work?

a) 20 days b) 25 days c) 30 days d) 40 days

Q 26) Three carpenters have to make 80 chairs. They are known to make 20 pieces evrey minute working together. The first carpenter began working alone and made 20 pieces of chairs having worked for sometime more than three minutes. The remaining part of the work was done by the second and the third cook working together. It took a total of 8 minutes to make 80 chairs. How many minutes would it take the first cook alone to cook 160 chairs for a function the next day?

a) 16 minutes b) 24 minutes c) 32 minutes d) 40 minutes

Q 27 – 31) Read the following and answer the question that follow:

A set of 10 pipes(set A) can fill 70% of a tank in 7 minutes. Another set of pipes (set B) fills 3/8 of the tank in 3 minutes. A third set of pipes (set C) can empty 5/10 of the tank in 10 minutes.

Q 27) How many minutes will it take to fill the tank if all the 23 pipes are opened at the same time?

a) 5 minutes b) 40/7 minutes c) 6 minutes d) 47/7 minutes

Q 28) If only half the pipes of set A are closed and only half the pipes of set B are open and all other pipes are open, how long will it take to fill 49% of the tank?

a) 16 minutes b) 13 minutes c) 7 minutes d) None of these

Q 29) If 4 pipes are closed in set C, and all other remain open, how long will it take to fill the tank?

a) 5 minutes b) 6 minutes c) 7 minutes d) 7.5 minutes

Q 30) If the tank is half full and set A & set B are closed, how many minutes will it take for set C to empty the tank if alternate taps of set C are closed.

a) 12 minutes b) 20 minutes c) 40 minutes d) 16 minutes

Q 31) if one pipe is added for set A and set B and set C's capacity is increased by 20% on its original value and all the taps are opened at 2.58pm, then at what time does the tank get filled?(if it is initially empty)

a) 3.05 pm b) 3.04 pm c) 3.10 pm d) 3.03 pm

Q 32) Rajeev can do as much work in 2 days as Brijesh can do in 3 days and Brijesh can do as much in 4 days as Daljeet in 5 days. A piece of work takes 20 days if all work together. How long Brijesh take to do all the work by himself?

a) 82 days b) 44 days c) 66 days d) 50 days

Q 33) In a factory, there are equal number of men and women. Men workfor 6 hour a day and children for 4 hour a day. During festival time, the work load goes up by 50%. The government rule does not allow women to work for more than 6 hour a day. If they are equally efficient and the extra work is done by men, then extra hours of work put in by men everyday are

a) 5 b) 3 c) 4 d) 9

Q 34) 20 men complete 1/3rd of a work in 20 days. How many more men should be employed to finish the rest of work in 25 more days?

a) 15 b) 12 c) 18 d) 25

Q 35) In a school, Mid – Day Meal food is sufficient for 250 students for 33 days, if each student is given 125 g meals. 80 more students joined the school. If same amount of meal is given to each student, then the food will last for

a) 20 days b) 40 days c) 30 days d) 25 days

Q 36) If x men working x hour per day, can do x units of work in x days, then y men working y hour per day would be able to complete how many units of work in y days?

a) y^3/x^2 b) y^3/x^2 c) x^4/y^2 d) y^4/x^3

Q 37) When 'P' alone can do a piece of work, he takes 25 days more than the time taken by (P+Q) to complete that particular work, while Q alone takes 49 days more than the time taken (P+Q) to finish the same work. P & Q together will take what time to finish this work?

a) 35 days b) 25 days c) 15 days d) 45 days

Q 38)A contractor undertook to do a certain piece of work in 18 days. He employed certain number of men but 12 of them being absent from the very 1st day, the rest could finish the work in 30 days. Find the number of men originally employed.

a) 40 b) 15 c) 45 d) 30

Q 39) There are three inlet pipes whose diameters are 1m, 2m & 3m respectively. If the rate of flow is directly proportional to the square of the diameter, find the time taken to fill an empty tank when all the three pipes are opened, given that the smallest pipe takes 9 min to fill the tank.

a) 3/14 min b) 9/14 c) 11/24 d) None of these

Q 40) There are two taps A & B connected to a tank. Capacity of the tank is 40 L. Tap A can fill the tank in 10 hour. Tap B can empty the tank in 20 hour. How much time will both the taps take to fill the tank when both are open simulataneously? It is given that water evaporates at the rate of 2.5% of the total capacity of tank in an hour.

a) 20 hour b) 25 hour c) 40 hour d) 42 hour

Q 41) Ravi builds a tank in his office, which has three taps attached to it. While the first tap can fill the tank in 10 hours, the second one takes 180% of time the first one take to fill it completely. A third tap is attached to the tank, which empties it in 30 hours. One day, in order to fill the tank, Ravi opens the first tap and after two hours opens the second tap as well. However, at the end of the fifth hour, he realizes that the third tap has been kept open right from the beginning and closes it. If he closes first tap 2 hours before second ta, what will be the total time required to fill the tank?

a) 9 hours 48 minutes b) 9 hours 30 minutes
c) 8 hours 30 minutes d) 8 hours 48 minutes

Q 42) The digging work of the underpass by Gammon on the Moolchand – Saket stretch requires thirty – six men to complete the work in twelve days. As a part of the task if Gammon were to hire forty – eight women, they can complete the same work in eighteen days. Sixteen men and sixteen women started working and worked for ten days. Due to time bound schedule the work had to be completed in remaining three days, for which how many more men are to be employed?

a) 32 b) 36 c) 40 d) 45

Q 43) In an assembly line, three robotics arms – R1, R2 & R3 – are working together. R1 alone takes 10 hrs to complete a single product but R2 & R3 working together take 4hours for the completion of the same product. If all of them worked together and completed 14 products, then for many hours did they work?

a) 20 hours b) 28 hours c) 40 hours d) 54 hours

Q 44) An overhead tank in the form of a cuboid is filled by two pumps – P1 & P2. P1 can fill the tank in 6 hours while P2 can fill the tank in 9 hours. There is a pump P3 which can empty the tank in the 12 hours. Both the inlet pumps are opened simultaneously. The caretaker of the house, before going out on a work, sets a timer to open P3 when the tank is 22.22% filled so that tank is exactly filled up by the time he is back. Due to some technical problem P3 didin't open at all .if the caretaker comes back as per the plan, for how much time was the tank over flowed with?

a) 48 minutes b) 1 hour 12 minutes c) 1 hour 36 minutes d) 1 hour 48 minutes

Q 45) Raj, Sahil&Harshit can fix a defect in m, 2m & 3, days repectively(where m is an integer). All the three mentioned person started working together. Raj continued to work till the defect was fixed, but Harshit left two days and Sahil one day before the defect was fixed. Which of the following is true?

a) Sahil cannot take 16 days to complete the defect alone.
b) Sahil cannot take 60 day to complete the defect alone
c) Sahil cannot take 40 days to complete the defect alone
d) None of these

Q 46) Due to a hole at the bottom of the bucket, a tap takes 2 more minutes to completely fill the bucket. Due to the leakage of water through this hole, a bucket filled completely with water gets emptied in 4 minutes. In how much time can the tap fill the bucket, if there was no hole at the bottom of the bucket?

a) 8 minutes b) 2 minutes c) 4 minutes d) 6 minutes

Q 47) A group of workers was given a job. From the second day onwards, one worker was withdrawn each day. The job was finished when the last worker was withdrawn. If no worker had been withdrawn, thegroup would have finished the job in 2/3rd of the time. How many workers were there in the group?
a) 2 b) 3 c) 5 d) 10

Q 48) A finishes a work in certain number of days. He got two assistants who work 3/4rth times as fast him. If all the three work together, then in what fraction of time would they finish the job as compared to A working alone?
a) 5/3 b) 3/5 c) 2/3 d) 2/5

Q 49) P does a work in 90 days, Q in 40 days and R in 12 days. They work one after another for a day each, starting with P followed by Q and then by R. if the total wages received is Rs 360 and P, Q & R share it in the ratio of the work done, find their respective individual wages.
a) Rs 40, Rs 60 and Rs 260 b) Rs 36, Rs 81 and Rs 243
c) Rs 42, Rs 86 and Rs 232 d) None of these

Q 50) Rajesh completes an assignment in 10 to 15 days and Rakesh takes 15 to 20 days to finish the same assignment. If they work on alternate days and both of them take a break together on every third day, then which of the following is correct regarding the number of dayin which the assignment may be completed?
a) Less than or equal to 25 days b) More than 18 days
c) More than or equal to 17 days d) More than 25 days

SOLUTION AND EXPLANATION OF TIME & WORK

1). b) 0.5(P+Q+R) = 50% of the work.
Means –: P, Q & R Can do the full work in 1 hour.
Thus, (P+Q+R) = 100%
From this point it better to solve through options. Option c) gives the correct answer based on the following thought process.
If x= 50% of work per hour, it means R takes 2 hours to complete the work. Consequently, P would take 3 hours and hence do 33.33% of work per hour.

2). b) Ratio of number of men, women & children = 18/6 : 10/5 : 12/3 = 3x : 2x : 4x
3x + 2x + 4x = 18 ; x=2
Therefore, number of women = 4
Share of all women = (10/40)* 4000 = Rs 1000 (since 18 + 10 + 12 = 40)
So share of each woman = 1000/4 Rs 250

3). a) Let 'x' hrs be required to complete the work together.

Then, 1/(x+4.5) + 1/(x+80) = 1/x. check the options to see which one fits the equation and we see that option a) 10.5 hours fits into it.

4). c) let the total work be = 60 units
so A's rate of doing work = 5 units/day
B's rate of doing work = (10/3) units/day
Similarly C's rate of doing work = 6 units/day
So sum total of their one day's work is = 5 + 10/3 + 6 = 43/3
So in 3 days 43 units of work was done and work left is = 60 – 43 = 17 units
To complete this remaining work it took B = (17 * 3)/10 = 5.1 days

5). c) MIT NIT
4 * 10* 60 * E1 = 5 * 8 * 80 * E2
E1/E2 = 4/3
Where E1 & E2 are the respective working efficiencies per hour .
So ans is Each engineer from NIT is 25% less efficient than each engineer from MIT.

6) c) Let A < B < C in terms of efficiency.

B and C together take n days.

A and B together take m days.

One of them, if he worked alone would take thrice as much time as it would take when all three work together. This is a crucial statement. Now, if there are three people who are all equally efficient, for each of them it would take thrice as much time as for all three together. Now, this tells us that the person who takes thrice as much time cannot be the quickest one. If the quickest one is only one-third as efficient as the entire team, the other two cannot add up to two-thirds. By a similar logic, the slowest one cannot be the person who is one-third as efficient. In other words, the person one-third as efficient = B

Let A, B and C together take x days. B alone would take 3x days
B and C together take n days. Or B + C in 1 day do
1n of the task .....Eqn (i)
A and B together take m days. Or, A + B in 1 day do
1m of the task .....Eqn (ii)
B takes 3x days to do the task. Or, B, in one day, does
13x of the task .....Eqn (iii)
Now, if we do (i) + (i) – (iii) we get
A + B + C do 1n+1m−13x in a day. This should be equal to 1x as all three of them complete the task in x days.
1n+1m−13x=1x
1n+1m=43x
m+nmn=43x
4mn3(m+n). Answer choice (C).

7) a) G α No of workers2
G α No.ofMachines−−−−−−−−−−−−−−√
G α No of hours 200 α 42×4√×8
200 α 16 x 2 x 8
200 α 256
200 = k x 256
K=200/256 : K=25/32
Correct Answer: K=25/32

8) d) Let time taken by A be 'a' hours and time taken by B be 'a+4' hours
Then A does 1a of the work in an hour. B does 1a+4 of the work in an hour. Together they take 288 minutes to finish the job, 288 minutes = 28860=245 hours. Therefore, both A and B together complete 524 every hour.
1a+1a+4=524
2a+4a(a+4)=524
We get, 48a + 96 = 5(a2 + 4a)
=> 5a2 - 28a - 96 = 0
=> 5a2 - 40a + 12a - 96 = 0
5a (a - 8) + 12(a - 8) = 0
(5a + 12)(a - 8) = 0 .Therefore, Since a cannot be negative, a = 8 hours.
Hence, a + 4 = 12 hours. Therefore, Time taken by B to complete the work on his own is 12 hours.
Correct Answer: 12 hrs

9) c)
Let us assume the amount of work be 60 units
Now 1/4rth of a work = 15 units which is completed by A in 10 days. So A's rate of work A= (3/2) units/day
B completed 40% of work (40% of 60 units=24 units) in 40 days. So B's rate of doing work B= (3/5) units/day
Similarly C does 1/3rd of work (i.e. 20 units) in 13 days. So C's rate of doing work, C=(20/13) units/ days
finding out A complete whole work in (60*2)/3 = **40 days**
B complete whole 60 units of work in (60*5)/3=**100 days**
& C complete the whole work in (60*13)20= **39 days**
So from the above we can conclude that C complete faster than the other two hence option c) C is the answer

10) c) answer is
Let us take amount of work be 60 units
So 5 men does 40 unit/day work
So if we assume rate of doing work of 10 women be x units/day
Then according to data given we get the equation as
10*4 + 5x = 60 which gives x=4
So time by 10 women to complete the whole work (ie 60 units) is = 60/4 = 15 days Ans

11)a) let us assume that the amount of work be 1440 units
6 children in 12 days can do – 1440 units. So – 1 children's rate of doing work = 20 units/day.
18 women in 10 days can do – 1440 units. So – 1 women's rate of doing work = 8 units/day.
8 men in 18 days can do – 1440 units. So – 1 man's rate of doin work = 10 units/day.
4 children can do – 4*20 = 80 units/day.
12 men can do – 12*10 = 120 units/day.
20 women can do – 20*8 = 160 units/day
Together 4 children, 12 men & 20 women can do = 360 units/day.
In 2 days they will do = 2*360 = 720 units.
Amount of work left = 1440 – 720 = 720 units.
So if only children are given to complete the left task of 720 units in one day, then
Required number of children will be = 720/20 = 36 is the answer.

12)d)90 days
let the amount of work be 360 units.
Rate of doing work of P is = 360/20 = 18 units/day
Rate of doing work of Q is = 360/30 = 12 units/day
P worked alone for 4 days, in which he did 4*18=72 units of wprk
Amount of work left is = 360 – 72 = 288 units; Q + R completes the remaining 288 units in 18 days which gives
In terms of work –:12*18 + 18x = 288 we get 216 + 18x =288 which gives x=4 ie rate of R= 4 units/day
So R alone completes the whole work in = 360/4 = 90 days

13) b) 5.
Let 'k' be the time from till when 'Y' left the work. Let the total amount of work done be = 150 units
So –: Rate of doing work by 'X' & 'Y' are 10 units/day& 6 units/day respectively.
As per the statement eq becomes - amount of work done by X + amount of that by Y = 150 units
i.e. 10(k + 7) + 6k = 150; 16k=150-70; k = 80/16 = 5 days is the answer.

14) a) 50/7 days. Let the amount of work be 1800 units.
Rate of doing work by S is = 1800/9 = 200 units/day; Similarly for T rate will be = 1800/18 = 100 units/day
But the efficiency as given for S is 90% so its rate will be = 90% of 200 = 180 units/day
Similarly the efficiency of T as given is 72% so its rate becomes = 72% of 100 = 72 units/day
With this reduced efficiency of doing work bot S & T together will take = 1800/(180+72) = 1800/252 =50/7days.

15) b) 10 hours. Letthe capacity of tank be = 600 litres
1 + 2 + 3 inlets rate of filling the tank = 600/12 = 50 litres/hour ---------- A)
2+ 3 + 4 inlets rate of filling the tank = 600/15 = 40 litres/hour ---------- B)
1 + 4 inlets rate of filling the tank = 600/20 = 30 litres/hour ---------- C)
Adding EqA& C we get 2(1) + 2 + 3 + 4 = 80 litres/hour
So 2(1) = 80 – 40 = 40 2(1) = 40; 1 = 20 litres/hour

So time taken by all four inlets is= 600/60 = 10 hours Ans

16) c)let the discharges per pipes be A & B litres/hr respectively.
Then 17(A+B) = 425
I.E. A + B = 25
From this point of solution proceed to check the conditions of the question through options.
Then we get15 hours as the answer.

17) b) P + Q = 50%/1.2 = 41.66%
(where P & Q represent the work per hour of pies P & Q respectively).
Solve using options to see which one fits the remaining conditions of the problem.
For eg, if we check option b(4 hrs), then we get that the work of the faster pipe(say P) = 25 %
Then Q = 16/66%
Then Q wsa open for 4/2= 2 hours and P was open 6/3= 2 hours.
Work done = 25% * 2 + 16.66% * 2 = 83.33% = 5/6 of work hence this option is correct.

18) a) let Vijay makes 'x' questions in 'a' minutes then
Ridhima will make 'x+b' questions in 'a' minutes
So minutes per questions by Vijay is a/x
And dat of Ridhima is a/(x+b)
If it is reduced by 2 mins den
Vijay's questions per minutes becomes (a/x) – 2 which gives in 'a' minutes it will solve ax/(a-2x)
And Ridhima will solve in 'a' minutes = x+b/(a – 2x – 2b) which gives equations as per the condition
(x+b)a/(a – 2x – 2b) = 2b + ax/(a – 2x)
Solving for x it we get the answer as option a)

19) b)let the delivery rate of pump filling the tank be 100x cubic m/min
Then the delivery rate of discharging pump becomes 120x cubic m/min
As its given that total time taken by filling pump takes 12 minutes more than that of discharging pump so according to this condition we get equation as
3600/100x – 3600/120x = 12 solve for x we get x= ½ so the delivery rate of pump discharging to the tank becomes
50 m^3 /min.

20 a) the equation from the above condition becomes 25 (n – 12) = 21 n + 300. Solving it we get n = 150. Hence, the first division harvest 3150 tons.

21) d) let the capacity of the tank be 150 cc then
Pipe filling the tank at the rate of (150/k) cc/ hrs
Similarly Pipe emptying the tank at the rate of (150/m) cc/hrs.since its 1/3rd full means left amount is 100 cc
So time taken to fill the remaining 100 cc of tank is – 100/[150(1/k – 1/m)] which gives 2km/3(m – k)

22) d) Since rate of filling capacity is directly proportional to the diameter of the inlet/outlets

So 5/x = 7p/14p we get x = 10 litres /min so time taken to empty the tank becomes 100/10 = 10.0 mins.

23) c)let the total amount of work be 900 units
So L's rate of doing work is 75 units/day
M's rate of doing work is 50 units/day
Similarly N's rate of doing work = 90 units/day
So their one days work is = 75 + 50 + 90 = 215 units.
They work together for 3 days in which they did 3*215 = 645 units of work. Amount of work left is 900 – 645 = 255 units and then after those 3 days L & N left.
So M takes time to complete the remaining work of 255 units in 255/50 = 5.1 days

24) a) Ditch dug per day = 324/6 = 54 metres
So x + (x + y) + (x + 2y) = 54
10 (x + 2y) = 14 x
Using the options to solve it we get 15 metres

25) a) work done on the first three days is 37 %. Hence, work done on the next 7 days is 63%.
Since, this is P + Q's work we get
One day's work of (P + Q) = 9%
Also, 5P = 4Q
Hence P = 4% & Q = 5%
Q turns out to be the fastest worker. So answer is 20 days

26 c) From the condition of the problem and a little bit of trial and error we can see that the first carpenter worked for for 4 mins and 2nd and 3rd carpenter also worked for 4 mins. As 4A + 4(B+C) = 49A + B + C) and we know that A + B + C = 20 pieces per minute.
So , the first carpenter make 20 pieces in 4 mins. To make 160 pieces of chairs he would take 32 mins.

Q 27 – 31) First set of ten pipes operate 10%/min (filling)
i.e. Filling done by 1 pipe = 1% minute/ minute
second set of five pipes operate at 12.5%/ minute (filling)
i.e. filling done by 1 pipe = 2.5%/minute
Set C (Emptying) = 5%/minute
Emptying per pipe = 0.625%/minute
So Answers are **27) b28) d29) a30) b31) d**

32) c)let Brijesh does 'x' units in 3 days then Rajeev does 'x' units in 4 days and similarly Daljeet does 4x/3 units in 5 days.
So there one day's work is -: x/3 + x/2 + 4x/15 = 11x/10.
They together completed the work in 20 days, so total work donbe = (11x * 20)/10
So time taken by Brijeshalone to complete the above amount of work is = [(11x * 20)/10]/[3/x] = 66 days.

Q 33) b) let the extra labour done by women be 'x' hours per day.

Let the number of women and children be 'w' & 'c' respectively.
And let the amount of work initially be 100 units then by increment in 50% means it will become 150 units.
Then by the formula (M1 * D1 * T1)/W1 = (M2 * D2 * T2)/W2
We get [(w + c) * 6 * 6]/100 = [(w + c) * 6 * (6 + 6 + x)]/150
So x = 3 hours is the answer.

34) b) let the amount of work be = 300 units
So 20 men does – 100 units in – 20 days
So 1 man does – in 1day – ¼ unit of work
So in 25 days they will do 125 units while remaining work is 200 units so some extra men will be required so let it be x
Then x+20 men will do – [(x+20) * 25]/4 units of work which is = 200 units so solving them we get x = 12 men

35) d) since M1 * D1 * T1 = M2 * D2 * T2 We need to find D2 = (M1 * D1 * T1)/(M2 * T2)
So substituting the values we get D2 = (250 * 33 * 125)/(330 * 125) = 25 DAYS

36) a) applying the same formula (M1 * D1 * T1) = (M2 * D2 * T2) we get amount of work done by y men is = y^3/x^2
37) a) Let (P + Q) complete the total work of 'x' units in k days.
Then P does 'x' unit of work in k+25 days.
& Q does 'x' unit of work in k+49 days.
Eq thus becomes -: x/(k+25) + x/(k+49) = x/k so we get k=35 days.

38) d) let the number of men employed initially by a contractor be 'x' then applying the same M1 * D1 *T1 =Const
We get -: x * 18 = (x – 12) * 30: x = 30 men

39) b) let the total capacity of tank be 180 cc
Since the rate of the pipe flows is proportional to the square of their diameter.
So the rate of their flows is k, 4k & 9k respectively.
And given time taken by smallest pipe to fill 180 cc tank is 9 min so its rate becomes 20 cc/min which is = k
So time taken by all 3 pipes together is = 180/(14 * 20)= 9/14 min

40) c)since the capacity of tank is 40 L.
Tap A takes 10 hr which means its rate of filling is = 4 L/hr.
Similarly B empties the tank in 20 hr so its rate of emptying the tank is = 2 L/hr
And given 2.5 % of total tank capacity get evaporated in every 1 hour which is = 1L/hr
So, net rate of filling is 4 – 2 – 1 = 1 L/hr
Hence, when both taps are open it will take 40/1 = 40 hr.

41 b) Second tap can fill the tank in 1.8 * 10 ie 18 hours. Fraction of tank filled after 5 hours = (5/10) + (3/18) – (5/30) =1/2

Let the first tank remains open for next 'n' hours
According to question,
n/10 + (n + 2)/18 = ½ or n = 2.5
Total time taken to fill the tank = 9.5 hours or 9 hours 30 minutes

42 c) Let a man in one day can do 'w' units of work. Therefore, total work = (36 * 12) * w units
Work done by a woman in one day = (36 * 12 * w)/(48 * 18) = w/2 units
Amount of work done in 10 days = 10 * (16w + 16w/2) = 240w units
Let 'n' additional men are required
So, according to question -: 3 * (24w + nw) = 192w or n =40 men
43 c) 1/R1 = 1/10 : 1/R2 + 1/R3 = ¼ : 1/R1 + 1/R2 + 1/R3 = ¼ + 1/10 = 7/20
So IN 20 hrs working together the three robotic arms will complete 7 products and in 40 hrs, they will complete (7 * 2) = 14 products.

44 b) Let in 't' hours the tank is filled by P1 & P2
t/6 +t/9 = 1 or t = 3.6 hours
therefore, timer is to start after 0.8 hrs or 48 mins.
(Since, 22.22% is equal to 2/9)
When P3 was opened, let the tank get filled in 'l' hours
So, l/6 + l/9 – l/12 = 7/9 or l = 4 hrs
Therefore, the caretaker was supposed to come back after 4.8 hrs.
Required time = 1.2 hrs or 1 hour 12 minutes.

45 c) Let the defect be fixed in'd' days .Then d/m + (d – 1)/2m + (d – 2)/3m = 1 ; 6d + 3d – 3 + 2d – 4 = 6m; 11d = 6m +7. Hence, m= 11k + 8, where k is a non negative integer. So Sahil alone can complete the defect in 2m = 22k +16 days.

46 b) let 'x' minutes be the time taken to completely fill the bucket.
It will take x+2 minutes to fill the bucket when it has a hole in it.
While the hole takes 4 minutes to empty the bucket
So, 1/x – ¼ = 1/(x+2) which gives x = 2 mins.

47 b) Let the initial number of workers be 'n' and each worker completes 'w' units of work in a day.
According to question.
n/w + (n – 1)/w + ……1/w = n * n/w * 2/3
n(n+1)/2w = 2(n^2)/3w or n =3

48 d) Let work(in units) done by A in one day be 4w.
Work (in units) done by A's assistants in one day will be 3w.
Total work (in units) done by all three of them in one day = 4w + 3w + 3w = 10w
Let the total work(in units) be 20 w. then req fraction will be 2/5.

49) b) let the work be 360 units.

So P, Q & R does 4 units, 9 units & 30 units per day respectively.
Since they work each alternate days, for 24 days they together work like that and did 344 units of work. Then P & Q working on each alternate day does 13 units more and the then R does remaining 3 units in $1/10^{th}$ of a day.
So from here we get that P & Q worked for 9 days so they did 36 units & 81 units respectively, while R did the remaining 243 units. Since their wages are divided in a direct relation to that of amount of work so 360 Rs will be divided for each of them as 36, 81 & 243 Rs each.

50) c) Take one extreme case where Rajesh takes 15 days and Rakesh takes 20 days to complete the assignment. Let us assume there are 60 units of work to be done. So Rajesh does 4 units/day and Rakesh does 3 units/day. Since they are working on alternate days, they will finish 7 units in 2 days. Both of them are not working on 3^{rd} day. So, after 3 days only 7 units will be finished. So in 24 days 56 units will be completed.
Now, if Rajesh starts assignment, he will work on 25^{th} day and he will complete the remaining 4 units. So in this case exactly 25 days will be required. Otherwise, if Rakesh starts, it will take more than 25 days. So option a) & d) are ruled out. In another extreme case, if we assume that Rajesh takes 10 days and Rakesh takes 15 days to complete the assignment , by approaching similarly, we get that it will take 17 days to complete the assignment. So correct anwer choice should be c).

PROBLEMS ON TRAINS

(1 – 5) A train enters into a tunnel PQ at P and exits at Q. A tiger is sitting at O in another by passing tunnel POQ, which is connected to PQ at P & Q, where OP is perpendicular to OQ. A cat is sitting at J inside the tunnel PQ making the shortest possible distance between O & J, such that PO: JQ = 30:32. When a train before entering into the tunnel PQ makes a whistle(or siren) somewhere before P, The tiger and cat run towards P, they meet with accident(with the train) at the entrance P. Further if the cat moves Q instead of P it again meets with accident at the exit of the tunnel by the same bike coming from the same direction.
1). What is the ratio of speeds of tiger and cat?
a) 4:3 b) 5:3 c) 1:1 d) Can't be determined

2). The ratio of speeds of tiger is to trainis :
a) 5:1 b) 3:5 c) 1:5 d) Can't be determined

3). If tiger moves towards OJP, it wil meet with bike at K then PK is:
a) 20 km b) 16 km c) 10 km d) Can't be determined

4). If tiger moves towards OJQ and cat moves towards JOP who will not meet with accident with the train?
a) Tiger b) Cat c) Both a & b d) Can't be determined

5). The ratio of time taken by cat and tiger in moving OPJO and JQOJ respectively given that they do not meet with accident:
a) 1:1 b) 3:4 c) 5:4 d) Can't be determined

(6 – 7) Train A and Train B start simultaneously from Allahabad to Delhi towards each other and continuously shuttle between these two places. Every time these trains meet each other, they turn back after exchanging their respective speeds, the initial ratio of their speeds is 2:1.

6). What is the number of distinct places at which they will meet?
a) 1 b) 2 c) 5 d) None of these

7). Let these two trains first meet at Kanpur, then what is the ratio of distances covered by train A and train B till they meet for the third time at the same place Kanpur:
a) 1:1 b) 14:13 c) 10:11 d) None of these

8). A train met with an accident 60 km away from Patna station. It completed the remaining journey at 5/6th of the previous speed and reached the Anandpuri station 1 hour 12 min late. Had the accident taken place 60 km further, it would have been only 1 hour late.What is the normal speed of the train?
a) 50 kmph b) 40 kmph c) 60 kmph d) None of these

9). A train approaches a tunnel distance PQ. Inside the tunnel a tiger located at a point i.e. 5/12th of the distance PQ measured from the entrance P. When the train whistles, the tiger runs. If the tiger moves to the entrance of the tunnel P, the train catches the tiger exactly at the entrance. If the tiger moves to the exit Q, the train catches the tiger at exactly the exit. The speed of the train is greater than the speed pf the tiger by what order?
a) Speed of the train = 4 * speed of the tiger b) Speed of the train = 5 * speed of the tiger
c) Speed of the train = 6 * speed of the tiger d) None of these

(10 – 11) Two trains leave Delhi at the difference of 4 hours. The first train leaves at 8 am at 40 kmph and the faster train leaves later at 60 kmph in the same direction.
10) When the faster train will overtake the slower train?
a) 4 pm b) 2 pm c) 8 pm d) 6:30 pm

11). What is the distance from Delhi, where one train overtakes another train?
a) 480 km b) 420 km c) 360 km d) 250 km

12). A train covers a certain distance moving at a speed of 60 kmph. However if it were to halt for a fixed time every hour, its average speed comes out to be 50 kmph. For how much time does the train halt every hour?
a) 6 min b) 10 min c) 12 min d) None of these

13). Two trains are travelling in the same direction at 22.5 kmph and 7.5 kmph respectively. The faster train crosses a man in the slower train in 18 seconds. What is length of the faster train?
a) 87.5 m b) 75 m c) 122.5 m d) None of these

14). Two trains start simultaneously from Mumbai and Chennai, respectively towards each other on the same track. The distance between the two stations is 560 km and speed of the trains are 30 kmph& 40 kmph. Simultaneously with the trains, a sparrow sitting on the top of one of the train starts towards the other and reverses its direction on reaching the other train and so on. If the speed of the sparrow is 80 kmph then the distance that the sparrow flies before being crushed between the train is:
a) 70 km b) 560 km c) 640 km d) 650 km

15). A train with 120 wagons crosses Raju who is going in the same direction, in 36 seconds. If travels for half an hour from the time it starts overtaking the Raju(he is riding on his horse) before it starts overtaking Laxman(who is also riding on his horse) coming from the opposite direction in 24 seconds. In how much time(in seconds) after the train has crossed the Laxman do the Raju meets Laxman?
a) 3560 sec b) 3600 sec c) 3576 sec d) Can't be determined

16). Due to technical snag in the signal system two trains start approaching each other on the same rail track from two different stations, 240 km away from each other. When the train starts a bird also starts moving to and fro between the two trains at 60 kmph touching each time each train. The bird is initially sitting on the top of the engine of one of the trains and it moves so till these trains collide. If these trains collide one and a half hour after the start, then how many kilometres bird travels till the time of collision of trains?
a) 90 km b) 130 km c) 120 km d) None of these

17). The distance between Meerut and Allahabad is 700 km. Sangamnagri express starts from Allahabad for the Meerut at 60 kmph. 50 minutes later Ganga express leaves Meerut for Allahabad on the parallel tracks at 70 kmph. How far from Meerut will they cross each other?
a) 250 km b) 360 km c) 350 km d) 475 km

18). Two trains R & S start simultaneously in the opposite direction from two points L & M and arrive at their destinations 16 & 9 hours respectively after their meeting each other. At what speed does the second train S travel if the first train travels at 120 kmph
a) 90 kmph b) 160 kmph c) 67.5 kmph d) None of these

19). Train Z start from point L for point M at the same time that train K starts from point M to L. Point L and M are 300 km apart. The trains are moving at a constant speed atleast at 25 kmph. The trains met each other 3 hours after they start. If the faster train takes atleast 2 more hours to reach the destination. By which time will the slower train have definitely reached its destination? (Ignoring the lengths of trains in crossing)
a) 4 hours after the start b) 7.5 hours after the start
c) 6 hours after the start d) None of the above

20). A train leaves Rampur at 2:15 pm and travels at the rate of 50 kmph. Another train leaves Rajrupur for Rampur at 1:35 pm and travels at the rate of 60 kmph. If the distance between Rajrupur and Rampur is 590 km at what distance from Rampur will the two trains meet?
a) 200 km b) 300 km c) 250 km d) 225 km

(21 – 22) The Kamayani express started from Varanasi to Bhopal at 7 p.m. at a speed of 60 kmph. Another train Godan Express started from Bhopal to Varanasi at 4 a.m. next morning at a speed of 90 kmph. The distance between Varanasi to Bhopal is 800 km.

21). How far from Bhopal will the two trains meet?
a) 164 km b) 156 km c) 132 km d) 128 km

22). At what time will the two trains meet?
a) 5:32 a.m. b) 5:28 a.m. c) 5:36 a.m. d) 5:44 a.m.

23). The Brahmaputra Express left Delhi for Kanpur. Having travelled 300 km, which constitutes 66.666 percent of the distance between Delhi & Kanpur, the train was stopped by a red signal. Half an hour later, the track was cleared and the engine – driver, having increased the speed by 15 kmph, arrived at Kanpur on time. Find the initial speed of the Brahmaputra express.
a) 50 kmph b) 60 kmph c) 75 kmph d) 40 kmph

24). The Ravi express from Lucknow to Gwalior was delayed due to rail construction on its way for 16 minutes and made up for the delay on a section of 80 km travelling with a speed 10 kmph higher than its normal speed. Find the original speed of the Ravi express(according to the schedule)
a) 60 kmph b) 66.66 kmph c) 50 kmph d) 40 kmph

25). The length of Mumbai mail is 120 m and that of Punjab mail is 80 m. These two trains are running in the same direction with velocities of 40 kmph and 50 kmph respectively. The time taken by them to cross each other is:
a) 8 s b) 72 s c) 11.5 s d) 12.5 s

26). Two stations P & Q are 110 km apart on a straight line. One train starts from P at 8 a.m. and travels towards Q at 40 kmph. Another train starts from Q at 10 a.m. and travels towards P at 50 kmph. At what time will they meet?
a) 8.30 a.m. b) 8.30 p.m. c) 10.20 a.m. d) 10.20 p.m.

27). A train covers a distance between stations R & S in 45 minutes. If the speed is reduced by 5 kmph. It will cover the same distance in 48 minutes. What is the distance between two stations R &S(in km)? Also find the speed of the train.
a) 60 km, 80 kmph b) 65 km, 70 kmph c) 60 km, 70 kmph d) None of these

28). Two places A & B are 162 km apart. A train leaves A for B and at the same time another train leaves B for A. Both the trains meet 6 hrs after they start moving. If the train travelling from A to B travels 8 kmph faster than the other train. Find the speed of the two trains.
a) 17.5 kmph, 9.5 kmph b) 19.5 kmph, 11.5 kmph
c) 21.5 kmph, 13.5 kmph d) None of these

29). The speed of the two trains are in the ratio 3:4. They are going in opposite directions along parallel tracks. If each takes 3 seconds to cross a telegraph post, find the time taken by the trains to cross each other completely?

a) 1 seconds b) 3 seconds c) 5 seconds d) 7 seconds

30). Train L and Train M are running on parallel tracks in the same direction. The driver of Train L observes that the Train M coming from behind overtakes and crossed his train completely in 60 seconds. Whereas a man on Train M marks that he crossed the Train L in 40 seconds. If the speed of the Trains be in the ratio 1:2, find the ration of their lengths.

a) 1:2 b) 2:1 c) 3:2 d) 2:3

31). The speed of two trains are in the ratio x:y. They are moving in the opposite directions on parallel tracks. The first train crossed a telegraph pole in 'k' seconds where as the second train crossed the same telegraph pole in 'p' second. Find the time taken by the trains to cross each other completely.

a) 1.5 seconds b) 2 seconds c) (xa + yb)/(x+ y) d) None of these

32). A train travels at the speed of 65 kmph and halts at 8 junctions for a certain time. It covers a distance of 1300 km in 1 day(24 hours). How long does the train stop at each junction, if it hats for the same period time at all the junction?

a) 30 minutes b) 20 minutes c) 60 minutes d) 40 minutes

33). A train overtakes two persons who are walking in the same directions in which the train is going, at the rate of 2kmph and 4 kmph respectively and passed them completely in 9 and 10 seconds respectively. The length of the train is

a) 50 m b) 60 m c) 65 m d) 70 m

34). How many seconds will a train 60 m in length, travelling at the rate of 42 kmph, take to pass another train 84 m long, proceeding in the same direction at the rate of 30 kmph?

a) 41.2 seconds b) 43.2 seconds c) 42.3 seconds d) 42.5 seconds

35). The distance two stations, Kanpur & Delhi, is 450 km. A train starts 4p.m. from Kanpur and moves toward Delhi at an average speed of 60 kmph. Another train starts from Delhi at 3.20 p.m. and moves towards Kanpur at an average of 80 kmph. At what time will the both trains meet?

a) 5.30 p.m. b) 5.50 a.m. c) 6.50 p.m. d) 6.30 a.m.

36). Two trains start at the same time fromstation C & station D and proceed toward each other at the rate of 80 kmph and 95 kmph respectively. When they meet, it is found that one train has travelled 180 km more than the other. Find the distance between station C & station D.

a) 1800 km b) 2000 km c) 2100 km d) 2300 km

37). Train H crosses a stationary train J in 30 seconds. The length of train J is 140% of the length of train H. The speed of train H is 72 kmph. What is the difference between the lengths of the two trains?

a) 140 m b) 80 m c) 70 m d) 100 m

38). A train was late by 6 minutes. The driver increased its speed by 4 kmph. At the next station, 36 km away, the train reached on time. Find the original speed of the train.
a) 32 kmph b) 33 kmph c) 34 kmph d) 36 kmph

39). A carriage driving in a fog passed a man who was walking at the rate of 3 kmph in the same direction. He could see the carriage for 4 minutes and it was visible to him upto a distance of 100m. what was the speed of the carriage?
a) 4(1/2) kmph b) 6(1/2) kmph c) 4(2/3) kmph d) 6(2/3) kmph

40). A train normally covers a certain distance at a speed of 60 kmph. However, if it were to halt for a fixed time interval in each hour its average speed reduced to 50 kmph. What is the time interval for which the train halt in each hour?
a) 10 minutes b) 20 minutes c) 6 minutes d) 12 minutes

41). A train without stopping travels at an average speed of 60 kmph and with stoppages at an average speed of 40 kmph. What is the total time taken by the taken by the train for stoppages on a route of length 300 km?
a) 10 hrs b) 20 hrs c) 5 hrs d) 2.5 hrs

42). A train is travelling at a speed of 72 kmph. It takes 3 seconds to enter a tunnel and 30 seconds more to pass through it completely. What is the length of the tunnel(in meters)?
a) 480 b) 540 c) 600 d) 660

43) A train of length 100m takes 1/6 minute to pass over another train 150 m long coming from the opposite direction. If the speed of first train is 60 kmph, the speed of the second train is :
a) 45 kmph b) 28 kmph c) 30 kmph d) None of these

44) The RjbRajdhaani – R007, which is scheduled to travel on Delhi – Ranchi – Patna route and RjbRajdhani – R096, which is scheduled to travel on Patna – Ranchi – Delhi route, start at the same time from Delhi and Patna stations and proceed towards each other at speeds 15 m/s and 25 m/s respectively. When the two trains meet, it is found that one train has traveled 72 km more than the other. What is the distance between two Delhi and Patna stations?
a) 144 km b) 192 km c) 256 km d) None of these

45) A train leaves K at 40 kmph. At the same time, another train departs from L at a speed of 60 kmph. They reach the respective destinations and turn back immediately towards the starting points. Now if they meet at a distance of 200 km from K, what is the distance between K & L?
a) 260 km b) 255 km c) 250 km d) None of these

46) Trains are moving from P to Z and Z to P at a regular interval of 1 hr. They complete their journey in 5 hr. How many trains coming from station Z will cross the train coming from station P that started at 10 a.m.? Assume the trains start from both the stations at the same time.
a) 12 b) 14 c) 11 d) Cannot be determined

(47 – 50) Two trains started simultaneouslyat 9 a.m. from P and Q towards Q & P. Both of them take 12 hr to reach their respective destinations.

47). At what time will the two trains meet?
a) 3 p.m. b) 3.45 p.m. c) 4.20 p.m. d) 6 p.m.

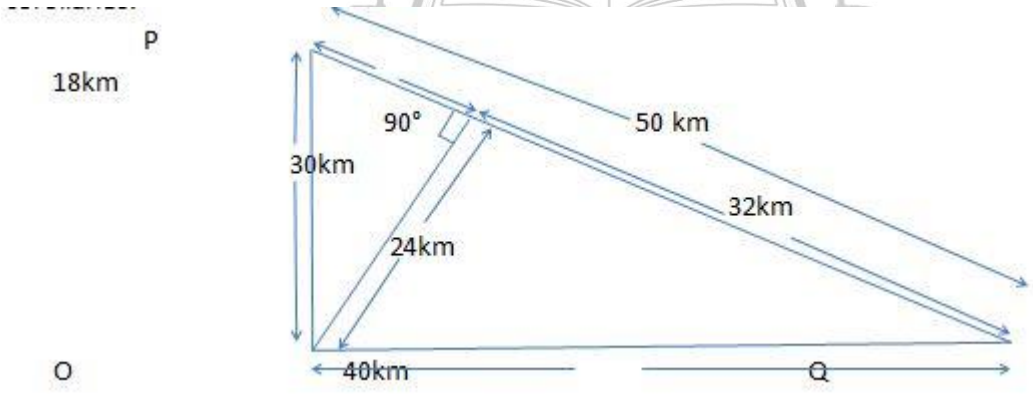
48). If the first train met with an accident at 1 p.m. and thereafter travels at half of its original speed, when will the two trains meet?
a) 2.40 p.m. b) 3.40 p.m. c) 3.20 p.m. d) 4.20 p.m.

49). The first train met with an accident and travelled at half of its original speed thereafter. It reached the destination 10 hr late. Find the time when the trains would meet?
a) 3 p.m. b) 2 p.m. c) 4.20 p.m. d) 4.33 p.m.

50). The first train met with an accident and travelled at half of its speed thereafter and the two trains met at 4 p.m. Find the time when the accident occurred.
a) 3.15 p.m. b) 11.00 a.m. c) 9.30 a.m. d) 12 noon

SOLUTION AND EXPLANATION OF PROBLEMS ON TRAINS

1). b) Since it is clear from the statement that the triangle POQ is a right angle triangle and further OJ must be perpendicular to PQ then we can find that PO = 30 km and QO = 40 km by using Pythogorous theorem and its corollaries.



$OJ^2 = OP^2 - PJ^2$

$OJ^2 = 900 - x^2$

And $OQ^2 = OJ^2 + QJ^2$

$OQ^2 = 900 - x^2 + 1024$

$(x + 32) = 900 + 900 - x^2 + 1024$

$x = 18$ km

Hence, PJ = 18, OP = 30 and OQ = 40 and OJ = 24 km

Now, since Tiger and Cat reaches P at the same time, so the ratio of speeds = ratio of distances covered by them.
(Speed of Jackal)/(Speed of cat) = 30/18 = 5/3

2). c) Again, since Tiger and train both arrive at P at the same time and let the train was x km away from P, before entering into the tunnels. i.e. when it makes a whistle then the ratio of distances covered by train & tiger.
= x/30 = (x + 500)/40

x = 150 km

Thus, the ratio of speeds of Tiger is to train is 1 : 5

3). c) Since, when the train arrive at P, the Tiger can move 30 km. So, at the time when train is at P the tiger will cover 6 km from J on JP in addition to 24 km at OJ. Now, the rest distance at PJ is 12 km this remaining distance will be covered by train and Tiger according to their respective speeds.
So, distance covered by train = 12 * (5/6) = 10 km
And distance covered by Tiger = 12 * (1/6) = 2 km
Hence, Tiger will meet with train at K which I 10 km away from P(inside PQ).

4). b) It is obvious from the path of cat that if cat moves in the JOP direction it will never meet with accident and now Tiger follows the path OJQ. Again when the train is at P then Tiger will cover 30 km(i.e.24(OJ) + 6km on JQ).
So, the ratio of distances covered by tiger is to train = ratio of their respective speeds.

Now let the tiger and train meet each other at PQ, (6 + x) km away from J towards Q, then

x/(x + 24) = 1/5 we get x= 6

Hence train meets with the tiger at (18 + 6 + 6) = 30 km away from P.

5). c) The ratio of time taken by cat and tiger = (72/3)/(96/5) = 5/4

6) b)

These two trains meet only at P and L i.e. there are only two points.
7). c) For the first meeting they have to cover only 2x + x = 3x distance and for the further meeting for each next meeting they have to cover 6x distance together.

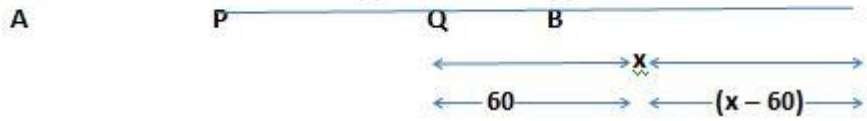
Distance covered by A	**2x**	**2x**	**4x**	**2x**
Distance covered by B	**x**	**4x**	**2x**	**4x**
Point of meeting	**P**	**L**	**P**	**P**
Total distance travelled	**3x**	**6x**	**6x**	**6x**

When A & B meet at P for the third time A goes 10x and B goes 11x.
Thus, the required ratio = 10 : 11

8). c) Case 1 –: Since the speed is decreased by 1/6. So, the time will be increased by 1/5, which is equal to 1 hour 12 minutes. It means the normal time required for this remaining part(x) of the journey is 5 * 72 min = 360 min = 6 h.
(1h 12 min = 72 min)

P is the place of accident.

Case 2 –: When accident is supposed to be happened at Q



Since, the speed is decreased by 1/6, hence the time will be increased by 1/5, which is equal to 1 hour, hence the normal time required for this remaining part (x – 60) of journey = 5 * 1 = 5 hours. Thus, it is clear that when the train runs 60 km of its normal speed it takes 1 hour less, which implies that in 1 hour the train can run 60 km with its normal speed. Thus the normal speed of the train is 60 kmph.

9) c)

Let the speed of train be u and the speed of tiger be v and train whistles at a point T, x km away from P, then

u/v = x/5k = (x+12k)/7k

7x = 5(x +12k)

x/k = 30/1 ; u/v = 30/(5*1) = 6/1 .So we get u = 6v i.e option c) is the answer

10). c) Required time = (distance travelled)/(relative speed) = (4 * 40)/20 = 8 h
Thus, the faster train will overtake at 8 pm.

11). a) Required distance = Time taken in overtaking * Faster's speed = 8 * 60 = 480 km from Delhi

12). b) Suppose the total distance be 300 km (LCM of 50 & 60) then in the first case it takes only 5 hours and in the second case it takes 6 hours. Thus , in 6 hours trains halts for 1/6 hour = 10 m

13). b) Time taken to cross the man = (length of the faster train)/relative speed
18 x/(15 * 5/18) we get x = 75 m

14). c) Time taken by trains to collide = 560/70 = 8 h
In 8 h sparrow will cover 8 * 80 = 640 km

15). c) Let the length of the train be L metres and speeds of the train Raju and Laxman be R, A & K respectively, then L/(R – A) = 36 ----------1)
and L/(R + K) = 24 ---------2)
From eq 1) & eq 2)
3(R – A) = 2(R + K)

R = 3A + 2K
In 30 minutes (i.e. 1800 seconds), the train covers 1800 R (distance) but the Raju also covers 1800 A(distance) in the same time. Therefore distance between Raju & Laxman when the train has just crossed Laxman
= 1800 (R – A) – 24(A + K)
Time required = [1800 (R – A) – 24(A + K)]/(A + K)
= 3600 – 24 = 3576s

16). a) Time taken to collide the two trains = 3/2 h
So, in 3/2 h bird travels (3/2) * 60 = 90 km
17). c) In 50 minute Sangam nagri can cover 50 km. So, the rest distance = 650 km, which will be jointly covered by both trains. Time taken = 650/(60 + 70) = 5 h
distance from Meerut = 5 * 70 = 350 km
18). b) S1/S2 = √T2/√T1
120/S2 = √9/√16 = ¾
S2 = 160 kmph
19). b) Let the speed of trains Z & K be z kmph and k kmph respectively. Since they meet after 3 hours, so z + k = 100.
Since the faster train takes atleast 3 + 2 = 5 hours to complete the 300 km journey. Hence, minimum possible speed for the slower train = 40 kmph at which speed it will take 7.5 h to complete the journey.
20). c) a train that leaves Rajrupur travels at the speed at the speed of 60 kmph, at 2.15 pm it will be at 550 km way from the given train at Rampur. So the two trains meet each other in 5 hours(550/110 = 5 hrs) and from Rampur trains will met at a distance of 50 * 5 = 250 km.
21- 22) in 9 hours (7pm to 4 am) The Kamayani exp would cover 540 km.
Remaining distance = 260 km
Relative speed = 150 kmph
Time required = 260/150 = 1.733 hours = 104 minutes.
So
21). b)
22). d)
23). b) When the signal happened distance left was 150 km.
150/(s) – 150/(s + 15) = ½ hours so s = 60 kmph
24). c) The train saves 16 minutess by travelling faster over a section of 80 km.
Thus, 80/S – 80/(S + 10) = 16/60 = 0.2666. checking the options we get S = 60 kmph
25). b) Relative speed = 50 – 40 = 10 kmph = 50 18 m/s
time taken = Sum of length of the trains/Relative speed = (200 *18)/50 = 72 s
26). c) at 10 am when train from P will be 30 km away from train from Q. so for 30 km the two trains will take 30/90 = 1/3 hr = 20 minutes to meet each other i.e. at 10.20 am
27). a) when distance is kept constant then speed and time are in inverse relations. So if speed is S then s/(s – 5) = 16/15 so we get s = 80 kmph and distance = 60 km
28). d) given distance between two trains = 162 km and time taken to meet = 6 hrs. so if second train from B to A is ‘s’ then from A to B is s + 8. So 162/6 = 2s + 8 which s = 9.5 kmph so none of the options matches

29). a) given their speeds are in ratio 3 : 1 while each train takes equal 3 secs to cross a pole. So their lengths will also be in the ratio 3:1. Hence it will take 4/4 = 1 sec to cross each other.

30). c) let the speeds of two trains be x & y respectively then their relative speed becomes x – y = D/60
x – y = d/40
So, D/60 = d/40 which gives D/3 = d/2 ratio of their length = 3 : 2

31). c) Length of 1st train = xk
Length of 2nd train = yp
Time = Total dist/[sum of time(as direction)] = (xk + yp)/(x + y)

32). a) speed = 65 kmph
distance = 1300 km
time taken = 1300/65 = 20 hours
clearly, 4 hours are spent at 8 junctions in stoppages as one full day was taken for the journey to be completed .
required time = 4 * 60 = 240 min and at each junction the halt is of = 240/8 = 30 min

33). a) let the speed and length of train be 's' and 'l' respectively. So the equation as per the question becomes
(s – 5/9) = l/9 --------1)
(s – 10/9) = l/10 ------2)
1)– 2) we get l = 50 m

34) b) relative speed = 42 – 30 = 12 kmph = 12 * 5/18 = 10/3 m/s
Time = Total length of both the train/relative speed = (84 + 60)/(10/3) = 43.2 s

35). c) let the first train also starts at 3.20 pm and add 40 km, to the total distance
Total distance = 490 km
Total speed = 140 kmph
Total time = D/S = 490/140 = 3.5 hr
They will meet at 3.20 p.m. + 3.5 hr = 6.50 pm

36) c) Faster train moves 95 – 80 = 15 km more in 1 hr
Faster train moves 180 km more in = (1/15) * 180 = 12 hrs
Since, they are moving in opposite directions, they cover a distance of 80 + 95 = 175kms, in 1 hr.
In 12 hrs they cover a distance = 175 * 12 = 2100 km

37) d) Supose the length of train H = x m
Therefore, the length of train J = 140 * x/100 = 1.4x m
Total length of two trains = x + 1.4x = 2.4x m
Speed off train H in metre per sec = 72 kmph = 20 m/s
According to the question D = S * T
2.4x = 20 * 30 so we get x = 250 m
Lebgth of train J= 250 * 1.4 = 350 m
Difference between the lengths of two trains is = 350 – 250 = 100 m

38) d) Pick up the option.Distance given = 36 km If speed = 36 kmph, time = 1 hr . if speed is increased by 4kmph then speed = 40 kmph
Time = D/S = 36 * 60/40 = 54 min; time saved = 6 min

39) a) 100m = 4 min
Speed = (100/1000)/(4/60) kmph = 1.5 kmph.

So speed of carriage = 1.5 kmph + speed of man = 4.5 kmph

40) a) For this type of questions take the LCM of speeds and assume the LCM as the distance
Then the time taken @ speed of 60 kmph = 300/60 = 5 hr

Again the time taken @ speed of 50 kmph = 300/50 = 6 hrs

Thus we see that in place of 5 hrs train takes 6 hrs. it means the train takes 1 hour extra and this one hour is stopping period in the total time of 6 hours. Thus in 6 hour train halts for 1 hour. So in 1 hour train will stop for 1.6 hours or 10 mins

41) d) Let r = running time of the train
s = stoppage time of the train

D = total distance travelled by train

We have:

D/r = 60 & D/(r + s) = 40

(r + s)/r = 3/2 so s/r =1/2

As D= 300 kms

300/r = 60 r = 5hr

So s =5/2 = 2.5 hr

42) b) Let the length of train be 't'
So time taken to enter the tunnel is 3 secs while its speed is 72 kmph = 20 m/s

So length 't' of a train becomes = 20 * 3 = 60 m
Let the length of tunnel be 'l'

So (60 + l)/20 = 30 we get l = 540 m

43) c) Relative speed = sum of speeds of two trains = (60 + x)
Time = (sum of length of two trains)/ (relative speed)

10 = [250/{(60 + x) *5}] * 18 we get 60 + x = 90 from here we have x = 30 kmph

44) d) Let the two trains meet after 't' hours.
According to question,

(25 – 15) *(18/5) * t = 72 or t = 2

Required distance = (25 + 15)*(18/5) * 2 = 288 km

45) c) 'x' be the distance between K & L.
The Train which leaves K travels a distance of x + (x – 200) = 2x – 200

The train which leaves L travels a total distance of x + 200

The ratio of distances travelled by the trains = ratio of the speeds

Therefore , (2x – 200) : (x + 200) proportional to 40 : 60 or we get x = 250 km

46) c) At 10 am a train from station Z is just coming to station P. That train must have started at 5 am from station Z. The train that starts at 10 am will reach at 3 pm at station Z. So from 5 am to 3 pm every train started from station Z will cross the train. So total number of train = 11

47 – 50)

47) a) Since the two trains have the same speed, they would take same time to cover the same distance (between P & Q). Hence, they would meet exactly 6 hr after they start i.e. at 3 pm

48) b) If the distance between P & Q is assumed to be 12 km, then speed of both the trains = 1 kmph.
Therefore, by 1 pm they would have both covered 4 km each. Distance left between them = 4 km
Speed of the first train = 0.5 kmph ; speed of the second train = 1 kmph
(relative speed = 1 + 0.5 = 0.5 kmph)

Hence, time taken to meet, after the accident = 4/1.5 = 2(2/3) hr = 2 hr 40 min
So they meet at 3.40 pm

49) c) The train is late by 10 hr due to reduction in speed after the accident as the same is half. So time taken now will be twice that of the original. Hence, the accident must have occurred 10 hr before actual arrival time at the destination i.e. at 11 o' clock. Now till 11 o' clock, if we assume the speed of each train to be 1 kmph and total distance = 12 km, in 2 hr they together will cover 4 km. the remaining distance of 8 km will be covered with relative speed of 1kmph and ½ kmph.
Time = 8/(3/2) = 16/3 hrs.
The two trains would meet after = (16/3 + 11) hr or at 4.20 pm

50) d) assume that the total distance d = 12 km
Speed of the train from P to Q and back from Q to P is 1 kmph.

Now if the accident occurred after 't' hours from start, the distance covered by the first train in t hours = t km
And distance covered in (7 – t) hr = [(7 – t)]/2
(because after the accident the speed is half)
(9 to 4 ------ 7 hr)
Distance covered by the second train in 7 hr = 7 km
To meet at 4am, the total distance = 12 km
Therefore 7 + t + (7 – t) * ½ = 12
t = 3 hr after start i.e. at 12 o' clock

DATA INTERPRETATION (MISSING DATA TYPE)

Directions (Q. 1-5): Study the table carefully to answer the following questions.
The percentage profit is given on total cost price. Cost price = cost of production + transportation cost + packaging cost

Name of the goods	Cost of production per kg	Cost of transportation	Cost of packaging	Selling price per kg	Profit / Loss	Percentage of Profit / Loss
Salt	` 80	` 8		` 120		
Wheat	` 40	` 0	` 0			5% Profit
Barley	` 45		` 5		` 50	
Mustard	` 20	` 3	` 1			
Soya bean	` 70	` 10		` 90		6% Loss

1. What is the cost of packaging of Soya bean?
a) `22.5 b) `20.04 c) `19.91 d) `18.71 e) `15.74

2. If the percentage of profit on sold Salt is 10%, then what is its cost of packaging?
a) ` 25.57 b) ` 18.41 c) ` 30.27 d) ` 21.09 e) ` 19.18

3. What is the difference between the selling price of Barley and that of Wheat, if the cost of transportation is zero for both?
a) `56 b) `52 c) `48 d) `36 e) `72

4. What is the percentage profit of Mustard if its selling price is 80% of the cost price of Wheat?
a) 28% b) 30% c) 32% d) 34% e) 38%

5. 4 kg Salt, 3 kg Wheat and 5 kg Mustard are sold. What is profit or loss percentage? (The packing cost is zero for all goods) and selling price of Mustard is `32 per kg?
a) 36% b) 32% c) 30.49% d) 34.2% e) 31.5%

Directions (Q.6-10): Study the table carefully to answer the following questions.

Field name	Shape	Side (in metres)	Base (in metres)	Height (in metres)	Radius (in metres)	Cost of flooring (in rupees per square metre)	Cost of fencing (in rupees per metre)
R	Square	15				40	18
T	Circle				10	45	22
S	Parallelogram		20	12		60	25
Q	Rectangle	10 × 20				30	15
P	Triangle		16	12		50	20

6. What is the ratio of the cost of flooring to that of fencing of field S?
a) 4 : 1 b) 6 : 1 c) 8 : 1 d) 9 : 1 e) 5 : 1

7. The cost of fencing of field T is approximately what percent of the cost of flooring of field R?
a) 10.5% b) 19.46% c) 18.71% d) 15.36% e) 13.82%

8. What is the difference between the cost of fencing of R and that of Q?
a) Rs.180 b) Rs.120 c) Rs.240 d) Rs.360 e) Rs.480

9. The cost of fencing of field R is what percent of the cost of fencing of field S?
a) 87.54% b) 67.5% c) 72.13% d) 54.36% e) 46.5%

10. What is the cost of flooring of P?
a) Rs.4000 b) Rs.4600 c) Rs.4800 d) Rs.5000 e) Rs.4400

Direction (Q. 11-15): Study the following table carefully and answer the given questions.

Name	Type of interest	Principal	Amount	Year	Rate %
Anil	Compound	12000	-	-	6
Kamal	Simple	-	35360	4	-
Sunil	Compound	25000	-	3	5
Jalal	Simple	-	-	5	-
Bilal	Compound	-	-	6	4

11. What is the principal of Kamal if the ratio of the rate of interest Anil to that of Kamal is 2 : 3?
a) 24500 b) 25500 c) 26000 d) 27500 e) 25600

12. What is the amount of Sunil, if the interest is compounded yearly for 3 years?
a) 24385.625 b) 26900.615 c) 27500.565 d) 28490.625 e) 25148.169

13. At what Rate of Interest does the amount of Kamal become 5 times his principal?
a) 95% b) 102% c) 98% d) 100% e) 97%

14. What will be the amount of Bilal in two years when his principal is 30% more than Anil's?
a) 18738.18 b) 16872.96 c) 19638.1 d) 19548.18 e) 19799.18

15. If the ratio of principal of Sunil to that of Jalal is 5 : 6 and the rate of interest of Jalal is 20% more than that of Sunil, then what is the interest of Jalal?
a) 9000 b) 8000 c) 9400 d) 7500 e) 8800

Directions (16-20): Read the following table is pie chart carefully and answer the questions given below it.
Distribution of employees of a company in different department:

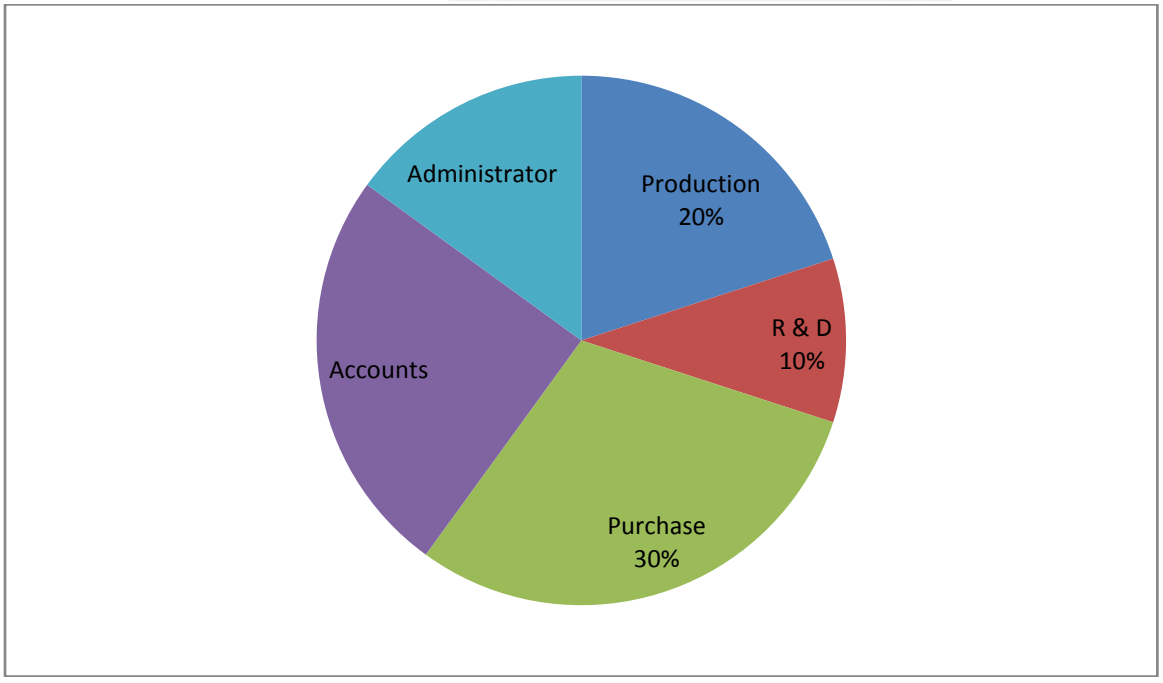


Table shows the portion of female employees and portion of employees whose age is under 25 years

Employees	Female	Under 25
Production		0.50
R & D	0.60	0.10
Purchase	0.40	
Accounts	0.10	0.25
Administrator	0.50	
Total	0.40	0.30

16. If in Purchase department, 25% of males are under 25 age then what is the ratio of number of males who are above 25 to the number of females who are under 25 age?
a) 3 : 2 b) 2 : 3 c) 1 : 3 d) 1 : 2 e) None of these

17. The number of males in Accounts department is 180, then find the number of employees whose age is under 25 in same department?
a) 100 b) 50 c) 75 d) 25 e) 125

18. What percent of employees in Production team are male?
a) 10 % b) 20 % c) 25 % d) 40 % e) 15 %

19. If in Administrator department, there are no employee under 25, then by what percent number of employee under 25 in Purchase are more than number of employee under 25 in Accounts?
a) 100% b) 96% c) 104% d) 124% e) None of these

20. What is the Ratio of number of male employees from Purchase department to number of employees under 25 age from Production team?
a) 5 : 9 b) 7 : 8 c) 2 : 9 d) 9 : 5 e) Data insufficient

Directions (Q. 21-25): Study the table carefully to answer the following questions.

Stations	Speed (m/min)	Distance between two stations (km)	Time taken (min)
Tambaram to Broadway	1100	2.75	
Broadway to Anna Nagar	1500		
Anna Nagar to Avadi		4.5	3
Avadito T Nagar	1200	2.25	
T Nagar to Central	1000		

21. By what percent time taken from station Anna Nagar to Avadi is more/less than the time taken from Avadi to T Nagar by the metro?
a) 66 2/3 % b) 65 1/3 % c) 62 1/3 % d) 60 % e) Data insufficient

22. From Broadway to Anna Nagar station, if the Metro train takes twice the time it takes to travel from Tambaram to Broadway, then what is the distance between Broadway to Anna Nagar station? (in km)
a) 5 Km b) 6 Km c) 7.5 Km d) 7 Km e) 6.5 Km

23. If total distance from Tambaram to Central is 20 km, then find time taken to travel from T Nagar to Central.
a) 2 Mins b) 3 Mins c) 4 Mins d) 5 Mins e) Data insufficient

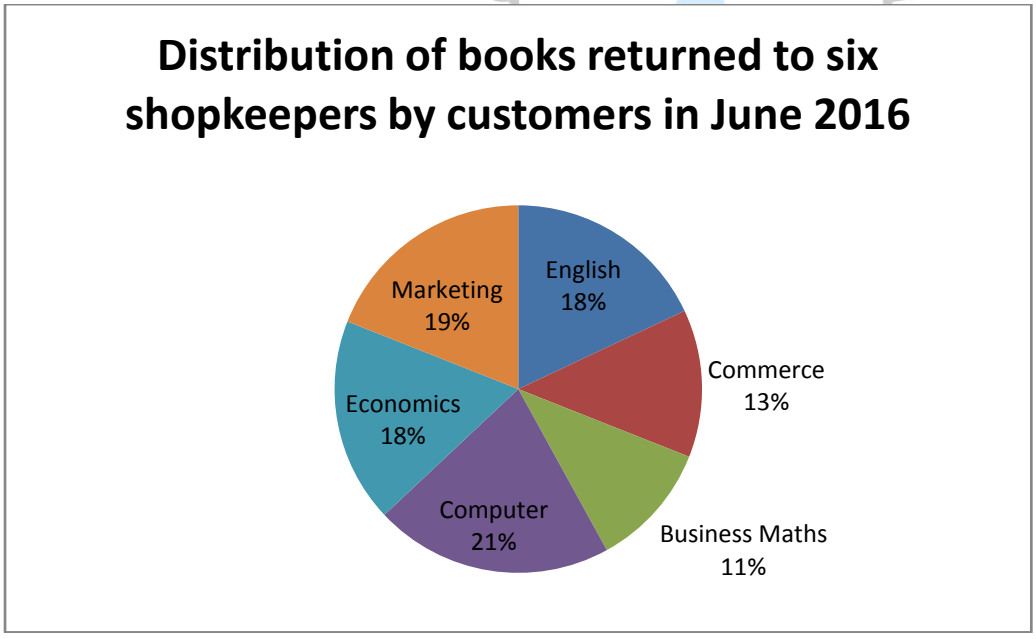
24. What is the average speed of the train from Tambaram to Central?
a) 75 km/hr b) 79.3 km/hr c) 75.6 km/hr d) 73.2 km/hr e) Data insufficient

25. If due to some problem, the train takes 2 more minutes to reach Central from T Nagar, then by what percent the average speed of entire journey has changed?
a) 6.35 % b) 7.28% c) 8.54% d) None of these e) Data insufficient

Directions (26-30): The questions are based on the table and pie-chart given below. The table has some missing information but it is known that every shopkeeper sold books. Complete the missing information and answer the questions using the information given in table and pie-chart.

Books sold by 6 shopkeepers in June 2016 (in thousands)

Subject	A	B	C	D	E	F	Total
English	3	1		2	5		20
Commerce	6	2	6		1	3	
Business Maths	7	9	9	8		8	50
Computer	1	2	5		8	6	29
Economics	8	8	1	3			
Marketing		4	2	4	7	4	
Total	30	26	27	33	32	35	183



26. What is the average number of books sold of Commerce, Computer and Economics together?
a) 29500 b) 30000 c) 30333 d) 28333 e) None of these

27. In June 2016, the second highest number of books sold was of which subject?
a) Marketing b) Commerce c) Business Maths d) Economics e) Computer

28. If a total of 4000 books were returned in June 2016, then what was the number of Economics books returned as a percentage of Economics books sold in June 2016?
a) 2.32% b) 2.74% c) 1.86% d) 1.44% e) 2.92%

29. Which shopkeeper sold maximum number of Commerce books as a percentage of the total number of books sold by that shopkeeper?
a) C b) D c) A d) F e) None of these

30. If the number of Commerce books returned in June 2016 is 780, then what is the approximate number of English and Marketing books sold as a ratio of the number of English and Marketing books returned in June 2016?
a) 33:2 b) 41:2 c) 47:3 d) 53:4 e) 65:3

Directions (31-35): Study the table carefully to answer the following questions

Laptop	Cost price	Selling price	% of profit	Profit
Acer	35000			3500
Dell	53000		14%	
Asus		22000		
HP	28000			
HCL		33000	10%	
Lenovo	32000			4000

31. What is the selling price and % of Profit of Lenovo Laptop?
a) 36,000 and 12.5% b) 36,00 and 15% c) 36,000 and 18%
d) 36,000 and 20% e) 36,000 and 23%

32. What is the ratio between Cost Price and selling price of Acer?
a) 14:15 b) 10:13 c) 10:14 d) 14:15 e) 10:11

33. What is the profit earned on Dell Laptop?
a) 7360 b) 7450 c) 7420 d) 7560 e) 7620

34. What is the % of Profit Asus, If Cost Price of Asus is 3/5 of Cost Price of HCL Laptop?
a) 33 1/3% b) 26 4/9% c) 22 2/9% d) 24 5/9% e) 25 7/9%

35. What is the selling price and % of profit of HP Laptop? If profit is 500 more than the profit of Acer Laptop
a) 32,000 and 14 1/7% b) 34,000 and 14 4/7% c) 32,000 and 15 2/7%
d) 34,000 and 17 5/7% e) 32,000 and 14 2/7%

Direction (36-40): Answer the following questions based on the information given below:
The proportion of male employees and the proportion of post graduates in a company are given below. The company has a total of 800 employees, 80% of whom are in the production department and the rest equally divided between the Sales and the Finance department.

Department	Male	Post Graduates
Sales	0.60	
Finance	0.55	0.50
Purchase		0.55
Total	0.475	0.53

36. In the Sales department, twenty five per cent of the post graduates are male. What is the difference between the number of female post graduates and male employees who are not post graduates?
a) Less than 8 b) Less than 10 c) Less than 12 d) Less than 14 e) Less than 16

37. What is the percentage of male employees in the Purchase department?
a) 40% b) 45% c) 50% d) 55% e) 60%

38. The number of Total males from all the departments are approx. what percent more than the number of males in Finance department?
a) 35% b) 32% c) 29% d) 25% e) 39%

39. The difference between the number of Post graduates in Sales department and Post graduates in Finance department is?
a) 6 b) 8 c) 10 d) 9 e) 12

40. What percentage of employees in the Sales department are post graduates?
a) 40% b) 45% c) 50% d) 55% e) 60%

Directions for Questions (41-45): Study the given table carefully to answer the given questions

Cities	Number of students enrolled		Number of students dropped		% of students enrolled who got job
	Male	Female	Male	Female	
Mumbai	350	200	90		16%
Chennai	270	210	33	32	
Hyderabad			52	20	
Delhi					60%
Bangalore			30	60	30%

(Number of students completed course = Number of students enrolled – Number of students dropped)

41. In Delhi city, number of students (M + F) who dropped out is 3/11 of the total number of students who enrolled for the course what % of students (M + F) in city Delhi who completed the course got the job?
a) 80% b) 82.5% c) 85% d) Cannot be determined e) None of these

42. If in Chennai city, 40% of the students (M + F) who completed the course got the job, then how many students got the job?
a) 160 b) 165 c) 166 d) 170 e) None of these

43. In Bangalore city, ratio of male to the female students who enrolled is 9 : 8 and the ratio of male to female who completed the course is 4 : 3, then find the number of students who got the job?
a) 153 b) 155 c) 160 d) Cannot be determined e) None of these

44. In Hyderabad city, number of male students who completed the course is equal to number of female students. Only 96 students, i.e. 25% of (M + F) who completed course got job? When how may male enrolled.
a) 245 b) 250 c) 488 d) Cannot be determined e) None of these

45. In Mumbai city, 25% of (M + F) who completed the course got the job, then find the number of females who dropped out?

a) 100 b) 110 c) 108 d) Cannot be determined e) None of these

Directions (Q. 46-50): Study the given table carefully to answer the given questions. Percentage profit or loss is based on the sum of cost price and transportation cost.

Name of goods	Cost price (in Rupees)	Selling price (in Rupees)	Cost of transportation (in Rupees)	Profit (in Rupees)	Loss (in Rupees)	Profit or loss%
Pen	50		30			
Pencil		100	0		10	
Book	250		20	5		
Note		400	0			4 % loss
Eraser	400		40			6% Profit (of CP)

46. If the loss on Pen is 5%, then its selling price is what percentage less than the selling price of Eraser?
a) 85.7% b) 88.7% c) 83.7% d) 81.7% e) 79.7%

47. What is the ratio of the loss on Note to that on Pencil?
a) 133 : 255 b) 65 : 55 c) 75 : 43 d)8.33 : 5.00 e) 233 : 155

48. The percentage profit on Pen is 4%. Then what is its selling price?
a) Rs. 91.2 b) Rs. 89.5 c) Rs. 87.5 d) Rs. 85 e) Rs. 83.2

49. The selling price of Book is what per cent of the cost price of Pencil?
a) 150% b) 250% c) 125% d) 200% e) 100%

50. What is the difference between the selling price of Eraser and that of Book?
a) Rs. 189.8 b) Rs. 294.5 c) Rs. 191.4 d) Rs. 195.9 e) Rs. 201

SOLUTION AND EXPLANATION OF DATA INTERPRETATION (MISSING DATA)

Answer: 1. E 2. D 3. C 4. A 5. c

1. Selling price of Soya bean = `90
Loss = 6%
Total cost price = 90 × 100 / 94 = `95.74
Cost of packaging of Soya bean = Total cost price – Cost of production – Cost of transportation = 95.74 – 70.10 = `15.74

2. Selling price of Salt = `120 per kg
Profit = 10%
Total cost price = 120 × 100 / 110 = `109.09
Cost of packing = Cost price – Cost of production – Cost of transportation

= 109.09 – 80 – 8 = `21.09

3. Selling price of Wheat = 40 × 105 / 100 = `42
Selling price of Barley = 45 + 5 + 50 = `100
Required difference = 100 – 42 = `48

4. Cost price of Wheat = `40
Selling price of Mustard = 40 × 80 / 100 = `32
Cost price of Mustard = Cost of production + Transportation + Packaging = 20 + 3 + 2 = `25
% profit = 32 – 25 / 25 × 100 = 28%

5. Cost price of 4 kg Salt + 3 kg Wheat + 5 kg Mustard
= {4 × (80 + 8) + 3 × 40 + 5 × (20 + 3)}
= 352 + 120 + 115 = `587
Selling price of 4 kg Salt + 3 kg Wheat + 5 kg Mustard
= 4 × 120 + 3 × 42 + 5 × 32 = 480 + 126 + 160 = `766
% profit = 766 – 587 / 587 = 30.49%

Answer: 6. D 7. D 8. A 9. B 10. c
6. Area of S = Base × Height
= 20 × 12 = 240 meter sq
So, cost of flooring of S= 240 × 60 = Rs.14400
Perimeter of S = 2 (20 + 12) = 64 m
So, cost of fencing of S = 64 × 25 = Rs.1600
So, required ratio = 14400 : 1600 = 9 : 1

7. Perimeter of T = 2πr = 2 × 22/7 × 10 = 440/7 m
Cost of fencing of T = 440/7 × 22 = Rs.1382.85
Area of R = 15 * 15= 225 meter square
So, cost of flooring of R = 225 × 40 = Rs.9000
So, required % = 1382.85 x 100 / 9000
= 15.36% of flooring cost of R.

8. Perimeter of Q = 2 (10 + 20) = 60 m
So, cost of fencing of Q = 60 × 15 = 900
Perimeter of R = 4 × 15 = 60 m
So, cost of fencing of R = 60 × 18 = Rs.1080
So, required difference = 1080 – 900 = Rs.180

9. Fencing cost of R = Rs.1080
Fencing cost of S = Rs.1600
Required % = 1080/1600 × 100 = 67.5%

10. P is a triangle
So, area of P = 1/2 × 16 × 12 = 96 sqm
So, cost of flooring of P = 96 × 50 = Rs.4800

Answer: 11. C 12. D 13. D 14. B 15. a

11. Rate of interest of Kamal = $6 \times \frac{3}{2} = 9\%$
Amount = 35360
Time = 4 years
Let the principal be x
Then, $x + \frac{x \times 9 \times 4}{100} = x\ (1 + 36/100) = 35360$
$X \times \frac{136}{100} = 35360$
X = 26000

12. Amount of Sunil = $P\ (1 + r/100)^t$
$= 25000 \times (1 + 5/100)^3$
$= 25000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20}$
= 28940.625

13. Let the principal be x
Then, SI = 5x – x = 4x
4x = x × r × 4/100
r = 100%

14. Principal of Bilal = $12000 \times \frac{130}{100} = 15600$
Amount of Bilal = $15600 \times (1 + 4/100)$
$= 15600 \times \frac{26}{25} \times \frac{26}{25} = 16872.96$

15. Principal of Jalal = $25000 \times \frac{6}{5} = 30000$
Rate of interest = $5 \times \frac{120}{100} = 6\%$
Interest = $\frac{30000 \times 6 \times 5}{100} = 90000$

Answer: 16.E 17. B 18. D 19. C 20. d

Department	Total	Male	Female	Under 25
Production	160	64	96	80
R & D	80	32	48	8
Purchase	240	144	96	102
Accounts	200	180	20	50
Administrator	120	60	60	0
Total	800	480	320	240

16. Required ratio = $\frac{75}{100} \times 144 / 102 - 36 = \frac{108}{66} = 18 : 11$

17. Number of males = $180 = \frac{90}{100} \times x$

Total employees in Accounts department = 200

Number of employees under 25 = $200 \times \frac{25}{100} = 50$

18. Required% = $\frac{64}{160} \times 100 = 40\%$

19. Required% = $\frac{52}{50} \times 100 = 104\%$

20. Required ratio = $\frac{144}{80} = 9 : 5$

Answer: 21. D 22. C 23. B 24. C 25. a

21. Required% = $\frac{3-1.875}{1.875} = \frac{1.125}{1.875} \times 100 = 60\%$ more

22. Time taken from Tambaram to Broadway = $\frac{2.75 \times 1000}{1100} = 2.5\ minutes$

Time taken from Broadway to Tambaram= 5 min

Distance = 5 × 1500 = 7500m = 7.5km

23. Total distance = 2.75 + .50 + 4.5 + 2.25 + d = 20

d = 3 km

Time = $\frac{3000}{1000}$ = 3 minutes

24. Average = $\frac{1100+1500+1500+1200+1000}{5}$

= $\frac{6300}{5}$ = 1260 m/min = 75.6 km/hr

25. Speed from T Nagar to Central = $\frac{1100+1500+1500+1200+600}{5}$

= $\frac{5900}{5}$ = 1180

Required% = $\frac{(1260-1180)}{1260} \times 100 = \frac{80}{1260} \times 100 = 6.35\%$

Answer: 26. E 27. D 28. A 29. B 30. b

Subject	A	B	C	D	E	F	Total
English	3	1	4	2	5	5	20
Commerce	6	2	6	9	1	3	27
Business Maths	7	9	9	8	9	8	50
Computer	1	2	5	7	8	6	29
Economics	8	8	1	3	2	9	31
Marketing	5	4	2	4	7	4	26
Total	30	26	27	33	32	35	183

26. Required average = $\frac{(27+29+31)}{3}$ = 29
= 29000
27. Second highest number of books sold was Economics
28. Number of Economics books returned = 18% of 4000 = 720
Required percentage = $\frac{720}{31000} \times 100 = 2.32\%$
29. We need to check for which shopkeeper (s) the number of Commerce books sold were the highest, for that shopkeeper the percentage of Commerce books sold as a percentage of total number of books sold by that shopkeeper would be higher than for the shopkeeper who has not sold maximum number of Commerce books out of all the books sold, there is only one shopkeeper is D.
30. Number of Commerce books returned = 780
Total number of books returned = $\frac{780}{13} \times 100 = 6000$
Number of English and Marketing books returned = 37% of 6000 = 2220
Required ratio = 46000 : 2220 = 2300 : 111 = 41 : 2.

Answer: 31. A 32. E 33. C 34. C 35. e
31. Selling price = 32,000+4000=36,000
% of Profit = 4000/36000 = 12.5%
32. Cost Price = 35,000
Selling Price = 35,000+3500=38500
Ratio = 35000 : 38500 = 10:11
33. Cost Price = 53,000
% of profit = 14%
53,000 ---------- 100%
? ---------- 114%
Selling price = 60,420
Profit = 60,420-53,000=7420
34. HCL Laptop Selling Price = 33,000
HCL Laptop % Of Profit = 10% means
33,000 ------- 110%
? ------- 100% (CP)
Cost Price of HCL = 30,000
Asus cost price = 3/5 × 30,000 = 18,000
Selling price = 22,000
Profit = 4,000
% of profit = (4000/18,000) × 100 = 22 2/9%
35. Profit on Acer Laptop =3,500
From that profit on HP Laptop = 3500+500=4000
Selling Price of HP Laptop = 32,000
% of profit on HP = (4000/28,000) × 100 = 14 2/7%

Answer: 36. E 37. B 38. B 39. B 40. a
Total employees = 800 ⇒ total males = 0.475*800 = 380
Total Post graduates = 0.53*800 = 424
80% employees = in Purchase department = 640
Number of Post graduates in Purchase department = 0.55*640 = 352
Now, rest employees (800-640 = 160 are equally divided between Sales and Finance. Thus, both has 80-80 employees.

Number of males in Sales = 0.6*80 = 48
Number of males in Finance = 0.55*80 = 44
Post graduates in Finance = 0.50*80 = 40
Post graduates in Sales = 424-[352+40] = 32
And number of males in Purchase = 380-[48+44] = 288

36. Post graduates in Sales department = 32
Male Post graduates = 25% = 8
Hence, female Post graduates = 24
Hence, Male non Post graduates = 48-8 = 40
Required difference = 40-24 = 16
37. Percentage of males in the Purchase department is: [288/640]*100 = 45%
38. Males in Finance department = 288
Total males = 380
Difference = 92
Required percentage = [92/288]*100 = approx. 32%
39. Difference = 40-32 = 8
40. Required percentage = [32/80]*100 = 40%

Answer: 41. B 42. C 43. A 44. E 45. c
41. Dropped (d) = 3/11
Enrolled (E)
Number of students who completed the course = 8/11 E
60% of students who enrolled got job = 60/100 E = 3/5 E
Required percentage = [(3/5 E) / (8/11 E)] × 100
= 82.50%
42. Total number of students who completed the course = Number of students enrolled – Number of students dropped
= (270 + 210 – 33 + 32)
= 415
40% of students who completed the course got job = $\frac{415 \times 40}{100}$ = 166
43. Let the total number of students enrolled = 17x
Male students enrolled = 9x
Female students enrolled = 8x
Number of students (Males) who completed the course = 9x – 30
Number of students (Females) who completed the course = 8x – 60
The ratio of male to female who completed the course is 4:3
= $\frac{9x-30}{8x-60} = \frac{4}{3}$
= x = 30
Total number of students enrolled = 17x = 17 × 30 = 510
30% of total number students enrolled got the job = 30% of 510 = 153
44. Let the number of students who completed the course be 'c'
Number of male students who enrolled for the course be 'M'
Number of Female students who enrolled for the course be 'F'
= 96 = $\frac{25}{100} \times c$
= c = 384 = (M+F) – (52 + 20)
= M + F = 456 …(1)

Number of male students who completed the course is equal to number of female student
(M – 52) = (F – 20)
M – F = 32 …(2)
From equation (1) and (2)
F = 108

45. Number of students who completed the course = (350 + 200) – (90 + F)
= 460 –F
25% of (M + F) who completed the course got the job
= 25% of (460 – F) …(1)
16% of total number of students enrolled got the job
= 16% of 550 …(2)
From equation (1) and (2)
$= \frac{16}{100} \times 550 = \frac{25}{100} \times (460 - F)$
F = 108

Answer: 46. C 47. D 48. E 49. B 50. c

46. Selling price of Pen = (Cost price + Cost of Transportation)*95/100=
(50+30) × 95/100 = Rs.76
Selling price of Eraser = Rs.466.4
Required% = (466.4-76) × 100/466.4
=83.7%

47. Loss on Note = Cost price of Note - selling price of Note
= 400 × 100/96-400 =416.66-400 = Rs.16.66
Loss on Pencil = Rs.10
Required ratio = 16.66:10=8.33:5.00

48. Cost price of Pen = Rs.50
Transportation cost = Rs.30
Total cost price = 50+30=Rs.80
Profit = 4%
Selling price = 80 × 104/100 = Rs.83.2

49. Selling price of Book = (Cost price + Cost on transportation + Profit) = 250+20+5=275
Cost price of Pencil =Selling price + Loss
= 100+10=Rs.110
Required % = 275*100/110%
=250%

50. Selling price of Eraser = Cost price of Eraser + Cost on transportation + Profit
=400+40+440 × 6/100= Rs.466.4
Selling price of Book =Rs.275
Difference =466.4-275=Rs.191.4