



IBPS Guide

Complete Guide for Bank & SSC Exams

Complete Quantitative Aptitude Questions for SBI, IBPS RRB/PO/Clerk

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1. PERCENTAGE

Type I :Based on basic type

1). In final exam of class IX there are 130 students 20 % students failed. How many students passed to class X?

- a) 105
- b) 112
- c) 104
- d) 117
- e) 104.5

2) Sanjay gets 72 % marks in examinations. If these are 864 marks, find the maximum marks.

- a) 1050
- b) 860
- c) 1225
- d) 1200
- e) 1500

3). Nandhini scored 996 marks out of 1200 marks and her elder brother kaviyaran scored 1020 marks out of 1500 marks. Find the scored percentage which is better?

- a) 68%
- b) 83%
- c) 65%
- d) 85%
- e) 97%

4). In a college of 1335 students, 60 % are boys. Find the number of girls and number of boys in the college?

- a) 924,221
- b) 691,404
- c) 802,333
- d) 441,564
- e) 534,801

5). A foot ball team lost 75 % of the matches it played. If it won 45 matches, find the number of matches it played.

- a) 120



- b) 145
- c) 105
- d) 140
- e) 180

6). In a plot of 18000 sq. m., only 13500 sq. m. is allowed for construction. What percent of the plot is to be left without construction?

- a) 25
- b) 60
- c) 45
- d) 40
- e) 98

7). Nesha scored 120 out of 150 in English, 120 out of 180 in mathematics and 160 out of 200 in Science. Find Nesha's score as percentage:

(i) in Mathematics

(ii) in all the three subjects (on the whole).

- a) 66 $\frac{2}{3}$, 78 $\frac{22}{51}$
- b) 71 $\frac{23}{5}$, 45 $\frac{7}{31}$
- c) 54 $\frac{13}{33}$, 82 $\frac{3}{4}$
- d) 60 $\frac{3}{4}$, 76 $\frac{32}{41}$

8). An alloy contains 36 % of bronze. What quantity of alloy is required to get 340 g of bronze?

- a) 1500
- b) 944.4
- c) 950
- d) 1000
- e) 980.5

9). In a basket of eggs, 20% of them are rotten and 68 are in good condition. Find the total number of eggs in the basket.

- a) 85
- b) 60
- c) 75
- d) 40
- e) 98



10). Gagan obtained a total of 1313 marks out of 1400 in an examination. What is his approximate percentage in the examination?

- a) 25
- b) 60
- c) 45
- d) None
- e) 98

1). Answer: C)

Percentage of students passed to class X = (100 % - 20 %) of 130

$$\begin{aligned} &= 80 \% \text{ of } 130 \\ &=> 80 \% \text{ of } 130 \\ &=> 80/100 \times 130 \\ &=> 10400/100 \\ &=> 104 \end{aligned}$$

Therefore, 104 students passed to class X

2) Answer: D

Let the maximum marks be s

Then 72 % of s = 864

$$\begin{aligned} 72/100 \times s &= 864 \\ s &= (864 \times 100)/72 \\ s &= 86400/72 \\ s &= 1200 \end{aligned}$$

Therefore, maximum marks in the examinations are 1200.

3) Answer: A

Percentage of marks scored by nandhini = $(994/1200 \times 100)$

$$\begin{aligned} &= (99400/1200) \\ &= (994/12) \\ &= 83 \% \end{aligned}$$

Percentage of marks scored by kaviyaran = $(1020/1500 \times 100)$

$$\begin{aligned} &= (102000/1500) \\ &= (1020/15) \\ &= 68 \% \end{aligned}$$

Hence, the percentage marks scored by nandhini is better.



4) Answer: E

$$\begin{aligned}\text{Number of boys in the college} &= 60 \% \text{ of } 1335 \\ &= 60/100 \times 1335 \\ &= 80100/100 \\ &= 801\end{aligned}$$

$$\begin{aligned}\text{Number of girls in the college} &= \text{Total number of students in the college} - \text{Number of boys} \\ &= 1335 - 801 \\ &= 534\end{aligned}$$

5). Answer: E

Percentage of matches lost = 75 %

Therefore Percentage of matches won $(100 - 75) \% = 25 \%$

Let the number of matches played be x .

Then 25 % of $x = 45$

$$25/100 \times x = 45$$

$$x = (45 \times 100)/25$$

$$x = (4500)/25$$

$$x = 180$$

Therefore, the total number of matches played is 180.

6). Answer: A

Percentage of plot allowed for construction = $(13500/18000 \times 100) = 75 \%$.

Thus, the percentage of plot to be left without construction = $100 \% - 75 \% = 25 \%$.

7). Answer: A

(i) Percentage scored in Mathematics = $120/180 \times 100$

$$= 12000/180$$

$$= 1200/18$$

$$= 66\frac{2}{3} \%$$

(ii) Total maximum of all the three subjects = $150 + 160 + 200 = 510$ and

Total score in the three subjects = $120 + 120 + 160 = 400$

Therefore, percentage on the whole = $(400/510 \times 100)$

$$= (40000/510)$$

$$= 4000/51$$

$$= 78\frac{22}{51} \%$$

8). Answer: B

Let the quantity of alloy required = x g



Then 36 % of x = 340 g

$$\Rightarrow 36/100 \times x = 340 \text{ g}$$

$$x = (340 \times 100)/36 \text{ g}$$

$$x = 34000/36 \text{ g}$$

$$x = 944.4 \text{ g}$$

9). Answer: A

Let the total number of eggs in the basket be x

20 % of the eggs are rotten, and eggs in good condition are 68

Therefore, according to the question,

$$80\% \text{ of } x = 68$$

$$80/100 \times x = 68$$

$$x = (68 \times 100)/80$$

$$x = 6800 / 80$$

$$x = 85$$

Therefore, total number of eggs in the basket is 85.

10). Answer: D

Required percentage = $1313 / 1400 \times 100$

$$= 131300/1400$$

$$= 93.7$$

Type II: Something more or less by x% or mixture and allegation

11) Brother's weight is 25 % more than that of sister. What percent is brother's weight less than sister's weight?

- a) 25%
- b) 60%
- c) 45%
- d) 20%
- e) 98%

12) What percent of a day in 12 hours?

- a) 25
- b) 60
- c) 45
- d) 20
- e) 50



13) One sixth of half of three fourth of a number is 25. What will be 30% of that number?

- a) 800
- b) 120
- c) 340
- d) 300

14). A mixture of 60 kg of rice and dhal contains 60% of dhal. The new mixture is formed by adding 15 kg of dhal. What is the percentage of rice in the new mixture?

- a) 25
- b) 64
- c) 45
- d) 32
- e) 98

15) A mixture of 90 kg of rava and sugar contains 90% of sugar. The new mixture is formed by adding 30 kg of sugar. What is the percentage of sugar in the new mixture?

- a) 45 $\frac{1}{2}$
- b) 60 $\frac{1}{5}$
- c) 45 $\frac{1}{2}$
- d) 92 $\frac{1}{2}$
- e) 98 $\frac{1}{2}$

Type III: Based on income, expenditure

16) mouli had \$ 3600 left after spending 40 % of the money he took for shopping. How much money did he take along with him?

- a) 2500
- b) 6000
- c) 4500
- d) 3000
- e) 9800

17) Two employees X and Y are paid a total of Rs. 4950 per week by their employer. If X is paid 150 percent of the sum paid to Y, how much is Y paid per week?

- a) 1250
- b) 3760



- c) 2405
- d) 1540
- e) 1980

18) Mithun went to a shop and bought things worth Rs. 75, out of which 90 Paise went on sales tax on taxable purchases. If the tax rate was 18%, then what was the cost of the tax free items?

- a) 12.5
- b) 69.80
- c) 19.7
- d) 34.5
- e) 69.1

19)

From the salary of shreya, 15% is deducted as house rent, 15% she spends on children's education and 20% on watching movies. If her savings are Rs.8450/- then her total salary is:

- a) 13500
- b) 2360
- c) 16900
- d) 11520
- e) 23198

20) Forty percent of Mouli's annual salary is equal to 160% of Surya's annual salary. Surya's monthly salary is 80% of Gowthaman's monthly salary. If Gowthaman's annual salary is ` 12 lacs, what is Mouli's monthly salary ? (At some places annual income and in some place monthly income is given.)

- a) 180000
- b) 1200000
- c) 320000
- d) 250000

11) Answer: D

Let sister's weight be 100 kg.

Then brother's weight = $(100 + 25)$ kg = 125 kg

If brother's weight is 125 kg, then sister's weight is 100 kg.

If brother's weight is 1 kg, then sister's weight is $100/125$ kg

If brother's weight is 100 kg, then sister's weight = $(100/125 \times 100)$ kg

Therefore, sister's weight is 20 % less than that of brother.

12) Answer: E



Total hours in a day = 24

Required percent = $12/24 \times 100$

= 50%

13) Answer: B

$(1/6) \times (1/2) \times (3/4) \times x = 25$

$x/16 = 25$

$x = 25 \times 16$

$x = 400$

30 % of 400 = $30/100 \times 400$

= $12000/100$

= 120

14). Answer: D

60 kg = 36 kg dhal 24 kg rice

----- 15 kg dhal

Total = 15 kg dhal 24 kg rice (new)

$24/75 \times 100 = 32\%$

15) Answer: D

90 kg = 81 kg sugar 9 kg rava

Adding = 30 kg sugar

Total = 111kg sugar 9kg rava (new)

$111/120 \times 100 = 92.5 = 92 \frac{1}{2}$

16) Answer: B

Let the money he took for shopping be x.

Money he spent = 40 % of x

= $40/100 \times x$

= $4/10 x$

Money left with him = $x - 4/10 x = (10x - 4x)/10 = 6x/10$

But money left with him = 3600

Therefore $6x/10 = 3600$

$x = 3600 \times 10/6$

$x = 36000/6$

$x = 6000$

Therefore, the money he took for shopping is 6000.



17) Answer: E

Let the amount paid to X per week = x

and the amount paid to Y per week = y

$$\text{Then } x + y = 4950$$

$$\text{But } x = 150\% \text{ of } y$$

$$= 150y/100$$

$$= 15y/10$$

$$\therefore 15y/10 + y = 4950$$

$$\Rightarrow y[15/10 + 1] = 4950$$

$$\Rightarrow 25y/10 = 4950$$

$$\Rightarrow 25y = 49500$$

$$\Rightarrow y = 49500/25$$

$$y = \text{Rs.}1980$$

18) Answer: E

Total cost of the items he purchased = Rs.75

Given that out of this Rs.75, 90 Paise is given as tax

$$\Rightarrow \text{Total tax incurred} = 90 \text{ Paise}$$

$$= \text{Rs.}90/100$$

Let the cost of the tax free items = x

Given that tax rate = 18%

$$\therefore (75 - 90/100 - x)18/100 = 90/100$$

$$\Rightarrow 18(75 - 0.9 - x) = 90$$

$$\Rightarrow (75 - 0.9 - x) = 5$$

$$x = 75 - 0.9 - 5$$

$$X = 69.1$$

19) Answer: C

She spends = 50% remaining 50% = 8450

$$\text{Total salary} = 8450 \times 100 / 50$$

$$= 845000 / 50$$

$$= 16900$$

20) Answer: C

Gowthaman's monthly salary = 12,00,000/12

$$= 1,00,000$$

Surya's monthly salary = 1,00,000 x 80/100



$$= 80,000$$

Mouli's monthly salary = $80,000 \times 1600/40$

$$= 3,20,000$$

Type IV: Based on Consumption and Expenditure

21) The Shopkeeper increased the price of a product by 75% so that customer finds it difficult to purchase the required amount. But somehow the customer managed to purchase only 140% of the required amount. What is the net difference in the expenditure on that product?

- a) 12.5
- b) 26.0
- c) 13.5
- d) 17.5
- e) 19.8

22) From the salary of pooja , 40% is deducted as house rent, 20% of rest she spends on children's education and 40% of balance she spends on watching movies. If her savings are Rs.5760/- then hers total salary is:

- a) 20000
- b) 30060
- c) 45000
- d) 47000
- e) 98000

23) Chenna dhal is now being sold at Rs. 70 a kg. Last month, is rate was Rs. 80 per kg. By how much percent should a family reduce its consumption so as to keep the expenditure fixed?

- a)12.5
- b)21.8
- c)23
- d)18

24) Vasavi spends 50% of her monthly income on grocery, clothes and education in the ratio of 8 : 4 : 10 respectively. If the amount spent on clothes is 2770/–, what is Vasavi's monthly income?

- a) 15235
- b) 65000
- c) 55400
- d) 30470
- e) 98700



25) Supriya invests 35% of her monthly salary in insurance policies. She spends 45% of her monthly salary in shopping and on household expenses. She saves the remaining amount of ₹25,750. What is Supriya's monthly income?

- a) 128750
- b) 160050
- c) 205200
- d) 263400
- e) 391800

Type V: Based on Examination and marks obtained

26) Two students appeared at an examination. One of them secured 18 marks more than the other and his marks were 72% of the sum of their marks. What are the marks obtained by them?

- a) 12.5, 23.3
- b) 26.7, 16.0
- c) 13.3, 14.2
- d) 11.45, 29.45
- e) 29.8, 15.4

27) A candidate scoring 50% in an examination fails by 60 marks, while another candidate scores 75% mark, gets 40 marks more than the minimum pass marks. Find the minimum pass mark.

- a) 125
- b) 220
- c) 140
- d) 260
- e) 298

28) Gowthaman needs 25% to pass. If he scored 424 marks and falls short by 26 marks, what was the maximum marks he could have got?

- a) 2725
- b) 2650
- c) 1800
- d) 1750
- e) 989

29) In an exam Aashika secured 1328 marks. If she secured 32% marks, find the maximum marks.

- a) 2250
- b) 3600



- c) 4400
- d) 4150
- e) 1298

30) In an examination, 900 students appeared. Out of these students; 56 % got first division, 27 % got second division and the remaining just passed. Assuming that no student failed; find the number of students who just passed.

- a) 225
- b) 153
- c) 245
- d) 148
- e) 298

21) Answer: D

$$\text{Quantity} \times \text{Rate} = \text{Price}$$

$$1 \times 1 = 1$$

$$1.4 \times 1.75 = 2.45$$

$$\begin{aligned}\text{Decrease in price} &= (0.175/1) \times 100 \\ &= 17.5\%\end{aligned}$$

22) Answer: A

Formula:

$$\text{First value} = \text{last value} \times 100 / (100 - p_1) \times 100 / (100 - p_2) \times 100 / (100 - p_3) \quad (p = \text{percentage})$$

$$\text{First value} = 5760 \times 100 / (100 - 40) \times 100 / (100 - 20) \times 100 / (100 - 40)$$

$$\begin{aligned}&= 5760 \times 100/60 \times 100/80 \times 100/60 \\ &= 5760 \times 5/3 \times 5/4 \times 5/3 \\ &= 5760 \times 125/36 \\ &= 720000/36 \\ &= 20000\end{aligned}$$

23) Answer: A

Let a family's monthly consumption of chenna dhal be x kg.

To keep the expenditure fixed,

their consumption for this month should be $70x/80 = 7x/8$.

Reduction in consumption $= x/8 = 12.5\%$ of x



24) Answer: D

Ratio of Expenses = 8: 4: 10

therefore amount spend on clothes, i.e. $4x = 2770$

$$x = 692.5$$

$$\text{Total exp} = (8 + 4 + 10)x$$

$$= 22x.$$

$$= 22 \times 692.5$$

$$= 15235$$

Monthly income be x .

$$50\% \text{ of } x = 15235$$

$$x = 15235 \times 100 / 50$$

$$X = 30470$$

25) Answer: A

$$\text{Percentage savings of Supriya} = 100 - (35 + 45)$$

$$= 20\%$$

Let her monthly income be x

$$x \times 20 / 100 = 25750$$

$$x = 25750 \times 100 / 20$$

$$x = 128750$$

26) Answer: D

Let the marks secured by them be x and $(x + 18)$

Then sum of their marks = $x + (x + 18) = 2x + 18$

Given that $(x + 18)$ was 72% of the sum of their marks

$$\Rightarrow (x+18) = 72/100(2x+18)$$

$$\Rightarrow (x+18) = 18/25(2x+18)$$

$$\Rightarrow 25x + 450 = 36x + 324$$

$$\Rightarrow 11x = 126 \rightarrow x = 11.45$$

$$\text{Then } (x + 18) = 11.45 + 18 = 29.45$$

Hence their marks are 11.45 and 29.45

27) Answer: B

Let x be the maximum marks,

$$\text{Then } (50\% \text{ of } x) + 60 = (75\% \text{ of } x) - 40$$

$$x/2 + 60 = 3x/4 - 20$$

$$60 + 20 = 3x/4 - x/2$$



$$X=320$$

Hence maximum marks = 320

$$\text{Minimum pass marks} = 320/2 + 60 = 220$$

28) Answer: C

If Gowthaman had scored 26 marks more, he could have scored 25%

$$\text{Therefore, Mike required } 424 + 26 = 450 \text{ marks}$$

Let the maximum marks be x .

$$\text{Then } 25 \% \text{ of } x = 450$$

$$(25/100) \times x = 450$$

$$x = (450 \times 100)/25$$

$$x = 45000/25$$

$$x = 1800$$

29) Answer: D

Let the maximum marks be x .

$$\text{Aashika's marks} = 32\% \text{ of } x$$

Aashika secured 1328 marks

$$\text{Therefore, } 32\% \text{ of } x = 1328$$

$$\Rightarrow 32/100 \times x = 1328$$

$$x = (1328 \times 100)/32$$

$$x = 132800/32$$

$$x = 4150$$

Therefore, Aashika got 1328 marks out of 4150 marks.

30) Answer: B

The number of students with first division = 56 % of 900

$$= 56/100 \times 900$$

$$= 50400/100$$

$$= 504$$

And, the number of students with second division = 27 % of 900

$$= 27/100 \times 900$$

$$= 24300/100$$

$$= 243$$

Therefore, the number of students who just passed = $900 - (504 + 243)$

$$= 900 - 747$$

$$= 153$$



31) In a competitive examination in Pondicherry, 18% candidates got selected from the total appeared candidates. Tamilnadu and Pondicherry had an equal number of candidates appeared and in Tamilnadu 21% candidates got selected with 240 more than the candidates got selected in Pondicherry. What was the number of candidates appeared from each State?

- a) 25000
- b) 84000
- c) 24000
- d) 700000
- e) 9800

32) On a test consisting of 500 questions, Dhivya answered 80% of the first 250 questions correctly. What percent of the other 250 questions does she need to answer correctly for her grade on the entire exam to be 60% ?

- a) 20
- b) 60
- c) 45
- d) 80
- e) 40

33) In a test, minimum passing percentage for girls and boys is 60% and 25% respectively. A boy scored 560 marks and failed by 160 marks. How many more marks did a girl require to pass in the test if she scored 216 marks ?

- a) 2123
- b) 1512
- c) 2251
- d) 1325
- e) 3989

34) In an examination it is required to get 672 aggregate marks to pass. A student gets 70% marks and is declared failed by 126 marks. What are the maximum aggregate marks a student can get?

- a) 780
- b) 840
- c) 741
- d) 805
- e) 983

Type VI: Based on tricks net increase or Decrease



35) The price of dhal is increased from \$ 30 to \$ 37.5 per kg. Find the percentage increase in price.

- a) 25
- b) 60
- c) 45
- d) None
- e) 98

36) The population in a small town increases from 50000 to 63750 in one year. Find the percentage increase in population.

- a) 25
- b) 62
- c) 6.25
- d) 27.5
- e) 59.8

37) Find the increase value if 450 is increased by 90 %.

- a) 525
- b) 715
- c) 645
- d) 795
- e) 855

38) By what number must the given number be multiplied to increase the number by 25 %.

- a) 25
- b) 60
- c) 50
- d) None
- e) 98

39) The cost of a stencil is decreased by 30%. If the original cost is \$140, find the decrease cost.

- a) 25
- b) 68
- c) 45
- d) None
- e) 98



40) A wooden manufacturing company declares that a wooden is now available for \$11200 as against \$25200 one year before. Find the percentage reduction in the price of wooden offered by the company.

- a) 25 1/3
- b) 69 1/3
- c) 66 1/3
- d) 33 1/3
- e) 55 5/9

31) Answer: C

Pondichery and Tamilnadu had an equal number of candidates appeared

In Pondicherry, 18% candidates got selected from the total appeared candidates

In tamilnadu, 21% candidates got selected from the total appeared candidates

But in Tamilnadu, 240 more candidates got selected than pondicherry

From these, it is clear that 1% of the total appeared candidates in pondicherry = 240

=>total appeared candidates in tamilnadu = 240 x 100 = 24000

=> total appeared candidates in pondicherry = total appeared candidates in tamilnadu = 24000

32) Answer: E

$$60\% \text{ of } 500 = 300$$

$$80\% \text{ of } 250 = 200$$

$$\text{No. of correct answers in remaining 250 questions} = 300 - 200$$

$$= 100$$

$$\text{Percentage} = 100 \times 100 / 250$$

$$= 40\%$$

33) Answer: B

$$\text{Total marks in the test} = (560 + 160) \times 100 / 25$$

$$= 720 \times 100 / 25$$

$$= 72000 / 25$$

$$= 2880$$

$$\text{Passing marks for girls} = 2880 \times 60 / 100$$

$$= 1728$$

$$\text{Required marks} = 1728 - 216$$

$$= 1512$$

34) Answer: A

$$\text{Difference} = 672 - 126 = 546$$

According to the question, 70% of total aggregate = 546



$$\begin{aligned}\text{Total aggregate marks} &= 546 \times 100 / 70 \\ &= 54600 / 70 \\ &= 780\end{aligned}$$

35) Answer: A

Price of dhal before = \$30

Price of dhal now = \$ 37.5

$$\begin{aligned}\text{Increase in dhal} &= \text{current price} - \text{original price} \\ &= \$37.5 - \$ 30 \\ &= \$ 7.5\end{aligned}$$

$$\begin{aligned}\text{Therefore, percentage increase in price} &= \text{Increase in price} / \text{Original price} \times 100 \% \\ &= 7.5 / 30 \times 100 \\ &= 750 / 100 \\ &= 25 \%\end{aligned}$$

Thus, increase in price = 25 %

36) Answer: D

Population in a small town last year = 50000

Population in a small town after one year = 63750

Increase in population = 63750 - 50000 = 13750

Therefore,

$$\begin{aligned}\text{percentage increase in population} &= \text{Increase in population} / \text{Last year population} \times 100 \% \\ &= 13750 / 50000 \times 100 \\ &= 1375000 / 50000 \\ &= 27.5\%\end{aligned}$$

Thus, the increase in population is 27.5%

37) Answer: E

$$\begin{aligned}\text{Increase} &= 90 \% \text{ of } 450 \\ &= 90 / 100 \times 450 \\ &= 40500 / 100 \\ &= 405\end{aligned}$$

Therefore, increase value = 450 + 405 = 855

38) Answer: A

Let the number be m

$$\begin{aligned}\text{Increase in its value} &= 25 \% \text{ of } m \\ &= 25 / 100 \times m\end{aligned}$$



$$= m/4$$

Therefore, increase value = $m + m/4$

$$= (4m + m)/4$$

$$= 5m/4$$

Therefore, the given number must be multiplied by $5/4$ to increase the number by 25 %.

39) Answer: E

Original cost = \$140

Decrease in it = 30% of \$140

$$= 30/100 \times 140$$

$$= 4200/100$$

$$= \$42$$

Therefore, decrease cost = $\$140 - \$42 = \$98$

40) Answer: E

Price of the wooden a year before = \$25200

Price of the wooden after a year = \$11200

Decrease in price = $\$(25200 - 11200) = \14000

Therefore, decrease % = $14000/25200 \times 100 \%$

$$= 55 \frac{5}{9} \%$$

41) A number 168 was misread as 24. Find the reading error in per cent.

a) 25.7

b) 42.8

c) 42.6

d) 85.7

e) 98.6

42) Find the number which when decreased by 24 % becomes 594.

a) 625.8

b) 360.9

c) 465.7

d) 781.5

e) 398.5

43) A number is reduced by 10%. Its present value is 1080. What was its original value?

a) 3250



- b) 2600
- c) 1200
- d) 2300
- e) 1980

44) A number is increased by 70 % and then decreased by 70 %. Find the net increase or decrease per cent.

- a) 25
- b) 56
- c) 45
- c) 49
- e) 98

Type VII: Based Voters in an Election

45) In an election between two candidates, one got 45% of the total valid votes, 40% of the votes were invalid. If the total number of votes was 15000, the number of valid votes that the other candidate got, was

- a) 2500
- b) 3600
- c) 4500
- d) 4950
- e) 9800

46) In an election, candidate A got 40% of the total valid votes. If 55% of the total votes were declared invalid and the total numbers of votes is 280000, find the number of valid vote polled in favour of candidate.

- a) 32500
- b) 56000
- c) 35700
- d) 50400
- e) 29800

47) In an election three candidates received 2272 , 15272, and 23256 votes respectively. What percentage of the total votes did the winning candidate got?

- a) 25
- b) 41
- c) 75
- d) 57
- e) 93



48) In an election between two candidates, the winner secured 85% of the total votes cast and wins by a majority of 6300 votes. How many votes did the losing candidate get?

- a) 1350
- b) 2479
- c) 3467
- d) 5789

49) In a college election between two candidates, one candidate got 25% of the total valid votes. 30% of the votes were invalid. If the total votes were 7600, what is the number of valid votes the other candidate got ?

- a) 2576
- b) 2314
- c) 5184
- d) 3990
- e) 9814

41) Answer: D

$$\text{Error} = 168 - 24 = 144$$

$$\text{Therefore, \% error} = 144/168$$

$$[\text{Since, we know decrease\%} = \text{decrease in value/original value} \times 100 \%]$$

$$= 144/168 \times 100$$

$$= 85.7 \%$$

42) Answer: D

Let the number be m.

$$\text{Decrease} = 24 \% \text{ of } m$$

$$= 24/100 \times m = 6m/25$$

$$\text{Therefore, decrease number} = m - 6m/25 = (25m - 6m)/25 = 19m/25$$

$$\text{According to the question } 19m/25 = 594$$

$$19m = 594 \times 25$$

$$19m = 14850$$

$$m = 14850/19$$

$$m = 781.5$$

43) Answer: C

Original value is percentage = 100 %.

Reduce amount in percentage = 10 %

Therefore, Percent value in percentage = 100 % - 10 % = 90 %.

According to the problem,

90 % of original value = 1080.



Therefore, 100 % of original value = $1080/100 \times 90 = 1200$.

Thus, the original value was 1200.

44) Answer: D

Let the number be 100.

$$\begin{aligned}\text{Increase in the number} &= 70 \% = 40 \% \text{ of } 100 \\ &= (40/100 \times 100) \\ &= 70\end{aligned}$$

Therefore, increased number = $100 + 70 = 170$

This number is decreased by 70 %

$$\begin{aligned}\text{Therefore, decrease in number} &= 70 \% \text{ of } 170 \\ &= (70/100 \times 170) \\ &= 11900/100 \\ &= 119\end{aligned}$$

Therefore, new number = $170 - 119 = 51$

Thus, net decreases = $100 - 51 = 49$

$$\begin{aligned}\text{Hence, net percentage decrease} &= (49/100 \times 100) \\ &= (4900/100) \\ &= 49 \%\end{aligned}$$

45) Answer: D

Total number of votes = 15000

Given that 40% of Percentage votes were invalid

=> Valid votes = 60%

Total valid votes = $15000 \times 60/100$

1st candidate got 45% of the total valid votes.

Hence the 2nd candidate should have got 55% of the total valid votes

$$\begin{aligned}\text{=> Valid votes that 2nd candidate got} &= \text{total valid votes} \times 55/100 \\ &= 15000 \times 60/100 \times 55/100 \\ &= 4950\end{aligned}$$

46) Answer: D

Total number of invalid votes = 55 % of 280000

$$\begin{aligned}&= 55/100 \times 280000 \\ &= 15400000/100 \\ &= 154000\end{aligned}$$

Total number of valid votes $280000 - 154000 = 126000$

Percentage of votes polled in favour of candidate A = 40 %



Therefore, the number of valid votes polled in favour of candidate A = 40 % of 126000

$$= 40/100 \times 126000$$

$$= 5040000/100$$

$$= 50400$$

47) Answer: D

Total number of votes polled = (2272+15272+23256)

$$= 40800$$

Required percentage = $23256/40800 \times 100$

$$= 2325600/40800$$

$$= 57$$

48) Answer: A

Total votes cast = 100%

Winner gets = 85%

Loser gets = $100 - 85 = 15\%$

Majority = Votes secured by winner – Votes secured by loser

$$= 85\% - 15\%$$

$$= 70\% = 6300$$

Votes by the losing candidate = $x = 15\%$

$$x = (15 \times 6300)/70$$

$$x = (94500/70)$$

$$x = 1350$$

49) Answer: D

Total valid votes = 70% of 7600 = 5320

Number of valid votes to other candidate = 75% of 5320

$$= 75/100 \times 5320$$

$$= 399000/100$$

$$= 3990$$

Type VIII: Based on Depreciation and population increase

50) The value of a machine depreciates at the rate of 20% every year. It was purchased 6 years ago. If its present value is Rs. 17,496, its purchase price was :

a) 25023.4

b) 67040.0

c) 34171.8

d) 27337.5



e) 23001.9

51) The population of a town was 200000 three years ago. If increased by 4%, 6% and 10% respectively in the last three years, then the present population of town is

- a) 1,10,313
- b) 1,10,314
- c) 2,42,528
- d) 2,93,313
- e) 2,10,313

52) The population of a town is 378000. It decreases by 16% in the 1st year and increases by 10% in the 2nd year. What is the population in the town at the end of 2 years?

- a) 182574
- b) 482576
- c) 282674
- d) 283574
- e) 349272

53) If the production of a factory grows at a 16% p.a., what will be its production for the year 2016 if its production in 2014 was 140 lakh tonnes?

- a) 222.734
- b) 149.597
- c) 188.384
- d) 28 3.812
- e) 180.534

54) The difference between 45% of a number and 37% of the same number is 896. What is 25% of that number ?

- a) 1200
- b) 2800
- c) 2569
- d) 3467

Type IX: Based on reducing and exceeding prices

55) A shopkeeper bought 1800 blackberry and 1200 blueberry. He found 45% of blackberry and 24% of blueberry were rotten. Find the percentage of fruits in good condition.

- a) 63.4



- b) 32.9
- c) 48.5
- d) 56.3

56) The population of a town is 15000. It increases annually at the rate of 20% p.a. What will be its population after 3 years?

- a) 65439
- b) 25920
- c) 37193
- d) 41093

57) The population of a town is 16200. It decreases annually at the rate of 40% p.a. What was its population 3 years ago?

- a) 75000
- b) 65000
- c) 84900
- d) 93600

58) If the numerator of a fraction is increased by 400% and the denominator of the fraction is increased by 300%, the resultant fraction is $\frac{18}{35}$. What is the original fraction?

- a) $\frac{72}{175}$
- b) $\frac{87}{123}$
- c) $\frac{56}{232}$
- d) $\frac{45}{241}$

50) Answer: C

$$\begin{aligned}\text{Purchase price} &= 17,496 / (1 - 20/100)^3 \\ &= 17,496 \times 10/8 \times 10/8 \times 10/8 \\ &= 17496 \times 1.25 \times 1.25 \times 1.25 \\ &= 17496 \times 1.953 \\ &= 34171.8\end{aligned}$$

51) Answer: C

$$\begin{aligned}\text{The present population} &= (1+4/100) \times (1+6/100) \times (1+10/100) \times 200000 \\ &= (104/100) \times (106/100) \times (110/100) \times 200000 \\ &= 1.04 \times 1.06 \times 1.1 \times 200000 \\ &= 2,42,528\end{aligned}$$



52) Answer: E

After 2 years required population is

$$\begin{aligned} &= 378000 (1-16/100) (1+10/100) \\ &= 378000 (84/100) (110/100) \\ &= 378000 (0.84) (1.1) \\ &= 3,49,272 \end{aligned}$$

53) Answer: C

Required Production = $140(1 + 16/100)^2$ lakh tones

$$\begin{aligned} &= 140(1 + 4/25)^2 \\ &= 140((25 + 4) / 25)^2 \\ &= 140(29/25)^2 \\ &= 140(1.16)^2 \\ &= 140 \times 1.3456 \\ &= 188.384 \text{ lakh tonnes} \end{aligned}$$

54) Answer: B

$(45 - 37)\%$ of the number = 896

8 % of the number = 896

Number = $896 \times 100 / 8$

$$\begin{aligned} &= 89600/8 \\ &= 11200 \end{aligned}$$

25% of 11200 = $11200 \times 25/100$

$$\begin{aligned} &= 280000 / 100 \\ &= 2800 \end{aligned}$$

55) Answer: A

Total number of fruits shopkeeper bought = $1800 + 1200 = 3000$

Number of rotten blackberry = 45% of 1800

$$\begin{aligned} &= 45/100 \times 1800 \\ &= 81000/100 \\ &= 810 \end{aligned}$$

Number of rotten blueberry = 24% of 1200

$$\begin{aligned} &= 2400/100 \times 1200 \\ &= 28800/100 \\ &= 288 \end{aligned}$$

Therefore, total number of rotten fruits = $810 + 288$



$$= 1098$$

Therefore Number of fruits in good condition = $3000 - 1098$

$$= 1902$$

Therefore Percentage of fruits in good condition = $(1902/3000 \times 100)$

$$= (190200/3000)$$

$$= 63.4\%$$

56) Answer: B

Formula :

(After =100 denominator)

(Ago = 100 numerator)

$$\text{After 3 years} = 15000 \times (1 + 20/100)^3$$

$$= 15000 \times (120/100)^3$$

$$= 15000 \times (1.2)^3$$

$$= 15000 \times (1.728)$$

$$= 25920$$

57) Answer: A

(Ago = 100 numerator)

$$\text{Ago 3 years} = 16200 \times (100/60 \times 100/60 \times 100/60)$$

$$= 75000$$

58) Answer: A

Fraction is x/y

$$(x + 400/100 x) / (y + 300/100 y) = 18/35$$

$$(500/100) x(35) = (400/100)y (18)$$

$$(5x) \times 35 = 18 \times 4 y$$

$$175 x = 72 y$$

$$x/y = 72/175$$

2. MENSURATION

1. Mensuration Formulas for RECTANGLE

Area of Rectangle = Length \times Breadth.

Perimeter of a Rectangle = $2 \times (\text{Length} + \text{Breadth})$

Length of the Diagonal = $\sqrt{(\text{Length}^2 + \text{Breadth}^2)}$

2. Mensuration Formulas for SQUARE



Area of a Square = Length \times Length = (Length)²

Perimeter of a square = 4 \times Length

Length of the Diagonal = $\sqrt{2} \times$ Length

3. Mensuration Formulas for PARALLELOGRAM

Area of a Parallelogram = Length \times Height

Perimeter of a Parallelogram = 2 \times (Length + Breadth)

4. Mensuration Formulas for TRIANGLE

Area of a triangle = $(1/2)(\text{Base} \times \text{Height}) = (1/2)(BC \times AD)$

For a triangle with sides measuring a, b and c, respectively:

Perimeter = a + b + c

s = semi perimeter = perimeter/2 = (a+b+c)/2

Area of Triangle, A = $\sqrt{s(s-a)(s-b)(s-c)}$

(This is also known as "Heron's formula")

Area of isosceles triangle = $\frac{b}{4} \sqrt{4a^2 - b^2}$

(Where a = length of two equal side, b = length of base of isosceles triangle.)

Area of an equilateral triangle = $\frac{\sqrt{3}}{4} \times a^2$

(Where, a is the side of an equilateral triangle)

5. Mensuration Formulas for TRAPEZIUM

Area of a trapezium = $(1/2) \times (\text{sum of parallel sides}) \times (\text{distance between parallel sides})$

= $(1/2) \times (AB+DC) \times AE$

Perimeter of a Trapezium = Sum of All Sides

6. Mensuration Formulas for RHOMBUS

Area of a rhombus = $(1/2) \times \text{Product of diagonals}$

Perimeter of a rhombus = 4 \times l

(where l = length of a side)

7. Mensuration Formulas for CIRCLE and SEMICIRCLE

In the following formulae, r = radius and d = diameter of the circle

Area of a circle = $\pi r^2 = (\pi d^2)/4$

Circumference of a circle = $2\pi r = \pi d$

Circumference of a semicircle = πr

Area of semicircle = $(\pi r^2)/2$

Length of an arc = $(2\pi r \theta)/360$, where θ is the central angle in degrees.



Area of a sector = $(1/2) \times (\text{length of arc}) \times r = (\pi r^2 \theta)/360$

8. Mensuration Formulas for CUBOID

In the following formulae, l = length, b = breadth and h = height

Total surface area of cuboid = $2(lb + bh + lh)$

Length of diagonal of cuboid = $\sqrt{l^2 + b^2 + h^2}$

Volume of cuboid = $l \times b \times h$

9. Mensuration Formulas for CUBE

In the following formulae, a = side of a cube

Volume of cube = a^3

Total surface area of cube = $6a^2$

Length of Leading Diagonal of Cube = $a\sqrt{3}$

10. Mensuration Formulas for CONE

In the following formulae, r = radius of base, l = slant height of cone and h = height of the cone (perpendicular to base)

Slant height of a cone = $l = \sqrt{h^2 + r^2}$

Curved surface area of a cone = $C = \pi \times r \times l$

Total surface area of a cone = $\pi \times r \times (r + l)$

Volume of right circular cone = $\frac{1}{3} \pi r^2 h$

11. Mensuration Formulas for CYLINDER

In the following formulae, r = radius of base, h = height of cylinder

Curved surface area of a cylinder = $2\pi rh$

Total surface area of a cylinder = $2\pi r(r + h)$

Volume of a cylinder = $\pi r^2 h$

12. Mensuration Formulas for SPHERE

In the following formulae, r = radius of sphere, d = diameter of sphere

Surface area of a sphere = $4\pi r^2 = \pi d^2$

Volume of a sphere = $\frac{4}{3} \pi r^3 = \frac{1}{6} \pi d^3$

13. Mensuration Formulas for HEMISPHERE

In the following formulae, r = radius of sphere

Volume of a hemisphere = $\frac{2}{3} \pi r^3$

Curved surface area of a hemisphere = $2\pi r^2$



Total surface area of a hemisphere = $3\pi r^2$

14. Mensuration Formulas for HOLLOW CYLINDER

Hollow cylinder made by cutting a smaller cylinder of same height and orientation out of a bigger cylinder.

Volume of hollow cylinder = $\pi h(R^2 - r^2)$

(Where, R = radius of cylinder, r = radius of cavity, h = height of cylinder)

15. Mensuration Formulas for FRUSTUM OF A RIGHT CIRCULAR CONE

Frustum is created when a plane cuts a cone parallel to its base.

In the following formulae, R = radius of the base of the frustum, r = radius of the top of the frustum,

h = height of the frustum, l = slant height of the frustum

If a cone is cut by a plane parallel to the base of the cone, the lower part is called the frustum of the cone.

Slant height of the frustum = $l = \sqrt{h^2 + (R - r)^2}$

Curved surface area of frustum = $\pi(R + r)l$

Total surface area of frustum = $\pi(R + r)l + \pi(R^2 + r^2)$

Volume of the frustum = $(1/3)\pi h(R^2 + r^2 + Rr)$

Problems:

1) The radius and height of a right circular cylinder are 42 cm & 63 cm respectively. Find its volume.

- a) 237564 cm³
- b) 349272 cm³
- c) 379252 cm³
- d) 453213 cm³

2) The radius and height of a right circular cone are 28 cm & 72 cm respectively. Find its volume.

- a) 59136 cm³
- b) 62423 cm³
- c) 45825 cm³
- d) 52924 cm³

3) Find the circumference of a circle whose radius is 91 cm.

- a) 572 cm
- b) 459 cm
- c) 308 cm
- d) 407 cm



- 4) Find the curved surface area of a right circular cylinder whose radius & height are 56 cm & 200cm respectively.
- a) 33500 cm²
 - b) 64320 cm²
 - c) 75310 cm²
 - d) 70400 cm²
- 5) The perimeter of a square is equal to the perimeter of a rectangle of length 42 cm and breadth 60 cm. Find the circumference of a semicircle whose diameter is equal to the side of the square.
- a) 165.265 cm
 - b) 174.22 cm
 - c) 131.14 cm
 - d) 192.27 cm
- 6) There are two circles of different radius such that radius of the smaller circle is two-fifth that of the larger circle. A square whose area equals 5184 sq cm has its side as thrice the radius of the larger circle. What is the circumference of the smaller circle?
- a) 49.34 cm
 - b) 54.23 cm
 - c) 60.34 cm
 - d) 65.25 cm
- 7) A cap is in the form of a right circular cone which has base of radius as 35 cm and height equal to 84cm. Find the approximate area of the sheet required to make 4 such caps.
- a) 13567 cm²
 - b) 33278 cm²
 - c) 42232 cm²
 - d) 40040 cm²
- 8) The barrel of a Ink pen is cylindrical in shape which radius of base as 0.12 cm and is 7 cm long. One such barrel in the pen can be used to write 450 words. A barrel full of ink which has a capacity of 17 cu. cm can be used to write how many words approximately?
- a) 15423
 - b) 21342
 - c) 17645
 - d) 24147



9) A receptacle is in the form of a hemi-spherical bowl on which is mounted a hollow cylinder. The diameter of the sphere is 22 cm and the total height of receptacle is 35cm, find the capacity of the receptacle.

- a) 11915.61 cm³
- b) 14238.35 cm³
- c) 17854.46cm³
- d) 1950.67 cm³

10) A jeep has wheels of diameter 140m. How many revolutions can the wheel complete in 40minutes if the jeep is travelling at a speed of 220 m/s?

- a) 1750
- b) 1700
- c) 1200
- d) 1450

1) Answer: B

we know that volume of Cylinder = $\pi r^2 h$

$$\begin{aligned}\text{Volume of the given cylinder} &= \left(\frac{22}{7}\right) * 42 * 42 * 63 \text{ cm}^3 \\ &= 2444904 / 7 \text{ cm}^3 \\ &= 349272 \text{ cm}^3\end{aligned}$$

Therefore Volume of the given cylinder is 349272 cm³

2) Answer: A

$$\begin{aligned}\text{volume of a right circular cone} &= \left(\frac{1}{3}\right)\pi r^2 h \\ &= \left(\frac{1}{3}\right) * \frac{22}{7} * 28 * 28 * 72 \text{ cm}^3 \\ &= 22 * 4 * 28 * 24 \text{ cm}^3\end{aligned}$$

Hence, volume of the given cone = 59136 cm³

3) Answer: A

$$\begin{aligned}\text{Circumference of circle} &= 2\pi r \text{ cm} \\ &= 2 * \frac{22}{7} * 91 \text{ cm} \\ &= 4004 / 7 \text{ cm} \\ &= 572 \text{ cm}\end{aligned}$$

Hence the required answer is 572 cm

4) Answer: D

$$\begin{aligned}\text{Curved surface area of a right circular cylinder} &= 2\pi r h \\ &= 2 * \frac{22}{7} * 56 * 200\end{aligned}$$



$$= 2 * 22 * 8 * 200$$

$$= 70400 \text{ cm}^2$$

5) Answer: C

Perimeter of a Rectangle = $2 \times (\text{Length} + \text{Breadth})$

Perimeter of a square = $2 * (42 + 60) = 204 \text{ cm}$

So side of square = $204 / 4 = 51 \text{ cm}$

So diameter of semicircle = 51 cm

So circumference of a semicircle = $\pi r + 2r$

$$= 22/7 * 51/2 + 51 \text{ cm}$$

$$= 80.14 + 51 = 131.14 \text{ cm}$$

6) Answer: C

Side of square = $\sqrt{5184} = 72 \text{ cm}$

So radius of larger circle = $1/3 * 72 = 24 \text{ cm}$

So radius of smaller circle = $2/5 * 24 = 9.6 \text{ cm}$

So circumference of smaller circle = $2 * 22/7 * 9.6 = 60.34 \text{ cm}$

7) Answer: D

$$r = 35, h = 84$$

So slant height, $l = \sqrt{(35^2 + 84^2)} = 91 \text{ cm}$

So curved surface area of a cap = $\pi r l = 22/7 * 35 * 91 = 10,010 \text{ sq. cm}$

So curved surface area of 4 such cap = $10010 * 4$

$= 40,040 \text{ sq. cm}$ which is also equal to area of

sheet required to make 4 such caps.

8) Answer: D

Volume of the barrel of Ink pen = $\pi r^2 h = 22/7 * 0.12 * 0.12 * 7 = 0.3168 \text{ cu cm}$

A barrel which has capacity 0.3168 cu. cm can write 450 words

So which has capacity 17 cu cm can write = $450 / 0.3168 * 17 = 24147 \text{ words}$.

9) Answer: A

Diameter is 22, so radius is 11 cm

Total height = 35 cm , so height of cylinder = $35 - 11 = 24 \text{ cm}$ (because height of hemisphere is same as its radius)

Capacity of vessel = volume of cylinder + volume of hemisphere

So = $\pi r^2 h + 2/3 * \pi r^3$

$$= 22/7 * 11 * 11 * 24 + 2/3 * 22/7 * 11 * 11 * 11$$

$$= 9126.85 + 2788.76$$



$$= 11915.61 \text{ cu cm}$$

10) Answer: C

Radius of wheel = $140/2 = 70 \text{ cm}$

Distance travelled in one revolution = $2\pi r = 2 * 22/7 * 70 = 440 \text{ cm}$

Let the number of revolutions made by wheel is x

So total distance travelled = distance travelled in one revolution * number of revolutions

So total distance travelled = $440x \text{ cm}$

40 mins = $40 * 60 \text{ seconds}$

Speed of jeep = $440x / (40 * 60)$

So $220 = 440x / (40 * 60)$

Solve, $x = 1200$

11) A wall clock has its minute hand of length 21 cm. What area will it swept in covering 30 minutes?

a) 545 cm^2

b) 637 cm^2

c) 742 cm^2

d) 693 cm^2

12) The radius of two cylindrical shape are in the ratio 12 : 15 and their curved surface areas are in the ratio 9 : 15. What is the ratio of their volumes?

a) 17 : 23

b) 3 : 5

c) 7 : 9

d) 11 : 25

13) The sides of a rectangle cartons are in the ratio 2:3 and its area is 486 sq.m find the perimeter of rectangle

a) 75 m

b) 90 m

c) 124m

d) 82m

14) Find the cost of painting a room 39m long and 27m broad with a red carpet 225cm broad at the rate of Rs.60 per metre

a) Rs.35640

b) Rs.28080

c) Rs.45020



d) Rs.15055

15) The length of a rectangle pillow is twice its breadth. If its length is decreased by 25cm and breadth is increased by 25 cm, the area of the rectangle is increased by 375sq. cm. Find the length of the rectangle.

- a) 100 cm
- b) 80cm
- c) 75cm
- d) 55cm

16) If each side of a square is increased by 50%, find the percentage change in its area.

- a) 142
- b) 135
- c) 158
- d) 125

17) A girl walking at the rate of 24km per hour crosses a square field diagonally in 36 seconds the area of the field is

- a) 17110sq.m
- b) 25485sq.m
- c) 28800sq.m
- d) 22114sq.m

18) A garden is in the form of a rectangle having its sides in the ratio 4: 5. The area of the garden is $(\frac{1}{2})$ hectares. Find the length and breadth of the garden (in metre).

- a) 20 ,25
- b) $20\sqrt{10}$, 25
- c) 20, $25\sqrt{3}$
- d) $20\sqrt{10}$, $25\sqrt{10}$

19) Find the cost of carpeting a hall 26 m long and 18m broad with a carpet 150 cm width at the rate of Rs.15 per square metre.

- a) 4680
- b) 4250
- c) 4375
- d) 4560



20) A place 32 m 39cm long and 29m 23 cm broad is to be paved with square tiles. Find the least number of square tiles required to cover the floor.

- a) 2636
- b) 1517
- c) 2246
- d) 1651

11) Answer: D

Length will be the radius, so $r = 21\text{cm}$

Minute hand covers 360° in 60 minutes

So in 30 minutes it covers = 180 degree

Area of arc = angle it makes/360 * πr^2

So area covered = $180/360 * 22/7 * 21 * 21 = 693$

12) Answer: B

Radius 1 /radius 2= $12/15 = 4/5$

curved surface area 1/curved surface area 2= $2\pi r_1 h_1 / 2\pi r_2 h_2 = 9/15 = 3/5$

So $h_1/h_2 = 3/4$

Volume1/ Volume2 = $\pi r_1^2 h_1 / \pi r_2^2 h_2 = 12/20 = 3/5$

13) Answer: B

let $2x$ and $3x$ be sides of the rectangle

We know that area of rectangle = $l \times b$

$2x \times 3x = 486$

$6x^2 = 486$

$x^2 = 81$

$x = 9$

Therefore length = $2x = 2 \times 9 = 18\text{m}$

Breadth = $3x = 3 \times 9 = 27\text{m}$

Therefore perimeter = $2(l+b) = 2(18+27) = 90\text{m}$

14) Answer:B

Area of the redcarpet = area of the room

= $39 \times 27 = 1053\text{sq.m}$

Breadth of the redcarpet = $225\text{cm} = 2.25\text{m}$

Length of the red carpet = area/breadth ($A=L \times B \Rightarrow L=A/B$)



$$=1053/2.25=468\text{m}$$

Hence, cost of redcarpet = $468 \times 60 = \text{Rs.}28,080$

15) Answer: B

Let breadth = x. Then, length = 2x Then,

$$(2x - 25)(x + 25) - 2x \times x = 375$$

$$50x - 25x - 625 = 375$$

$$25x = 1000$$

$$x = 40$$

Length of the rectangle = $2x = 80 \text{ cm}$.

16) Answer: D

Let each side of the square be a Then, area = a^2 .

New side = $(150a/100) = (3a/2)$. New area = $(3a/2)^2 = (9a^2)/4$.

Increase in area = $((9a^2)/4) - a^2 = (5a^2)/4$

Increase% = $[(5a^2/4) \times (1/a^2) \times 100] \% = 125\%$

17) Answer: C

Distance covered in 36 seconds = $(24 \times 1000 / 3600) \times 36 = 240\text{m}$

Diagonal of square field = 240m

Side of square = a, then diagonal of that square = $\sqrt{2} a$

Hence area of the square = $a^2 = (240^2)/2 = 28,800\text{sq.m}$

18) Answer: D

Let length = 4x metres and breadth = 5x metres.

Now, area = $(1/2) \times 10000 \text{ sq.m} = 5000\text{sq.m}$

$$\text{So, } 4x \times 5x = 5000$$

$$\Rightarrow 20x^2 = 5000 \Rightarrow x^2 = 250$$

$$x = 5\sqrt{10}$$

Therefore Length = $4x = 20\sqrt{10} \text{ m}$ and Breadth = $5x = 25\sqrt{10}\text{m}$

19) Answer: A

Area of the carpet = Area of the hall = $(26 \times 18) \text{ m}^2 = 468\text{m}^2$.

Length of the carpet = $(\text{area}/\text{width}) = 468 \times (2/3) \text{ m} = 312 \text{ m}$.

Therefore Cost of carpeting = $(312 \times 15) = \text{Rs.}4680$

20) Answer: B



Area of the place = $(3239 * 2923) \text{ cm}^2$.

Size of largest square tile = H.C.F. of 3239cm and 2923cm = 79 cm.

Area of 1 tile = $(79*79) \text{ cm}^2$.

Number of tiles required = $(3239 * 2923) / (79*79) = 1517$

21) Length and width of a rectangle park is 14 m and 7 m respectively. Find the area of circle of maximum radius

- a) 29.62
- b) 16.52
- c) 38.5
- d) 27.85

22) Find the area of a rhombus field one side of which measures 80 cm and one diagonal is 96cm.

- a) 4370 cm^2
- b) 6565 cm^2
- c) 6320 cm^2
- d) 6144 cm^2

23) The difference between two parallel sides of a trapezium is 24cm, perpendicular distance between them is 60 cm. If the area of the trapezium is 1500 cm^2 find the lengths of the parallel side

- a) 27, 23
- b) 37, 13
- c) 27, 23
- d) 37, 15

24) Find the length of a string by which a goat must be tethered in order that it may be able to graze an area of 3426 sq. metres .

- a) 33.01
- b) 26.7
- c) 37.2
- d) 28.4

25) The area of a circular land is 35.42 hectares. Find the cost of fencing it at the rate of Rs. 5 per metre approximately

- a) 14457.5
- b) 12457.25
- c) 10550.57



d) 15050.75

26) The diameter of the driving wheel of a lorry is 95 cm. How many revolution, per minute must the wheel make in order to keep a speed of 75kmph approximately

- a) 215
- b) 207
- c) 232
- d) 209

27) A car wheel makes 650 revolutions in covering a distance of 35km. Find the radius of the wheel.

- a) 1.5m
- b) 3.61m
- c) 3.65m
- d) 1.45m

28) The inner circumference of a circular car race track, 75 m wide, is 2640 m. Find radius of the outer circle.

- a) 495m
- b) 456m
- c) 463m
- d) 482m

29) A hall is half as long again as its broad. The cost of carpeting the hall at Rs.10 /sq m is Rs.540 and the cost of papering the four walls at Rs.20 per m² is Rs.3440. if a door and 2 windows occupy 16 sq.m. find the dimensions of the room.

- a) 6.2 m
- b) 7.2m
- c) 8.2m
- d) 5.2m

30) The difference between two parallel sides of trapezium is 8cm. the perpendicular distance between them is 38cm. if the area of the trapezium is 950 cm². Find the length of the parallel sides.

- a) 27,35
- b) 31,40
- c) 29,21
- d) 41,49

21) Answer: C



$$\begin{aligned}\text{area of circle} &= \pi b^2/4 \\ &= (22/7 * 7*7)/4 \\ &= 38.5\text{sq.m}\end{aligned}$$

Hence the required answer is 38.5sq.m

22) Answer: D

Let other diagonal = 2x cm.

Since diagonals of a rhombus bisect each other at right angles, we have:

$$(80)^2 = (48)^2 + (x)^2$$

$$x^2 = 4096 \Rightarrow x=64$$

So, other diagonal = 128 cm.

$$\text{Area of rhombus} = (1/2) \times (\text{Product of diagonals}) = (1/2 \times 96 \times 128) \text{ cm}^2 = 6144 \text{ cm}^2$$

23) Answer: B

Let the length of two parallel sides of the trapezium be xcm and ycm.

$$\text{Then, } x-y = 24 \text{ ----- (1)}$$

$$\text{And, } (1/2) * (x+y) * 60 = 1500$$

$$\Rightarrow (x+y) = (1500 * 2)/60 \Rightarrow x+y = 50 \text{----- (2)}$$

Solving 1 and 2, we get: x=37, y=13

So, the two parallel sides are 37 cm and 13cm

24) Answer: A

Clearly, the goat will graze a circular field of area 3426sq. metres and radius equal to the length of the string

Let the length of the string be R metres.

$$\text{Then, } \pi(R)^2 = 3426$$

$$R^2 = (3426 * (7/22)) = 1090.09$$

$$\Rightarrow R = 33.01$$

Length of the rope = 33.01 m.

25) Answer: C

$$\text{Area} = (35.42 \times 10000) \text{ m}^2 = 354200 \text{ m}^2.$$

$$\pi R^2 = 354200 \Leftrightarrow (R)^2 = (354200 \times (7/22)) \Leftrightarrow R = 335.70 \text{ m.}$$

$$\text{Circumference} = 2\pi R = (2 \times (22/7) \times 335.70) \text{ m} = 2110.114 \text{ m.}$$

$$\text{Cost of fencing} = \text{Rs. } (2110.114 \times 5) = \text{Rs. } 10550.57$$

26) Answer: D



Distance to be covered in 1 min. = $(75 \times 1000)/(60)$ m = 1250m.

Circumference of the wheel = $(2 \times (22/7) \times 0.95)$ m = 5.97 m.

Number of revolutions per min. = $(1250/5.97)$ = 209

27) Answer: B

Distance covered in one revolution = $((35 \times 650)/1000)$ = 22.75m.

$$2\pi R = 22.75 \Rightarrow 2 \times (22/7) \times R = 22.75$$

$$\Rightarrow R = 22.75 \times (7/22) \times 1/2 = 3.61 \text{ m}$$

$$R = 3.61 \text{ m}$$

Hence the radius of the wheel is 3.61m

28) Answer: A

Let inner radius be r metres.

$$\text{Then, } 2\pi r = 2640$$

$$r = (2640 \times (7/44))$$

$$r = 420 \text{ m.}$$

$$\text{Radius of outer circle} = (420 + 75) \text{ m}$$

$$R = 495 \text{ m.}$$

Therefore the radius of outer circle is 495m

29) Answer: A

Let breadth = x and length = $3x/2$

$$\text{Area of the floor} = 540/10 = 54 \text{ m}^2$$

$$x \times 3x/2 = 54 \Rightarrow x^2 = 54 \times 2/3$$

$$x^2 = 36$$

$$x = 6$$

$$\text{Breadth} = 6 \text{ m and length} = 3/2 \times 6 = 9 \text{ m}$$

$$\text{Papered area} = (3440/20) = 172 \text{ m}^2$$

$$\text{Area of 1 door and 2 windows} = 16 \text{ m}^2$$

$$\text{Total area of 4 walls} = 172 + 16 = 188 \text{ m}^2$$

$$2(6+9) \times H = 188$$

$$30H = 188$$

$$H = 188/30 = 6.2 \text{ m}$$

30) Answer: C

Let the 2 parallel sides of the trapezium be x cm and y cm



Then $x - y = 8$ =====>1

$$\frac{1}{2} (x+y) \times 38 = 950$$

$$19 (x+y) = 950$$

$$X+y = 950/19$$

$$X- y = 50$$
 =====>2

Solving 1 and 2

$$2x = 58$$

$$x = 29, y = 21$$

so the parallel sides are 29cm and 21 cm.

3. PERMUTATION AND COMBINATION

1) Factorial Notation:

Let n be a positive integer. Then, factorial n , denoted $n!$ is defined as:

$$n! = n(n - 1)(n - 2) \dots 3.2.1.$$

Examples:

We define $0! = 1$.

$$4! = (4 \times 3 \times 2 \times 1) = 24.$$

$$5! = (5 \times 4 \times 3 \times 2 \times 1) = 120.$$

2) Permutations:

Permutation is defined as arrangement of r things that can be done out of total n things. This is denoted by ${}^n P_r$, which is equal to $n!/(n-r)!$. The different arrangements of a given number of things by taking some or all at a time, are called permutations.

Examples:

All permutations (or arrangements) made with the letters a, b, c by taking two at a time are (ab, ba, ac, ca, bc, cb) .

All permutations made with the letters a, b, c taking all at a time are:

$(abc, acb, bac, bca, cab, cba)$

3) Number of Permutations:

Number of all permutations of n things, taken r at a time, is given by:

$${}^n P_r = n(n - 1)(n - 2) \dots (n - r + 1) = n! / (n - r)!$$

Examples:

$${}^6 P_2 = (6 \times 5) = 30.$$

$${}^7 P_3 = (7 \times 6 \times 5) = 210.$$



Cor. number of all permutations of n things, taken all at a time = $n!$.

4) An Important Result:

If there are n subjects of which p_1 are alike of one kind; p_2 are alike of another kind; p_3 are alike of third kind and so on and p_r are alike of r^{th} kind,

such that $(p_1 + p_2 + \dots + p_r) = n$.

Then, number of permutations of these n objects is =
$$\frac{n!}{(p_1!)(p_2!).....(p_r!)}$$

5) Combinations:

Combination is defined as selection of r things that can be done out of total n things. This is denoted by nC_r which is equal to $n!/r!(n-r)!$. Each of the different groups or selections which can be formed by taking some or all of a number of objects is called a **combination**.

Examples:

Suppose we want to select two out of three boys A, B, C. Then, possible selections are AB, BC and CA.

Note: AB and BA represent the same selection.

All the combinations formed by a, b, c taking ***ab, bc, ca***.

The only combination that can be formed of three letters a, b, c taken all at a time is ***abc***.

Various groups of 2 out of four persons A, B, C, D are:

AB, AC, AD, BC, BD, CD.

Note that ab ba are two different permutations but they represent the same combination.

Number of Combinations:

The number of all combinations of n things, taken r at a time is:

$${}^nC_r = \frac{n!}{(r!)(n-r)!} = \frac{n(n-1)(n-2) \dots \text{to } r \text{ factors}}{r!}.$$

Note:

${}^nC_n = 1$ and ${}^nC_0 = 1$.

${}^nC_r = {}^nC_{(n-r)}$

Examples:

i. ${}^{11}C_4 = \frac{(11 \times 10 \times 9 \times 8)}{(4 \times 3 \times 2 \times 1)} = 330.$

ii. ${}^{16}C_{13} = {}^{16}C_{(16-13)} = {}^{16}C_3 = \frac{16 \times 15 \times 14}{3!} = \frac{16 \times 15 \times 14}{3 \times 2 \times 1} = 560.$



6) Fundamental Principles of Counting

1. **Addition rule** : If an experiment can be performed in 'n' ways, & another experiment can be performed in 'm' ways then either of the two experiments can be performed in (m+n) ways. This rule can be extended to any finite number of experiments.
2. **Multiplication Rule** : If a work can be done in m ways, another work can be done in 'n' ways, then both of the operations can be performed in m x n ways. It can be extended to any finite number of operations.

7) Difference between Permutations and Combinations and How to identify them

Sometimes, it will be clearly stated in the problem itself whether permutation or combination is to be used. However if it is not mentioned in the problem, we have to find out whether the question is related to permutation or combination.

Consider a situation where we need to find out the total number of possible samples of two objects which can be taken from three objects P, Q, R. To understand if the question is related to permutation or combination, we need to find out if the order is important or not.

If order is important, PQ will be different from QP, PR will be different from RP and QR will be different from RQ

If order is not important, PQ will be same as QP, PR will be same as RP and QR will be same as RQ
Hence,

If the order is important, problem will be related to permutations.

If the order is not important, problem will be related to combinations.

For permutations, the problems can be like "What is the number of permutations that can be made", "What is the number of arrangements that can be made", "What are the different number of ways in which something can be arranged", etc.

For combinations, the problems can be like "What is the number of combinations that can be made", "What is the number of selections that can be made", "What are the different number of ways in which something can be selected", etc.

pq and qp are two different permutations, but they represent the same combination.

Mostly problems related to word formation, number formation etc will be related to permutations. Similarly most problems related to selection of persons, formation of geometrical figures, distribution of items (there are exceptions for this) etc will be related to combinations.

Examples:

1) In how many ways can the letters of the word 'NOMINATION' be arranged?

- A) 237672
- B) 123144
- C) 151200



- D) 150720
- E) None of these

2) How many words can be formed by using all letters of the word 'CABIN'?

- A) 720
- B) 24
- C) 120
- D) 60
- E) None

3) How many arrangements can be made out of the letters of the word 'BIGBOSS' ?

- A) 9240
- B) 2772
- C) 1260
- D) 1820
- E) 2800

4) In how many different ways can the letters of the word 'GRINDER' be arranged?

- A) 2520
- B) 1280
- C) 3605
- D) 1807
- E) 1900

5) In how many different ways can any 4 letters of the word 'ABOLISH' be arranged?

- a) 5040
- b) 840
- c) 24
- d) 120

Vowel Always together odd / Even position

6) In how many different ways can the letters of the word 'ABOMINABLES' be arranged so that the vowels always come together?

- A) 181045
- B) 201440
- C) 12880
- D) 504020



E) 151200

7) In how many different ways can the letters of the word 'POTENCY' be arranged in such a way that the vowels always come together?

A) 1360

B) 2480

C) 3720

D) 5040

E) 1440

8) In how many different ways can the letters of the word 'RAPINE' be arranged in such a way that the vowels occupy only the odd positions?

A) 32

B) 48

C) 36

D) 60

E) 120

9) In how many different ways can the letters of the word 'SPORADIC' be arranged so that the vowels always come together?

A) 120 2

B) 1720

C) 4320

D) 2160

E) 2400

10) In how many different ways can the letters of the word 'VINTAGE' be arranged such that the vowels always come together?

A) 720

B) 1440

C) 632

D) 364

E) 546

1) Answer: C)

The word 'NOMINATION' contains 10 letters, namely

3N, 2O, 1M, 2I, 1A, and 1T.



$$\begin{aligned}\text{Required number of ways} &= 10! / (3!)(2!)(1!)(2!)(1!)(1!) \\ &= 151200\end{aligned}$$

2) Answer: C)

The word 'CABIN' has 5 letters and all these 5 letters are different.

$$\begin{aligned}\text{Total number of words that can be formed by using all these 5 letters} \\ &= 5P5 \\ &= 5! \\ &= 5 \times 4 \times 3 \times 2 \times 1 \\ &= 120\end{aligned}$$

3) Answer: C)

The word 'BIGBOSS' has 7 letters

In these 7 letters, B(2), I(1), G(1), O(1), S(2)

Hence, number of ways to arrange these letters

$$\begin{aligned}&= \{7!\} / \{(2!)(1!)(1!)(2!)\} \\ &= 5040/4 \\ &= 1260\end{aligned}$$

4) Answer: A)

In these 7 letters, 'R' occurs 2 times, and rest of the letters are different.

Hence, number of ways to arrange these letters

$$\begin{aligned}&= \{7!\} / \{(2!)\} \\ &= \{7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1\} / \{2 \times 1\} \\ &= 2520.\end{aligned}$$

5) Answer: B)

There are 7 different letters in the word 'ABOLISH'.

Therefore,

The number of arrangements of any 4 out of seven letters of the word = Number of all permutations of 7 letters, taken 4 at a time =

$${}^nP_r = n(n-1)(n-2) \dots (n-r+1)$$

Here, $n = 7$ and $r = 4$, then we have

$${}^7P_4 = 7 \times 6 \times 5 \times 4 = 840.$$

Hence, the required number of ways is 840.

6) Answer: E)

In the word 'ABOMINABLES', we treat the vowels AOIAE as one letter.

Thus, we have BMNBLS (AOIAE).

This has 7 (6 + 1) letters of which B occurs 2 times and the rest are different.



Number of ways arranging these letters = $7! / 2!$

$$= (7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1) / (2 \times 1)$$

$$= 2520$$

Now, 5 vowels in which A occurs 2 times and the rest are different, can be arranged

$$\text{In } 5! / 2! = 120 / 2$$

$$= 60$$

Required numbers of ways = (2520×60)

$$= 151200$$

7) Answer: E)

The word 'POTENCY' has 7 different letters.

When the vowels EO are always together, they can be supposed to form one letter.

Then, we have to arrange the letters PTNCY (EO).

Now, 6 ($5 + 1 = 6$) letters can be arranged in $6! = 720$ ways.

The vowels (EO) can be arranged among themselves in $2! = 2$ ways.

Required number of ways = (720×2)

$$= 1440.$$

8) Answer: C)

There are 6 letters in the given word, out of which there are 3 vowels and 3 consonants.

Let us mark these positions as under:

(1) (2) (3) (4) (5) (6)

Now, 3 vowels can be placed at any of the three places out of 4, marked 1, 3, 5.

Number of ways of arranging the vowels = ${}^3P_3 = 3! = 6$.

Also, the 3 consonants can be arranged at the remaining 3 positions.

Number of ways of these arrangements = ${}^3P_3 = 3! = 6$.

Total number of ways = $(6 \times 6) = 36$

9) Answer: C)

The word 'SPORADIC' contains 8 different letters.

When the vowels OAI are always together, they can be supposed to form one letter.

Then, we have to arrange the letters SPRDC (OAI).

Now, 6 letters can be arranged in $6! = 720$ ways.

The vowels (OAI) can be arranged among themselves in $3! = 6$ ways.

∴ Required number of ways = $(720 \times 6) = 4320$.

10) Answer: A)



It has 3 vowels (IAE) and these 3 vowels should always come together. Hence these 3 vowels can be grouped and considered as a single letter.

That is, VNTG(IAE).

Hence we can assume total letters as 5.

Number of ways to arrange these letters

$$5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$$

In the 3 vowels (IAE), all the vowels are different. Number of ways to arrange these vowels among themselves

$$3! = 3 \times 2 \times 1 = 6$$

$$\text{Total number of ways } 120 \times 6 = 720$$

11) How many different possible permutations can be made from the word 'WAGGISH' such that the vowels are never together?

- A) 3605
- B) 3120
- C) 1800
- D) 1240
- E) 2140

12) In how many different ways can the letters of the word "ZYMOGEN" be arranged in such a way that the vowels always come together?

- a) 1440
- b) 1720
- c) 2360
- d) 2240

13) In how many different ways can the letters of the word "XANTHOUS" be arranged in such a way that the vowels occupy only the odd positions?

- a) 2880
- b) 4320
- c) 2140
- d) 5420

14) In how many different ways can the letters of the word "POMADE" be arranged in such a way that the vowels occupy only the odd positions?

- a) 72
- b) 144



- c) 532
- d) 36

15) In how many different ways can the letters of the word 'DILUTE' be arranged such that the vowels may appear in the even places?

- a) 36
- b) 720
- c) 144
- d) 24

Choosing from N things M things

16) How many 3 letters words (with or without meaning) can be formed out of the letters of the word, "PLATINUM", if repetition of letters is not allowed?

- a) 742
- b) 850
- c) 990
- d) 336

17) How many 3-letter words can be formed with or without meaning from the letters A , G , M , D , N , and J , which are ending with G and none of the letters should be repeated?

- a) 20
- b) 18
- c) 25
- d) 27

18) Find out the number of ways in which 12 Bangles of different types can be worn in 2 hands?

- A) 1260
- B) 2720
- C) 1225
- D) 4096

19) In how many different ways can 6 apple and 6 orange form a circle such that the apple and the orange alternate?

- A) 82880
- B) 86400
- C) 71200
- D) 63212



20) There are 7 periods in each working day of a college. In how many ways can one organize 6 subjects such that each subject is allowed at least one period?

- A) 33200
- B) 15120
- C) 10800
- D) 43600

11) Answer: C)

The word 'WAGGISH' contains 7 letters of which 1 letter occurs twice

$$= 7! / 2!$$

$$= 2520$$

No. of permutations possible with vowels always together = $6! * 2! / 2!$

$$= 1440 / 2$$

$$= 720$$

No. of permutations possible with vowels never together = $2520 - 720$

$$= 1800.$$

12) Answer: A)

The arrangement is made in such a way that the vowels always come together.

i.e., "ZYMGN(OE)".

Considering vowels as one letter, 6 different letters can be arranged in $6!$ ways; i.e., $6! = 720$ ways.

The vowels "AE" can be arranged themselves in $2!$ ways; i.e., $2! = 2$ ways

Therefore, required number of ways = $720 \times 2 = 1440$ ways.

13) Answer: A)

There are 8 different letters in the given word "XANTHOUS", out of which there are 3 vowels and 5 consonants.

Let us mark these positions as under:

[1] [2] [3] [4] [5] [6] [7]

Now, 3 vowels can be placed at any of the three places out of 4 marked 1, 3, 5, and 7.

Number of ways of arranging the vowels = $4P3$

$$= 24 \text{ ways.}$$

Also, the 5 consonants at the remaining positions may be arranged in $5P5$ ways = $5!$ Ways

$$= 120 \text{ ways.}$$

Therefore, required number of ways = $24 \times 120 = 2880$ ways.



14) Answer: D)

There are 6 different letters in the given word, out of which there are 3 vowels and 3 consonants.

Let us mark these positions as under:

[1] [2] [3] [4] [5] [6]

Now, 3 vowels can be placed at any of the three places out of 3 marked 1, 3 and 5.

Number of ways of arranging the vowels = 3P_3

$$= 3!$$

$$= 6 \text{ ways.}$$

Also, the 3 consonants can be arranged at the remaining 3 positions.

Number of ways of these arrangements = 3P_3

$$= 3!$$

$$= 6 \text{ ways.}$$

Therefore, total number of ways = $6 \times 6 = 36$.

15) Answer: A)

There are 3 consonants and 3 vowels in the word DILUTE.

Out of 6 places, 3 places odd and 3 places are even.

3 vowels can arranged in 3 even places in 3P_3 ways = $3! = 6$ ways.

And then 3 consonants can be arranged in the remaining 3 places in 3P_3 ways = $3! = 6$ ways.

Hence, the required number of ways = $6 \times 6 = 36$.

16) Answer: D)

The word PLATINUM contains 8 different letters.

Required number of words = number of arrangements of 8 letters taking 3 at a time.

$$= {}^8P_3$$

$$= 8 \times 7 \times 6$$

$$= 56 \times 6$$

$$= 336$$

17) Answer: A)

Since each desired word is ending with G, the least place is occupied with G. So, there is only 1 way.

The second place can now be filled by any of the remaining 5 letters (A, M, D, N, J). So, there are 5 ways of filling that place.

Then, the first place can now be filled by any of the remaining 4 letters. So, there are 4 ways to fill.

Required number of words = $(1 \times 5 \times 4) = 20$.

18) Answer: D)



The first bangle can be worn in any of the 2 hands (2 ways).

Similarly each of the remaining 11 bangles also can be worn in 2 ways.

Hence total number of ways = $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$$= 2^{12}$$

$$= 4096$$

19) Answer: B)

6 apples can be arranged in $(6-1)!$ Ways

Now there are 6 positions in which 6 orange can be placed.

This can be done in $6!$ ways.

Required number of ways = $(6-1)! \times 6!$

$$= 5! \times 6!$$

$$= 120 \times 720$$

$$= 86400$$

20) Answer: B)

6 subjects can be arranged in periods in 7P_6 ways.

Remaining 1 period can be arranged in 6P_1 ways.

Two subjects are alike in each of the arrangement. So we need to divide by $2!$ to avoid over counting.

Total number of arrangements = $({}^7P_6 \times {}^6P_1) / 2!$

$$= 5040 \times 6 / 2$$

$$= 30240 / 2$$

$$= 15120$$

21) How many 5-letter code words are possible using last 10 letter of the English alphabet , if no letter can be repeated ?

a) 30240

b) 25440

c) 45640

d) 32940

22) In how many ways can a group of 10 men and 5 women be made out of a total of 12 men and 10 women?

A) 16632

B) 15290

C) 25126

D) 34845

E) 38135



23) A box contains 2 pink balls, 3 brown balls and 4 blue balls. In how many ways can 3 balls be drawn from the box, if at least one brown ball is to be included in the draw?

- A) 32
- B) 48
- C) 64
- D) 96
- E) None

24) Pramoth has 12 friends and he wants to invite 7 of them to a party. How many times will 4 particular friends never attend the party?

- A) 8
- B) 7
- C) 12
- D) 15

25) In how many ways can 8 different ballons be distributed among 7 different boxes when any box can have any number of ballons?

- A) $5^4 - 1$
- B) 5^4
- C) $4^5 - 1$
- D) 7^8

Problems on Selecting Items

26) A question paper has two parts A and B, each containing 12 questions. If a student needs to choose 10 from part A and 8 from part B, in how many ways can he do that?

- A) 32670
- B) 36020
- C) 41200
- D) 29450

27) A bowl contains 8 violet, 6 purple and 4 magenta balls. Three balls are drawn at random. Find out the number of ways of selecting the balls of different colours?

- A) 362
- B) 2 48
- C) 122
- D) 192



28) An shopkeeper has 15 models of cup and 9 models of saucer. In how many ways can he make a pair of cup and saucer?

- A) 100
- B) 80
- C) 110
- D) 135

29) There are 10 orange, 2 violet and 4 purple balls in a bag. All the 16 balls are drawn one by one and arranged in a row. Find out the number of different arrangements possible.

- A) 25230
- B) 23420
- C) 120120
- D) 27720

30) In how many ways can a team of 6 persons be formed out of a total of 12 persons such that 3 particular persons should not be included in any team?

- A) 56
- B) 112
- C) 84
- D) 128

21) Answer: A)

The number of 5 letter code words out of the last 10 letters of the English alphabets are = $10 \times 9 \times 8 \times 7 \times 6$

$$= 80 \times 63 \times 6$$

$$= 30240 \text{ ways.}$$

22) Answer: A)

$$\text{Required number of ways} = {}^{12}C_{10} \times {}^{10}C_5$$

$$= 66 \times 252$$

$$= 16632$$

23) Answer: C)



We may have (1 brown and 2 non-brown) or (2 brown and 1 non-brown) or (3 brown).

$$\begin{aligned}\therefore \text{Required number of ways} &= ({}^3C_1 \times {}^6C_2) + ({}^3C_2 \times {}^6C_1) + ({}^3C_3) \\ &= (3 \times (6 \times 5 / 2 \times 1)) + ((3 \times 2 / 2 \times 1) \times 6) + 1 \\ &= (45 + 18 + 1) \\ &= 64.\end{aligned}$$

24) Answer: A)

Remove the 4 particular friends and invite 7 friends from the remaining 8 (12-4) friends . this can be done in 8C_7 ways.

$$\begin{aligned}\text{Therefore , required number of ways} &= {}^8C_7 \\ &= {}^8C_1 \\ &= 8\end{aligned}$$

25) Answer: D)

Here $n = 7$, $k = 8$.

$$\begin{aligned}\text{Hence, required number of ways} &= n^k \\ &= 7^8\end{aligned}$$

26) Answer: A)

Number of ways to choose 10 questions from part A = ${}^{12}C_{10}$

Number of ways to choose 8 questions from part B = ${}^{12}C_8$

$$\begin{aligned}\text{Total number of ways} &= {}^{12}C_{10} \times {}^{12}C_8 \\ &= {}^{12}C_2 \times {}^{12}C_4 \quad [\because nCr = nC(n-r)] \\ &= \{12 \times 11\} / \{2 \times 1\} \times \{12 \times 11 \times 10 \times 9\} / \{4 \times 3 \times 2 \times 1\} \\ &= 66 \times 495 \\ &= 32670\end{aligned}$$

27) Answer: D)

1 violet ball can be selected is 8C_1 ways.

1 purple ball can be selected in 6C_1 ways.

1 magenta ball can be selected in 4C_1 ways.

$$\begin{aligned}\text{Total number of ways} &= {}^8C_1 \times {}^6C_1 \times {}^4C_1 \\ &= 8 \times 6 \times 4 \\ &= 192\end{aligned}$$

28) Answer: D)

He has 15 patterns of cup and 9 model of saucer

A cup can be selected in 15 ways.

A saucer can be selected in 9 ways.



Hence one cup and one saucer can be selected in 15×9 ways = 135 ways

29) Answer: C)

Number of different arrangements possible

$$\begin{aligned} &= \{16!\} / \{10! 2! 4!\} \\ &= \{16 \times 15 \times 14 \times 13 \times 12 \times 11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2\} / \\ &\quad \{(10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2) (2) (4 \times 3 \times 2)\} \\ &= \{16 \times 15 \times 14 \times 13 \times 12 \times 11\} / \{(2)(4 \times 3 \times 2)\} \\ &= \{8 \times 5 \times 7 \times 13 \times 3 \times 11\} \\ &= 120120 \end{aligned}$$

30) Answer: C)

Three particular persons should not be included in each team.

i.e., we have to select remaining $6 - 3 = 3$ persons from $12 - 3 = 9$ persons.

Hence, required number of ways = 9C_3

$$\begin{aligned} &= \{9 \times 8 \times 7\} / \{3 \times 2 \times 1\} \\ &= 504 / 6 \\ &= 84 \end{aligned}$$

Circular Permutations

There are two cases of circular-permutations:-

(a) If clockwise and anti clock-wise orders are different, then total number of circular-permutations is given by $(n-1)!$

(b) If clock-wise and anti-clock-wise orders are taken as not different, then total number of circular-permutations is given by $(n-1)!/2!$

31) In how many ways can 6 girls be seated in a rectangular order?

- A) 60
- B) 120
- C) 5040
- D) 720

32) In how many ways can 10 stones can be arranged to form a bangles?

- A) 267720
- B) 284360
- C) 125380
- D) 181440

33) In a birthday party, every person shakes hand with every other person. If there was a total of 66 handshakes in the party, how many persons were present in the party?



- A) 9
- B) 8
- C) 7
- D) 12

34) A school has 9 maths teachers and 6 science teachers. In how many ways can a team of 4 maths teachers be formed from them such that the team must contain exactly 1 science teacher?

- A) 800
- B) 720
- C) 680
- D) 504

35) In how many ways can 8 different balls be distributed in 6 different boxes can contain any number of balls except that ball 4 can only be put into box 4 or 5 ?

- A) 2×5^6
- B) 2×6^7
- C) 2×5^4
- D) 2×4^7

31) Answer: B)

$$\begin{aligned}\text{Number of arrangements possible} &= (6-1)! \\ &= 5! \\ &= 5 \times 4 \times 3 \times 2 \times 1 \\ &= 120\end{aligned}$$

32) Answer: D)

$$\begin{aligned}\text{Number of arrangements possible} &= \{1\} / \{2\} \times (10-1)! \\ &= \{1\} / \{2\} \times 9! \\ &= \{1\} / \{2\} \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 \\ &= \{1 / 2\} \times 362880 \\ &= 181440\end{aligned}$$

33) Answer: D)

Assume that in a party every person shakes hand with every other person

$$\text{Number of hand shake} = 66$$

Total number of hand shake is given by nC_2

Let n = the total number of persons present in the party

$${}^nC_2 = 66$$

$$n(n-1) / 2 = 66$$



$$n^2 - n = 2 \times 66$$

$$n^2 - n - 132 = 0$$

$$n = 12, -11$$

But we cannot take negative value of n

$$\text{So, } n = 12$$

Therefore number of persons in the party = 12

34) Answer: D)

The team should have 4 maths teachers. But the team must contain exactly 1 science teacher.

Hence, select 3 maths teachers from 9 maths teachers and select 1 science teachers from 6 science teachers.

$$\begin{aligned}\text{Number of ways this can be done} &= {}^9C_3 \times {}^6C_1 \\ &= \frac{9 \times 8 \times 7}{3 \times 2 \times 1} \times 6 \\ &= 504 / 6 \times 6 \\ &= 84 \times 6 \\ &= 504\end{aligned}$$

35) Answer: B)

1st ball can be put in any of the 6 boxes.

2nd ball can be put in any of the 6 boxes.

3rd ball can be put in any of the 6 boxes.

Ball 4 can only be put into box 4 or box 5. Hence, 4th ball can be put in any of these 2 boxes.

5th ball can be put in any of the 6 boxes.

6th ball can be put in any of the 6 boxes.

7th ball can be put in any of the 6 boxes.

8th ball can be put in any of the 6 boxes.

$$\begin{aligned}\text{Hence, required number of ways} &= 6 \times 6 \times 6 \times 2 \times 6 \times 6 \times 6 \times 6 \\ &= 2 \times 6^7\end{aligned}$$

4. MIXTURE AND ALLIGATION

MIXTURE

When two or more components are mixed in a certain ratio, a mixture is created.

Types of mixtures:

Simple Mixtures:-

When two or more different ingredients are mixed together, a simple mixture is formed.

Eg., sugar and water, wine with water, milk with water etc.



Compound Mixtures:-

When two or more simple mixtures are mixed together, a compound mixture is formed.

Eg., three or more than types of tea variety, rice variety etc.

Basically mixing of two quantity i.e. cheaper quantity and nearer quantity mean price always falls between these two quantities from which respective ratio is calculated.

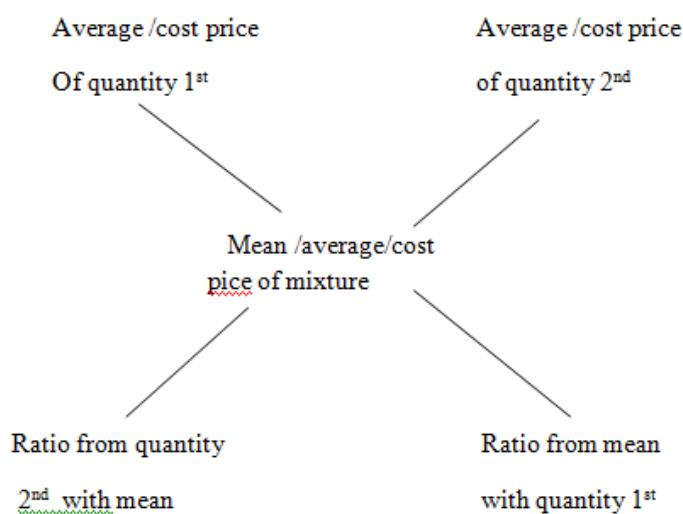
Mean Price:

Mean price is also known as median price or cost price of mixture of quantities taken, which lies between quantities taken for value consideration.

Allegation:

Allegation is the rule that enables us to find the ratio in which two or more ingredients at the given price must be mixed to produce a mixture of a desired price.

Basic formula



TYPE 1:

1) In what ratio should a shopkeeper mix two types of rice, one costing 40 rupees/kg and another costing 20 rupees/kg to get a rice variety costing 28 rupees/kg

- a) 3:2
- b) 2:3
- c) 4:3
- d) 2:7
- e) None



- 2) Some amount out of Rs.8500 was lent at 5% per annum and the remaining was lent at 3% per annum. If the total simple interest from both the fractions in 4 years was Rs.1500, the sum lent at 5% per annum was
- a) Rs. 2400
 - b) Rs. 2200
 - c) Rs. 2000
 - d) Rs. 6000
- 3) In what ratio should wheat at Rs12.60 per kg be mixed with wheat at Rs. 14.60 per kg so that the mixture be worth Rs.13 per kg ?
- a) 6:8
 - b) 8:7
 - c) 4:3
 - d) 2:7
 - e) 4:1
- 4) In what ratio must water be mixed with milk costing Rs.30 per litre in order to get a mixture worth of Rs.18 per litre?
- a) 3:2
 - b) 2:3
 - c) 4:3
 - d) 2:7
 - e) 1:2
- 5) How many kg of dal at Rs.8.40 per kg be mixed with 32 kg of dall at Rs10.20 per kg to get a mixture worth Rs.9.60 per kg?
- a) 23
 - b) 49
 - c) 43
 - d) 72
 - e) 16
- 6) In 1 kg mixture of iron and carbon, 40% is carbon. How much iron should be added so that the proportion of carbon becomes 20%
- a) 1.5kg
 - b) 2kg
 - c) 3kg
 - d) 5kg



e) 1kg

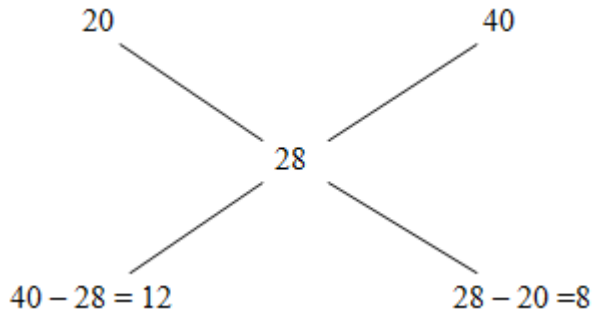
7) Find the ratio in which Nuts at Rs. 5.40 a kg be mixed with Nuts at Rs. 3.20 a kg to produce a mixture worth Rs. 4.60 a kg.

- a) 9:2
- b) 2:3
- c) 4:3
- d) 3:2
- e) 7:4

8) In 20 litres of a mixture, the ratio of sugar syrubb to honey syrubb is 5:1. In order to make the ratio of sugar syrubb to honey syrubb as 3:1, the quantity of honey syrubb that should be added to the mixture will be

- A) $5 \frac{2}{3}$
- B) $4 \frac{1}{3}$
- C) $6 \frac{2}{3}$
- D) $2 \frac{2}{9}$

1) B



Here also we can use Alligation as follows

$$X = 40 - 28 = 12 ; y = 28 - 20 = 8$$

The ratio between the type 1 and type 2 rice is 4:6 or 2: 3

2) D

Total simple interest received , I = Rs.1500

Principal , p = 8500

period, n = 4 years

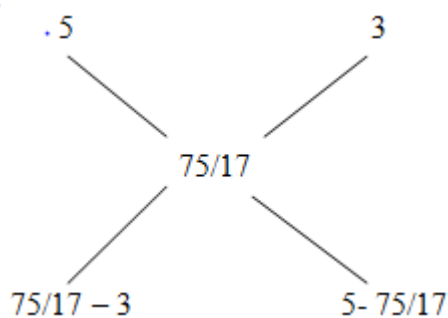
Rate of interest, r = ?

Simple Interest, I=PNR/100

$$1500 = (8500 \times 4 \times r) / 100$$

$$= 1500 / 85 \times 4$$

$$= 75 / 17$$

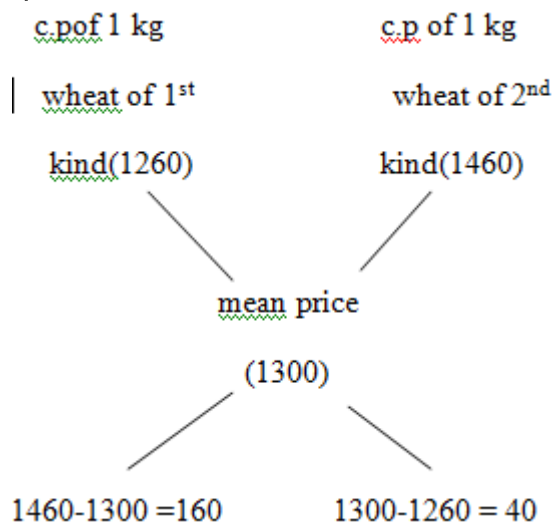


required ratio is: 12:5

Given that total amount is Rs.8500.

Therefore, the amount lent at 5% per annum (part1 amount) = $8500 \times 12/17$
 $= 6000$

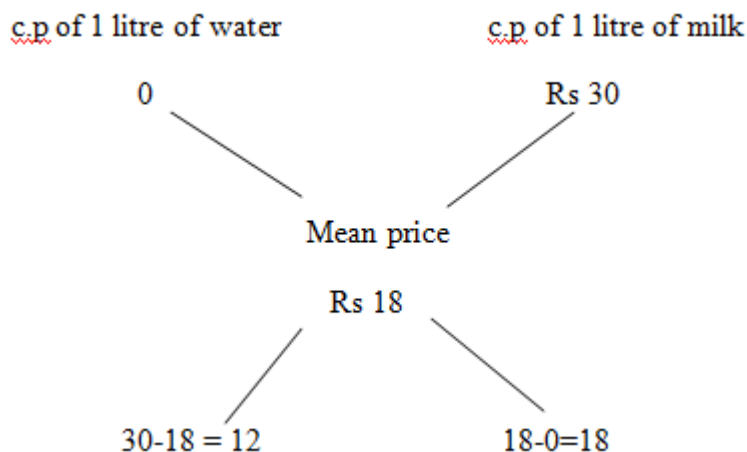
3) E



Thus the required ratio = $160 : 40 = 4:1$

4) B

By the rule of allegation

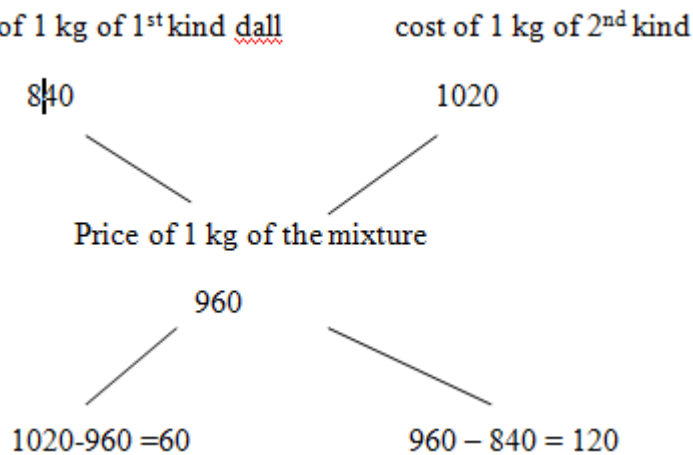


Ratio of water to milk = $12:18 = 2:3$



5) E

By the rule of allegation, we have

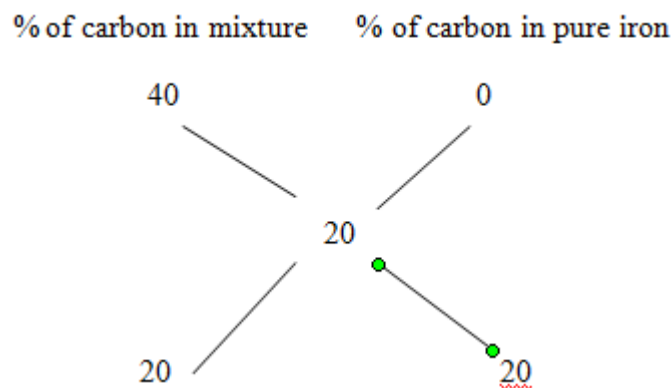


Quantity of 1st kind dall : Quantity of 2nd kind dall = 60 : 120

=> Quantity of 1st kind dall:32 = 1:2

Quantity of 1st kind dall = $32 \times \frac{1}{2} = 16$

6) E



Quantity of the mixture : Quantity of iron = 20 : 20 = 1 : 1

Given that quantity of the mixture = 1 kg

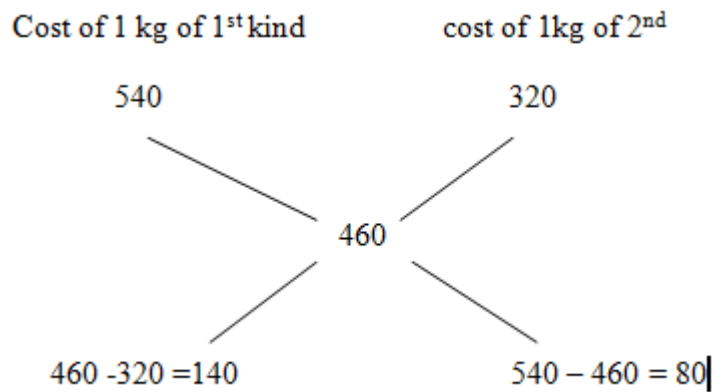
Hence quantity of iron to be added = 1 kg

7) E

By the rule of allegation

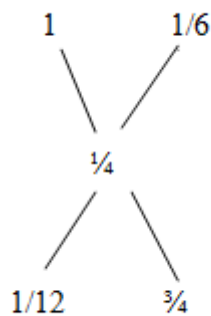


Complete Quantitative Aptitude Questions


$$\begin{aligned}\text{Required ratio} &= 140 : 80 \\ &= 7:4\end{aligned}$$

8) D

By the rule of alligation



Quantity of honey : Quantity of mixture = $1/12 : 3/4$ } = 1:9

Given that quantity of mixture = 20 litre

=>Quantity of honey : 20 = 1 : 9

$$\Rightarrow \text{Quantity of honey} = 20 \times \frac{1}{9}$$
$$= 2 \frac{2}{9} \text{ litre}$$

Type II: Percentage of profit or loss

9) How many kg of cumin seeds at 62 rs per kg. must a man mix with 15 kg of cumin seeds at 20 rs per kg. So that he may , on selling the mixture at 40 rs per kg ,gain 25% on the outlay ?

- a) 62
b) 25
c) 42
d) 15



- 10) A merchant has 1500 kg of salt part of which he sells at 12% profit and the rest at 18% profit. He gains 16% on the whole. The Quantity sold at 18% profit is
- a) 3020
 - b) 2000
 - c) 1000
 - d) 2700
 - e) 6003
- 11) How many kgs of Ponni rice costing Rs.21/kg should a shopkeeper mix with 12.5 kgs of ordinary rice costing Rs.12 per kg so that he makes a profit of 25% on selling the mixture at Rs.20/kg?
- a) 20
 - b) 23
 - c) 43
 - d) 27
 - e) 10
- 12) How many litres of water should be added to a 30 litre mixture of milk and water containing milk and water in the ratio of 3:7 such that the resultant mixture has 40% water in it?
- a) 3
 - b) 5
 - c) 6
 - d) 7
 - e) 9
- 13) How many kilograms of sugar costing Rs. 17.2 per kg must be mixed with 54 kg of sugar costing Rs.14 per kg so that there may be a gain of 20 % by selling the mixture at Rs. 18.48 per kg?
- a) 63
 - b) 83
 - c) 73
 - d) 27
 - e) 42
- 14) In what ratio must coffee powder worth Rs. 40 per kg be mixed with coffee powder worth Rs. 45 a kg such that by selling the mixture at Rs. 48.40 a kg ,there can be a gain 10%?
- a) 3:2
 - b) 2:3
 - c) 4:3



- d) 2:7
- e) 1:4

15) 5 litre of coconut oil is added to 15 litre of a solution containing 40% of groundnut oil. The percentage of groundnut in the new mixture is

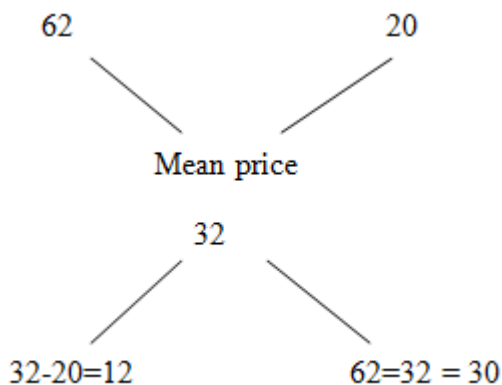
- a) 32
- b) 23
- c) 43
- d) 33
- e) 30

16) Suprith bought 40 kg of rava at the rate of Rs.8.50 per kg and 55 kg at the rate of Rs.8.75 per kg. He mixed the two. Approximately at what price per kg should he sell the mixture to make 40% profit at the cost price?

- a) Rs.12
- b) Rs.14
- c) Rs.25
- d) Rs.21

9) A

$$\begin{aligned}\text{Cost price of the mixture} &= \text{S.P} \times 100 / (100 + \text{gain} \%) \\ &= 40 \times 100 / (100 + 25) \\ &= 40 \times 100 / 125 \\ &= 32 \text{ rs per kg}\end{aligned}$$



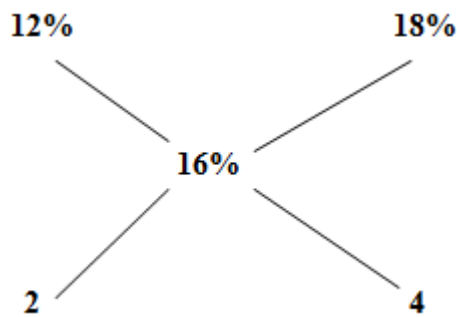
Required ratio = $12 / 30 = 2:5$

$2:5 = x:15$

So 6 kg of cumin at rs. 62



10) C



So , ratio of 1st and 2nd parts = 2:4 = 1:2

Quantity of 2nd kind = $(\frac{2}{3} \times 1500)$ kg
= 1000 kg

11) E

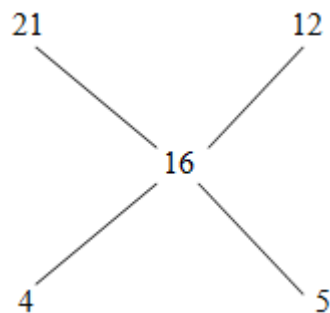
As the trader makes 25% profit by selling the mixture at Rs.20/kg, his cost per kg of the mixture = Rs.16/kg.

C.P of 1 kg of rice of 1st kind = Rs. 21

C.P of 1 kg of rice of 2nd kind = Rs. 12

Mean price = Rs. 16

By the rule of alligation



Let the amount of ponni rice being mixed be x kgs

$$4:5 = x : 12.5$$

$$X = 10 \text{ kg}$$

12) B

60 litres of the mixture has milk and water in the ratio 3:7.

i.e. the solution has 21 litres of milk and 9 litres of water.

When you add more water, the amount of milk in the mixture remains constant at 21 litres.

In the first case, before addition of further water, 21 litres of milk accounts for 70% by volume. After water is added, the new mixture contains 60% milk and 40% water.

Therefore, the 21 litres of milk accounts for 60% by volume.



Hence, 100% volume = $21/0.6 = 35$ litres.

We started with 30 litres and ended up with 35 litres.

Therefore, **5 litres** of water was added.

13) E

Selling Price (SP) of 1 kg mixture = Rs. 18.48

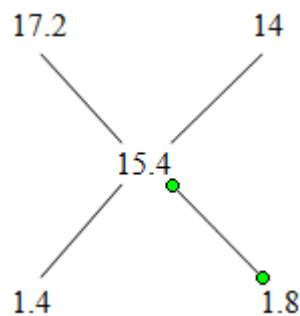
Profit = 20%

Cost Price (CP) of 1 kg mixture = $(s.p \times 100) / 120$

$$= (18.48 \times 100) / 120$$

$$= (184800 / 120)$$

$$= 15.4$$



i.e., to get a cost price of 15.4

The sugars of kind1 and kind2 should be mixed in the ratio 1.4 : 1.8

$$= 14 : 18$$

$$= 7 : 9$$

Suppose X kg of kind1 sugar is mixed with 54 kg of kind2 sugar.

$$\text{Then } x : 54 = 7 : 9$$

$$9x = 54 \times 7$$

$$9x = 378$$

$$X = 42$$

14) E

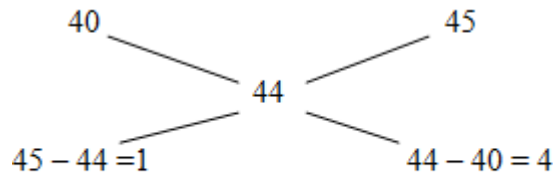
Cost Price (CP) of 1 kg mixture = Rs. 68.20

Profit = 10%

Cost Price (CP) of 1 kg mixture = $68.20 \times 100 / 110$

$$= 6200 / 110$$

$$= 56.36$$



Hence required ratio = 1 : 4

15) E

We have a 15 litre solution containing 40% of groundnut in the coconut oil.

=> Quantity of groundnut in the solution = $(15 \times 40)/100 = 6$

Now 5 litre of coconut oil is added to the solution.

=> Total quantity of the new solution = $15 + 5 = 20$

Percentage of groundnut in the new solution = $6 \times 100/20 = 600/20 = 30\%$

16) A

$$\begin{aligned} \text{CP} &= 40 \times 8.50 + 55 \times 8.75 \\ &= 340 + 481.25 \\ &= 821.25 \end{aligned}$$

Profit = 40%

$$\begin{aligned} \text{SP} &= (100 + 40) / 100 \times \text{c.p} \\ &= 1.4 \times 821.25 \end{aligned}$$

Total quantity = $40 + 55 = 95 \text{ kg}$

SP per kg = $(1.4 \times 821.25) / 95 = 12$

Type: III Drawn and replacement

17) A vessel is filled with liquid, 4 parts of which are water and 5 parts syrup. How much of the mixture must be drawn off and replaced with water so that the mixture may be half water and half syrup?

- a) $1/3$
- b) $1/5$
- c) $1/4$
- d) $1/7$
- e) $1/10$

18) From a cask of milk containing 45 litres, 9 litres are drawn out and the cask is filled up with water. If the same process is repeated a second, then a third time, what will be the number of litres of milk left in the cask?

- a) 31.2



- b) 20.9
- c) 23.04
- d) 12.39
- e) 15.36

19) How many litres of a 36 litre mixture containing milk and water in the ratio of 4 : 6 be replaced with pure milk so that the resultant mixture contains milk and water in equal proportion?

- a) 3
- b) 2
- c) 4
- d) 7
- e) 6

20) A container contains 55 litres of milk. From this container 5.5 litres of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?

- a) 32
- b) 29.16
- c) 43
- d) 27.12
- e) 40.09

21) 12 litres are drawn from a cask full of wine and is then filled with water. This operation is performed three more times. The ratio of the quantity of wine now left in cask to that of the water is 81 : 256. How much wine did the cask originally hold?

- a) 32
- b) 23
- c) 43
- d) 27
- e) 48

22) A jar full of whiskey contains 52% alcohol. A part of this whisky is replaced by another containing 31% alcohol and now the percentage of alcohol was found to be 38%. The quantity of whisky replaced is

- a) $\frac{3}{2}$
- b) $\frac{2}{3}$
- c) $\frac{4}{3}$
- d) $\frac{2}{7}$



e) None

23) A sample of x litres from a container having a 60 litre mixture of milk and water containing milk and water in the ratio of 2 : 3 is replaced with pure milk so that the container will have milk and water in equal proportions. What is the value of x?

- a) 6 litres
- b) 10 litres
- c) 30 litres
- d) None of these

17) E

Suppose the vessel initially contains 9 litres of liquid.

Let x litres of this liquid be replaced with water.

Quantity of water in new mixture = $4 - 4x/9 + x$ litres

Quantity of syrup in new mixture = $5 - 5x/9$

$$(4 - 4x/9 + x) = (5 - 5x/9)$$

$$36 - 4x + 9x = 45 - 5x$$

$$36 + 5x = 45 - 5x$$

$$10x = 45 - 36$$

$$10x = 9$$

$$X = 9/10$$

So part of the mixture replaced = $9/10 \times 1/9$

$$= 1/10$$

18) C

where x is the initial quantity of milk in the cask y is the quantity of milk withdrawn in each process and n is the number of processes.

Initial quantity: 45

Withdrawn quantity = 9

number of times repeated = 3

Hence from the above rule it can be say that,

Formula, $= [a(1 - b/a)^n]$

Quantity of milk left after the 3rd operation = $45 \times (45 - 9)/45^3$

= 23.04 litres.

19) E



The mixture contains 40% milk and 60% water in it.

That is 14.4 litres of milk and 21.6 litres of water.

Now we are replacing the mixture with pure milk so that the amount of milk and water in the mixture is 50% and 50%.

That is we will end up with 18 litres of milk and 18 litres of water.

Water gets reduced by 3.6 litres.

To remove 3.6 litres of water from the original mixture containing 60% water,

we need to remove $= \{3.6\} / \{0.6\}$ litres of the mixture

= 6 litres

20) E

Where x is the initial quantity of milk in the cask y is the quantity of milk withdrawn in each process and n is the number of processes.

Initial quantity: 55

Withdrawn quantity = 5.5 number of times repeated = 3

Hence from the above rule it can be said that,

Formula, $= [a(1 - b/a)^n]$

Quantity of milk left after the 3rd operation $= 55 * ((55 - 5.5) / 55)^3$

= 40.09 litres.

21) E

Let initial quantity of wine = x litre

After a total of 4 operations, quantity of wine

$$x(1 - (y/x))^n = x(1 - 12/x)^4$$

Given that after a total of 4 operations, the ratio of the quantity of wine left in cask to that of water = 81 : 256

$$x(1 - 12/x)^4 / x = 81 / 256$$

$$(1 - 12/x)^4 = (3/4)^4$$

$$X - 12 / x = 3 / 4$$

$$4x - 48 = 3x$$

$$X = 48$$

22) B

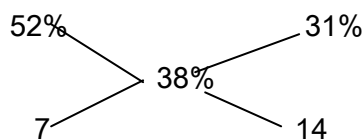
Concentration of alcohol in 1st Jar = 52%

Concentration of alcohol in 2nd Jar = 31%

After the mixing, Concentration of alcohol in the mixture = 38%



By rule of allegation,



Hence ratio of 1st and 2nd quantities = 7 : 14 = 1 : 2

i.e., 2/3 part of the whisky is replaced.

23) C

Another way for solving this sum is by choice

The mixture of 60 litres has in it 24 litres of milk and 36 litres of water. (2 : 3 :: milk water)

When you remove x litres from it, you will remove 0.4 x litres of milk and 0.6 x litres of water from it. assume(2). According to this choice, x = 10.

So, when one removes, 10 litres of the mixture, one is removing 4 litres of milk and 6 litres of water.

Therefore, there will be 20 litres of milk and 30 litres of water in the container.

Now, when you add 10 litres of milk, you will have 30 litres of milk and 30 litres of water – i.e. milk and water are in equal proportion.

Type IV: Two variety of mixture with ratio

24) Two vessels A and B contain sugar and rava in the ratio 4 : 3 and 2 : 3 respectively. Find the ratio in which these mixtures be mixed to obtain a new mixture in vessel C containing sugar and rava in the ratio 1 : 2?

- a) 2:9
- b) 3:2
- c) 7:9
- d) 2:7
- e) 7:4

25) Vessel A contains milk and water in the ratio 3:2. Vessel B contains milk and water in the proportion 4:5. In what proportion should quantities be taken from A & B to form a mixture in which milk and water are in the ratio 7:2?

- a) 3:2
- b) 15:2
- c) 4:3



d) 8:15

e) 6:18

26) In what ratio must a person mix three kinds of dall costing him Rs 12.25, Rs 12.50 and Rs 12.75 per Kg so that the mixture may be worth Rs 12.65 per Kg?

a) 11:7:1

b) 22:3:6

c) 14:3:4

d) 2:7:4

e) 3:12:32

27) A milk vendor has 2 cans of milk. The first contains 25% water and the rest milk. The second contains 50% water. How much milk should he mix from each of the containers so as to get 12 litres of milk such that the ratio of water to milk is 3 : 5?

a) 2

b) 3

c) 4

d) 7

e) 6

28) The cost of Type 1 material is Rs. 50 per kg and Type 2 material is Rs. 75 per kg. If both Type 1 and Type 2 are mixed in the ratio of 3:2 then what is the price per kg of the mixed variety of material?

a) 32

b) 38

c) 53

d) 62

e) 60

29) A container contains a mixture of two liquids P and Q in the ratio 7 : 5. When 9 litres of mixture are drawn off and the container is filled with Q, the ratio of P and Q becomes 7 : 9. How many litres of liquid P was contained in the container initially?

a) 12

b) 21

c) 93

d) 17

e) None



24) E

Let Cost Price(CP) of 1 kg sugar be Rs.1

Quantity of sugar in 1kg mixture from vessel A= $\frac{4}{7}$

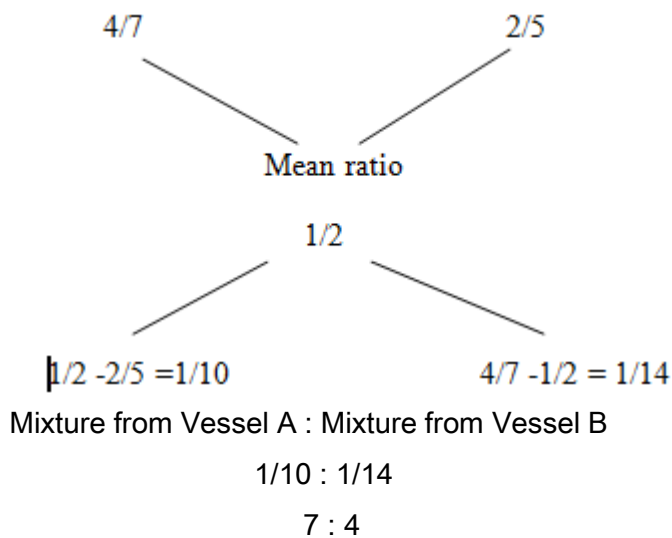
Cost Price(CP) of 1kg mixture from vessel A = Rs. $\frac{4}{7}$

Quantity of sugar in 1 kg mixture from vessel B = $\frac{2}{5}$

Cost Price(CP) of 1 kg mixture from vessel B = Rs. $\frac{2}{5}$

Quantity of sugar to be obtained in 1 kg mixture from vessel C= $\frac{1}{2}$

Cost Price(CP) of 1 kg mixture from vessel C(Mean Price) = Rs. $\frac{1}{2}$

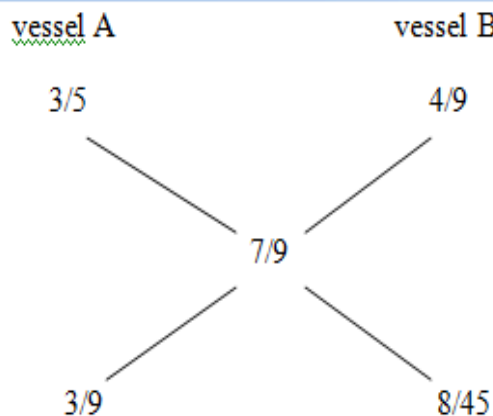


25) D

For this question, we will consider the proportion of milk in each mixture.

In Vessel A, the proportion of milk in $\frac{3}{(3+2)} = \frac{3}{5}$.

vessel B, the proportion of milk is $\frac{4}{(4+5)} = \frac{4}{9}$



The ratio is $(\frac{3}{9}) : (\frac{3}{9}) = 1 : 1$

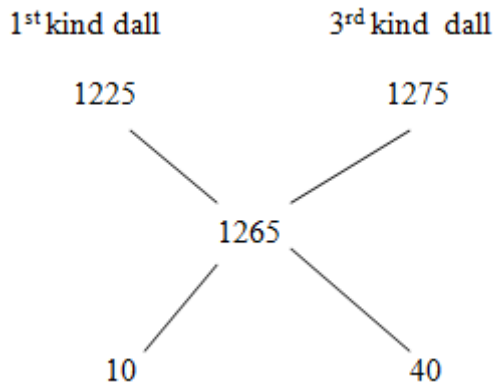


26) E

Step1: Mix dall of first and third kind to get a mixture worth Rs 12.25 per Kg.

C.P of 1 Kg dall of 1st kind 1225p

C.P of 1 Kg dall of 3rd kind 1275p



So they must be mixed in the ratio 1 : 4

Step 2: similarly Mix dall of 1st kind and 2nd kind to obtain a mixture worth of Rs.12.65per Kg

So the Mixed ratio = 3:8

Thus the quantities of dall 1st : 2nd : 3rd = 3:12:32

27) E

Let cost of 1 litre milk be Rs.1

Milk in 1 litre mix in 1st can = $\frac{3}{4}$ litre

Cost Price(CP) of 1 litre mix in 1st can = Rs. $\frac{3}{4}$

Milk in 1 litre mix in 2nd can $\frac{1}{2}$ litre.

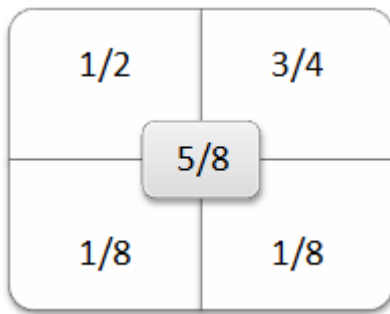
Cost Price(CP) of 1 litre mix in 2nd can = Rs. $\frac{1}{2}$

Milk in 1 litre of the final mix = $\frac{5}{8}$

Cost Price(CP) of 1 litre final mix =Rs. $\frac{5}{8}$

=> Mean price $\frac{5}{8}$

By rule of allegation,



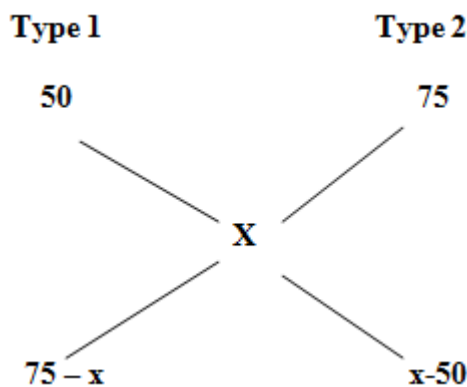
mix in 2nd can : mix in 1st can = $1/8 : 1/8 = 1:1$
ie, from each can, $1/2 * 12 = 6$ litre should be taken.

28) E

Cost Price (CP) of Type 1 material is Rs. 50 per kg

Cost Price (CP) of Type 2 material is Rs. 75 per kg

Let Cost Price (CP) of resultant mixture be Rs. x per kg



Type 1 material : Type 2 material = $3/2$

$$75-x : x-50 = 3/2$$

$$X = 60$$

29) B

Let initial quantity of P in the container be $7x$

and initial quantity of Q in the container be $5x$

Now 9 litres of mixture is drawn off from the container.

Quantity of P in 9 litres of the mixture drawn off

$$= 9 * (7/12) = 63/12 = 21/4$$

Quantity of Q in 9 litres of the mixture drawn off

$$= 9 * (5/12) = 45/12 = 15/4$$

Hence,



Quantity of P remaining in the mixture after 9 litres is drawn off

$$=7x-21/4$$

Quantity of Q remaining in the mixture after 9 litres is drawn off

$$=5x-15/4$$

Since the container is filled with Q after 9 litres of mixture is drawn off, quantity of Q in the mixture

$$= 5x-(15/4)+9=5x+(21/4)$$

Given that the ratio of P and Q becomes 7 : 9

$$(7x-21/4) : (5x+(21/4)) = 7 : 9$$

$$x=16*21/4*28$$

Litres of P contained in the container initially

$$=7x = 21$$

Type IV: Three variety

30) Redgram worth Rs. 112 per kg and Rs.123 per kg are mixed with a third variety in the ratio 1: 1 : 2. If the mixture is worth Rs. 142 per kg, the price of the third variety per kg will be

- a) 153
- b) 175.50
- c) 43.9
- d) 227.9
- e) 166.5

31) In what ratio must a person mix three kinds of musted seeds costing Rs.65/kg, Rs.70/kg and Rs.105 /kg so that the resultant mixture when sold at Rs.96/kg yields a profit of 20%?

- a) 1:2:4
- b) 3:7:6
- c) 1:4:2
- d) 1:8:6
- e) 40 : 8 : 25

32) A merchant mixes three varieties of rice costing Rs.40/kg, Rs.48/kg and Rs.60/kg and sells the mixture at a profit of 40% at Rs.60 / kg. How many kgs of the second variety will be in the mixture if 4 kgs of the third variety is there in the mixture?

- a) 1 kg
- b) 20 kgs
- c) 3 kgs
- d) 6 kgs



e) 8kgs

30) E

Since first second varieties are mixed in equal proportions

so their average price = Rs.(112 + 123/2)

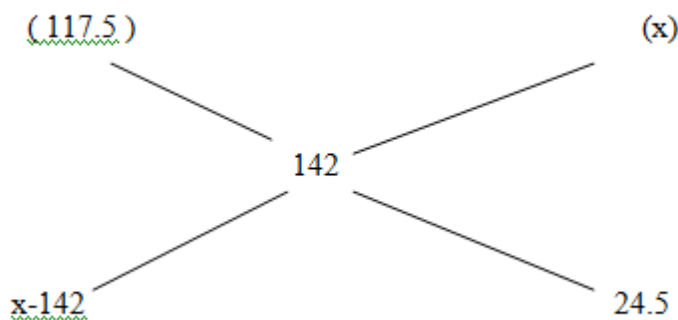
= Rs. 117.5

So, the mixture is formed by mixing two varieties, one at Rs. 117.50 per kg and the other at say, Rs. x per kg in the ratio 2 : 2, i.e., 1 : 1. We have to find x.

By the rule of alligation

Cost of 1 kg of 1st kind

cost of 1kg of 2nd kind



$$X - 142 / 24.5 = 1$$

$$X = 24.5 + 142$$

$$X = 166.5 \text{ per kg.}$$

31) E

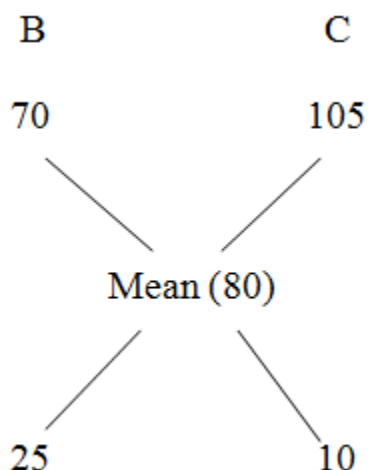
The resultant mixture is sold at a profit of 20% at Rs.96/kg

i.e. 1.2 (cost) = Rs.96 => Cost = = Rs.80 / kg.

Let the three varieties be A, B, and C costing Rs.65, Rs.70 and Rs.105 respectively.

The mean price falls between B and C.

Hence the following method should be used to find the ratio in which they should be mixed.





A:C=4:5 B:C=2:5

The resultant ratio A : B : C :: 40 : 8 : 25.

32) D

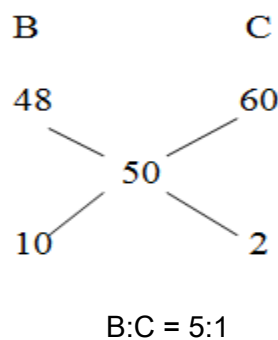
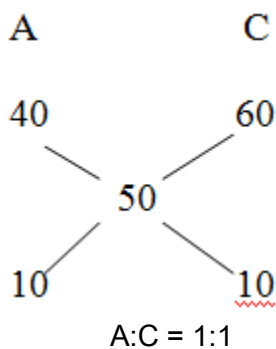
If the selling price of mixture is Rs.60/kg and the merchant makes a profit of 20%, then the cost price of the mixture = $60/1.2 = \text{Rs.}50/\text{kg}$.

We need to find out the ratio in which the three varieties are mixed to obtain a mixture costing Rs.50 /kg.

Let variety A cost Rs.40/kg, variety B cost Rs.48 / kg and variety C cost Rs.60/kg. The mean desired price falls between B and C.

Step 1: Find out the ratio A : C

Using allegation rule



Step 2: QC is found by adding the value of QC in step 1 and step 2 = 1 + 5 = 6

Therefore, the ratio = 1 : 25 : 5

5. BOATS AND STREAMS

Type 1

1) A boat takes 38 hrs for travelling downstream from point p to point q and coming back to a point r midway between p and q. If the velocity of the stream is 8 km/hr and the speed of the boat in still water is 28 km/hr.

What is the distance between p and q?

- A) 720
- B) 640
- C) 510
- D) 450

2) A boat takes 27 hrs to travel a distance upstream and takes 9hrs to travel the same distance downstream.

If the speed of the boat in still water is 12km/hr, then what is the velocity of the stream?

- A) 8km/hr
- B) 6km/hr



- C) 4km/hr
- D) None of these

3) There is a bridge besides a river. Two friends Arun and Varun started their journey from place L, moved to the garden located at another place M & then returned to place L. Arun moves by swimming at a speed of 30 km/hr while Varun sails on a boat at a speed of about 24km/hr. If the flow of water current is at the speed of 12km/hr, what will be the average speed of boat sailor?

- A) 36
- B) 18
- C) 24
- D) 48

4) A boat covers 12 km upstream and 18km downstream in 3hrs while it covers 18 km upstream and 12km downstream in $3\frac{1}{4}$ hrs the velocity of the boat upstream and downstream?

- A) 4,8
- B) 8,12
- C) 12,16
- D) 3,9

5) At the same speed a boat travelling 50km upstream and 78km downstream in 16hrs. Also it can travel 70km upstream and 104km downstream, in 22hrs at the same speed of the stream is.

- A) 5km/hr
- B) 3km/hr
- C) 4km/hr
- D) 2km/hr

TYPE 2:

6) Thanu can travel 24 miles downstream in a certain river in 12hrs less than it takes him to travel the same distance upstream. But if he could double his usual rowing rate for his 48 mile round trip, the downstream 24 miles would then take only 2hr less than the upstream 24miles. What is the speed of the current in miles per hour?

- A) $2\frac{1}{3}$ miles/hr
- B) $8\frac{1}{3}$ miles/hr
- C) $7\frac{1}{5}$ miles/hr
- D) $3\frac{1}{5}$ miles/hr

7) A boat takes 24 hours to cover 128 km downstream and 16 hours to cover 64 km



upstream. Then the speed of the boat in still water is:

- A) $14/3$
- B) $8/7$
- C) $3/2$
- D) $9/5$

8) If a boy rows 8 km downstream in 6 hours and 4 km upstream in 4 hours then how long will he take to cover 16 km in stationary (still) water?

- A) 8
- B) 14
- C) 22
- D) 16

9) A pedal boat goes 12km upstream and 14km downstream in 3hrs. It goes 15km upstream and 10.5km downstream in 3 hrs 15mints. The speed of the boat in still water is

- A) 10
- B) 15
- C) 20
- D) 25

10) A boatman can take the same time to row 6.5km downstream and 3.5km upstream. His speed in still water 2.5 km/hr. The speed of the stream is.

- A) 0.75 km/hr
- B) 2.5 km/hr
- C) 1.5km/hr
- D) 7.5km/hr

1) **ANSWER: A**

Explanation:

$$\begin{aligned}\text{Speed downstream} &= (28 + 8)\text{km/hr} \\ &= 36 \text{ km/hr}\end{aligned}$$

$$\begin{aligned}\text{Speed upstream} &= (28 - 8)\text{km/hr} \\ &= 20 \text{ km/hr}\end{aligned}$$

Let the distance between p and q be 'x'km

$$\text{Then, } x/36 + (x/2)/20 = 38$$

$$x/36 + x/40 = 38$$

$$19x = 13680$$



$$X = 720 \text{ km}$$

Therefore the distance between p and q is 720km

2) ANSWER : B

Explanation:

Let the velocity of the stream be 'y' km/hr

Then the speed of the downstream = $(12 + y)$ km/hr

The speed of the upstream = $(12 - y)$ km/hr

$$9(12 + y) = 27(12 - y)$$

$$108 + 9y = 324 - 27y$$

$$27y + 9y = 324 - 108$$

$$36y = 216$$

$$y = 6 \text{ km/hr}$$

3) ANSWER: B

Explanation:

As Arun swims both the ways at the speed of 30km/hr,

the average speed of swimming is 30 km/hr

Being a boat sailor, varun moves downstream at speed $= 24 + 12 = 36$ km/hr

and upstream at speed $= 24 - 12 = 12$ km/hr

Therefore, Average speed of boat sailor = $\frac{\text{Downstream speed} \times \text{Upstream speed}}{\text{speed in still water}}$

$$= \frac{[\text{Downstream Speed} \times \text{Upstream Speed}]}{[(1/2)(\text{downstream Speed} + \text{Upstream Speed})]}$$

$$= \frac{(36 \times 12)}{0.5(36 + 12)} \text{ km/hr}$$

$$= \frac{432}{24} \text{ km/hr}$$

$$= 18 \text{ km/hr}$$

4) ANSWER : B

Explanation:

Let rate of upstream be 'x' km/hr and downstream be 'y' km/hr

$$\text{Then, } \frac{12}{x} + \frac{18}{y} = 3 \quad \rightarrow 1$$

$$\frac{18}{x} + \frac{12}{y} = \frac{13}{4} \quad \rightarrow 2$$

Adding 1 and 2 we get,

$$\frac{30}{x} + \frac{30}{y} = \frac{25}{4}$$

$$\frac{1}{x} + \frac{1}{y} = \frac{5}{24} \quad \rightarrow 3$$

Subtracting 1 and 2 we get,



$$1/x - 1/y = 1/24 \quad \rightarrow 4$$

Adding 3 and 4 we get,

$$2/x = 6/24 \quad ; \quad x = 8 \quad \rightarrow 5$$

Substitute 5 in 3 we get, $y = 12$

Speed of upstream = 8 km/hr and downstream = 12 km/hr

5) ANSWER : C

Explanation:

Let speed of the boat in still water be 'x' km/hr

Speed of the stream be 'y' km/hr

$$50 / (x - y) + 78 / (x + y) = 16 \quad \rightarrow 1$$

$$70 / (x - y) + 104 / (x + y) = 22 \quad \rightarrow 2$$

By equation 1 * 7 and 2 * 5 we get,

$$350 / (x - y) + 546 / (x + y) = 112$$

$$350 / (x - y) + 520 / (x + y) = 110$$

Subtracting the above equation we get

$$26 / x + y = 2$$

$$x + y = 13 \quad \rightarrow 3$$

substitute 3 in 1

$$50 / x - y = 10$$

$$x - y = 5 \quad \rightarrow 4$$

solving 3 and 4 we get

$$2x = 18$$

$$x = 9 \text{ km/hr}$$

$$y = 4 \text{ km/hr}$$

TYPE 2

6) ANSWER : B

Explanation:

Let the speed in still water be 'x' m/hr and

The speed of current be 'y' m/hr

Speed upstream = $x - y$

Speed downstream = $x + y$

$$24 / (x - y) - 24 / (x + y) = 12$$

$$24 [(x + y) - (x - y) / x^2 - y^2] = 12$$

$$2y / (x^2 - y^2) = 12 / 24 = 1 / 2$$



$$x^2 - y^2 = 4y$$

$$x^2 = 4y + y^2 \quad \text{-----} \rightarrow 1$$

$$24 / (2x - y) - 24 / (2x + y) = 2$$

$$24[(2x + y) - (2x - y)] / 4x^2 - y^2 = 2$$

$$2y / (4x^2 - y^2) = 1 / 12$$

$$4x^2 - y^2 = 24y$$

$$x^2 = (24y + y^2) / 4 \quad \text{----} \rightarrow 2$$

From 1 and 2 we get

$$4y + y^2 = 24y + y^2 / 4$$

$$16y + 4y^2 = 24y + y^2$$

$$3y^2 = 8y$$

$$y = 8 / 3$$

Speed of the current is $8 / 3$ m/hr.

7) Answer: A

Explanation:

Distance covered in downstream = 128km

Time taken in downstream = 24 hours.

Rate of downstream = distance / time = $a = 128 \text{ km} / 24 \text{ hours} = 16/3 \text{ km/hr}$

Distance covered in upstream = 64km

Time taken in upstream = 16 hours.

Rate of upstream = distance / time = $b = 64 \text{ km} / 16 \text{ hours} = 4 \text{ km/hr}$.

Speed in still water = $(a + b) / 2 = (1/2)(16/3 + 4) \text{ km/hr} = (1/2)(28/3) \text{ km/hr}$
 $= 14/3 \text{ km/hr}$.

8) Answer: B

Explanation:

Distance covered in downstream = 8 km

Time taken in downstream = 6 hours.

Rate of downstream = $8/6 = 4/3 \text{ km/hr}$

Distance covered in upstream = 4 km

Time taken in upstream = 4 hours.

Rate of upstream = $4/4 = 1 \text{ km/hr}$

Speed in still water = $(1/2)(4/3 + 1) = 7/6 \text{ km/hr}$

Time Taken to cover 16 km in still water = $16 * 6/7 = 14 \text{ hrs}$ (approximately)



9) ANSWER: A

Explanation :

Let 'x' be the speed of the boat in still water

Let 'y' be the speed of the current.

Pedal boat will travel downstream at $(x + y)$ km/hr and upstream $(x - y)$ km/hr

$$\text{Therefore } 14/x + y + 12/x - y = 3$$

$$10.5/(x+y) + 15/(x-y) = 3 \frac{1}{4} = 13/4$$

$$70/(x+y) + 60/(x-y) = 15 \rightarrow 1$$

$$42/(x+y) + 60/(x-y) = 13 \rightarrow 2$$

From 1 and we get,

$$x+y = 14 ; x-y = 6$$

$$\text{Therefore } x = 10 ; y = 4$$

The speed of the pedalboat is 10 km/hr

10) ANSWER: A

Explanation:

Given that the speed in still water = 2.5 km/hr

Let the speed of the stream be 'x' km/hr

speed in upstream = $(2.5 - x)$ km/hr

Then time taken to cover 6.5 km downstream = $6.5 / (2.5+x)$

Then time taken to cover 3.5 km upstream = $3.5 / (2.5 - x)$

$$6.5 / (2.5 + x) = 3.5 / (2.5 - x)$$

$$6.5 (2.5 - x) = 3.5 (2.5 + x)$$

$$16.25 - 6.5x = 8.75 + 3.5x$$

$$10x = 7.5$$

$$x = 0.75 \text{ km/hr}$$

The speed of the stream is 0.75 km/hr

11) A mototboat can row to a place 112 km away and come back in 44 hours. The time to row 42 km with the stream is same as the time to row 24 km against the stream. Find the speed of boat in still water.

A) 5.5 km/hr

B) 7.5km/hr

C) 10.5 km/hr

D) 3.5 km/hr

12) A boy rows 1500m in 1350 seconds against the stream and returns in 15 minutes. His



rowing speed in still water is.

- A) 5km/hr
- B) 4km/hr
- C) 7km/hr
- D) 9km/hr

TYPE:3

13) A woman rows to a place 24km distant and come back in 7 hrs. She finds that she can row 2km with the stream in the same time as 1.5km against the stream. The rate of the stream is,

- A) 2
- B) 4
- C) 1
- D) 3

14) A girl can row 15 kmph in still water and he finds that it takes him thrice as long to row up as to row down the river. Find the rate of stream.

- A) 2.5
- B) 5.5
- C) 7.5
- D) 12.5

15) A fisherman rows to a place 24km distance and back in 7 hours. He finds that he can row 2km with the stream in the same time 1.5 km against the stream. The rate of the stream is?

- A) 7
- B) 5
- C) 3
- D) 1

16) A pedal boat can cover 20km in 1 hr in still water. And it takes thrice as much as time to cover up than as to cover down the same distance in running water. The speed of the current is.

- A) 7.5 km/hr
- B) 20 km/hr
- C) 5 km/hr
- D) 10 km/hr

17) A man can row 4 km against the stream in 40mins and return in 36mins. Find the rate of current.



- A) 1/2 km/hr
- B) 1/3 km/hr
- C) 2/3 km/hr
- D) 1/4 km/hr

18) A boat goes 3.5km upstream in 24 mins and the speed of the stream is 1.5km per hour, then the speed of the boat in still water is.

- A) 4.3 km/hr
- B) 7.4 km/hr
- C) 5.2km/hr
- D) 10.25km/hr

19) A boat man takes 5hrs 30 mins to row a boat 30km downstream of a river and 4 hrs 15mins to cover a distance of 10km upstream. Find the speed of the river current in km/hr.

- A) 1.5 km/hr
- B) 3km/hr
- C) 5km/hr
- D) 7 km/hr

11) ANSWER: A

Explanation:

Downstream speed = $42/x$ km/hr

Upstream speed = $24/x$ km/hr

$$112 / (42 / x) + 112 / (24 / x) = 44$$

$$112[x / 42 + x / 24] = 44$$

$$112 / 3 [x / 14 + x / 8] = 44$$

$$11x / 56 = 44 * 3 / 112$$

$$x = 44 * 3 * 56 / 11 * 112$$

$$x = 6 \text{ km/hr}$$

So, downstream speed = 7 km/hr,

upstream speed = 4 km/hr

Speed of boat = $1/2 * (7 + 4)$ km/hr = 11 / 2

speed of boat in still water = 5.5 km/hr

12) ANSWER : A

Explanation:

$$\text{Rate upstream} = (1500 / 1350) \text{ m/s} = (150/135) \text{ m/s}$$



$$= 10/9 \text{ m/s}$$

$$\text{Rate downstream} = (1500 / 900) \text{ m/s} = (15/9) \text{ m/s}$$

$$= 5/3 \text{ m/s}$$

$$\text{Rate in still water} = \frac{1}{2} [a + b]$$

$$= \frac{1}{2} [10 / 9 + 5 / 3]$$

$$= \frac{1}{2} [10 + 15 / 9]$$

$$= \frac{1}{2} [25/9]$$

$$= 25/18 \text{ m/s}$$

$$= (25/18) * (18/5) \text{ km/hr}$$

$$\text{speed in still water} = 5 \text{ km/hr}$$

13) ANSWER: C

Explanation:

Suppose she move 2km downstream in x hrs

Then, speed of downstream = (2/x) km/hr

Speed of upstream = (1.5/x) km/hr

Therefore $24/(2/x) + 24/(1.5/x) = 7$

$$12x + 16x = 7$$

$$X = \frac{1}{4}$$

So speed of downstream = 8km/hr and upstream = 6km/hr

$$\begin{aligned} \text{Rate of the stream} &= \frac{1}{2} (8 - 6) \text{ km/hr} \\ &= 1 \text{ km/hr} \end{aligned}$$

14) Answer: C

Explanation:

Given that, time taken to travel upstream = 3 × time taken to travel downstream

When distance is constant, speed is inversely proportional to the time

Hence, 3 × speed upstream = speed downstream

Let speed upstream = x

Then speed downstream = 3x

we have, $\frac{1}{2}(x+3x) = \text{speed in still water}$

$$\text{i.e., } 2x = 15 \rightarrow x = 7.5$$

i.e., speed upstream = 7.5 km/hr

$$\text{Rate of stream} = \frac{1}{2}(3x - x) = x = 7.5 \text{ km/hr}$$

15) Answer: D



Explanation:

Let be moves 2 km downstream in x Hours

Then in speed downstream = $2/x$ kmph

Speed in upstream = $1.5/x$ kmph

$$\Rightarrow 24/2/X + 24/1.5/X = 7$$

$$12x + 16x = 7$$

Therefore $x = 1/4$

Speed in downstream = 8 Kmph

Speed in upstream = 6 Kmph

Then the Rate of stream = $1/2 (8 - 6) = 1$ Kmph

16) ANSWER : D

Explanation:

Let the speed of upstream be 'x' km/hr

Then speed in downstream = $3x$ km/hr [thrice as much as time to cover up than as to cover down the same distance in running water]

Speed in still water = $3x + x/2$ km/hr

$$= 4x / 2 = 2x \text{ km/hr}$$

Given that boat covers 20km in 1 hr in still water

$$\text{Therefore } 2x = 20$$

$$x = 10$$

So speed in upstream = 10km/hr and

Speed in downstream = 30 km/hr

Hence speed of the current = $(30 - 10)/2$

$$= 10 \text{ km/hr.}$$

17) ANSWER: B

Explanation:

Speed of the man (upstream) = $(4 / 40 * 60)$ km/hr

$$= 6 \text{ km/hr}$$

Speed of the man (downstream) = $(4 / 36 * 60)$ km/hr

$$= (60 / 9) \text{ km/hr}$$

$$= 20/3 \text{ km/h}$$

Rate of the current = $\frac{1}{2}[\text{downstream speed} - \text{upstream speed}]$

$$= \frac{1}{2} [20 / 3 - 6] \text{ km/hr}$$

$$= \frac{1}{2} [20 - 18/3] \text{ km/hr}$$

$$= \frac{1}{2} [2/3] \text{ km/hr}$$



Rate of the current = $1/3$ km/hr

18) ANSWER: D

Explanation:

$$\begin{aligned}\text{Speed of upstream} &= 3.5 / 24 \text{ km/min} \\ &= 3.5 / 24 * 60 \text{ km/hr} \\ &= 8.75 \text{ km/hr}\end{aligned}$$

$$\text{Speed of the stream} = \frac{1}{2} (a - b) \text{ km/hr} = 1.5 \text{ km/hr}$$

$$1.5 = \frac{1}{2} (a - 8.75) \text{ km/hr}$$

$$a = 11.75 \text{ km/hr}$$

$$\begin{aligned}\text{speed of the boat in still water} &= \frac{1}{2} (a + b) \text{ km/hr} \\ &= \frac{1}{2} (11.75 + 8.75) \\ &= \frac{1}{2} (20.5)\end{aligned}$$

$$\text{The speed of the boat in still water} = 10.25 \text{ km/hr}$$

19) ANSWER: A

Explanation:

$$\begin{aligned}\text{Rate downstream} &= (30 / 5 \frac{1}{2}) \text{ km/hr} \\ &= 30 / (11/2) \text{ km/hr} \\ &= 30 * 2 / 11 \text{ km/hr} \\ &= 60/11 \text{ km/hr}\end{aligned}$$

$$\begin{aligned}\text{Rate upstream} &= (10 / 4 \frac{1}{4}) \text{ km/hr} \\ &= 10 / (17/4) \text{ km/hr} \\ &= 10 * 4 / 17 \text{ km/hr} \\ &= 40 / 17 \text{ km/hr}\end{aligned}$$

$$\begin{aligned}\text{Speed of current} &= \frac{1}{2} (a - b) \text{ km/hr} \\ &= \frac{1}{2} (60 / 11 - 40 / 17) \\ &= 1.5 \text{ km/hr (approx.)}\end{aligned}$$

TYPE: 4

20) Sakthi rows a boat at 4 km upstream in 1 hour and 1 km downstream in 20 minutes.

How long will he take to reach 3.5 km in still water?

- A) 1
- B) 2
- C) 3



D) 4

21) A motor boat sails 30 km of a river towards upstream in 10hrs. How long will it take to cover the same distance downstream, if the speed of the current is $\frac{1}{2}$ of the speed of the boat in still water.

- A) 1.8hrs
- B) 3.33hrs
- C) 5hrs
- D) None of these

22) Faucet 'P' can fill the tank completely in 12 hrs while faucet 'q' can empty it by 24 hrs. By mistake, Anitha forgot to close the faucet 'q', As a result, both the faucet remained open. After 8 hrs, faucet realized the mistake and immediately closed the faucet 'q'. In how much time now onwards, would the tank be full?

- A) 4
- B) 8
- C) 12
- D) 16

23) A man goes 4km upstream of the stream in 2hr and goes 2km downstream of the stream in 20mints. How long will it take to go 10km in stationary water?

- A) 1hr 15mits
- B) 2hrs 30mints
- C) 5hrs 30mints
- D) 3hrs 45mints

24) A boys rows to a certain place and comes back, but by mistake he covers $\frac{2}{3}$ rd more distance while coming back. The total time for this journey is 20 hours. The ratio of speed of boat to that of stream is 2 : 1. If the difference between upstream and downstream speed is 24km/hr, then how much time will the man take to reach to starting point from his present position?

- A) 2hr 13mints
- B) 1hr 30 mins
- C) 2hr 30mins
- D) 1hr 40 mins

25) Dhanvanth can swim at 15 km/hr in stagnant water. In a river with 3 km/hr current, he swims to a certain distance and comes back within 100 min. What is the distance between the two points?



- A) 11km
- B) 13km
- C) 19km
- D) 12km

TYPE 5

26) X, Y, Z are three towns on a lake which flows uniformly. Y is equidistant from X and Z. A man rows from X to Y and returns in 20hrs. He can row from X to Z in 8 hr. The ratio of speed of the man in still water to the speed of the current is.

- A) 3:5
- B) 5:3
- C) 2:3
- D) None of these

27) A motorboat can cover 80 km upstream and 120 km downstream together in 26 hours. Also it can cover 100 km upstream and 144 km downstream together in 32 hours. What is the speed of the motorboat in still water?

- A) 12 km/hr
- B) 15km/hr
- C) 8.5km/hr
- D) 19km/hr

28) There are 3 poles M, N and O in a straight line such that point N is equidistant from points M and O. A boat can travel from point M to O downstream in 6 hours and from N to M upstream in 4 hours. Find the ratio of boat in still water to speed of stream.

- A) 2:3
- B) 7:1
- C) 3:2
- D) 1:7

29) Mohana can row 80km upstream and 110km downstream in 26 hrs. Also she can 60km upstream and 88km downstream in 20 hrs. Find the speed of the girl in still water and the speed of the current in ratio:

- A) 5:6
- B) 3:6
- C) 7:9
- D) 8:3



30) A motorboat running upstream takes 4 hrs 24 mins to cover a certain distance, while it takes 2hrs to cover the same distance running downstream. What is the ratio between the speed of the boat and speed of the water current respectively?

- A) 8:3
- B) 5:2
- C) 3:7
- D) 2:4

20) ANSWER:A

Explanation:

Upstream Speed = $4/1 = 4\text{km/hr}$

Downstream Speed = $1/20 = 0.05\text{ km/min}$

$= 0.05 \times 60 = 3\text{ km/hr}$

Hence, speed of boat = $1/2(\text{Upstream Speed} + \text{Downstream Speed})$

$= 1/2 (4+3)\text{km/hr} = 3.5\text{ km/hr}$

Thus, the time required to reach the distance of 3.5 km = $\text{Distance Covered} / \text{Speed of boat}$

$= 3.5 / 3.5\text{km/hr} = 1\text{ km/hr}$

21) ANSWER : B

Explanation:

Upstream speed = $x - y$

Downstream speed = $x + y$

$x - y = 30/10 = 3\text{km/hr}$

Again $x = 2y$

Therefore $x - y = 3$

$y = 3\text{km/hr}$; $x = 6\text{km/hr}$

Therefore $x + y = 9\text{ km/hr}$

Time during downstream = $30/9 = 3.33\text{hrs}$

22) Answer: B

Explanation:

Faucet P can fill the tank completely in 12 hours

\Rightarrow In 1 hour, Faucet P can fill $1/12$ of the tank

Faucet q can empty the tank completely in 24 hours

\Rightarrow In 1 hour, Faucet q can empty $1/24$ of the tank

i.e., In one hour, Tank p and q together can effectively fill $(1/12 - 1/24) = 1/24$ of the tank



=> In 8 hours, Tank p and q can effectively fill $\frac{1}{24} \times 8 = \frac{1}{3}$ of the tank.

Time taken to fill the remaining $(1 - \frac{1}{3}) = \frac{2}{3}$ of the tank $= (\frac{2}{3}) / (\frac{1}{12}) = 8$ hours

23) ANSWER : B

Explanation:

$$\text{Rate downstream} = (2/20 * 60) \text{ km/hr}$$

$$= 6 \text{ km/hr}$$

$$\text{Rate upstream} = 2 \text{ km/hr}$$

$$\text{Speed in still water} = \frac{1}{2}(6+2) \text{ km/hr}$$

$$= 4 \text{ km/hr}$$

$$\text{Required time} = \text{distance} / \text{speed}$$

$$= (10/4) \text{ hrs} = (5/2) \text{ hrs} = 2 \frac{1}{2} \text{ hrs}$$

$$= 2 \text{ hrs } 30 \text{ mins.}$$

24) ANSWER : A

Explanation:

let speed of boat and stream be $2x$ and x respectively

So downstream speed $= 2x + x = 3x$, and

upstream speed $= 2x - x = x$

Let total distance between points is d km

So he covered d km downstream, and while coming back

i.e. upstream he covers $d + \frac{2}{3} * d = \frac{5d}{3}$ km

Total time for this journey is 20 hrs.

$$\text{So } \frac{d}{3x} + \frac{(5d/3)}{x} = 20$$

$$6d / 3x = 20$$

$$d = 10x$$

$$\text{Now also given, that } (2x+x) - (2x-x) = 24$$

$$2x + x - 2x + x = 24$$

$$2x = 24$$

$$x = 12$$

$$\text{So } d = 120 \text{ km}$$

So to come to original point, he will have to cover $\frac{2}{3} * 120 = 80 \text{ km}$

And with speed $3x = 48 \text{ km/hr}$ (downstream)

So time is $80/48 * 60 = 100$ minutes = 1 hr 40 mins

25) ANSWER: D

Explanation:



Speed in still water (a) = 15 km/hr

Speed in current(b) = 3 km/hr

Upstream speed = a – b

= 15 – 3

= 12 km/hr

Downstream speed = a + b

= 15 + 3

= 18 km/hr

Let the distance between the 2 points be s km.

Total journey time = $s / 12 + s / 18 = 100 / 60$

$3s + 2s / 36 = 5 / 3$

$5s / 36 = 5 / 3$

$15x = 36 * 5$

$x = 36 * 5 / 15$

= 12 km

Distance between the two points is 12km

26) ANSWER: A

Explanation:

Let the speed of man in still water = x km/hr

Speed of the current = y km/hr

Speed of downstream = (x+ y) km/hr

Speed of upstream = (x – y) km/hr

Let the lake be flowing from X to Z and

$$xy = yz a$$

$$\text{then } xz = 2a.$$

$$a / (x + y) + a / (x - y) = 20 \quad \text{-----} \rightarrow 1$$

$$\text{and } 2a / x + y = 8 \quad \text{----} \rightarrow 2$$

$$a / x + y = 4 \quad \text{-----} \rightarrow 3$$

substitute 3 in 1

$$4 + a / x - y = 20$$

$$a / x - y = 16 \quad \text{-----} \rightarrow 4$$

dividing 3 and 4 we get,

$$a / (x + y) * (x - y) / a = 4 / 16$$

$$x - y / x + y = 1 / 4$$

$$4x - 4y = x + y$$

$$3x = 5y$$



$$x / y = 3 / 5 \rightarrow x : y = 3 : 5$$

27) ANSWER :C

Explanation:

Upstream speed in both cases is 80 and 100.

Ratio is $80 : 100 = 8:10 = 4 : 5$.

So let times in both cases be $4x$ and $5x$

Downstream speed in both cases is 120 and 144 resp.

Ratio is $120 : 144 = 5 : 6$.

So let times in both cases be $5y$ and $6y$

$$\text{So } 4x + 5y = 26$$

$$\text{an } 5x + 6y = 32$$

Solve both, $x = 4, y = 2$

So upstream speed is $= 80/4x = 80/16 = 5 \text{ km/hr}$

And downstream $= 120/5y = 120/10 = 12 \text{ km/hr}$

So speed of boat $= 1/2 * (5+12) = 17/2 \text{ km/hr}$

speed of boat $= 8.5 \text{ km/hr}$

28) ANSWER: B

Explanation:

Let speed in still water $= x \text{ km/hr}$, of current $= y \text{ km/hr}$

Downstream speed $= (x+y) \text{ km/hr}$

Upstream speed $= (x - y) \text{ km/hr}$

Let $MO = 2p \text{ km}$. So $MN = NO = p \text{ km}$.

$$\text{So } 2p/(x+y) = 6 \quad \text{-----} \rightarrow 1$$

$$p/(x-y) = 4 \quad \text{-----} \rightarrow 2$$

Divide both equations, and solve

$$(2p / x+y) * (x - y / p) = 6/4$$

$$4 (2x - 2y) = 6x + 6y$$

$$8x - 8y = 6x + 6y$$

$$2x = 14y$$

$$x/y = 14 / 2 = 7/1$$

$$x : y = 7 : 1$$

29) ANSWER : D

Explanation:



Let rate upstream = 'x' km/hr and

Rate downstream = 'y' km/hr

Then $80/x + 110/y = 26 \rightarrow 1$

$60/x + 88/y = 20 \rightarrow 2$

By solving 1 and 2

$y = 11$; $x = 5$

Rain in still water = $\frac{1}{2} (11 + 5)$ km/hr = 8 km/hr

Rain of current = $\frac{1}{2} (11 - 5)$ km/hr = 3 km/hr

The required answer is 8:3

30) ANSWER : A

Explanation:

Let the man's rate upstream be 'x' km/hr and downstream be 'y' km/hr

Then distance covered upstream by 4hrs 24mints = distance covered by downstream in 2hrs

$$(x * 4 \frac{2}{5}) = y * 2$$

$$22x/5 = 2y$$

$$Y = 11x/5$$

Required ratio = $(y+x/2) : (y-x/2)$

$$= 16x/10 : 6x/10$$

$$= 16x : 6x$$

$$= 8:3$$

6. PROBABILITY

In mathematics too, probability indicates the same – the likelihood of the occurrence of an event.

Examples of events can be :

- Tossing a coin with the head up
- Drawing a red pen from a pack of different coloured pens
- Drawing a card from a deck of 52 cards etc.

An event that occurs for sure is called a Certain event and its probability is 1.

An event that doesn't occur at all is called an impossible event and its probability is 0.

This means that all other possibilities of an event occurrence lie between 0 and 1.

$$0 \leq P(A) \leq 1$$

where A is an event and P(A) is the probability of the occurrence of the event.

This also means that a probability value can never be negative.

Every event will have a set of possible outcomes. It is called the 'sample space'.

Consider the example of tossing a coin.



When a coin is tossed, the possible outcomes are Head and Tail. So, the sample space is represented as {H, T}.

Similarly when two coins are tossed, the sample space is {(H,H), (H,T), (T,H), (T,T)}.

The probability of head each time you toss the coin is $1/2$. So is the probability of tail.

Basic formula of probability

the Probability of the occurrence of an event A is defined as:

$$P(A) = (\text{No. of ways A can occur}) / (\text{Total no. of possible outcomes})$$

Compound probability:

Compound probability is when the problem statement asks for the likelihood of the occurrence of more than one outcome.

Formula for compound probability

- $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

where A and B are any two events.

$P(A \text{ or } B)$ is the probability of the occurrence of atleast one of the events.

$P(A \text{ and } B)$ is the probability of the occurrence of both A and B at the same time

Mutually exclusive events:

Mutually exclusive events are those where the occurrence of one indicates the non-occurrence of the other
OR

When two events cannot occur at the same time, they are considered mutually exclusive.

Note: For a mutually exclusive event, $P(A \text{ and } B) = 0$.

Independent and Dependent Events

Independent Event

When multiple events occur, if the outcome of one event DOES NOT affect the outcome of the other events, they are called independent events.

Say, a die is rolled twice. The outcome of the first roll doesn't affect the second outcome. These two are independent events.

Dependent Events

When two events occur, if the outcome of one event affects the outcome of the other, they are called dependent events.

Conditional probability

Conditional probability is calculating the probability of an event given that another event has already occurred .

The formula for conditional probability $P(A|B)$, read as P(A given B) is

$$P(A|B) = P(A \text{ and } B) / P(B)$$

Complement of an event

A complement of an event A can be stated as that which does NOT contain the occurrence of A.

A complement of an event is denoted as $P(A^c)$ or $P(A')$.

$$P(A^c) = 1 - P(A)$$



or it can be stated, $P(A) + P(A^c) = 1$

For example,

if A is the event of getting a head in coin toss, A^c is not getting a head i.e., getting a tail.

if A is the event of getting an even number in a die roll, A^c is the event of NOT getting an even number i.e., getting an odd number.

if A is the event of randomly choosing a number in the range of -3 to 3, A^c is the event of choosing every number that is NOT negative i.e., 0, 1, 2 & 3 (0 is neither positive or negative).

Problems:

1) When a single die is rolled, the sample space is {1,2,3,4,5,6}. What is the probability of getting a 3 when a die is rolled?

- A) 1/2
- B) 1/6
- C) 6/1
- D) 3/6

2) When two dice are thrown, find the probability of getting a greater number on the first die than the one on the second, given that the sum should equal 9.

- A) 1/2
- B) 1/5
- C) 2/5
- D) 4/2

3) A carton contains 12 green and 8 blue bulbs .2 bulbs are drawn at random. Find the probability that they are of same colour.

- A) 91/47
- B) 47/105
- C) 47/95
- D) 95/47

4) Tickets numbered 1 to 37 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 4 or 10?

- A) 11/37
- B) 37/11
- C) 12/37
- D) 37/12



- 5) In a Coupon, there are 30 prizes and 75 blanks. A Coupon is drawn at random. What is the probability of getting a prize?
- A) $\frac{2}{7}$
B) $\frac{5}{7}$
C) $\frac{1}{5}$
D) $\frac{1}{2}$
- 6) Two dice are thrown together. The probability that the total score is a composite number is:
- A) $\frac{5}{12}$
b) $\frac{12}{7}$
c) $\frac{7}{12}$
d) $\frac{12}{5}$
- 7) A Receptacle contains 3 violet, 4 purple and 5 black balls. Three balls are drawn at random from the receptacle. The probability that all of them are purple, is:
- A) $\frac{3}{55}$
B) $\frac{7}{55}$
C) $\frac{1}{55}$
D) $\frac{9}{55}$
- 8) Two dice are rolling simultaneously. What is the probability that the sum of the number on the two faces is divided by 5 Or 7.
- A) $\frac{13}{36}$
B) $\frac{14}{36}$
C) $\frac{11}{36}$
D) $\frac{9}{36}$
- 9) In a batch, there are 22 boys and 18 girls. Three students are selected at random. The probability that 1 girl and 2 boys are selected, is:
- a) $\frac{3754}{8854}$
b) $\frac{4158}{9880}$
c) $\frac{8514}{9880}$
d) $\frac{2078}{4920}$
- 10) What is the probability of getting a 4 or a 6 when a die is thrown together?
- a) $\frac{2}{3}$
b) $\frac{1}{3}$



c) $3/6$

d) $4/6$

1) Answer: B)

No. of ways it can occur = 1

Total no. of possible outcomes = 6

So the probability of rolling a particular number (3) when a die is rolled = $1/6$.

2) Answer: A)

Let the event of getting a greater number on the first die be G.

There are 4 ways to get a sum of 9 when two dice are rolled = $\{(3,6), (4,5), (5,4), (6,3)\}$.

And there are two ways where the number on the first die is greater than the one on the second given that the sum should equal 9, $G = \{(5,4), (6,3)\}$.

Therefore, $P(\text{Sum equals } 9) = 4/36$ and $P(G \text{ sum equals } 9) = 2/36$.

Now, $P(G) = P(G \text{ sum equals } 9) / P(\text{sum equals } 9)$

$= (2/36) / (4/36)$

$= 2/4 \Rightarrow 1/2$

3) Answer: C)

Let S be the sample space

Then $n(S) = \text{no of ways of drawing 2 bulbs out of } (12+8) = {}^{20}C_2 = 20 \times 19 / 2 \times 1 = 190$

Let E = event of getting both bulbs of same colour

Then, $n(E) = \text{no of ways (2 bulbs out of 12) or (2 bulbs out of 8)}$

$$= {}^{12}C_2 + {}^8C_2 = (132/2) + (56/2) = 66 + 28 = 94$$

Therefore, $P(E) = n(E)/n(S) = 94/190 = 47/95$

4) Answer: A)

Here, $S = \{1, 2, 3, 4, \dots, 36, 37\}$.

Let E = event of getting a multiple of 4 or 10 = $\{4, 8, 12, 16, 20, 24, 28, 32, 36, 10, 30\}$.

$P(E) = n(E)/n(S) = 11/37$

5) Answer: A)

Total number of outcomes possible, $n(S) = 30 + 75 = 105$

Total number of prizes, $n(E) = 30$

$P(E) = n(E)/n(S) = 30/105 = 2/7$

6) Answer: C)



Clearly, $n(S) = (6 \times 6) = 36$.

Let E = Event that the sum is a composite number

Then $E = \{ (1, 3), (1, 5), (2, 2), (2, 4), (2, 6), (3, 1), (3, 5), (3, 3), (3, 6), (4, 2), (4, 4), (4, 5), (4, 6), (5, 1), (5, 3), (5, 4), (5, 5), (6, 2), (6, 3), (6, 4), (6, 6) \}$

$$n(E) = 21$$

$$P(E) = n(E)/n(S) = 21/36 = 7/12.$$

7) Answer: C)

Let S be the sample space.

Then, $n(S)$ = number of ways of drawing 3 balls out of 12 = ${}^{12}C_3 = 220$

Let E = event of getting all the 3 purple balls.

$$n(E) = {}^4C_3 = 4$$

$$P(E) = n(E)/n(S) = 4/220 = 1/55$$

8) Answer: C)

Clearly, $n(S) = 6 \times 6 = 36$

Let E be the event that the sum of the numbers on the two faces is divided by 5 or 7.

Then, $E = \{ (1, 4), (1, 6), (2, 3), (2, 5), (3, 2), (3, 4), (4, 1), (4, 3), (4, 6), (5, 2), (5, 5), (6, 1), (6, 4) \}$

$$n(E) = 11.$$

$$\text{Hence, } P(E) = n(E)/n(S) = 11/36$$

9) Answer: B)

Let, S - sample space E - event of selecting 1 girl and 2 boys.

Then, $n(S)$ = Number ways of selecting 3 students out of 40

$$= {}^{40}C_3$$

$$= 9880$$

$$n(E) = {}^{18}C_1 \times {}^{22}C_2$$

$$= 18 \times 231$$

$$= 4158$$

$$P(E) = n(E)/n(s) = 4158/9880$$

10) Answer: B)

Taking the individual probabilities of each number, getting a 4 is $1/6$ and so is getting a 6.

Applying the formula of compound probability,

Probability of getting a 4 or a 6,

$$P(4 \text{ or } 6) = P(4) + P(6) - P(4 \text{ and } 6)$$

$$\Rightarrow 1/6 + 1/6 - 0$$



$\Rightarrow 2/6 = 1/3$

11) Consider the example of finding the probability of selecting a red card or a 9 from a deck of 52 cards.

- A) $15/26$
- B) $26/15$
- C) $7/13$
- D) $13/7$

12) What is the probability of the occurrence of a number that is even or less than 3 when a fair die is rolled.

- a) $2/3$
- b) $3/2$
- c) $5/6$
- d) $6/5$

13) Two cards are drawn at random from a pack of 52 cards. what is the probability that either both are Red or both are king?

- A) $52/221$
- B) $55/190$
- C) $55/221$
- D) $19/221$

14) In a batch, 40% of the students offered Maths, 30% offered science and 15% offered both. If a student is selected at random, what is the probability that they has offered science or maths?

- A) 0.55
- B) 0.65
- C) 0.45
- D) 0.75

15) In a hostel, 40% of the students play cricket, 20% play chess and 10% both. If a student is selected at random, then the probability that he plays cricket or chess is:

- a) $1/2$
- b) $3/5$
- c) $1/4$
- d) $4/7$

16) one rupee coin is tossed twice. What is the probability of getting two consecutive heads ?

- A) $1/2$



- B) $1/4$
- C) $3/4$
- D) $4/3$

17) Consider a pack contains 2 black, 9 white and 3 pink pencils. If a pencil is drawn at random from the pack, replaced and the process repeated 2 more times, What is the probability of drawing 2 black pencils and 1 pink pencil?

- a) $3/49$
- b) $3/686$
- c) $3/14$
- d) $3/545$

18) A box contains 5 cone and 4 chocobar ice-creams. Preethi eats 3 of them, by randomly choosing. What is the probability of choosing 1 chocobar and 2 cone ice-creams?

- a) $63/10$
- b) $20/63$
- c) $10/63$
- d) $63/20$

19) A box contains 3 red, 8 blue and 5 green marker pens. If 2 marker pens are drawn at random from the pack, not replaced and then another pen is drawn. What is the probability of drawing 2 blue marker pens and 1 red marker pen?

- a) $3/20$
- b) $1/20$
- c) $7/20$
- d) $9/20$

20) What is the probability of drawing a jack and a queen consecutively from a deck of 52 cards, without replacement?

- a) $4/664$
- b) $8/52$
- c) $4/663$
- d) $4/52$

11) Answer: C)

We need to find out $P(R \text{ or } 6)$



Probability of selecting a Red card = $26/52$

Probability of selecting a 9 = $4/52$

Probability of selecting both a red card and a 9 = $2/52$

$$P(R \text{ or } 9) = P(R) + P(9) - P(R \text{ and } 9)$$

$$= 26/52 + 4/52 - 2/52$$

$$= 28/52$$

$$= 7/13.$$

12) Answer: A)

Let the event of the occurrence of a number that is even be 'A' and the event of the occurrence of a number that is less than 3 be 'B'. We need to find $P(A \text{ or } B)$.

$$P(A) = 3/6 \text{ (even numbers = 2,4,6)}$$

$$P(B) = 2/6 \text{ (numbers less than 3 = 1,2)}$$

$$P(A \text{ and } B) = 1/6 \text{ (numbers that are both even and less than 3 = 2)}$$

$$\text{Now, } P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$= 3/6 + 2/6 - 1/6$$

$$P(A \text{ or } B) = 4/6 = 2/3$$

13) Answer: C)

We have $n(s) = {}^{52}C_2 = 1326$.

Let A = event of getting both red cards

B = event of getting both king

$A \cap B$ = event of getting king of red cards

$$n(A) = {}^{26}C_2 = 325, n(B) = {}^4C_2 = 6 \text{ and } n(A \cap B) = {}^2C_2 = 1$$

$$P(A) = n(A)/n(S) = 325/1326;$$

$$P(B) = n(B)/n(S) = 6/1326 \text{ and}$$

$$P(A \cap B) = n(A \cap B)/n(S) = 1/1326$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$= (325+6-1) / 1326 = 330/1326 = 55/221$$

14) Answer: A)

$$P(M) = 0.40$$

$$P(S) = 0.30 \text{ and}$$

$$P(M \cap S) = 0.15$$

$$P(M \cup S) = P(M) + P(S) - P(M \cap S) = 0.55$$

15) Answer: A)



Given that, 40% play cricket; that is, $P(C) = 40/100 = 4/10$

20% play chess; that is, $P(c) = 20/100 = 2/10$

And, 10% play both cricket and chess; that is, $P(C \text{ And } c) = 10/100 = 1/10$

Now, we have to find the probability that 1 student plays cricket or chess; that we have to find, $P(C \text{ or } c)$

We know that, $P(C \text{ Or } c) = P(C) + P(c) - P(C \text{ And } c)$

$= 4/10 + 2/10 - 1/10 = 5/10 = 1/2$

Hence, the required probability $1/2$

16) Answer: B)

Probability of getting a head in one toss = $1/2$

The coin is tossed twice. So $1/2 * 1/2 = 1/4$ is the answer.

Here's the verification of the above answer with the help of sample space.

When a coin is tossed twice, the sample space is $\{(H,H), (H,T), (T,H), (T,T)\}$.

Our desired event is (H,H) whose occurrence is only once out of four possible outcomes and hence, our answer is $1/4$.

17) Answer: B)

Here, total number of pencils = 14

Probability of drawing 1 black pencil = $2/14$

Probability of drawing another black pencil = $2/14$

Probability of drawing 1 pink pencil = $3/14$

Probability of drawing 2 black pencils and 1 pink pencil = $2/14 * 2/14 * 3/14 = 3/686$

18) Answer: C)

Probability of choosing 1 cone = $5/9$

After taking out 1 cone, the total number is 8 .

Probability of choosing 2nd cone = $4/8$

Probability of choosing 1 chocolate cream out of a total of 7 = $4/7$

So the final probability of choosing 2 cone and 1 chocolate ice cream = $5/9 * 1/2 * 4/7 = 10/63$

19) Answer: B)

Probability of drawing 1 blue marker pen = $8/16$

Probability of drawing another blue marker pen = $7/15$

Probability of drawing 1 red marker pen = $3/14$

Probability of drawing 2 blue marker pens and 1 red marker pen = $8/16 * 7/15 * 3/14 = 1/20$

20) Answer: C)



Probability of drawing a jack = $4/52 = 1/13$

After drawing one card, the number of cards are 51.

Probability of drawing a queen = $4/51$.

Now, the probability of drawing a jack and queen consecutively is $1/13 * 4/51 = 4/663$

21) There are 2 vessels. 1st vessel contains 5 white and 5 blue thread roll. 2nd vessel contains 4 white and 6 black thread roll. One roll is taken at random from first vessel and put to second vessel without noticing its color. Now a roll is chosen at random from 2nd vessel. What is the probability of the second roll being a white colored roll?

- A) $11/13$
- B) $9/11$
- C) $13/11$
- D) $5/12$

22) In MSM college, 35% of the students study Tamil and English. 40% of the students study English. What is the probability of a student studying Tamil given he/she is already studying english?

- A) 0.675
- B) 0.580
- C) 0.875
- D) 0.725

23) A single coin is tossed 7 times. What is the probability of getting at least one tail?

- a) $127/128$
- b) $128/127$
- c) $2/128$
- d) $4/128$

24) A question (sum) is given to three boys whose chances of solving it are $1/3, 1/4$ and $1/5$ respectively. What is the probability that the question will be solved?

- A) $4/5$
- B) $3/5$
- C) $3/4$
- D) $7/5$

25) Murali and his wife appear in an interview for two vacancies in the same post. The probability of murali's selection is $(1/6)$ and the probability of wife's selection is $(1/4)$. What is the probability that only one of them is selected ?



- A) $8/25$
- B) $1/7$
- C) $3/4$
- D) $1/3$

26) M speaks truth in 45% of cases and N in 65% of cases. In what percentage of cases are they likely to contradict each other, narrating the same incident?

- A) 57.5
- B) 55.5
- C) 53.8
- D) 51.5

27) A Package contains 12 pack of variety1 drink, 6 pack of variety2 drink and 8pack of variety3 drink. Three packsof them are drawn at random, what is the probability that the three are not of the same variety?

- a) $37/325$
- b) $288/325$
- c) $188/325$
- d) None of these

28) There are two groups, X and Y wrote an examination. The probability of X's pass is $3/5$ and the probability of Y's pass is $5/7$. What is the probability that only one of them is passed out?

- a) $15/16$
- b) $16/35$
- c) $12/43$
- d) $18/35$

29) Pradeesh gets a chance of 40% to win 1st round of a game and a Priya gets a chance of 55% to win 2nd round of the game. In what % of cases are they likely to contradict each other, narrating the same incident?

- a) 49%
- b) 54%
- c) 51%
- d) 38%

30) A cartoon contains 15 torch lights out of which 3 are defective. Two torch light are chosen at random from this cartoon. The probability that at least one of these is defective is.

- A) $13/35$
- B) $14/35$



C) 11/35

D) 17/35

21) Answer: B)

Case 1: first was a white roll

Now it is put in second vessel, so total white rolls in second vessel = $4+1 = 5$, and total rolls in second vessel = $10+1 = 11$

So probability of white roll from second vessel = $5/11$

Case 2: first was a blue roll

Now it is put in second vessel, so total white rolls in second vessel remain 4, and total rolls in second vessel = $10+1 = 11$

So probability of white rolls from second vessel = $4/11$

So required probability = $5/11 + 4/11 = 9/11$ (added the cases because we want one of these cases to happen and not both)

22) Answer: C)

$P(T \text{ and } E) = 0.35$

$P(E) = 0.40$

$P(T/E) = P(T \text{ and } E)/P(E) = 0.35/0.40 = 0.875$

23) Answer: A)

Consider solving this using complement.

Probability of getting no tail = $P(\text{all heads}) = 1/128$

$P(\text{at least one tail}) = 1 - P(\text{all heads}) = 1 - 1/128 = 127/128$

24) Answer: B)

Let A, B, C be the respective events of solving the problem and A^c, B^c, C^c be the respective events of not solving the problem. Then A, B, C are independent events

A^c, B^c, C^c are independent events

Now, $P(A) = 1/3$, $P(B) = 1/4$ and $P(C) = 1/5$

$P(A^c) = 2/3$, $P(B^c) = 3/4$ and $P(C^c) = 4/5$

$P(\text{none solves the problem}) = P(\text{not A and (not B) and (not C)})$

$$= P(A^c \cap B^c \cap C^c)$$

$$= P(A^c) P(B^c) P(C^c)$$

$$= 2/3 \times 3/4 \times 4/5 = 2/5$$

Hence, $P(\text{the problem will be solved}) = 1 - P(\text{none solves the problem})$

$$= 1 - 2/5 = 3/5$$



25) Answer: D)

A= Event that the husband is selected

B =Event that the wife is selected

$$P(A)=1/6, P(B)=1/4$$

$$P(A^c)=1-1/6=5/6$$

$$P(B^c)=1-1/4=3/4$$

Required Probability= $P[(A \text{ and not } B) \text{ or } (B \text{ and not } A)]$

$$= P(A) \cdot P(B^c) + P(B) \cdot P(A^c)$$

$$= 1/6 \cdot 3/4 + 1/4 \cdot 5/6 = 1/3$$

26) Answer: D)

Let M = Event that M speaks the truth

N = Event that N speaks the truth

$$\text{Then } P(M) = 45/100 = 9/20$$

$$P(N) = 65/100 = 13/20$$

$$P(M\text{-lie}) = 1 - 9/20 = 11/20$$

$$P(N\text{-lie}) = 1 - 13/20 = 7/20$$

Now, M and N contradict each other = $[M \text{ lies and } N \text{ true}] \text{ or } [M \text{ true and } N \text{ lies}]$

$$= P(M) \cdot P(N\text{-lie}) + P(M\text{-lie}) \cdot P(N)$$

$$= 9/20 \cdot 7/20 + 11/20 \cdot 13/20 = 206/400$$

$$= 206/400 \cdot 100 = 51.5\%$$

27) Answer: B)

Total number of drink pack = $12+6+8=26$.

Let S be the sample space.

Then, $n(S)$ = number of ways of taking 3 drink pack out of 26.

$$\text{Therefore, } n(S) = {}^{26}C_3 = 2600$$

Let E be the event of taking 3 pack of the same variety.

Then, E = event of taking (3 pack out of 12) or (3 pack out of 6) or (3 pack out of 8)

$$n(E) = {}^{12}C_3 + {}^6C_3 + {}^8C_3$$

$$= 220+20+56$$

$$= 296$$

The probability of taking 3 pack of the same variety = $n(E)/n(S) = 296/2600 = 37/325$

Then, the probability of taking 3 pack are not of the same variety = $1 - 37/325 = 288/325$



28) Answer: B)

Let X be the event of the group X pass

Let Y be the event of the group Y pass

Then, X' = Event of the group X's fail and Y' = event of the group Y's fail.

Therefore, $p(X) = 3/5$ and $p(Y) = 5/7$,

$P(X') = 1 - P(X) = 1 - 3/5 = 2/5$ and $P(Y') = 1 - P(Y) = 1 - 5/7 = 2/7$

Required probability = $P[(X \text{ And } Y') \text{ Or } (Y \text{ And } X')]$

$= P[(X \text{ And } Y') \text{ Or } (Y \text{ And } X')]$

$= P[(X \text{ And } Y') + (Y \text{ And } X')]$

$= P[(X \text{ And } Y')] + p[(Y \text{ And } X')]$

$= p(X) * p(Y') + P(Y) * P(X')$

$= (6/35 + 10/35) = 16/35$

29) Answer: C)

Let A be the event that a pradeesh wins 1st round

Let B be the event that a priya wins 2nd round.

Then, A' = Event that the pradeesh losses 1st round

and B' = event that the priya losses 2nd round.

Therefore, $P(A) = 40/100 = 8/20$, $P(B) = 55/100 = 11/20$

$P(A') = 1 - (8/20) = 12/20$ and $P(B') = 1 - (11/20) = 9/20$

First, we have to find the probability that they contradict each other;

That is, $P(A \text{ And } B \text{ contradicts each other})$

$= P[(\text{pradeesh win in 1st round And priya losses in 2nd round}) \text{ Or}$

$(\text{pradeesh losses in 1st round And priya wins in 2nd round})]$

$= P[(A \text{ And } B') \text{ Or } (A' \text{ And } B)] = P[(A \text{ And } B')] + p[(A' \text{ And } B)]$

$= P(A) \times P(B') + P(A') \times P(B)$

$= 72/400 + 132/400$

$= 204/400$

We have to find the %.

Required % = $(204/400) \times 100 = 51\%$.

30) Answer: A)

$P(\text{none is defective}) = 12C_2/15C_2$

$= (12 \times 11/2 \times 1) / (15 \times 14/2 \times 1)$

$= 66/105 = 22/35$

$P(\text{at least one is defective}) = (1 - 22/35)$

$= 13/35$



7. PROBLEMS ON TRAIN

TYPE :1

- 1) A train 170 m long is running at a speed of 22.5 km/hr. what time will it take to cross a 80m long bridge?
- A) 20 sec
B) 40 sec
C) 15 sec
D) 30sec
- 2) A train 560 m long crosses the platform of length 340 m in 45seconds. Find the speed of the train in km/hr
- A) 72km/hr
B) 36km/hr
C) 48km/hr
D) 15km/hr
- 3) Length of train is 510 meters and speed of train is 63 km/hour. This train can pass a pole in 90 seconds, then find the length of the pole?
- A) 575mts
B) 2500mts
C) 1065mts
D) 876mts
- 4) A train crosses a platform and a scooter standing on the platform in 20 seconds, 12seconds respectively.What is the length of the platform if the speed of the train is 25 km/hr?
- A) 55.8 m
B) 75m
C) 124m
D) 68.5m
- 5) A 240m train crosses a standing object in 6 seconds. Find the time taken by the train to cross a long pole of length 162.5 m.
- A) 25
B) 45
C) 10
D) 15



6) A train crosses a long bridge of length 12 km and a standing girl in 600 seconds and 24 seconds respectively. What will be the length of the train?

- A) 275
- B) 480
- C) 389
- D) 225

7) A train, 1800 meters long running at the rate of 204 km/hr will cross a platform in:

- A) 16
- B) 32
- C) 45
- D) 64

8) If a Rajdhani train running at the speed of 25 m/s and covers 0.8 km long chunk in 6 minutes, then the length of the train is:

- A) 8.2
- B) 6.7
- C) 7.5
- D) 9.3

9) A shatabadi express takes 240 seconds to cover a distance of length 700 meters at a speed of 270 km/hr. What will be the time taken by the train to cross a standing pole?

- A) 160sec
- B) 465sec
- C) 310sec
- D) 231sec

10) If a train crosses a tree in 24 seconds while travelling at a speed of 90km/hr, then in how much time will the train cross a telegraph post of length 1200m at same speed?

- A) 26 sec
- B) 48 sec
- C) 72 sec
- D) 38 sec

1) ANSWER:B

Explanation:

Length of the train = 170 m



Length of the bridge = 80 m

Therefore, length of the train + length of the bridge = $(170 + 80) \text{ m} = 250\text{m}$

Speed of the train = 22.5 km/hr

Speed of the train = $22.5 \times 5/18 \text{ m/sec}$

= $112.5/18 \text{ m/sec}$

= 6.25m/sec

Therefore, time taken by the train to cross the bridge = $250 \text{ m} / 6.25 \text{ m/sec.} = 40 \text{ seconds.}$

2) ANSWER: A

Explanation:

Length of the train = 560 m

Length of the platform = 340 m

Therefore, length of the train + length of the platform = $560 \text{ m} + 340 \text{ m} = 900 \text{ m}$

Time taken by the train to cross the platform = 45 sec

Therefore, speed of train = $900 \text{ m} / 45 \text{ m/sec} = 20 \text{ m/sec}$

To convert the speed from m/sec to km/hr, multiply by 18/5

Therefore, speed of the train = $20 \times 18/5 \text{ km/hr} = 72 \text{ km/hr}$

3) ANSWER: C

Explanation:

Given speed of the train = 63 km/hr

= $63 \times 5/18 \text{ m/s} = 17.5 \text{ m/s}$

Let the length of the pole = x mts

Given time taken to cover the distance of $(510 + x) \text{ mts}$ is 90 sec.

We know speed = distance/time m/s

$17.5 = (510 + x)/90$

$1575 = 510 + x$

$x = 1065$

Therefore the length of the pole is 1065 mts

4) Answer: A

Explanation:

Given that,

The speed of the train = 25km/hr

= $25 \times 5/18 \text{ m/sec}$

= $125/18 \text{ m/sec}$

The train crosses a scooter in 12 seconds. Then,



Length of the train = $125/18 \times 12 = 83.33$

Now, let the length of the platform is X m.

the train crosses the platform in 20 seconds.

Then, $(X + 83.3)/20 = 125/18$

$18(X + 83.3) = 2500$

$18X = 1000.6$

$X = 55.58$ m

Hence the platform is 55.58 m long.

5) ANSWER:C

Explanation:

Length of the train = 240 m

Time taken to cross an object = 6 seconds

Speed of the train = Length of the train / Time taken to cross an object

$$= 240/6 \text{ m/s}$$

$$= 40 \text{ m/s}$$

Length of the pole = 162.5 m

Time taken to cross the pole = (Length of the train + Length of the pole) / Speed of the train

$$= (240 + 162.5)/40$$

$$= 402.5/40$$

$$= 10.06 \text{ seconds}$$

Hence the answer is 10 seconds.

6) ANSWER:B

Explanation:

Time taken to cross the bridge(12 km) = 600 seconds.

Speed of the train = Distance / Time

$$= 12/600 \text{ km/s}$$

$$= 12000/600 \text{ m/s}$$

$$= 20 \text{ m/s}$$

Train crosses a girl in 24 seconds.

Length of the train = Speed of the train x Time Taken

$$= (20 \times 24) \text{ m}$$

$$= 480 \text{ m}$$

Hence the required length is 480 m.

7) ANSWER: B



Explanation:

Speed of the train = 204 km/hr.

We have to find the time in seconds, so convert the speed in the unit of m/sec.

$$\begin{aligned}\text{Therefore } 204 \text{ km/hr} &= 204 \times 5/18 \text{ m/s} \\ &= 1020/18 \text{ m/s}\end{aligned}$$

Length of the train = 1800 meters.

we have to find the time taken by the train to cover 1800 meters at 1020/18 m/sec

$$\begin{aligned}\text{Time} &= \text{distance/speed} \\ &= 1800/(1020/18)\text{sec} \\ &= (1800 \times 18/1020)\text{sec} \\ &= 32 \text{ sec (approx.)}\end{aligned}$$

8) ANSWER:A

Explanation:

Speed of the train = 25 m/s.

$$\begin{aligned}\text{Length of the chunk} &= 0.8 \text{ km} \\ &= 800 \text{ meters}\end{aligned}$$

$$\begin{aligned}\text{Time taken to cross the chunk} &= 6 \text{ minutes} \\ &= (6 \times 60) \text{ seconds} \\ &= 360 \text{ seconds}\end{aligned}$$

Let the length of the train be y meters.

Time taken by the train to cover (800 + y) meters at 25 is 360 seconds

$$\begin{aligned}\text{i.e., distance} &= \text{speed} \times \text{time} \\ (800+y) &= 25 \times 360 \\ 800+y &= 9000 \\ y &= 8200 \text{ m} \\ \text{i.e., } y &= 8.2 \text{ km}\end{aligned}$$

Hence the length of the train is 8.2 km

9) ANSWER:D

Explanation:

Speed of the train = 270 km/hr.

Converting the speed into m/sec

$$\text{Speed} = 270 \text{ km/hr} = 270 \times 5/18 \text{ m/sec} = 75 \text{ m/sec}$$

First, we have to find the length of the train

Let the length of the train be X km.

Given that, the time taken to cover 700 meters = 240 seconds.



We can have, distance/speed = time

$$x+700/75 = 240$$

$$x+700 = 18000$$

$$x = 17300 \text{ m}$$

The time taken by the train of length 17300 meters to cross a standing Pole at 75 m/s = (17300/75)seconds
= 231 seconds.

Hence the answer is 231 sec(approx.)

10) ANSWER:C

Explanation:

Speed of the train = 90 km/hr

Converting the speed into m/sec

$$90 \text{ km/hr} = (90 \times 5/18) \text{ m/s}$$

$$= 25 \text{ m/s}$$

length of the train = distance travelled

$$\text{we know distance} = \text{speed} \times \text{time} = (25 \times 24) \text{ m}$$

$$= 600 \text{ m}$$

$$\text{Distance travelled} = \text{Train length} + \text{telegraph post length}$$

$$= (600 + 1200) \text{ m}$$

$$= 1800 \text{ m}$$

$$\text{Time} = \text{distance} / \text{speed}$$

$$= (1800/25) \text{ sec}$$

$$= 72 \text{ seconds}$$

Hence the required answer is 72 seconds

TYPE 2

11) A passenger train 300m long is running with a speed of 136 km/hr. In what time will it pass a boy who is running at 6 km/hr in opposite direction in which the train is moving?

A) 8.6sec

B) 7.6sec

C) 3.6sec

D) 2.6sec

12) A person runs opposite to that of Chandigarh train at a speed of 10km/hr. If the relative speed between train and the boy running in opposite direction is 25km/hr. What is the length of the train, if it takes 10 seconds to cross a boy, when is at rest?

A) 36.6 m



- B) 40.6 m
- C) 43.6m
- D) 41.6m

13) A mail train 220 m long is running with a speed of 120 km/hr. What is the time in which it will pass a man who starts from the engine running at the speed of 12km/hr in the direction opposite to that of the train.

- A) 6sec
- B) 5sec
- C) 4sec
- D) 3sec

14) A boy sitting in a train which is travelling at 25 km/hr observes that a goods train travelling in opposite direction, takes 4.5 seconds to pass him. If the train is 140 m long, find its speed.

- A) 77km/hr
- B) 79km/hr
- C) 87km/hr
- D) 89km/hr

15) A train 135m long is moving at a speed of 12.5 km/h. It will cross a girl coming from the opposite direction at a speed of 1km/hr in.

- A) 36sec
- B) 46sec
- C) 56sec
- D) 66sec

16) The rajdhani express of 400m runs at a speed of 124 km/hr and a person runs on the platform at a speed of 40km/hr in the direction opposite to that of the train. Find the time taken by the train to cross the running person?

- A) 7 sec
- B) 8.78sec
- C) 7.78sec
- D) 8 sec

17) A passenger train 165 m long which is running at a speed of 30km/hr. In what time will it pass a man who is running at a speed of 3 km/hr in the opposite direction. In which the train is moving.

- A) 14 sec
- B) 17sec



C) 16sec

D) 18sec

18) A metro train 200 metres long takes 12 seconds to cross a man walking at 10 km/hr in a opposite to that of the train. Find the speed of the train?

A) 50 km/hr

B) 60km/hr

C) 130km/hr

D) 140km/hr

19) A goods train 110m long is running with the speed of 30 km/hr. in what time will it pass a boy who is running at 3.5 km/hr in the direction opposite to that in which the train is going.

A) 9 sec

B) 10sec

C) 12sec

D) 13sec

20) A train 330 m long passes a man, running at 18 km/hr in the direction opposite to that of the train in 18 seconds. The speed of the train is.

A) 38 km/hr

B) 29km/hr

C) 48km/hr

D) 44km/hr

11) ANSWER: B

Explanation:

Speed of the train = 136 km/hr

Speed of boy = 6 km/hr

Speed of the train relative to boy = $(13 + 6)$ km/hr
= 142 km/hr

Convert km/hr into m/s $142 \text{ km/hr} = (142 \times 5 / 18)$
= 710 / 18 m/s

= 39.44 m/s

Time taken by the train to cross a boy = time taken by it to cover 300 m at 39.44 m/s

= $300 / 39.44$ [speed time = distance / speed]

= 7.6 sec



12) ANSWER : D

Explanation:

Speed of person = 10km/hr

As the train and the running person are moving in opposite direction, their speed values are added to find the relative speed.

Relative speed = speed of train + speed of person

25 = speed of train

Speed of train = 25 – 10

= 15 km/hr

Convert km/hr into m/s

15 km/hr = $(15 \times 5 / 18)$ m/s

= 25 / 6 m/s

Distance = speed * time

= 25 / 6 * 10

= 250/6 m/s

= 41.6 m

13) ANSWER: A

Explanation:

We know as the train and the running person are moving in opposite direction, their speed values are added to find the relative speed.

Relative speed = speed of mail train + speed of running engine

= (120 + 12) km/hr

= 132 km/hr

Convert km/hr into m/s

132 km/hr = $(132 \times 5 / 18)$ m/s

= (660 / 18) m/s

= 36.66 m/s

Time taken by train to pass a man = distance / speed

[from the length of the mail train is the distance]

= 220 / 36.66

= 6 sec.

14) ANSWER : C

Explanation:

Relative speed = distance / time

= (140 / 4.5) m/s



$$= 31.11 \text{ m/s}$$

Convert m/s into km/hr

$$31.11 \text{ m/s} = (31.11 \times 18 / 50) \text{ km/hr}$$

$$= (560 / 5) \text{ km/hr}$$

$$= 112 \text{ km/hr}$$

Relative speed = speed of train + speed of train (by sitting)

speed of train = Relative speed - speed of train (by sitting)

$$= (112 - 25) \text{ km/hr}$$

$$= 87 \text{ km/hr}$$

Therefore the speed of goods train is 87 km/hr.

15) ANSWER : A

Explanation:

$$\text{Speed of the train} = 12.5 \text{ km/hr}$$

$$\text{Speed of girl} = 1 \text{ km/hr}$$

Relative speed = speed of train + speed of girl

$$= (12.5 + 1) \text{ km/hr}$$

$$= 13.5 \text{ km/hr}$$

Convert km/hr into m/s

$$13.5 \text{ km/hr} = (13.5 \times 5 / 18) \text{ m/s}$$

$$= 67.5 / 18 \text{ m/s}$$

$$= 3.75 \text{ m/s}$$

Time = distance / speed

$$\text{Time taken by the train to pass the man} = 135 / 3.75$$

$$= 36 \text{ sec.}$$

16) ANSWER : B

Explanation:

$$\text{Length of the train} = 400 \text{ m}$$

$$\text{Speed of train} = 124 \text{ km/hr}$$

$$\text{Speed of person} = 40 \text{ km/hr}$$

$$\text{Relative speed (speed of train relative to man)} = (124 + 40) \text{ km/hr}$$

$$= 164 \text{ km/hr}$$

[As the train and the running person are moving in opposite direction, their speed values are added to find the relative speed.]

Convert km/hr into m/s

$$164 \text{ km/hr} = 164 \times 5 / 18$$



$$= 820/18$$

$$= 45.55 \text{ m/s}$$

We know speed = distance / time

Therefore time taken by the train to cross the running person = time taken by the train to cover 400m at a relative of 45.55 m/s

$$= 400 / 45.55$$

$$= 8.78 \text{ sec.}$$

17) ANSWER: D

Explanation:

Speed of the train = 30 km/hr

Speed of man = 3 km/hr

Length of the train = 165m

If direction is given in opposite direction then we add both speed.

That is $(30 + 3) = 33 \text{ km/hr}$

Convert km/hr into m/s

$$33 \text{ km/hr} = (33 * 5 / 18) \text{ m/s} = 55/6 \text{ m/s}$$

If the train time taken to passing a man who running in opposite direction

That is $55/6 \text{ m/s}$

So we can easily get the distance of m/s

So it cover 165 m

$$\text{i.e., } 165 * 6 / 55 = 18 \text{ sec.}$$

18) ANSWER: A

Explanation:

Length of the train = 200 m

Man walking speed = 10 km/hr

Let the speed of the train be 'x' km/hr

Speed of the train relative to man = $(x + 10) \text{ km/hr}$

Convert km/hr into m/s

$$(x + 10) \text{ km/hr} = (x + 10) * 5 / 18 \text{ m/s}$$

Speed = distance / time

$$200 / (x + 10) * 5 / 18 = 12$$

$$18 * 200 / 5(x + 10) = 12$$

$$3600 = 60(x + 10)$$

$$3600 = 60x + 600$$

$$60x = 3000$$



$$X = 50$$

So speed of the train is 110km/hr.

19) ANSWER : C

Explanation:

Length of the train = 110 m

Speed of the train = 30 km/hr

Speed of the boy = 3.5 km/hr

Speed of the train relative to man = $(30 + 3.5)$ km/hr
= 33.5 km/hr

Convert km/hr into m/s

$$\begin{aligned} 33.5 \text{ km/hr} &= (33.5 \times 5 / 18) \text{ m/s} \\ &= 167.5 / 18 \\ &= 9.30 \text{ m/s} \end{aligned}$$

Time taken by the train to cross the man = time taken by it to cover 110 m at 9.30 m/s
= $110 / 9.30$
= 11.8 seconds
= 12 sec(approx.).

20) ANSWER: C

Explanation:

Length of the train = 330 m

Speed = distance / time.

Speed of the train relative to man = $330 / 18$ m/s
= $110 / 6$ m/s

Convert m/s into km/hr

Therefore $110 / 6$ m/s = $(110 / 6 \times 18 / 5)$ km/hr
= 22×3 km/hr
= 66 km/hr

Let the speed of the train be 'x' km/hr

Relative speed = $(x + 18) = 66$ km/hr

$$X + 18 = 66$$

$$X = 48$$

Therefore the speed of the train is 48 km/hr.

TYPE: 3



- 21) A girl is walking at a speed of 15 km/hr along a railway track. If she is 600 m ahead of the train which is 300 m long and runs at a speed of 180 km/hr in same direction, then what is the time required to pass a girl?
- A) 19.63sec
B) 32sec
C) 8.2sec
D) 28.3sec
- 22) A person runs on the platform of 90 m at a speed of 5km/hr in the same direction of the passenger train. Find the time taken by the train to cross the running person if speed of the train is 35.5 km/hr? (Length of train = Length of platform)
- A) 5.32sec
B) 7.5sec
C) 12.6sec
D) 10.62sec
- 23) A goods train overtakes two boys who are walking in the same direction in which the train is going, at the rate of 4 kmph and 8 kmph and passes them completely in 18 and 20seconds respectively. The length of the goods train is :
- A) 50m
B) 200m
C) 160m
D) 80 m
- 24) A train overtakes two girls walking along a railway track. The first girl walks at 9 km/hr. The other girl walks at 10.8 km/hr. The train needs 16.8 and 17 seconds respectively to overtake them. What is the speed of the train if both the girls are walking in the same direction as the train?
- A) 25 m/s
B) 45 m/s
C) 30m/s
D) 40m/s
- 25) Sakthi running at 27 kmph alongside a railway track in 272 metres ahead of the engine of a 240 metres long train running at 135 kmph in the same direction. In how much time will the train pass sakthi?
- A) 24
B) 29
C) 36
D) 17



26) A train overtakes two persons like A and B who are walking in the same direction in which the train is going, at the rate of 8 kmph and 16 kmph and passes them completely in 36 and 40 seconds respectively. The length of the train is:

- A) 800m
- B) 750m
- C) 250m
- D) 450m

27) A Superfast train overtakes two persons walking along a railway track. The first one walks at 9 km/hr. The other one walks at 10.8 km/hr. The train needs 16.8 and 17 seconds respectively to overtake them. What is the speed of the train if both the persons are walking in the same direction as the train?

- A) 250 kmph
- B) 487 kmph
- C) 162 kmph
- D) 312 kmph

28) A 250 m goods train takes 50 s to cross a person who is going in the same direction with the speed of 8 km/h. After crossing that person, the train can reach next station in 2 hr. How long that person takes to reach that station after being crossed by them?

- A) 2 $\frac{1}{2}$ hr
- B) 5hr
- C) 3 $\frac{1}{2}$ hr
- D) 1hr

29) The Mumbai express 500m long passes a man running at 20km/hr in the same direction in which the express is going in 40sec. The speed of the express is.

- A) 50km/hr
- B) 45km/hr
- C) 25km/hr
- D) 65km/hr

30) A train 200m in length, travels at 120 km/hr. In what time it will pass a boy who is walking at 12km an hour.

- a) against(opposite) it:
- b) in the same direction?

- A) 5.4, 6.66



B) 7.2,5.2

C) 3.5,6

D) 12,16

21) ANSWER:A

Explanation:

Speed of a girl = 15 km/hr

speed of train = 180 km/hr

By using the condition,

The speed values of train and the moving object are subtracted if they are moving in same direction.

Speed of train relative to walking person (girl) = $(180 - 15)\text{kmph} = 165 \text{ kmph}$

Convert km/hr into m/s, $165 \text{ kmph} = (165 \times 5/18) \text{ m/s}$

$$= 45.83 \text{ m/s}$$

Distance to be covered by the train = $(600 + 300)\text{m}$

$$= 900\text{m}$$

Therefore, time taken by the train to cross the girl = Distance over speed

$$= 900 / 45.83$$

$$= 19.63$$

Hence the time taken by the train to cross the girl is 19.63seconds

22) ANSWER:D

Explanation:

speed of the train = 35.5 km/hr

speed of the person = 5 km/hr

As the train and the running person move in same direction, their speed values are subtracted to find the relative speed.

Relative speed (Speed of train relative to man) = $(35.5 - 5)\text{kmph} = 30.5 \text{ kmph}$

Convert km/hr into m/s, $30.5 \text{ kmph} = (30.5 \times 5/18) \text{ m/s}$

$$= 8.47 \text{ m/s}$$

We know, speed = distance/time

Therefore, time taken by the train to cross the running person = Time taken by the train to cover 90 m at a relative of 8.47 m/s

$$= 90/8.47$$

$$= 10.62 \text{ sec}$$

Hence, the time taken by the train to cross the running person is 10.62 sec



23) ANSWER:B

Explanation:

Let the length of the goods train be x km and its speed be y km/hr.

Then, speed relative to first boy = $(y-4)$ km/hr.

Speed relative to second boy = $(y-8)$ km/hr.

$$x/y-4 = 18/60 \times 60 \text{ and } x/y-8 = 20/60 \times 60$$

$$3600x = 18y - 72 \dots\dots\dots(1)$$

$$3600x = 20y - 160 \dots\dots\dots(2)$$

From (1) and (2),

$$20y - 160 = 18y - 72$$

$$2y = 88$$

$$y = 44 \dots\dots\dots(3)$$

substitute y value in (1) ,

$$x = (18 \times 44) - 72 / 3600$$

$$= 720 / 3600$$

$$= 0.2 \times 1000$$

$$= 200 \text{ m}$$

Therefore the length of the goods train is 200m

24) ANSWER:B

Explanation:

First girl speed = 9km/hr

$$= 9 \times 5 / 18 \text{ m/s}$$

$$= 5/2 \text{ m/s}$$

$$= 2.5 \text{ m/s}$$

second girl speed = 10.8 km/hr

$$= 10.8 \times 5/18 \text{ m/s}$$

$$= 54/18$$

$$= 3 \text{ m/s}$$

Let the speed of the train be x m/s and speed of the train = distance / time

$$(x - 2.5) \times 16.8 = (x - 3) \times 17$$

$$16.8x - 42 = 17x - 51$$

$$0.2x = 9$$

$$x = 45$$

Therefore the speed of the train is 45 m/s

25) ANSWER:D



Explanation:

Speed of the train = 135 kmph

Speed of sakthi = 27 kmph

Speed of train relative to sakthi = $(135-27)$ kmph
= 108 kmph

We have to find the time in seconds, so convert the speed in the unit of m/sec.

$108 \text{ kmph} = (108 * 5/18) \text{ m/s}$
= 30 m/s

Length of the train = 240 m

Distance covered by sakthi = 272m

Total Distance to be covered = $(240 + 272)$ m
= 512 m

Speed of the train = Distance / Time

Therefore Time taken = $(512 / 30)$ sec
= 17 sec

26) ANSWER:A

Explanation:

person A at speed = 8kmph

convert the speed in the unit of m/sec

$8 \text{ kmph} = (8 * 5/18) \text{ m/s}$
= $20/9$ m/s

person B at speed = 16 kmph

convert the speed in the unit of m/sec

$16 \text{ kmph} = (16 * 5/18) \text{ m/s}$
= $40/9$ m/s

Let the length of the train be x metres and its speed by y m/sec.

Then $(x/y - 20/9) = 36$ and $(x/y - 40/9) = 40$

$(9x/9y - 20) = 36$ and $(9x/9y - 40) = 40$

$36y - x = 80$ (1)

$360y - 9x = 1600$(2)

Solving (1) and (2), we get

$x = 800$ m

Therefore length of the train is 800 m

27) ANSWER:C

Explanation:

Given that the first one walks at 9 km/hr



convert the speed in the unit of m/sec

$$\begin{aligned}9 \text{ km/hr} &= (9 \times 5/18) \text{ m/s} \\&= 5/2 \text{ m/s} \\&= 2.5 \text{ m/s}\end{aligned}$$

Another one walks at 10.8 km/hr

convert the speed in the unit of m/sec

$$\begin{aligned}10.8 \text{ km/hr} &= (10.8 \times 5/18) \text{ m/s} \\&= 3 \text{ m/s}\end{aligned}$$

Let the speed of the train be x m/sec.

$$\begin{aligned}(x - 2.5) \times 16.8 &= (x - 3) \times 17 \\16.8x - 42 &= 17x - 51 \\0.2x &= 9 \\x &= 45 \text{ m/s}\end{aligned}$$

convert the speed in the unit of km/hr

$$\text{Speed of the train} = (45 \times 18/5) \text{ kmph}$$

$$\text{Speed of the train} = 162 \text{ km/hr}$$

28) ANSWER:A

Explanation:

$$\begin{aligned}\text{Speed of the person} &= 8 \text{ kmph} \\&= (8 \times 5/18) \text{ m/s} \\&= 20/9 \text{ m/s}\end{aligned}$$

$$\text{Then relative speed of train} = (x - 20/9) \text{ m/s}$$

As train takes 50 sec to cross the person

$$\text{Therefore } 50 = 250 / (x - 20/9)$$

$$50 = 2250 / 9x - 20$$

$$450x - 1000 = 2250$$

$$450x = 1250$$

$$x = 125/45$$

$$x = 25/9 \text{ m/s}$$

Now distance covered by the train in 2 hr

$$\begin{aligned}&= 25/9 \times 60 \times 120 \\&= 20,000 \text{ m} \\&= 20 \text{ km}\end{aligned}$$

Thus time taken by the person to cover the distance of

$$20 \text{ km} = 20/8 \text{ hr} = 2 \frac{1}{2} \text{ hr}$$



29) ANSWER : D

Explanation:

$$\text{Length of the train} = 500\text{m}$$

$$\begin{aligned}\text{Speed of the express relative to man} &= (500 / 40)\text{m/s} \\ &= 25/2 \text{ m/s}\end{aligned}$$

Convert m/s into km/hr

$$25 / 2 \text{ m/s} = 25 / 2 * 18 / 5 = 45 \text{ km/hr}$$

Let the speed of the express be 'x' km/hr

$$\text{Then the relative speed} = (x - 20)\text{km/hr}$$

$$\text{Therefore } x - 20 = 45$$

$$x = 45 + 20$$

$$= 65\text{km/hr}$$

$$\text{Speed of the express} = 65 \text{ km/hr.}$$

30) ANSWER: A

Explanation:

$$\text{I) Speed of the train} = 120 \text{ km/hr}$$

$$\text{Speed of the boy} = 12 \text{ km/hr}$$

$$\text{Relative speed} = (120 + 12) \text{ km/hr}$$

Convert km/hr into m/s

$$\begin{aligned}132 \text{ km/hr} &= (132 * 5 / 18)\text{m/s} \\ &= 36.66 \text{ m/s}\end{aligned}$$

$$\text{Time} = \text{distance} / \text{speed}$$

$$= 200 / 36.6$$

$$= 5.4 \text{ sec}$$

$$\begin{aligned}\text{II) Relative speed for same direction} &= (120 - 12)\text{km/hr} \\ &= 108 \text{ km/hr}\end{aligned}$$

Convert km/hr into m/s

$$\begin{aligned}108 \text{ km/hr} &= (108 * 5 / 18)\text{m/s} \\ &= 30 \text{ sec}\end{aligned}$$

$$\text{Time} = \text{distance} / \text{speed}$$

$$= 200 / 30$$

$$= 6.66 \text{ sec}$$

Type 4



31) A passenger train travelling at 96 kmph completely crosses another train having half its length and travelling in opposite direction at 84 kmph, in 24 seconds. It also passes a railway platform in 90 seconds.

The length of the platform is

- A) 1250 m
- B) 2258m
- C) 1600 m
- D) 3725m

32) Two goods trains having equal lengths, take 30 seconds and 45 seconds respectively to cross a telegraph post. If the length of each train is 360 meters, in what time (in seconds) will they cross each other when traveling in opposite direction?

- A) 36
- B) 12
- C) 24
- D) 48

33) The distance between two stations ooty and chennai is 615km. A train with speed of 75 km/h leaves ooty at 8:00 am towards chennai. Another train with speed of 105 km/h leaves Chennai at 9 : 00 am towards ooty . Then, at what time both trains meet?

- A) 6
- B) 12
- C) 18
- D) 24

34) A train leaves Mumbai for chennai at 6 : 45 a.m. and goes at the rate of 100 km/h. Another train leaves Chennai for Mumbai at 4.30a.m. and goes at the rate of 120 km/h. If the distance between both is 1240 km, at what distance from Mumbai will the two trains meet?

- A) 210km
- B) 324km
- C) 115km
- D) 440km

35) Two trains A and B are moving in opposite directions at 180 km/hr and 270 km/hr. their lengths are 3.30 km and 2.7 km respectively. The time taken by the slower train to cross the faster train in second is.

- A) 48sec
- B) 13 sec
- C) 38sec



D) 24sec

36) Two trains, both 50m long, moving in opposite directions cross each other in 4 seconds. If one is moving thrice as fast the other, then the speed of the faster train is.

- A) 45km/hr
- B) 19 km/hr
- C) 95 km/hr
- D) 67.5 km/hr

37) A and B are 2 trains running in opposite direction cross a man standing on the platform in 54sec and 34 sec respectively and they cross each other in 46sec. The ratio of their speed is.

- A) 1:3
- B) 3:2
- C) 2:3
- D) 2:2

38) A train p starts from delhi at 8pm and reaches kanyakumari at 10pm. While another train q starts from kanyakumari at 8pm and reaches delhi at 11pm. The two trains will cross each other at.

- A) 9.24pm
- B) 9.10pm
- C) 9.02pm
- D) 9.12pm

39) Two mail trains Pand Q of 300 m and 600m, run at speed of 130 km/hr and 160 km/hr respectively, in the direction opposite direction to each other. Find the time required to cross each other after the moment they met?

- A) 11.17 sec
- B) 12sec
- C) 9.10sec
- D) 21sec

40) A goodstrain of 700 m runs at a speed of 165 km/hr. A person traveling in it observes that the mail train moving in opposite direction takes 30 seconds to cross him. Find the speed of the mail train, if it is 750 m long.

- A) 8.4 m/s
- B) 5.3 m/s
- C) 2.5 m/s



D) 6.8 m/s

31) ANSWER:C

Explanation:

Let the length of the first train be x metres

Then, is $x/2$ metres

$$\begin{aligned}\text{Relative speed} &= (96+84)\text{kmph} \\ &= 180 \text{ kmph}\end{aligned}$$

$$\begin{aligned}\text{Convert km/hr into m/s,} \\ &= 180 \times 5/18 \\ &= 50 \text{ m/s}\end{aligned}$$

$$\text{Therefore } (x+x/2)/50 = 24$$

$$x+x/2 = 1200$$

$$3x/2 = 1200$$

$$3x = 2400$$

$$x = 800$$

$$\text{Length of first train} = 800 \text{ m.}$$

Let the length of platform be y metres.

$$\text{Speed of the first train} = 96 \times 5/18 = 480/18 \text{ m/s}$$

$$\text{Therefore } (800+y)/(450+18) = 90$$

$$(800+y) = 90 \times 480/18$$

$$y = 2400 - 800$$

$$= 1600$$

Hence, the length of the platform is 1600 m

32) ANSWER:A

Explanation:

$$\text{Speed of train} = \text{distance /time}$$

$$= 360/30 \text{ m/s}$$

$$= 12 \text{ m/s}$$

$$\text{Speed of train 2} = \text{distance /time}$$

$$= 360 /45 \text{ m/s}$$

$$= 8 \text{ m/s}$$

If 2 trains are moving in opposite direction then their speed values are added to find the relative speed.

$$\text{Relative speed} = 12+8 = 20 \text{ m/sec}$$

$$\text{distance covered} = 360+360 = 720 \text{ m}$$

$$\text{Time} = \text{distance/speed}$$

$$= (720/20)$$



= 36 Seconds

Hence the required answer is 36 seconds

33) ANSWER: B

Explanation:

First train leaves at 8.00am and second leaves at 9.00am

So, first train that is, from ooty to Chennai has covered

75 km distance in 1 hr.

So, distance left by between the station = $615 - 75 = 540$ km

Now trains are travelling in opposite directions.

We know that if 2 trains are moving in opposite direction then their speed values are added to find the relative speed.

So, Relative speed = $75 + 105$ kmph

= 180 km/hr

Time taken to cover 180 kmph = $540 / 180$

= 3 hrs

Therefore, the time at which both the trains will meet, 3 hr after second train left

i.e., 9.00 am + 3 = 12.00 pm

34) ANSWER: D

Explanation:

Given speed of the first train = 100 kmph

speed of the second train = 120 kmph

The second train leaving Chennai starts its journey earlier and it travels = $120 \times (6.45 \text{ a.m.} - 4.30 \text{ a.m.})$

= 120×2.15

= $120 \times 2 \frac{1}{4}$

= $120 \times \frac{9}{4}$

= 270 km, when the first train starts its journey

Now both the trains cover $(1240 - 270) = 970$ km with relative speed $(100 + 120) = 220$ kmph

Therefore the trains after meet $970 / 220 = 4.40$ hrs

After the first starts at 6.45 a.m.,

Now the first train covers $4.40 \times 100 = 440$ km

Therefore the first train meets the second train at 440 km

35) ANSWER: A

Explanation:



Speed of 1st train = 180 km/hr

Speed of 2nd train = 270 km/hr

Relative speed = (180 + 270)km/hr

= 450 km/hr

= (450 * 5 / 180)m/s

= (2250 / 18)m/s

= 125 m/s

Distance covered = (3.30 + 2.70)km

= 6km = 6000m

Required time = 6000 / 125

= 48sec

36) ANSWER:D

Explanation:

Let the speed of the slower train be 'x' m/sec

The speed of the faster train = 3x m/s

Relative speed = (x + 3x)m/sec

= 4x m/sec

50 + 50 / 4 = 4x

100 / 4 = 4x

100 = 16x

x = 100 / 16 = 25/4

so speed of the faster train = 3 * 25 / 4

= 75 / 4 m/s = (75/4 * 18 / 5)km/hr

= 67.5 km/hr

37) ANSWER:B

Explanation:

Let the speed of the 1st train be 'x' m/sec and

the speed of the 2nd train be 'y' m/sec

then the length of the 1st train = 54 x metres

length of the 2nd train = 34 y metres

54x + 34y / x + y = 46

54x + 34y = 46x + 46y

54x - 46x = 46y - 34y

8x = 12y

x/y = 12 / 8 = 6/4 = 3/2

x:y = 3:2



38) ANSWER: D

Explanation:

Suppose the distance between delhi and kanyakumari is x km

The time taken by p to cover x km = 2hrs

The time taken by q to cover x km = 3hrs

$$\begin{aligned}\text{Therefore speed of p} &= \text{distance} / \text{time} \\ &= x / 2 \text{ km/hr}\end{aligned}$$

$$\begin{aligned}\text{Speed of q} &= \text{distance} / \text{time} \\ &= x / 3 \text{ km/hr}\end{aligned}$$

Let them meet y hrs after 8pm

$$\text{Then, } xy / 2 + xy / 3 = x$$

$$Y (1/2 + 1/3) = 1$$

$$5/6 = 1/y$$

$$5y = 6$$

$$y = (6/5 * 60)\text{min} = 72\text{min}$$

So the two trains meet at 9.12pm

39) ANSWER:A

Explanation:

Length of train P = 300 m

Length of train Q = 600 m

Speed of train p = 130 kmph

Convert km/hr into m/s,

$$\begin{aligned}\text{Speed of train p} &= (130 * 5/18) \text{ m/s} \\ &= 650/18 \text{ m/s} \\ &= 36.11 \text{ m/s}\end{aligned}$$

Speed of train Q = 160 kmph

Convert km/hr into m/s,

$$\begin{aligned}\text{Speed of train Q} &= (160 * 5/18) \text{ m/s} \\ &= 800 / 18 \text{ m/s} \\ &= 44.44 \text{ m/s}\end{aligned}$$

As both trains move opposite to each other,

$$\text{relative speed} = 36.11 + 44.44 = 80.55 \text{ m/s}$$

$$\begin{aligned}\text{Distance} &= (\text{Length of train A} + \text{Length of train B}) \\ &= (300 + 600) \text{ m} \\ &= 900 \text{ m}\end{aligned}$$



$$\begin{aligned}\text{We know, } \text{time} &= \text{distance} / \text{speed} \\ &= 900 / 80.55 \\ &= 11.17 \text{ seconds}\end{aligned}$$

40) ANSWER:C

Explanation:

$$\text{Speed of goods train} = 165 \text{ km/hr}$$

$$\text{length of mail train (P)} = 750 \text{ m}$$

$$\text{length of goods train (Q)} = 700 \text{ m}$$

Alternately, we can directly use the formula:

$$\text{Time} = (p+q) / (v_1+v_2) \text{ sec}$$

(here P and Q are length of trains and V_1 and V_2 are speeds of two trains)

Goods train and the mail train move in opposite direction.

Hence, the relative speed is the addition of two speeds.

Convert 165 km/hr into m/s

$$165 \text{ km/hr} = (165 \times 5/18) \text{ m/s}$$

$$= 45.833 \text{ m/s}$$

Therefore,

$$\text{Time} = (p+q) / (v_1+v_2) \text{ sec}$$

$$30 = (750 + 700) / (45.833 + v_2)$$

$$= 1450 / 45.833 + v_2$$

$$45.833 + v_2 = 48.333$$

$$v_2 = 2.5 \text{ m/s}$$

Therefore the speed of the mail train is 2.5 m/s

TYPE 5:

41) Two metro train 360 meters and 360 meters in length respectively and running in same directions, one at the rate of 116 km and other at the rate of 100 km an hours. What time will they be cross of each other?

- A) 100 sec
- B) 162sec
- C) 132sec
- D) 126sec

42) Let p and q be two trains 65m and 70m long are running on parallel tracks in the same direction with a speed of 34km/hr and 25 km/hr. how long will it take to clear off each other from the moment they met?

- A) 54sec



- B) 56sec
- C) 45sec
- D) None of these

43) X and y are two trains of length 500m and 400m run on parallel lines. When they run in the same direction it will take 60 sec to cross each other. When they run in opposite direction, it will take 20 sec to cross each other. Find the speed of 2 trains (in km/hr)

- A) 116 and 42 km/hr
- B) 54 and 78km/hr
- C) 104 and 60km/hr
- D) 108 and 54km/hr

44) Two passenger trains are running in the same direction on parallel tracks at 210km/hr and 150km/hr respectively. The faster train passes a man 81 sec faster than the slower train. Find the length of the faster train.

- A) 1250m
- B) 1150m
- C) 1350m
- D) 1450m

45) It takes 60 sec for a train running at 162 km/hr to cross a bridge. And it takes 36 sec for the same speed to cross a boy walking at the rate of 18km/hr in the same direction in which the train is running. What is the length of the train and length of the platform.

- A) 1440 & 1260m
- B) 1220 & 60m
- C) 1000 & 1460m
- D) 1260 & 1450m

46) Find the time taken by mailtrain 200m long running at a speed of 120 km/hr to cross another train of length 160m running at a speed of 96km/hr in the same direction.

- A) 34sec
- B) 52sec
- C) 45sec
- D) 54sec

47) A train M speeding with 60km/hr crosses another train N, running in the same direction in 1 min. If the lengths of the trains M and N be 50m and 100m respectively. What is the speed of train N?



- A) 15 km/hr
- B) 61km/hr
- C) 51km/hr
- D) 50k/hr

48) Two trains 300 metres and 360 metres long are running in the same direction with speeds of 216 kmph and 162 kmph .In how much time will the first train cross the second?

- A) 54sec
- B) 44sec
- C) 40sec
- D) 14sec

49) A and B are two trains 150m and 100m long are running on parallel rails at the rate of 30 kmph and 40 kmph respectively.In how much time will they cross each other if they are running in the same direction.

- A) 80 sec
- B) 90sec
- C) 105sec
- D) 45sec

50) Two trains are running at 120 km/hr and 60km/hr respectively in the same direction. Fast train completely passes a boy sitting in the slower train in 15 seconds. What is the length of the fast train?

- A) 150m
- B) 550 m
- C) 250m
- D) 215m

41) ANSWER: B

Explanation:

Length of the 1st metro train = 360m

Length of the 2nd metro train = 360m

Total length of the both metro train = $360 + 360 = 720$ m

speed of the 1st metro train = 116 km/hr

speed of the 2nd metro train = 100 km/hr

here two fast trains are running in same direction and their,

relative speed = $(116 - 100)$ km/hr

= 16km/hr

Convert km/hr into m/s



$$16\text{km/hr} = (16 * 5 / 18)\text{m/s} \\ = 40/9 \text{ m/s}$$

$$\text{Speed} = \text{distance} / \text{time}$$

$$\begin{aligned} \text{Required time} &= \text{distance} / \text{speed} \\ &= (720/(40/9))\text{sec} \\ &= 720 * 9 / 40 \\ &= 162\text{sec.} \end{aligned}$$

42) ANSWER : A

Explanation :

$$\text{Speed of the train p} = 34\text{km/hr}$$

$$\text{Speed of the train q} = 25 \text{ km/hr}$$

If the direction is given in the same direction then we subtract

$$\begin{aligned} \text{So relative speed of trains} &= (34 - 25)\text{km/hr} \\ &= 9 \text{ km/hr} \end{aligned}$$

Convert km/hr into m/s

$$\begin{aligned} 9 \text{ km/hr} &= (9 * 5 / 18)\text{m/s} \\ &= 5/2 \text{ m/s} \end{aligned}$$

$$\text{Time} = \text{distance} / \text{speed}$$

$$\begin{aligned} \text{Here, distance} &= \text{sum of length of trains} \\ &= (65 + 70)\text{m} \\ &= 135\text{m} \end{aligned}$$

$$\begin{aligned} \text{Therefore time} &= (135 / (5/2))\text{sec} \\ &= 270/5 \text{ sec} \\ &= 54 \text{ sec.} \end{aligned}$$

43) ANSWER : D

Explanation:

Let the speed of 2 trains be a_1 and a_2

$$\begin{aligned} \text{Total distance covered to cross each other} &= (500 + 400)\text{m} \\ &= 900\text{m} \end{aligned}$$

When they run in the same direction,

$$\begin{aligned} \text{Relative speed} &= a_1 - a_2 \\ &= 900 / 60 \end{aligned}$$

$$A_1 - a_2 = 15 \quad \text{-----} \rightarrow 1$$

When they run in the opposite directions,

$$\text{Relative speed} = a_1 + a_2$$



$$= 900 / 60$$

$$A_1 + a_2 = 45 \quad \text{-----} \rightarrow 2$$

Solving 1 and 2 we get

$$2a_1 = 60 \quad \rightarrow a_1 = 30 \text{ m/s} \quad \text{-----} \rightarrow 3$$

Convert m/s into km/hr

$$\begin{aligned} a_1 &= (30 * 18 / 5) \text{ km/hr} \\ &= 108 \text{ km/hr} \end{aligned}$$

Put 3 value in 1 to get a_2 value,

$$a_2 = 30 - 15 \rightarrow 15 \text{ m/s} \quad \text{----} \rightarrow 4$$

Convert m/s into km/hr

$$\begin{aligned} a_2 &= (15 * 18 / 5) \text{ m/s} \\ &= 54 \text{ km/hr} \end{aligned}$$

Speed of two trains are 108 and 54 km/hr

44) ANSWER: C

Explanation:

Speed of 1st train = 210 km/hr

Speed of 2nd train = 150 km/hr

Here the two passenger trains are running in same direction, so

$$\begin{aligned} \text{Relative speed} &= (210 - 150) \text{ km/hr} \\ &= 60 \text{ km/hr} \end{aligned}$$

Convert km/hr into m/s

$$\begin{aligned} 60 \text{ km/hr} &= (60 * 5 / 18) \text{ m/s} \\ &= 50 / 3 \text{ m/s} \end{aligned}$$

Time = distance (length) / speed

Length of the faster train = relative speed * time taken by train to pass

$$\begin{aligned} &= 50/3 * 81 \\ &= 1350 \text{ m} \end{aligned}$$

45) ANSWER: A

Explanation:

$$\begin{aligned} \text{Relative speed of the train to man} &= (162 - 18) \\ &= 144 \text{ km/hr} \end{aligned}$$

Convert km/hr into m/s

$$\begin{aligned} 144 \text{ km/hr} &= (144 * 5 / 18) \text{ m/s} \\ &= 40 \text{ m/s} \end{aligned}$$

When the train passes a boy, it covers the distance which is equal to its own length in the above relative speed



Given that it takes 24se for the train to cross a boy

So length of the train = relative speed * time

$$= 40 * 36$$

$$= 1440 \text{ m}$$

Speed of train = 162 km/hr

$$= (162 * 5 / 18) \text{ m/s}$$

$$= 45 \text{ m/s}$$

When the train crosses the bridge it over the distance which is equal to the sum of length of trains & bridge

So the sum of length of train & bridge = speed * time

$$= 45 * 60$$

$$= 2700 \text{ m}$$

i.e., length of the train + length of bridge = 2700m

$$1440 + \text{length of bridge} = 2700$$

$$\text{length of bridge} = 1260 \text{ m}$$

the length of the bridge & train are 1260 and 1440m

46) ANSWER: D

Explanation:

Total distance covered to cross each other = 200 + 160

$$= 360 \text{ m}$$

If the direction is given in the same direction then we subtract

Relative speed of two trains (same direction) = (120 – 96)km/hr

$$= 24 \text{ km/hr}$$

Convert km/hr into m/s

$$24 \text{ km/hr} = (24 * 5 / 18) \text{ m/s}$$

$$= 20 / 3 \text{ m/s}$$

Time taken to cross = distance / speed

$$= 360 / (20/3)$$

$$= 360 * 3 / 20$$

$$= 54 \text{ sec}$$

Time taken by the faster train to cross the slower train is 54sec.

47) ANSWER: C

Explanation:

Let the speed of be train N be 'x'km/hr

Speed of M relative to N = (60 – x)km/hr

$$= (60-x) * 5/18] \text{ m/s}$$



$$= (300 - 5x / 18) \text{m/s}$$

$$150 / (300 - 5x / 18) = 60$$

$$2700/300-5x=60$$

$$2700=18000-300x$$

$$300x=15300$$

$$x= 153/3$$

$$x=51\text{km/hr}$$

Therefore the speed of the train is 51 km/hr

48) ANSWER: B

Explanation:

Length of the 1st train=300m

Length of the 2nd train=360m

Speed of the first train=216kmph

Speed of the second train=162kmph

Relative speed =(216-162)kmph

=54kmph.

Convert km/hr into m/s

=(54*5/18) m/s

=15 m/sec.

Time taken by the trains to cross each other=Time taken to cover (300+360)m at 15 m/s

=(660/15) sec

=44 sec

Therefore the first train cross the second at 44 sec.

49) ANSWER: B

Explanation:

Length of first train=150m

Length of second train=100m

Speed of first train =30kmph

Speed of second train =40kmph

If the direction is given in the same direction then we subtract

Relative speed = (40-30)kmph

=10kmph

Convert km/hr into m/s

=(10*5/18)m/s



$$=25/9\text{m/s}$$

Total distance covered=sum of the length of trains

$$=(150+100)\text{m}$$

$$=250\text{m}$$

$$\text{Time} = \text{distance/speed}$$

$$\text{Time taken} = (250 \times 9/25)\text{sec}$$

$$=90 \text{ sec.}$$

50) ANSWER: C

Explanation:

$$\text{Speed of the 1}^{\text{st}} \text{ train} = 120\text{km/hr}$$

$$\text{Speed of the 2}^{\text{nd}} \text{ train} = 60\text{km/hr}$$

If the direction is given in the same direction then we subtract the relative speed.

$$\text{Relative speed} = (120 - 60)\text{km/hr}$$

$$= 60\text{km/hr}$$

Convert km/hr into m/s

$$= (60 \times 5 / 18)\text{m/s}$$

$$= 50 / 3 \text{ m/s}$$

$$\text{Length} = \text{speed} \times \text{time}$$

$$\text{Length of the faster train} = (50 / 3 \times 15)\text{m}$$

$$=(750/3)\text{m}$$

$$= 250\text{m}$$

Therefore the length of the faster train is 250m

8. AVERAGE

1) The average age of a family of 24 members is 132 years. If the age of the youngest member is 22 years, the average age of the family at the birth of the youngest member was?

- A) 75
- B) 110
- C) 100
- D) 95

2) There are three different categories of jobs A, B and C. The average salary of the students who got the job of A and B categories is Rs.32 lakh per annum. The average salary of the student who got the job of B and C category is 54 lakh per annum. And the average salary of those students who got the job of A and C is Rs.44



lakh per annum. The most appropriate (or closet) range of average salary of all the three categories (if it is known that each student gets only one category for jobs i.e, A, B and C):

- A) lies between 30 & 44
- B) lies between 48 & 56
- C) lies between 38 & 45
- D) lies between 49 & 50

3) In shewak's opinion, his weight is greater than 76 kg but less than 83 kg. His sister does not agree with shewak and she thinks that shewak's weight is greater than 71 kg but less than 81 kg. His father's view is that his weight cannot be greater than 79 kg. If all are them are correct in their estimation, what is the average of different probable weights of shewak?

- A) 67kg
- B) 68kg
- C) 72kg
- D) 78kg

4) In a post graduate examination the marks obtained by a student is 75 per paper. If he had obtained 33 marks more in Evs paper & 27 more marks in science paper, then his average per paper is increased by 3 marks. Then how many papers were there in exam?

- A) 10
- B) 12
- C) 14
- D) 20

5) Students of two university appeared for a common test of maximum 60 marks. The average of their marks for university 1 & university 2 are 39 & 42 respectively. If the no of students of university 1 is twice the no of students of university 2. Then what is the average marks of all students of both the university?

- A) 40
- B) 42
- C) 26
- D) 36

6) Find the average of even numbers above 1000 & upto 1 lakh?

- A) 50500
- B) 50000
- C) 49500
- D) 51500



- 7) The average age of 11 daughters of a family is 12yrs. Average age of the daughters together with their parents is 27yrs. If mother is 14yrs younger than father. Then find the father's age
- A) 127 yrs
B) 116.5 yrs
C) 168yrs
D) 170yrs
- 8) The average price of 12 note books is Rs.15 while the average price of 10 of these note books is Rs.13. Of the remaining 2 note books, if the price of one note book is 50% more than the price of the other, what is the price of each of these two note books?
- A) Rs. 30, Rs.20
B) Rs. 8, Rs. 30
C) Rs. 10, Rs. 16
D) Rs. 12, Rs. 20
- 9) The average monthly salary of 24 labours and 6 supervisor in a factory was Rs. 1200. When one of the supervisor whose salary was Rs. 1440, was replaced with a new supervisor, then the average salary of the team went down to 1160. What is the salary of the new supervisor?
- A) 170
B) 420
C) 390
D) 240
- 10) The average scores of a batch of students in a test is 84. The 36% of students's average score is 57 and 42% of students's score is 84. Then find the average score of remaining 22% of students approximately,
- A) 128
B) 131
C) 119
D) 106

1) Answer: B)

Total age of the family of 24 members = $132 \times 24 = 3168$ yrs

Total age of the family members 22 yrs ago = $3168 - (24 \times 22) = 2640$

at the time total members in a family = 24

average age of the family at the birth of the youngest member = $2640/24 = 110$ yrs.



2) Answer: C)

Let the number of students who got the jobs of A, B and C categories is a, b and c respectively,

$$\therefore \text{Total salary of A and B} = 32(a + b)$$

$$\therefore \text{Total salary of B and C} = 54(b + c)$$

$$\therefore \text{Total salary of A and C} = 44(a + c)$$

$$\text{Then the total salary} = 32(a+b) + 54(b+c) + 44(a+c) / 2(a+b+c)$$

$$= 76a + 86b + 98c / 2(a+b+c)$$

$$= 38a + 43b + 49c / (a+b+c)$$

$$= 38(a+b+c) + (5b + 11c) / (a+b+c)$$

$$= 38 + \text{some positive value}$$

\therefore So the minimum salary must be Rs.38 lakh and the maximum salary cannot exceed 45, which is the highest of the three..

3) Answer: D)

Let shewak's weight be X kg.

According to shewak, $76 < X < 83$

According to shewak's sister, $71 < X < 81$.

According to shewak's father, $X \leq 79$

The values satisfying all the above conditions are 77, 78 and 79.

$$\text{Required average} = [(77+78+79)/3] = 201/3 = 78\text{kg.}$$

4) Answer: D)

Let the number of paper be A.

Then total marks earned him = 75A

from questions,

$$75A + 33 + 27 = 78A$$

$$3A = 60 \Rightarrow A = 20 = \text{number of subjects}$$

5) Answer: A)

Let number of students of university 2 be N and

the no of students of university 1 be 2N

the average of university 1 and university 2 is 39 and 42

total marks of university 1 students and university 2 students,

$$= 2N \times 39 = 78N \quad \text{and} \quad N \times 42 = 42N$$

average of both university,

$$= (78N + 42N) / (N + 2N) = 40 \text{ marks}$$



6) Answer: A)

No of even numbers upto 1lakh = 50000

No of even numbers upto 1000 = 500

No of even numbers above 1000 & upto 1 lakh = 49500

sum of first N even numbers = $N \times N$

sum of even numbers above 1000 & upto 1 lakh = $50000 \times 50000 - 500 \times 500 = 2499750000$

average of even numbers above 1000 & upto 1 lakh = $2499750000 / 49500 = 50500$

7) Answer: B)

Total age of 11 daughters of a family = $11 \times 12 = 132$

father age = 14 + mother age

total age of the family

(11 daughters + father + mother) is,

$132 + \text{mother} + 14 + \text{mother} = 27 \times 13$

mother = 102.5

father age = $14 + 102.5 = 116.5$ years

8) Answer: A)

Total price of 12 note books = Rs. 180

Total price of 10 note books = Rs. 130

⇒ The price of 2 note books = Rs. 50

Let the price of each book be x and y.

⇒ $x + y = 50$ ----- (1)

Given that the price of 1 note book is 50% more than the other price

$150y / 100 + y = 50$

y = 20

Substituting y value in (1) we get, x = 30

9) D)

The total salary amount = $30 \times 1200 = 36000$

The salary of the exiting supervisor = 1440

Therefore, the salary of 24 labours and the remaining 5 supervisors:

$= 36000 - 1440 = 34560$

When a new supervisor joins, the new average salary drops to Rs. 1160 for the total team of 30 of them.

The total salary for the 30 people i.e., 24 labours, 5 old supervisors and 1 new supervisor = $1160 \times 30 = 34800$

Therefore, the salary of the new supervisor is $36000 - 34800 = 1200$ less than that of the old supervisor who left the company, which is equal to $1440 - 1200 = 240$



10) Answer: A)

let the number of students be 100,

$$\text{then, } 100 \times 84 = 36 \times 57 + 42 \times 84 + 22 \times x$$

$$22x = 8400 - 2052 - 3528$$

$$x = 128.18$$

11) In a famous restaurant rooms were numbered from 401 to 430, each room gives an earning of Rs. 4675/ day for the first 15 days a month and for the later half, Rs. 5370/ day per room. Find the average income room per day over the month of 30 days?

A) 5700.5

B) 5872.7

C) 5900.5

D) 5022.5

12) The average height of the students in a group was 360cm. When 10 students whose height is 292.8cm are newly admitted. The average height of the group was reduced by 24cm. How many students are present in the group?

A) 29

B) 25

C) 28

D) 14

13) Rohit married 21 years ago at the age of 90 years. His wife's present age 99 years. If 24 years later the average age of Rohit, his wife and their son was 90 years, then what is son's present age?

A) 15yr

B) 14yr

C) 13yr

D) 12yr

14) The average height of a batch is 344 cm. 16 more students with an average height of 320 cm joined the batch therefore decreasing the average height of the batch by 12 cm. Find the total strength of the batch?

A) 12

B) 11

C) 14

D) 16



15) The average age of the assemblage of people was 114 yrs. When the 2 people of the assemblage went out with age of 84 yrs and 108yrs, then the average of the assemblage increased by 12yrs. How many people are there initially?

- A) 3
- B) 4
- C) 5
- D) 6

16) The monthly expenditure of Moorthy family was Rs 3120 during the first 4 months, Rs 3390 during the next 3 months and Rs 3618 during the last 5 months of a year. If the total saving during the year is Rs 3540, find the average monthly income of moorthy family.

- A) Rs 3690
- B) Rs 3785
- C) Rs 3670
- D) Rs 3875

17) Saravanan has scored an total of 90% in an examination with five subjects in the ratio 18:14:15:21:22. If 85% is the marks required to get an 'A' grade in each subject, then find in how many subjects did he get an 'A' grade. Given that the maximum marks in each subject is 120.

- A) 2
- B) 3
- C) 4
- D) 5

18) The average age of K and L is 48 years. If M replaced K, the average age would be 40 and if M replaced L, the average would be 44. What are the ages of K,L,M repectively?

- A) 58, 46, 22
- B) 32, 44, 36
- C) 52,44,36
- D) 56, 22,38

19) There were 126 people in a Inn. Due to the entry of 39 new people, the expenses of the inn increase by Rs. 93 per day while the average expenditure per head diminished by Rs. 9. What was the original expenditure of the inn?

- A) Rs. 6343
- B) Rs.5098
- C) Rs.6215



D) Rs. 5476

20) A batch of 50 people has the oldest person with 160 years of age. The average of the batch is reduced by 2, if the oldest person is replaced by someone new, Find the age of the new person.

- A) 45
- B) 30
- C) 60
- D) 75

11) Answer: D)

Total number of rooms = 30

earning in 1st 15 days for 30 rooms

$$= 15 * 4675 * 30 = \text{Rs. } 2103750$$

earning in 2nd 15 days for 30 rooms

$$= 15 * 5370 * 30 = \text{Rs. } 2416500$$

Average income per room per day over the month of 30 days

$$= [2103750 + 2416500] / [30 * 30]$$

$$= \text{Rs. } 5022.5$$

12) Answer: C)

let the number of students initially in the class be A,

then, total height = $A * 360$ ----- 1

again the no of students increased = $A + 10$

then, total height $A + 10$ student = $(A + 10) * 336$ ----2

the total height of 10 student of 10 new students = $10 * 292.8 = 2928\text{cm}$ -----3

from 1,2 , 3

$$(A+10) * 336 - 2928 = A * 360$$

$$336A + 3360 - 2928 = 360A$$

$$A = 18$$

$$\text{Number of students in class} = 18 + 10 = 28$$

13) Answer: D)

Rohit present age = 111 years

total age of family after 24 yrs = $90 * 3 = 270$

present age of rohit & his wife = $111 + 99 = 210\text{yrs}$

present age of rohit, his wife & his son = $270 - 24 * 3 = 198$

present age of son = $210 - 198 = 12\text{yrs}$



14) Answer: D)

let the initial strength of the batch be X

total height of the batch initially = 344X

total height of 16 new students = $320 \times 16 = 5120$ cm

Then, the average height of X+ 16students = 332

$$332 = [5120 + 344 X] / [X + 16]$$

X= 16 students

15) Answer: C)

let the number of people initially be N

total age of N people = 114N

total age of N-2 people = $114N - (84+108) = 114N - 192$

average age of N-2 people = $126 = [114N - 192] / [N - 2]$

N=5

Hence the required answer is 5

16) Answer: A)

Total expenditure during the year

$$= \text{Rs } [3120 \times 4 + 3390 \times 3 + 3618 \times 5]$$

$$= \text{Rs } [12480+10170 +18090]$$

$$= \text{Rs } 40740.$$

Total income during the year = $(40740 + 3540) = 44280$.

Average monthly income = $(44280/12) = \text{Rs}3690$.

Hence, the average monthly income of moorthy family is 3690

17) Answer: B)

Maximum total marks = $5 \times 120 = 600$

Marks scored by Saravanan = $90/100 \times 600 = 540$

Let the marks scored by him in the 5 subjects be 18x, 14x, 15x, 21x and 22x respectively.

$$18x + 14x + 15x + 21x + 22x = 540 \Rightarrow 90x = 540 \Rightarrow x = 6.$$

So, The marks scored by him in each of the subjects are $18x = 108$, $14x = 84$, $15x = 90$, $21x = 126$, $22x = 132$

minimum 80% marks are required for 'A' grade i.e. $0.85 \times 120 = 102$

Therefore, he has got an 'A' grade in 3 subjects.

18) Answer: C)

Total age of K& L = $48 \times 2 = 96$ yrs----->1



Total age of L & M = $40 \times 2 = 80$ yrs----->2

Total age of K & M = $44 \times 2 = 88$ yrs----->3

from 1, 2, 3

$K + L + M = 132$ ----->4

from 1 & 4, M = 36

from 2 & 4, K = 52

from 3 & 4, L = 44

Hence the required answer is 52, 44, 36

19) Answer: B)

Let per day average expense = x

$$126x + 93 = 165(x - 9)$$

$$126x + 93 = 165x - 1485$$

$$1578 = 39x$$

$$X = 40.46$$

$$\text{original expenditure} = 126 \times 40.46 = \text{Rs } 5098$$

20) Answer: C)

Average = Sum of observations / Number of observations

Given, a batch of 50 people has the oldest person with 160 years of age.

Let the average of the group be 'a'.

Sum total of ages = 50a

Given, average of the batch is reduced by 2, if the oldest person is replaced by someone new.

Let the age of the new person be 'b'.

$$50a - 160 + b = 50(a - 2)$$

$$b = 160 - 100$$

$$b = 60 \text{ years}$$

21) There were 32 boys in a hostel. If the number of boys be increased by 15, then the expenditure on food increases by Rs. 43 per day while the average of expenditure of boys is reduced by Rs. 2. What was the initial expenditure on food per day?

A) Rs. 108.2

B) Rs. 125.6

C) Rs. 135.8

D) Rs. 144.5



22) The average monthly salary of directors & office boys of an organization Rs. 3750. Then the average salary of all directors is Rs. 6000 while that of all office boys is Rs. 3000 per month. If there are 120 employees in the organization then find the ratio of manager and office boy.

- A) 2:5
- B) 3:1
- C) 1:3
- D) 5:2

23) There are two groups of a class consisting of 72 and 88 students respectively. If the average weight of 1st group is 80kg and the weight of 2nd group is 70kg. Find the average weight of whole class?

- A) 64kg
- B) 74.5kg
- C) 84.5kg
- D) 54kg

24) A person's age is 150% of what it was 15 years ago, but 76% of what it will be after 15years. What is his present age?

- A) 39.7
- B) 45.8
- C) 42.8
- D) 37.8

25) The average marks scored by two Class A1 and A2 students are 120 and 130 respectively. If 8 students are moved from Class A2 to Class A1 and the average marks of the two Class get interchanged. Find the total number of students in two Class put together, if the average marks scored by the 8 students who moved is 150

- A) 25
- B) 30
- C) 35
- D) 40

26) When a girl weighing 90 kgs left a class, the average weight of the remaining 119 students increased by 400 g. What is the average weight of the remaining 119 students?

- A) 124
- B) 138
- C) 145
- D) 116



27) In an competitive examination, the average was found to be 72 marks. After detecting the errors the marks of 94 candidates had to be charged from 90 to 66 each, and the average is reduced to 64 marks. Find the total number of candidates who took the exam.

- A) 282
- B) 382
- C) 828
- D) 200

28) In an exam the average marks obtained by a candidate is 82 per paper. If he had obtained 32 marks more in science paper & 28 more marks in social paper, then his average per paper is increased by 15 marks. Then how many papers were there in examination?

- A) 10
- B) 6
- C) 4
- D) 8

29) 18 friends went to a restaurant for taking their breakfast. 17 of them spent RS.24 each on their breakfast and the last one spent RS.16 more than the average expenditure of all the 18. What was the total money spent by them?

- A) 228
- B) 448.9
- C) 458.6
- D) 428.0

30) The average weight of x,y,z is 90kg. If the average weight of x and y be 80kg and that of y and z be 86kg. Find the weight of y

- A) 66kg
- B) 63kg
- C) 62kg
- D) 70kg

21) Answer: A)

Let initial expense of 32 boys = Rs. x

average expense of 32 boys = $x/32$

average expense of 47 boys = $(x + 43)/47$

then,



$$(x/32) - ((x+43)/47) = 2$$

$$x = \text{Rs. } 108.28$$

22) C)

let the number of director be X and office boy be 120-x

total salary of director and office boy = $120 \times 3750 =$

Rs.450000

total salary of director = $6000x$

total salary of office boy = $3000 \times (120 - x)$

total salary of director + total salary of office boy = 450000

$$450000 = 6000x + 3000 \times (120 - x)$$

$$3000x = 90000$$

$$x = 30 \rightarrow \text{number of director}$$

$$\text{number of office boy} = 120 - 30 = 90$$

$$\text{ratio of director to office boy} = 30:90 = 1:3$$

23) B)

$$\text{Total weight of } (72 + 88) = (72 \times 80) + (88 \times 70) \text{ kg}$$

$$= (5760 + 6160) \text{ kg}$$

$$= 11,920 \text{ kg}$$

$$\text{Average weight of the whole class} = 11920 / 160$$

$$= 74.5 \text{ kg}$$

24) B)

let the present age be X yrs then $150\% \text{ of } (X-15) = X$; and $76\% \text{ of } (x+15) = X$

$$150\% \text{ of } (X-15) = 76\% \text{ of } (X+15)$$

$$3/2(X-15) = 19/25(X+15)$$

$$X = 45.8 \text{ yrs}$$

25) D)

let the number of students in Class A1 be x and class A2 be y.

Total marks scored by the students will be $120x$ and $130y$, the average gets interchanged after moving student from y

Thus we get,

$$130y - 8 \times 150 = 120(y - 8)$$

$$130y - 1200 = 120y - 960$$

$$10y = 240$$

$$Y = 24$$

$$\text{Similarly, } 120x + 1200 = 130(x + 8)$$



$$120x + 1200 = 130x + 1040$$

$$10x = 160$$

$$x = 16$$

Thus the total number of students = $24 + 16 = 40$

26) B

Let the average weight of the 119 students be X .

Therefore, the total weight of the 119 of them will be $119X$.

The questions states that when the weight of this student who left is added, the total weight of the class = $119X + 90$

When this student is also included, the average weight decreases by 0.4 kgs.

$$(119X + 90) / 120 = X - 0.4$$

$$\Rightarrow 119X + 90 = 120X - 48$$

$$\Rightarrow X = 138$$

27) A)

let the number of candidates be A

total marks of candidates = $72A$

after detecting error the change of marks for one candidate = $90 - 66 = 24$ marks

change of marks for 94 candidates = $94 * 24 = 2256$

after detecting error of N candidates = $64A$

then, $72A - 2256 = 64A$,

$$8A = 2256$$

$$A = 282$$

28) C)

let the number of paper be x

total mark earned him = $82x$

then,, $82x + 32 + 28 = 97x$

$$15x = 60$$

$x = 4$ = number of subjects

29) B)

Let the average expenditure of all the 18 be Rs ' x '.

Then $(24 * 17) + (x + 16) = 18x$

$$424 + x = 18x$$

$$x = 24.9$$



therefore total money spent $18x$

$$= 18 * 24.9$$

$$= \text{Rs.}448.9$$

30) C)

Let x, y and z represent their individual weights. Then,

$$X + y + z = (90 * 3) = 270\text{kg}$$

$$X + y = 80 * 2 = 160\text{kg}$$

$$Y + z = 86 * 2 = 172\text{kg}$$

$$\text{Therefore } y = (x + y) + (y + z) - (x + y + z)$$

$$= 160 + 172 - 270$$

$$Y = 62\text{kg.}$$

31) The average age of 78 students of a batch is 30 years. If the age of the head master be included, then the average increases by 6 months. Find the age of head master?

A) 56yrs 5 months

B) 66yrs 6 months

C) 56yrs 5 months

D) 69yrs 5 months

32) The average of 12 numbers is 7.9. The average of 5 of them is 6.8, while the average of other five is 7.7. what is the average of the remaining 2 numbers?

A) 10.25

B) 11.15

C) 12.65

D) 13.25

33) Harish buys petrol at rs 21, Rs.24 and Rs.27 per litre for 3 successive years. What approximately is the average cost per litre of petrol if he spends Rs.12000 each year?

A) 23.74

B) 54.76

C) 24.66

D) 28.99

34) A batsman average for 20 innings is 25 runs. His highest score exceeds his lowest score by 64 runs. If these 2 innings are excluded, the average of the remaining 18 innings is 24 runs. The highest score of the player is.

A) 66



- B) 72
C) 77
D) 88
- 35) The batting average of runs of a cricket player of 30 innings was 96. How many runs must he make in his next innings so as to increase his average of runs by 12?
- A) 468
b) 668
C) 648
D) 486
- 36) A students maks were wrongly entered as 72 instead of 52. Due to that the average marks for the class got increased by half. The number of students in the class is.
- A) 50
B) 56
C) 46
D) 40
- 37) The average state of the city in the first 4 days of a month was 116 degrees. The average for the second, third, fourth and fifth days was 120 degrees. If the state of the first and fifth days were in the ratio 7:8 then what is the state on the fifth day.
- A) 112degrees
B) 128degrees
C) 132degrees
D) 130degrees
- 38) 4 years ago, the average age of x and y was 22 years. With z joining them, the average becomes 26 years. How ols is z now?
- A) 62yrs
B) 50yrs
C) 38 yrs
D) 54yrs
- 39) The average age of Krishnan family of 10 members was 34 yrs, 3 yrs ago. A baby having been born, the average age of the family is the same today. The present age of the baby.
- A) 1yr
B) 3yrs



C) 4yrs

D) 2yrs

40) An industry employed 1200 men and 800 women and the average salary was Rs 51 per day. If a woman got Rs 10 less than a man, then what are their daily salary?(mens and women respectively)

A) men Rs 25 and women Rs 35

B) men Rs 45 and women Rs 55

C) men Rs 35 and women Rs 25

D) men Rs 55 and women Rs 45

31) D)

Total age of 78 students = $(780 * 30)$ yrs

= 2340 yrs

Average of 79 persons = 30 yrs 6 months

= $6 \frac{1}{2}$ yrs

Total age of 79 persons = $6\frac{1}{2} * 79$

= 2409.5

Age of headmaster = $(2409.5 - 2340)$ yrs

= 69.5 yrs

= 69 yrs 5 months.

32) B)

Sum of the remaining 2 numbers = $[(12 * 7.9) - (586.8) - (5 * 7.7)]$

= $94.8 - 34 - 38.5$

= 22.3

Required average = $22.3 / 2$

= 11.15

33) A)

Total quantity of petrol consumed in 3 yr = $(12000/21 + 12000/24 + 12000/27)$

= $12000(1/21 + 1/24 + 1/27)$

= $12000(72+63+56/1512)$

= $12000(191/1512)$

= $(2292000/1512)$ litres

Total amount spent = $rs(3 * 12000)$

= Rs.36000

Average cost = $Rs(36000 * 1512 / 2292000)$



=Rs.23.74

34) A)

Let the highest score be 'x'

Then lowest score = $x - 64$

Then $(25 * 20) - 18 * 24 = 432$

$X + X - 64 = 68$

$X = 66$

35) A

Given that the total average runs of a cricket player (30 innings) = 96

After 31 innings = 108

Required number of runs = $(108 * 31 - (96 * 30))$

= $3348 - 2880$

= 468

36) D)

Let there be y students in the class

Total increase in marks = $y * 1/2$

= $y/2$

Therefore $y/2 = (72 - 52)$

$y/2 = 20$

$y = 40$

37) B)

Sum of states on 1st, 2nd, 3rd, 4th days = $(116 * 4) = 464$ =====>A

Sum of states on 2nd, 3rd, 4th and 5th days = $(120 * 4) = 480$ =====>b

From a and b

Subtracting each other we get,

State on 5th day – state on 1st day = 16 degrees

Let the state on 1st and 5th days be 7x and 8x degrees respectively

Then $8x - 7x = 16$

$x = 16$

therefore state on the 5th day = $8x = 128$ degrees.

38) C)

age of $(x+y)$ 4 yrs ago = $(22 * 2)$ yrs



=44

age of $(x+y+z) = (26 \times 3)$ yrs

=78 yrs

Therefore z's age = $(78-44)$ yrs

=34 yrs.

Current age of z = 38 yrs

39) C)

Total age of 10 members , 3 yrs ago = (34×10) yrs = 340 yrs

Total age of 10 members now = $(340 + 3 \times 10)$

=370 yrs

Total age of 11 members now = (34×11) yrs

=374 yrs

Therefore age of the baby = $374 - 370$

=4 yrs.

40) D)

Let the daily salary of man be Rs 'x'

Then the daily salary of a women = Rs $(x-100)$

Now $1200x + 800(x-10) = 51 \times (1200+800)$

$1200x + 800x - 8000 = 51 \times 2000$

$2000x = 102000 + 8000$

=110000

X=55

Therefore mens daily salary Rs 55 and womens daily salary Rs 45

41) A group of students of arithmetic mean of the marks in a test was 63. The brightest 30% of them secured a mean score of 70 and the dullest 15% a mean score of 41. The mean score of remaining 55 % is

A) 63.675

B) 61.785

C) 65.181

D) 66.67

42) Find the average of first 85 natural numbers?

A) 43

B) 41

C) 45



- D) 47
- 43) The average of 7 consecutive odd numbers is 41. Find the largest of these numbers
- A) 40
 - B) 57
 - C) 47
 - D) 43
- 44) The average of 3,8,7 and a is 6 and the average of 19,2,7, a and b is 11. What is the value of b?
- A) 11
 - B) 21
 - C) 31
 - D) 41
- 45) If the average of 4 observations x , $x+1$, $x+2$, $x+3$ is 12 then the average of last 2 observations is
- A) 10
 - B) 11
 - C) 12
 - D) 13
- 46) The average of a positive numbers (non-zero) and its square is 8 times the number. The number is
- A) 15
 - B) 17
 - C) 13
 - D) 19
- 47) A zoo has an average of 1020 visitors on Sundays and 480 on other days. The average number visitors per day in a month of 30 days beginning with a Sunday is.
- A) 5200
 - B) 570
 - C) 530
 - D) 450
- 48) 11 girls went to a canteen. 10 of them spent 10 each and the 11th girl spent 25 more than the average expenditure of all. Find the total money spent by them?
- A) 172 .5
 - B) 178 .5



C) 137.5

D) 165.5

49) An Aided school has only three classes which contain 70, 36 and 40 students respectively. The pass percentage of these classes are 30, 25 and 20 respectively. The pass percentage of the aided school is

A) 23 %

B) 15%

C) 26 %

D) 30%

50) The average weight of M, N and O is 168 kg. If P joins the group, the average weight of the group becomes 160 kg. If another man Q who weighs 6kg more than P replaces M, then the average of N, O, P and Q becomes 158 kg. What is the weight of M?

A) 175

B) 140

C) 145

D) 150

41) C)

Let the required mean score be 'x'

Then $(30 \times 70) + (15 \times 41) + 55x = 63 \times 100$

$2100 + 615 + 55x = 6300$

$2715 + 55x = 6300$

$55x = 3585$

$x = 65.181$

42) A)

Sum of 1st n natural numbers = $\frac{n(n+1)}{2}$

So, sum of 1st 85 natural numbers = $\frac{85(85+1)}{2}$

$= \frac{85(86)}{2}$

$= \frac{7310}{2}$

$= 3655$

Required average = $3655/85$

$= 43$.

43) C)

Let the numbers be x, x+2, x+4, x+6, x+8, x+10 and x+12



Then $x+x+2+x+4+x+6+x+8+x+10+x+12/7$

$$7x+42=287$$

$$7x=245$$

$$X=35$$

$$\text{Largest number} = x+12 = 35+12$$

$$=47$$

44) B)

$$\text{We have } (3+8+7+a+6/5)=6$$

$$24+a=30$$

$$A=6$$

$$\text{Also } (19+2+7+a+b/5)=11$$

$$19+2+7+6+b=55$$

$$34+b=55$$

$$b=21$$

45) D)

$$\text{We have } (x+x+1+x+2x+3/40)=12$$

$$4x+6=48$$

$$4x=42$$

$$x=10.5$$

so the numbers are 10.5, 11.5, 12.5, 13.5

$$\text{required average} = 12.5+13.5/2$$

$$=26/2$$

$$=13.$$

46) A)

Let the number be 'x'

$$\text{Then } x+x^2/2 = 8x$$

$$X+x^2=16x$$

$$X^2=15x$$

$$X^2 - 15x = 0$$

$$X(x-15)=0$$

$$X=0 \text{ or } x=15$$

So the number is 15 (because given [non-zero] positive).

47) B)



Since the month begins with a Sunday

So there will be 5 Sundays in the month

Therefore required average = $[(1020 \times 5) + (480 \times 25)] / 30$

$= (5100 + 12000) / 30$

$= 17100 / 30$

$= 570$

48) C)

Let the average money spent by the 11 girls = x

Money spent by the 11th girl = $(x + 25)$

Money spent by the other 10 girls = $(10 \times 10) = 100$

Total money spent by the 11 girls = $(100 + x + 25) = (x + 125)$

$x = (x + 125) / 11 \Rightarrow 10x = 125$

$x = 12.5$ Total money spent by the 11 girls = $11 \times 12.5 = 137.5$.

49) C)

Total number of students passed in class 1 = $30 / 100 \times 70 = 21$

Total number of students passed in class 2 = $25 / 100 \times 36 = 9$

Total number of students passed in class 3 = $20 / 100 \times 40 = 8$

Total number of students passed in the school = 38

Thus, pass percentage of the school = $38 / 146 \times 100 = 26\%$

50) D)

$M + N + O = 168 \times 3 = 504$

$M + N + O + P = 160 \times 4 = 640 \dots (1)$

$P = 136$ kg and $Q = 142$ kg

$N + O + P + Q = 158 \times 4 = 632$

$N + O + P = 632 - 142 = 490 \dots (2)$

from 1 & 2,

$M = 640 - 490 = 150$ kg

51) $1/2$ of a certain travel is covered at the rate of 30 km/hr, one-third at the rate of 40 km/hr and the rest at 35 km/hr. Find the average speed for the whole travel.

A) $33 \frac{1}{3}$

B) $33 \frac{3}{5}$

C) $34 \frac{3}{7}$

D) None of these



52) After replacing an old person by a new person, it was found that the average age of five persons of a assembly is the same as it was 6 years ago. What is the difference between the ages of the replaced and the new persons?

- A) 24
- B) 36
- C) 30
- D) 15

53) There are 50 compartments in a Chennai express carrying an average of 70 passengers per compartments. At least 24 passengers were sitting in each compartment, not any compartment has equal number of passengers, and any compartment does not exceed the number of average passengers expect 50th compartment. Find how many passengers can be accommodated in 50th compartment?

- A. 748
- B. 705
- C.739
- D.cannot be determined

54) Students of two colleges appeared for Talent test carrying 250marks as maximum. The average of their marks for college1 & college 2 are 160 & 180respectively. If the number of students of college 1 is the half of the number of students of college 2, then what is the average marks of all students of both the college?

- A) 170
- B) 110
- C) 173.33
- D) 177.33

55) If the average of two numbers are 138& product is 2241. Then find the difference of both numbers?

- A) 225.40
- B) 259.25
- C) 267.81
- D) 294.57

56) In an examination mahi scores 64% of marks, nitesh scores 52% of marks and ritesh scores 48% of marks. The maximum mark of the exam is a three digit number, whose sum is 10 and the middle digit is equal to the sum of the other two digits. The number will decreased by 297, if its digit are reversed. approximately what is the average mark obtained by mahi, nitesh and ritesh?

- A) 247



- B) 248
- C) 264
- D) 284

57) At the average age of siva and sasi is equal to the average age of somu and ramu. if the ratio of age of siva and sasi 1:3 and somu age is equal to the three by two of siva age. What is the present age of somu if ramu age is 25years?

- A) 12
- B) 15
- C) 18
- D) 21

58) The average height of 60 girls was calculated to be 300 cm. It was detected later that one value of 330 cm was wrongly copied as 270 cm for the computation of the mean. Find the correct mean.

- A) 301cm
- B) 300.5cm
- C) 307cm
- D) 311cm

59) The mean of 8 article was found to be 15. On rechecking, it was found that two article were wrongly taken as 11 and 9 instead of 16 and 14 respectively. Find the correct mean.

- A) 17.25
- B) 13.65
- C) 16.54
- D) 16.25

60) The average height of 50 students in a class is 182 cm. 40 students whose average height is 182.5 cm left the class and 50 students whose average height is 180.5 cm joined the class. Find the average height of the present?

- A) 180.41
- B) 175.5
- C) 180.55
- D) 185.5

51) B)

let the total travel be X km.



Then $X/2$ km at the speed of 30 km/hr and $X/3$ km at 40 km/hr and the rest distance $(X - X/2 - X/3) = 1/6 X$ at the speed of 35km/hr.

Total time taken during the travel of X km

$$= X/2 \times 30 \text{ hrs} + X/3 \times 40 \text{ hrs} +$$

$$X/6 \times 35 \text{ hrs}$$

$$= 5X/168 \text{ hrs}$$

$$\text{Average speed} = X / (5X/168) = 168/5 = 33 \frac{3}{5} \text{ km/hr}$$

52) C)

Let the ages of the five persons at present be a, b, c, d & e years.

And the age of the new persons be f years.

$$\text{So the new average of five members' age} = (a + b + c + d + f)/5 \text{ ----- (1)}$$

Their corresponding ages 6 years ago = $(a-6), (b-6), (c-6), (d-6)$ & $(e-6)$ years

$$\text{So their average age 6 years ago} = (a + b + c + d + e - 30)/5 = x \text{ ----- (2)}$$

$$\Rightarrow a + b + c + d + e = 5x + 30$$

$$\Rightarrow a + b + c + d = 5x + 30 - e \text{ ----- (3)}$$

Substituting this value of $a + b + c + d = 5x + 30 - e$ in (1) above,

$$\text{The new average is: } (5x + 30 - e + f)/5$$

Equating this to the average age of x years, 6yrs, ago as in (2) above,

$$(5x + 30 - e + f)/5 = x$$

$$\Rightarrow (5x + 30 - e + f) = 5x$$

$$\text{Solving } e - f = 30 \text{ years.}$$

Thus the difference of ages between replaced and new person = 30 years.

53) C)

$$\text{Total number of passengers in Chennai express} = 50 \times 70 = 3500$$

$$\text{Total number of candidates from 1 to 49 compartments} = 24 + 25 + \dots + 70$$

$$= (70 \times 71)/2 + (23 \times 24)/2 = 2761$$

$$\text{number of passengers in 50th compartment} = 3500 - 2761 = 739$$

54) C)

let the number of students of college 2 be ' $2N$ '

then the number of students of college 1 is ' N '

the average marks for college 1 is 160

the average marks for college 2 is 180

$$\text{total marks of college 1 students} = N \times 160 = 160N$$

$$\text{total marks of college 2 students} = 2N \times 180 = 360N$$



average marks of all students of both the colleges =

$$(160N + 360N)/N+2N = 173.33\text{marks}$$

55) B)

let the two number be a & b

sum of two numbers, $a+b = 138 \times 2 = 276$ ---1

product of two numbers, $a \times b = 2241$

$$(a+b)^2 = a^2 + 2ab + b^2 \quad \text{-----2}$$

$$(a-b)^2 = a^2 - 2ab + b^2 \quad \text{-----3}$$

solving 2 & 3,

$$76176 - (a-b)^2 = 4 \times 2241$$

$$a-b = 259.25$$

56) A)

Maximum mark consist of a three digit number let's consider

Unit digit place is Z, ten's place digit is Y and hundred's place digit is X.

According to the question,

$$Y = X + Z \quad \text{-----1}$$

$$X + Y + Z = 10, \text{ substitute equation 1}$$

$$2Y = 10$$

$$Y = 5$$

$$X + Z = 5 \quad \text{-----2}$$

$$\text{Number} = 100Z + 10Y + X$$

$$100Z + 10Y + X = 100X + 10Y + Z - 297$$

$$99X - 99Z = 297$$

$$X - Z = 3 \quad \text{-----3}$$

Solve equation 2 and 3,

$$X = 4, Z = 1$$

Original number = 451 = maximum mark

Total number of Mahi, Nitesh and Ritesh

$$= 164/100 \times 451 = 739.61$$

$$\text{Required average} = 739.64/3 = 246.54 \sim 247.$$

57) B)

$$\text{siva:sasi} = x:3x$$

$$\text{siva} + \text{sasi}/2 = \text{somu} + \text{ramu}/2$$

$$X + 3X = 3/2 \times X + 25$$



$$5X=50$$

$$X=10$$

Siva's age is 10 then somu's age = $\frac{3}{2} \times 10 = 15$ years

58) A)

Calculated average height of 60 girls = 300cm.

Incorrect sum of the heights of 60 girls

$$= (300 \times 60) \text{cm}$$

$$= 18000 \text{ cm.}$$

Correct sum of the heights of 60 girls

$$= (\text{incorrect sum}) - (\text{wrongly copied item}) + (\text{actual item})$$

$$= (18000 - 270 + 330) \text{ cm}$$

$$= 18060 \text{cm.}$$

Correct mean = correct sum/number of girls

$$= (18060/60) \text{ cm}$$

$$= 301 \text{ cm.}$$

59) D)

Calculated mean of 8 articles = 15

Incorrect sum of these 8 articles = $(15 \times 8) = 120$.

Correct sum of these 8 articles

$$= (\text{incorrect sum}) - (\text{sum of incorrect articles}) + (\text{sum of actual articles})$$

$$= [120 - (20) + (30)]$$

$$= 130$$

Therefore, correct mean = $130/8 = 16.25$

Hence, the correct mean is 16.25.

60) A)

The average of the students leaving the class as well as joining the class to be 182 so that the average remains the same.

But it is given that the average of the 40 students leaving the class is 182.5 (more than 182).

So we will incur a loss of 0.5 cm in the average upon 40 students.

Hence the loss in the sum = $0.5 \times 40 = 20 \text{ cm}$

Also, since the average of the 50 students joining the class is 180.5 (less than 182) we will incur a loss in this case as well. The loss in the average is 1.5 cm upon 50 students.

Hence the loss in the sum = $1.5 \times 50 = 75 \text{ cm}$



Thus the total loss in the sum = 95 cm. This loss will be shared by 60 students which is the present strength of the class.

Hence the average of the present class = $182 - 95/60 = 180.5$ cm

61) A cricketer played 3 matches in tournament. The respective ratio between the scores of first and second matches was 3:7 and that between the scores of second and third matches between was 7 :2. the difference between first and third matches was 84 runs, what was the cricketer average score in all the matches together?

- A) 336
- B) 146
- C) 168
- D) 189

62. The average marks obtained by a student in Tamil, english, maths, science, and social together is 65% above the average mark obtained in maths and science together. How many more marks exceeded by the average of maths and science together than the sum of the tamil and english together?

- A) 50
- B) 65
- C) Data insufficient
- D) None of these

63) There are five numbers, the second number is 25% more than the first or third number, the 4th number is $\frac{5}{4}$ of the third number and the fifth number is $\frac{3}{2}$ of the 3rd number. What is the average of 5 numbers if the first number is 10?

- A) 12.5
- B) 12
- C) 13
- D) 10

64) The average age of 150 students in a class is 40% of the number of students in the class and the average age of a group of 50 students present in the class is 32yrs and the average age of another 50 students in the class is 36yrs. What is the average age of the remaining students in the class?

- A) 102
- B) 118
- C) 112
- D) 108



65) Average age of A, B, C is 90yrs, however when D joins them, then the average comes down to 80 yrs. Now a new person E, whose age is six-fifth of the age of D, replaces A and the new average is 78. What is age of A?

- A) 64
- B) 68
- C) 62
- D) 66

66) Mr. Sebastine, a famous author, recently got his new novel released. To his utter dismay, he found that for the 1974 pages on an average there were 3 mistakes in every page. While, in the first 1024 pages there were only 2122 mistakes, they seemed to increase for latter pages. Find the average number of mistakes per page for the remaining pages.

- A) 5
- B) 2
- C) 3
- D) 4

67) Gowshik is going to market from his home by bike at a speed of 20kmph. While he comes back to his home with a speed of X kmph, what should be the value of x so that his average speed is 24kmph ?

- A) 24
- B) 34
- C) 30
- D) 32

68) There are some middle level workers in steel factory. The average monthly salary of the 70 middle level workers is Rs. 3250. and that of higher level workers is Rs. 3750., if the average monthly salary of higher and middle level workers is 3400. Find the total number of workers in the factory, if the number of middle level and higher level workers in factory from 50% of the total number of workers?

- a) 200
- b) 150
- c) 250
- d) 100

69) The average weather(rainfall) for the first 6 days out of 8 days recorded to be 9 cm. The rainfall on last 2 days was in the ratio 2:3. the average of 8 days was 14.2 cm. What was the rainfall on the last day?

- A) 7.8
- B) 34.4



C) 35.76

D) 8.9

70) A cricket player had a certain average of runs for his 43 innings. In his 44th innings, he is bowled out for no score on his part. This brings down his average by 4 runs. His new average of runs is ?

A) 172

B) 182

C) 166

D) 162

61) A)

The ratio between first and second matches equal to 3 : 7

The ratio between second and third matches = 7 : 2

The difference between first and third matches = $3x - 2x = 84$ runs
= 84

Required average = $1008/3 = 336$.

62) C)

According to the question

There is no other information about the marks in any one of the subject.

The data given is insufficient to answer the question.

63) B)

Let us consider 5 numbers are A, B, C, D and E

$$B = 125/100 \times A$$

$$B = 125/100 \times C$$

$$125/100 \times A = 125/100 \times C$$

$$A/C = 1/1$$

$$D = 5/4 \times C$$

$$E = 3/2 \times C$$

First number is 10,

$$A = 10 = x$$

$$B = 25\% \times 10 + 10 = 12.5$$

$$C = 10$$

$$D = 5/4 \times 10 = 12.5$$

$$E = 3/2 \times C = 15$$

$$\text{Required average} = 10 + 12.5 + 10 + 12.5 + 15/5 = 12$$



64) C)

150 students average $150 \times 40 / 100 = 60$ years

According to the question,

$$150 \times 60 = 50 \times 32 + 50 \times 36 + 50 \times X$$

$$50 \times X = 9000 - 1600 - 1800$$

$$50x = 5600$$

$$X = 112$$

65) B)

according to the question

$$A + B + C / 3 = 90$$

$$\Rightarrow A + B + C = 270 \dots \dots \dots (1)$$

$$A + B + C + D / 4 = 80$$

$$\Rightarrow A + B + C + D = 320 \dots \dots \dots (2)$$

From the equation 1 and 2

$$D = 50$$

$$E = 6 / 5 \times 50 = 60$$

$$E + B + C + D / 4 = 78$$

$$\Rightarrow E + B + C + D = 312$$

$$B + C + D = 312 - 60 = 252 \dots \dots \dots (3)$$

From 2 and 3

$$\text{The age of } A = 320 - 252 = 68$$

66) D

According to the question

X is the remaining pages average.

$$2122 + (1974 - 1024) \times x / 1974 = 3$$

$$950x = 5922 - 2122 = 3800$$

$$X = 3800 / 950 = 4$$

67) C)

Let speed be X

$$\text{Average speed} = 2xy / (x + y)$$

$$\Rightarrow 2 \times X \times 20 / (x + 20) = 24$$

$$40x = 24x + 480$$

$$16x = 480$$



$X=30$ kmph.

68) A)

$$(70 \times 3250 + x \times 3750) / (70 + x) = 3400$$

$$227500 + 3750x = 238000 + 3400x$$

$$350x = 10500$$

$$x = 10500 / 350$$

$$X = 30$$

$$\text{Total workers} = 100 / 50 \times (70 + 30)$$

= 200 workers are there in factory

69) C)

according to question

$$(6 \times 9 + 3x + 2x) / 8 = 14.2$$

$$54 + 5x = 113.6$$

$$X = 11.92$$

$$\text{Last day rainfall} = 3 \times 11.92 = 35.76 \text{ cm}$$

70) A)

Let the cricket player's average of runs for his 43 innings be X runs.

$$\text{Total number of runs in 43 innings} = 43x$$

According to the question,

$$[43x + 0] / 44 = x - 4$$

$$43x = 44x - 176$$

$$x = 176$$

$$\text{new average of runs} = 176 - 4$$

$$\Rightarrow 172$$

71) The average age of Mr and Mrs Rahim at the time of their marriage in 1981 was 56 yrs. On the occasion of their anniversary in 1986, they observed that the average age of their family had come down by 15 yrs compared to their age at the time of their marriage. This was due to the fact that their daughter varshini was born. What was the age of varshini in 1990?

A) 6

B) 5

C) 4

D) 1



72) The Cricketer average score in 40 over is 21, if the man scores 23runs in 8over, 26 runs in 10 over and 18runs in 14 over. What is the average score in remaining over?

- A) 18
- B) 19
- C) 16
- D) 20

73) The average age of a morning class is 108, if the average age of 72 ladies in the class is as same as the total average and the number of gents in the class is 2 more than the ladies in the class, what is the average age of gents in the class?

- A) 152
- B) 108
- C) 156
- D) 154

74) The average marks of a class of 90 students is 126. Out Of them, 4 scores zero, first 60 students scored an average of 116, next 24 scored an average of 118. What is the mark obtained by the remaining student in the class?

- A) 750
- B) 862
- C) 774
- D) 875

75) The average salary per head of all the employees in a company is Rs. 180. The average salary of 24 employees is Rs. 1040and the average salary per head of the rest is Rs. 160. Find the total number of employees in the workshop.

- A) 2841
- B) 1056
- C) 1195
- D) 2145

76) The average score in a bank examination of 13 students of a class is 50. If the scores of the top five students are not considered, the average score of the remaining students falls by 5. The pass mark was 35 and the maximum mark was 100. It is also known that none of the students failed. If each of the top five scorers had distinct integral scores, the maximum possible score of the topper is.

- A) 85
- B) 90



- C) 95
- D) 100

77) The average age of three -seventh of class is 49, what should be the average of remaining four-seventh students so that the average of the entire class is 63?

- A) 24.5
- B) 86.5
- C) 73.5
- D) 25.5

78) Ronit spends his money from his saving in different way that is he spends 25% on travel, 15% on food, 20% on wages and 17% on shopping a clothes and after that all expenditure he saved 6900. Find the how much he spent on clothes.

- A) 4400
- B) 5100
- C) 4000
- D) 6000

79) The average expenditure of A, B and C is Rs 10000 per month. Also, the average expenditure of B, C and D is Rs 14000 per month. If the average expenditure of D is thrice of that of A then the average expenditure of B and C is:

- A) 12000
- B) 15000
- C) 18000
- D) 21000

80) The average monthly income of M and N is Rs. 12100. The average monthly income of N and O is Rs. 10500 and the average monthly income of O and M is Rs. 14400. What is the monthly income of N?

- A) 4200
- B) 8200
- C) 5600
- D) 7600

71) B)

Sum of the ages of Mr and Mrs Rahim = $56 \times 2 = 112$ years

Sum of the ages in 1986 = $41 \times 3 = 123$ years

Sum of the ages of Mr and Mrs Rahim = $112 + 10 = 122$



Daughters age in 1986 = $123 - 122 = 1$ years

Daughters age in 1990 = $1 + 4 = 5$ years.

72) A)

According to the question

$$40 \times 21 = 23 \times 8 + 26 \times 10 + 18 \times 14 + 8 \times X$$

$$840 = 184 + 260 + 252 + 8x$$

$$8x = 144$$

$$X = 144/8 = 18 \text{ runs}$$

73) B)

According to question,

$$(72 + 74)X = 72 \times 108 + 74X$$

$$146x - 74x = 7776$$

$$72x = 7776$$

$$X = 7776/72 = 108 \text{ years}$$

74) C)

According to the question,

$$90 \times 126 = (4 \times 0) + (60 \times 116) + (24 \times 118) + 2y$$

$$11340 = 6960 + 2832 + 2y$$

$$2y = 1548$$

$$y = 774$$

75) B)

Average = Sum of observations/Number of observations

Let the number of employees be x .

Given, the average salary per head of all the employees in a company is Rs. 180

So, the sum of salary of all the employees in the company = Rs. $180x$

Given, the average salary of 24 employees is Rs. 1040

So, the total salary of 24 employees = $1040 \times 24 = \text{Rs. } 24960$

Given, the average salary per head of the result is Rs. 160.

Number of remaining employees = $x - 24$

Then, total salary of the remaining employees = $160 \times (x - 24)$

$$\therefore 24960 + 160 \times (x - 24) = 180x$$

$$\Rightarrow 24960 + 160x - 3840 = 180x$$

$$\Rightarrow 20x = 2112$$

$$\Rightarrow x = 1056$$



76) D

Average = Sum of observations/Number of observations

Given, average score in a bank examination of 13 students of a class is 50.

Sum of total scores = $13 \times 50 = 650$

Given, if the scores of the top five students are not considered, the average score of the remaining students falls by 5.

Sum of scores of remaining 8 students = $8 \times 45 = 360$

Sum of scores of the top 5 students = $650 - 360 = 290$

Let the scores of the top 5 students be a, b, c, d and e.

Let 'e' be the maximum possible score of the topper.

Also, each of the top five scorers had distinct integral scores.

Thus, for 'e' to be the maximum possible score, the collective score of (a + b + c + d) should be least possible.

Since average given was 45, so minimum score for highest scorers will be 46 atleast.

Thus,

$a = 46, b = 47, c = 48, d = 49$

$\Rightarrow a + b + c + d + e = 290$

$\Rightarrow 46 + 47 + 48 + 49 + e = 290$

$\Rightarrow e = 100$

77) C)

According to the question,

$63 = \frac{3}{7} \times 49 + \frac{4}{7} \times y$

$63 = \frac{147}{7} + \frac{4y}{7}$

$441 = 147 + 4y$

$4y = 294$

$Y = 73.5$

78) B)

Let the total income of Ronit x then total expenditure from income

$X \times (25\% + 15\% + 20\% + 17\%) = X \times 77\%$

$X \times 77\% = \text{Total savings} = X \times 23\%$

$X = 6900 \times 100 / 23 = 30000$

expenditure on clothes = 17% so, $30000 \times 17 / 100 = 5100$

79) A)

Total expenditure of A, B & C = $3 \times 10000 = 30000$



Total expenditure of B, C & D = $3 \times 14000 = 42000$

$D - A = 42000 - 30000 = 12000$

Also, we are given $D = 3A$. so $3A - A = 12000$ & $A = 6000$

Total expenditure of B & C = $30000 - 6000 = 24000$

Average expenditure of B & C = $24000 / 2 = 12000$

80) B)

The average monthly income of M and N is Rs. 12100.

The average monthly income of N and O is Rs. 10500 and

the average monthly income of O and M is Rs. 14400.

$M + N = 2 \times 12100 = 24200$ (Equation 1)

$N + O = 2 \times 10500 = 21000$ (Equation 2)

$O + M = 2 \times 14400 = 28800$ (Equation 3)

by solving,

(Equation 1) + (Equation 2) – (Equation 3)

$\Rightarrow M + N + N + O - (O + M) = 24200 + 21000 - 28800$

$\Rightarrow 2 \times N = 16400$

then $N = 8200$

N's monthly income = Rs. 8200

81) The batting average for 20 innings of a cricketer is 25 runs. His highest score exceeds his lowest score by 86 runs. If these two innings are excluded, the average of the remaining 18 innings is 22 runs. Find out the highest score of the player.

A) 85

B) 90

C) 95

D) 100

82) The average age of 14 mens is increased by 1 year when one of them whose age is 44 years is replaced by a lady. What is the age of the lady?

A) 54

B) 58

C) 50

D) 56



83) on analyzing the result of an competitive exam the teacher found that the average for the entire the class was 69 marks. If we say that average of 10 % of the students scored 77 marks and average of 28 % of the students scored 66 marks, then calculate average marks of the remaining students of the class

- A) 67.54
- B) 68.26
- C) 66.91
- D) 69.06

84) The average weight of a group of 22students is 34kg. When the weight of the staff is also included, the average weight increases by 2kg. What is the weight of the staff?

- A. 80 kgs
- B. 54 kgs
- C. 47 kgs
- D. 33kgs

85) The average of marks obtained by 60 students in a computer examination is 18. If the average marks of passed students is 20and that of the failed students is 8, what is the number of students who passed the examination?

- A) 100
- B) 75
- C) 50
- D) 85

86) The average age of 160 boys in a class is 58 yrs. The average group of 30 boys in the class is 42 yrs and the average of another group of 50 boys in the class is 36 years. What is the average age of the remaining boys?

- A) 72.58
- B) 74.25
- C) 77.75
- D) 75.68

87) When the average age of a father, mother and their son was 90 years, the son got married and a child was born just 6 year after the marriage when child turned 14 years the average age of the family is 80yrs. Find the age of daughter - in - law at present?

- A) 55
- B) 56
- C) 57



D) 58

88) The average age of Anu, banu and tonu is 74 yrs. 10 years hence the average age of anu and tonu is 86 yrs. 6 yrs ago the average age of aarthi and banu was 72 yrs. Find the present age of aarthi.

- A) 80
- B) 86
- C) 84
- D) 83

89) The average monthly expenditure of Mr. Abi family for the first 4 months is Rs.4210, next 4 month expenditure Rs.4450 for the last 4 months Rs. 4360 . If his family saves Rs. 6800 for 12 months, find the average monthly income of the family for the 12 months?

- A) Rs. 4707.25
- B) Rs.4564.75
- C) Rs. 4906.66
- D) Rs. 4806.50

90) The average of 35 results is 28. The average of first 17 of them is 24 and that of last 17 is 21. Find the 18th result?

- A) 125
- B) 215
- C) 512
- D) 521

81) C)

Total runs scored by the player in 20 innings = 20×25

Total runs scored by the player in 18 innings after excluding two innings = 18×22

Sum of the scores of the excluded innings = $20 \times 25 - 18 \times 22 = 104$

Given that the scores of the excluded innings differ by 86. Hence let's take the highest score as $x + 86$ and lowest score as x

Now $x + 86 + x = 104$

$\Rightarrow 2x = 18$

then $x = 9$

Highest score = $9 + 86 = 95$

82) B)

suppose the average age of 14 men is x years and the age of lady is y years.



the total age of 14 mens will be = $14x$ years

the average age of 14 mens is increased by 1 years who of them whose age is 44 years is replaced by a lady

So, the new average is = $x + 1$ years

total age of them will be = $[14 * (x + 1)]$ years

$$14x - 44 + y = 14 * (x + 1)$$

$$14x - 44 + y = 14x + 14$$

$$y = 14 + 44$$

$$y = 58$$

83) D)

average of entire class = 69 marks

average of 28 % of the students = 66 marks

average of 10% of the students = 77 marks

then % of remaining students = $(100 - 10 - 28) = 62\%$

let the average of 62% of the students be x

$$(62 * x) + (10 * 77) + (28 * 66) = 100 * 69$$

$$(62 * x) + 770 + 1848 = 6900$$

$$62 * x = 6900 - 770 - 1848$$

$$62 * x = 4282$$

$$x = 69.06$$

84) A)

The average weight of a group of 22 students = 34 kgs.

Therefore, the total weight of the group = $22 * 34 = 748$ kg

When the weight of the staff is included, there are 23 individuals.

The average weight increases by 2kg. That is the new average weight = 36 kgs.

Therefore, the total weight of the 22 students plus the staff = $23 * 36 = 828$

$$828 - 748 = 80 \text{ kg.}$$

85) C

Let the number of passed students be x .

Then total marks = $60 * 18 = 20x + (60 - x) * 8$

$$1080 = 20x + 480 - 8x$$

$$12x = 600$$

$$\therefore x = 50$$

\therefore number of passed students = 50



86) C)

Total age of 160 boys = $160 \times 58 = 9280$

total age of 30 boys = $30 \times 42 = 1260$

total age of next 50 boys = $50 \times 36 = 1800$

average of the remaining boys =

$[(9280 - \{1260 + 1800\}) / (160 - (30 + 50))]$

$\Rightarrow 9280 - 3060 / 80$

$\Rightarrow 6220 / 80$

$= 77.75 \text{ yrs}$

87) B)

total age of father, mother and son at the time of son's marriage = $90 \times 3 = 270$

present age of family father, mother, son, daughter-in-law, child = (father, mother, son age at the time of marriage) + daughter-in-law present age + child present age

$= (270 + 60) + \text{daughter-in-law present age} + 14 = 80 \times 5 = 400$

daughter-in-law present age = $400 - 344 = 56 \text{ yrs}$

88) B)

$\text{anu} + \text{banu} + \text{tonu} = 74 \times 3 = 222 \text{ yrs}$

10 yrs hence,

$\text{anu} + 10 + \text{tonu} + 10 = 86 \times 2$

$\text{anu} + \text{tonu} = 152$

$\text{banu} = 222 - 152 = 70 \text{ yrs}$

$\text{aarthi} - 6 + \text{banu} - 6 = 72 \times 2$

$\text{aarthi} + \text{banu} = 144 + 12 = 156$

$\text{aarthi age} = 156 - 70$

$\text{aarthi age} = 86 \text{ yrs}$

89) C)

Mr Abi family first 4 month expenditure = $4210 \times 4 = 16840$

Mr Abi family next 4 month expenditure = $4450 \times 4 = \text{Rs.} 17800$

Mr Abi family last 4 month expenditure = $4360 \times 4 = \text{Rs.} 17440$

Mr Abi family total expenditure in 12 months = $16840 + 17800 + 17440 + 6800 = \text{Rs.} 58880$.

Mr Abi family average expenditure in 12 months = $58880 / 12 = \text{Rs.} 4906.66$

90) B)

Clearly 18th result = (sum of 35 results) - (sum of 34 results)



$$\begin{aligned} &= (35 * 28) - \{ (17 * 24) + (17 * 21) \} \\ &= 980 - (408 + 357) \\ &= 980 - 765 \\ &= 215 \end{aligned}$$

91) Distance between two stations P & Q is 1556km. A passenger train covers the journey from P to Q at 168km per hr and return back to P with a uniform speed of 112km/hr. Find the Average speed of the train during the whole journey?

- A) 124.4 km/hr
- B) 130.4km/hr
- C) 134.4 km/hr
- D) 130.0 km/hr

92) If the mean of P, Q,R is A and $PQ + QR + RP = 0$, then the mean of p^2, q^2, r^2 is.

- A) $2A^2$
- B) $4A^2$
- C) A^2
- D) $3A^2$

93) The average of the 3 digit number, which remain the same when the digits interchange their positions is.

- A) 444
- B) 555
- C) 666
- D) 777

94) The average age of the men in a team is 76 years and that of the women is 75 years. The average age for the whole team is.

- A) 75 yrs
- B) 75.5 yrs
- C) Cannot be computed with the given information
- D) None of the above

95) The average monthly income of certain fashion designers is F and that of other workers is N. The number of fashion designer workers is 33 times that of other workers. The average monthly income (in rs) of all the worker is.

- A) $F+N/2$
- B) $F+33N/12$



- C) $33F + N/22$
- D) $(33F + N)/34$

96) Of the 5 numbers, the first is twice the second, the second is one – third of the third, the third is 5 times of the fourth, and the fourth is three – seventh of fifth. The average of the numbers is 35. The largest of these number is.

- A) 30.63
- B) 65.625
- C) 43.75
- D) 75.356

97) If the arithmetic mean of 150 numbers is calculated 70. If each number is increased by 10, then mean of new number is.

- A) 70
- B) 80
- C) 90
- D) 60

98) A group of 4 persons joins in javelin throw competition. The best player scored 42.5 points. If he had scored 46 points, the average score for the team would have been 42. The number of points the team scored.

- A) 164.5
- B) 166.5
- C) 169.7
- D) 162.5

99) 20 years ago, the average age of a family of 4 member was 48 years. 2 children having been born (with the age difference of 4 yrs) the present average age of the family is the same. The present age of the youngest child is.

- A) 2yrs
- B) 4 yrs
- C) 6yrs
- D) 8yrs

100) The average age of students of a college is 31.6 yrs. The average age of boys in the class is 32.8 yrs and that of girls is 30.8. The ratio of number of boys to the number of girls in the class.

- A) 2:3
- B) 3:1



C) 1:3

D) 3:2

91) C)

Given $x = 168$, $y = 112$

Required average speed = $(2xy / x + y)$ km/hr

$$= 2 * 168 * 112 / 168 + 112$$

$$= 37632 / 280$$

$$= 134.4 \text{ km/hr}$$

92) D)

We have $(P + Q + R)/3 = A$

$$P + Q + R = 3A$$

$$(P + Q + R)^2 = 9A^2$$

$$P^2 + Q^2 + R^2 + 2(PQ + QR + PR) = 9A^2$$

$$P^2 + Q^2 + R^2 = 9A^2$$

$$\text{Required mean} = (P^2 + Q^2 + R^2)/3 = 9A^2/3 = 3A^2$$

93) B)

$$\text{Average} = (111 + 222 + 333 + 444 + 555 + 666 + 777 + 888 + 999)/9$$

$$= (111 + 999) + (222 + 888) + (333 + 777) + (444 + 666) + 555/9$$

$$= (4 * 1110) + 555/9$$

$$= 4440 + 555/9$$

$$= 4995/9$$

$$= 555.$$

94) C)

Clearly to find the average, we ought to know number of men, women or total persons in the class, neither of which has been given.

So the data provided is inadequate.

95) D)

Let the number of other workers be 'x'.

The number of fashion design workers = $33x$

Total number of workers = $34x$

Average monthly income = $(F * 33x) + (N * x)/34x$

$$= x(33F + N)/34x$$



$$=(33F + N)/34.$$

96) B)

Let the fifth number be 'x'.

$$4^{\text{th}} \text{ number} = 3/7 x$$

$$3^{\text{rd}} \text{ number} = 5 (3/7 x) = 15/7x$$

$$2^{\text{nd}} \text{ number} = 1/3 (15/7 x) = 15/21 x$$

$$1^{\text{st}} \text{ number} = 2 (15/21 x) = 30/21 x$$

$$X + 3/7 x + 15/7 x + 15/21 x + 30/21 x = 35 * 5$$

$$120x = 3675$$

$$X = 30.625$$

So the numbers are 30.62, 13.125, 65.625, 21.875, 43.75.

Therefore largest number is 65.625.

97) B)

Arithmetic mean of numbers = 70

$$\text{Sum of 150 numbers} = (70 * 150)$$

$$=10500$$

$$\text{Total increase} = (150 * 10) = 1500$$

$$\text{Increased sum} = 10500 + 1500 = 12000$$

$$\text{Increased average} = 12000/150$$

$$=80$$

98) A)

Let the total score be 'x'.

$$(X+46 - 42.5)/4 = 42$$

$$X + 3.5 = 42 * 4$$

$$X + 3.5 = 168$$

$$X = 168 - 3.5$$

$$X = 164.5$$

99) C)

$$\text{Total age of 4 members, 20 yrs ago} = (48 * 4)=192 \text{ yrs}$$

$$\text{Total age of 4 members now} = 192 + 20 * 4 = 272 \text{ yrs}$$

$$\text{Total age of 6 members now} = (48*6)=288\text{yrs}$$

$$\text{Sum of the age of children} = 288 - 272 = 16 \text{ yrs}$$

Let the age of the younger child be x.



Then the age of the elder child $4 + x$

So $x + 4 + x = 16$

$2x = 12$

$x = 6$

Age of younger child = 6 years

100) A)

Let the ratio be $D:1$. then,

$(D * 32.8) + (1 * 30.8) = (D+1) * 31.6$

$32.8 D + 30.8 = 31.6 D + 31.6$

$32.8 D - 31.6 D = 31.6 - 30.8$

$1.2 D = 0.8$

$D = 0.8 / 1.2 = 0.4 / 0.6$

$D = 2/3$

Required ratio = $2/3 : 1 = 2:3$.

9. PROFIT AND LOSS

1) Tata Docomo charged Rs 540 for 1gb(1day) and aircel charged 90% of RS 540 for the same 1gb for same days. Gowri uses docomo for 1st 15days and remaining 15days uses aircel. If she uses aircel for whole 30days, how much amount she save?

2) A vendor bought 35kg of wheat at the rate of Rs 50 per kg. He sold 45% of the total quantity at the rate of Rs 55 per kg. Approximately, at what price per kg should he sell the remaining quantity to make 40% overall profit?

3) If 20% discount is allowed on the marked price then the profit is 40%. If the discount is increased to 40% then what will be the profit percentage?

4) After selling a fan at 6% gain and a fridge at 9% gain, a shopkeeper gains Rs 5100. But if he sells the fan at 9% gain and the fridge at 6% loss, he gains Rs 1800 on the whole transaction. Find the original price of the fan.

5) A shopkeeper announced 35% discount on an item. A customer bought the item from the shop for Rs. 21000 after getting discount. That person sells the item to another person in such a way that he earned a profit of 32% on the original price. What is the selling price for the another person?

6) A seller sold a cloth for Rs. 720 after giving 20% discount on the labelled price. Had he not given the discount, he would have earned a profit of 40% on the CP. what was the Cp of the cloth?



7) A salesperson has goods of worth Rs.12000. He sold half of the goods at a gain of 24%. At what profit per cent should he sell the remaining half of the stock so that he gets 36% profit on the whole?

8) Kannan sells laddu at Rs.30 per kg. A laddu is made up of flour and sugar in the ratio of 5:3. The ratio of price of sugar and flour is 7:3 (per kg). Thus, he earns 67% profit. What is the cost price of sugar?

9) Two items X and Y are sold at a profit of 30% and 45% respectively. If the amount of profit received is the same, then the cost price X and Y may be in ratio?

10) Sai purchased a DVD player at an additional 20% discount on the reduced price after deducting 40% on the labelled price. If the labelled price of the DVD player was Rs. 5600, then at what price did he purchase the DVD player?

1) for 1st 15days= $15 \times 540 = 8100$ rs

for 2nd 15days= $90/100 \times 540 \times 15 = 7290$

for 30days= $8100 + 7290 = 15390$

if she uses aircel for 30days= $30 \times 540 \times 90/100 = 14580$.

Amount save= $15390 - 14580 = \text{Rs.} 810$

2) CP of wheat= $35 \times 50 = \text{Rs.} 1750$

45 of 35kg= $45/100 \times 35 = 15.75$ kg

SP of 15.75kg= $15.75 \times 55 = \text{Rs.} 866.25$

For 40%profit, total Sp of all the wheat is $1750 \times 140/100 = \text{Rs.} 2450$

Remaining sugar(35-15.75)=19.25kg

Rate of remaining sugar per kg= $2450 - 866.25 / 19.25$

= Rs.82.27

3) cp=100% profit=40% selling price= 140% marked price = 140%

mp= $140 \times 100 / 80 = 175$

40%discount in mp= $175 \times 60 / 100$

New sp=105

new profit%= $\text{new sp} - \text{cp} / \text{cp} \times 100$

= $105 - 100 / 100 \times 100$

=5

4) let the price of fan be X and fridge be Y

$6x/100 + 9y/100 = 5100$



$$6x+9y=510000\text{-----}(1)$$

$$\text{then } 9x/100-6y/100=1800$$

$$9x-6y=180000\text{-----}(2)$$

Calculate both, then we will get

$$x=\text{Rs}40000$$

5) Let original price = x

$$X \cdot 65/100 = 21000$$

$$X = 21000 \cdot 100/65 = 32307.6 \text{Rs.}$$

$$SP = 32307.6 \cdot 132/100 = \text{Rs.}42646.15$$

6) Let CP = x

$$\text{Sp of each cloth} = 80/100 \cdot x = 720$$

$$x = 720 \cdot 100/80 = 900$$

$$CP = 900 \cdot 100/140$$

$$= \text{Rs } 643.$$

7) CP of goods = 12000

$$\text{For } 36\% \text{ gain, total SP} = 12000 + (36/100 \cdot 12000) = 16320$$

SP of goods worth 6000 at 24% profit

$$= 6000 + (24/100 \cdot 6000) = 7440$$

$$\text{Therefore, SP of remaining goods} = (16320 - 7440) = 8880$$

Let the gain % for remaining goods be x . Then,

$$\Rightarrow 6000 \cdot (100+x)/100 = 8880$$

$$\Rightarrow 100+x = 8880/60$$

$$x = 148 - 100 = 48$$

8) Since, the profit is 67, so the selling price will be 167% of the cost price

\therefore Ratio of selling price to cost price will be 5:3

$$\therefore \text{Cost price of laddu} = 30 \cdot 3/5 = 18$$

Let cost of flour and sugar be 3s and 7s respectively

$$\text{Since laddu is made up of flour and sugar in the ratio of } 5:3 = (5 \cdot 3s) + (3 \cdot 7s)/8 = 18$$

$$15s + 21s = 144$$

$$36s = 144$$

$$s = 4$$

$$\therefore \text{Price of sugar} = 7s = 7 \times 4$$

$$= \text{Rs. } 28$$



9) Let same profit be Rs 45.

30% = Rs 45 for item X \Rightarrow CP of item X = 150 Rs

45% = Rs 45 for item Y \Rightarrow CP of item Y = 100 Rs

Ratio = 150:100 = 3:2

10) Let the labelled price be Rs. 100

Reduced price = $(100 - 40)\%$ of 100 = Rs. 60

20% additional discount = 20% of 60 = Rs. 12

Net CP = 60 - 12 = Rs. 48

Therefore, sai's cost price = $5600/100 * 48$ = Rs. 2688

11) By selling a mobile at 52% discount, a seller incurs a loss of 8%. The marked price of the product is 18000 Rs. At what percent discount the seller should sell the mobile so as to have a profit of 33%.

12) In a certain mall, the profit is 160% of the cost. If the cost increases by 12.5% but the selling price remains constant, approximately what percentage of the selling price is the profit?

13) On selling 9 pens at Rs. 360, there is a loss equal to the cost price of 3 pens. The cost price of a pen is:

14) Sekar gives the discount of 42% for nokia phone, after he marked the price 29% more than its cost price. find his loss or profit %?

15) A seller mixes 52 kg of ragi at Rs. 40 per kg with 60 kg of ragi of other variety at Rs.72per kg and sells the mixture at Rs.60 per kg. His profit percent is:

16) A decrease of 40 % in the price of coffee enables a person to buy 8 kg more for Rs 400 find the original and reduced price per kg of coffee.

17) Varsha purchased a speaker of Rs 10,800 and a phone Rs 19,200. she sold speaker at four-fifth of its cost price and the phone at $5/4$ of its cost price. What was the profit?

18) Deepak selling a product at 48% discount, he incurs a loss of 10%. The marked price of the product is 15000 Rs. At what percent discount he should sell the product so as to have a profit of 30%.

19) Dhuviksha sells his two camera one at 45% loss and another at 30% profit. If the cost prices of the two cameras are in the ratio of 1:2, what is his percent profit or loss?



20) By selling 90 oranges for Rs 80, a man loses 40 %. How many oranges should he sell approximately for Rs 48 to gain 40 % in the transaction?

11) Since, Marked Price = 18000

Therefore, Selling Price = $18000 \times 0.48 = 8640$

Loss of 8% is there

Therefore, Cost price = $8640 / 0.92 = 9391.30\text{Rs}$

To have profit of 33%

The Selling Price should be = $9391.30 \times 1.33 = 12490.42$

Hence, Discount should be $18000 - 12490.42 = 5509.58\text{Rs}$

Discount% should be $[5509.58 / 18000] \times 100 = 30.60 \approx 31\%$.

12) Let C.P.= Rs. 100.

Then, Profit = Rs. 160, S.P. = Rs. 260.

New C.P. = 112.5% of Rs. 100 = Rs. 112.5

New S.P. = Rs. 260.

Profit = Rs. $(260 - 112.5) = \text{Rs. } 147.5$

Required percentage = $147.5 / 260 \times 100 = 57\%$ (approx.)

13) CP of 9 pens - Sp of 9 pens = Cp of 3 pens

Cp of 6pens = Sp of 9 pens = 360

Cp of 6pens = 360

CP of 1 pen = $360 / 6 = 60$.

14) Cp= 100

MP = $129 / 100 \times 100 = 129$

Sp = $129 \times 42 / 100 = 129 - 54.18 = 74.82$

Loss% = $(100 - 74.82)$

= 25.18%

15) C.P. of 112 kg rice = Rs. $(52 \times 40 + 60 \times 72)$

= Rs. $(2080 + 4320) = \text{Rs. } 6400$.

S.P. of 112 kg rice = Rs. $(112 \times 60) = \text{Rs. } 6720$

Gain = 320

Gain % = $320 \times 100 / 6400$

Gain % = 5



16) Price of 8kg of coffee= 40% of 400

Reduced price of 8kg=160Rs

Reduced price of 1kg= 20Rs

Original price= $20 \times 100 / 60 = \text{Rs } 33.33$

17) CP of speaker = Rs 10800

SP = $10800 \times \frac{4}{5} = \text{Rs } 8640$

CP of the phone = Rs 19200

SP = $19200 \times \frac{5}{4} = \text{Rs } 24000$

Total CP = $10800 + 19200 = \text{Rs } 30000$

Total SP = $8640 + 24000 = \text{Rs } 32640$

Profit = $32640 - 30000 = \text{Rs } 2640$

18) $M_p = 15000 \Rightarrow S_p = 15000 \times 0.52 = 7800$.

Loss of 10% is there $\Rightarrow C_p = 7800 / 0.90 = \text{Rs } 8666.66$

Profit of 30% = $6000 \times 1.15 = 11266.66$

Discount should be Rs2600

Discount % should be $\{2600 / 15000\} \times 100$

=17.3%

19) Given that CPs are in the ratio 1:2

Therefore let the CPs be Rs.100 & Rs. 200 respectively,

1st SP = $100 - 45\% \text{ of } 100 = \text{Rs. } 55$.

2nd SP = $200 + 30\% \text{ of } 200 = \text{Rs. } 260$.

Total CP = Rs.300.

Total SP = $55 + 260 = \text{Rs. } 315$.

Profit = $\text{Rs. } 315 - 300 = \text{Rs. } 15$.

Profit percent = $15 \times 100 / 300 = 5\% \text{ profit}$.

20) Let S.P. of 90 oranges be Rs. x.

Then, $60 : 80 = 140 : x$

$$x = 80 \times 140 / 60 = 186.66$$

For Rs.186.66, oranges sold = 90

For Rs.48, oranges sold = $90 / 186.66 \times 48 = 23(\text{approx.})$



- 21) If $\frac{7}{8}$ part of a books is sold at 60% profit, $\frac{1}{12}$ part at 32% profit and remaining part at 24% profit and finally, there is a profit of Rs.150, then find the cost price of the books approximately
- 22) Gokul purchases 10 goats at Rs. 1500 each. 1 goat died. He sold 2 goats at 5% loss, at what rate he should sale the remaining goat, so as to gain a Profit of 10 % on the total Cost?
- 23) Geetha groups sell their two hotels which are made up of teak woods. One at 25% loss and other at 20% profit. If the cost prices of the two hotels are in the ratio of 3:4, what is his % profit or loss?
- 24) Jai earns 20% on investment but loses 15% on another investment .If the ratio of the two investments be 3:5, what is the gain or loss on the two investments taken together?
- 25) Reeta buys an old cycle for Rs.2500 and spends Rs.300 on its repairs. If he sells the cycle for Rs.3200, his gain percent is?
- 26) Kathir bought some bananas at Rs.20 per dozen and bought the same number of bananas at Rs.16 per dozen. He sold these bananas at Rs.22 per dozen and gained Rs. 240. The total number of dozen bananas bought by him was:
- 27) P sells a bike to Q at a profit of 25%. Q sells it to R at a profit of 30%.If R pays Rs.273 for it, the cost price of the bike for P is:
- 28) Profit after selling a product for Rs. 850 is the same as the loss after selling it for Rs.710. What is the cost of the product?
- 29) Nivetha buys a tape recorder for Rs.450. His overhead expenses are Rs.30 she sells the tape recorder for Rs.600. The profit percent of nivetha is
- 30) By selling a pen for Rs.15, a man loses one sixteenth of what it costs him. The cost of the pen is?

21) $a = \frac{7}{8}$, $x = 60\%$,

$b = \frac{1}{12}$, $y = 32\%$,

$z = 24\%$ and $R = \text{Rs}150$

Required CP of books = $(150 \times 100) / (\frac{7}{8} \times 60 + \frac{1}{12} \times 32 + \frac{1}{24} \times 24)$

$= 15000 / (52.5 + 2.66 + 1)$

$= 15000 / 56.16$

$= \text{Rs}267$



22) Selling Price with Profit of 10 % of total cost = $1500 \times 10 \times 110 / 100$
= 16500

Selling Price of 2 goat with 5% loss = $3000 \times 95 / 100$
= 2850

Difference = $16500 - 2850 = 13650$

So rate of the goats for selling to gain 10% profit on total = $13650 / 7$
= Rs. 1950

23) CP are in the ratio 3:4 which is Rs.300 & Rs.400

1st SP = $300 - 25\%$ of 300 = Rs.225

2nd Sp = $400 + 20\%$ of 400 = Rs.480

Total Cp = Rs 700

Total SP = $225 + 480 =$ Rs 705

Profit = Rs. 705 - 700 = Rs .5

then % profit = $(5 \times 100) / 700 = 5/7\%$ profit.

24) Suppose he invested 300 & 500 respectively

profit : 20% of 300 = 60

loss = $500 \times 15 / 100 = 75$

net loss = - 15

= $\Rightarrow 15 / 800 \times 100 = 1.8\%$.

25) Profit Percentage = Profit / cost price $\times 100$

Cost price = $2500 + 300 = 2800$

Profit = sp - cp

= $3200 - 2800 = \Rightarrow 400$

Profit percentage = $400 / 2800 \times 100$

= 14.28%

26) Cost price :

1 dozen bananas = Rs. 20

1 dozen bananas = Rs. 16

2 dozen bananas = Rs. 36

1 dozen bananas = Rs. 18

Selling price:

1 dozen bananas = Rs.22



Profit per dozen is Rs. 4

Therefore $x \times \text{profit} = \text{Rs. } 240$

$$x = 240/4$$

$$X = 60 \text{ dozen}$$

27) Selling price for q is Rs. 273

Cost price + profit = 273

$$X + 30x/100 = 273$$

$$X = 210$$

Cost price of q is 210

Selling price of p is 210

Cost price + profit = 210

$$Y + 25y/100 = 210$$

$$Y = 168$$

The cost price of p is Rs. 168/-

28) Assume cost Price = x

$$P = 850 - x$$

$$P \rightarrow 850 - x = 710 + x$$

$$850 - 710 = 2x$$

$$140 = 2x$$

$$X = 70$$

$$P = 850 - 70$$

$$= 780$$

29) Cost price + profit = selling price

$$\text{Cost price} = 450 + 30 = 480$$

$$\text{Profit} = \text{sp} - \text{cp}$$

$$= 600 - 480$$

$$= 120$$

$$\text{Profit}\% = 120/480 \times 100$$

$$X = 12000/480$$

$$X = 25 \%$$

30) Let us assume cost price is x

$$\text{ie., } x - 15 = 1/16x$$

$$X - 15 = x/16$$



$$X - x/16 = 15$$

$$16x - x/16 = 15$$

$$15x = 15/16$$

$$X = 15 \times 16/15$$

$$X = 16.$$

31) By selling a marker for Rs.18, a boy loses one nineteenth of what it costs him. The cost of the marker is?

32) Selva purchased 60 chairs at a price of Rs. 55 per chair. He sold 15 chairs at a profit of Rs. 6 per chair and 37 chair at a profit of Rs. 7 per chair. The remaining chairs were sold at a loss of RS.3 per chair. What is the average profit per chair?

33) Reenu sold an article at a loss of 40%. If the selling price had been increased by Rs.200, there would have been a gain of 10%. The cost price of the article was

34) kalyan bought 16 types of rava of certain rupees. After a week, he sold 6 types of rava at 20%profit, 6types of rava with neither profit nor loss and 4 types at 10%loss. In this transaction, what is the profit %?

35) A merchant purchases a table and a fan for Rs.450. He sells them making a profit of 15% on the table and 20% on a fan. He earns a profit of Rs.76.50. The difference between the original prices of the table and fan is equal to

36) When a manufacturer allows 38% commission on the retail price of his product he earns a profit of 9%. What would be his profit percent if he commission is reduced by 22%?

37) Sridevi sells an article at a profit of 50%. If she had bought it at 40% less and sold it for Rs.21.50 less, She would have gained 60%. Find the cost price of the article.

38) If the cost price of shoes doubles, then the loss gets tripled of what it was initially. The initial loss % was ?

39) Gowtham started a business, investing Rs.25000. After 4 months and 5 months respectively, Rithick and Sudhir joined him with capitals of 15000 and 12000. At the end of the year the total profit was Rs.4632. What is the difference between Rithick's and Sudhir's share in the profit approximately?

40) Bhuvana bought 50 dozen of bangles at Rs5 per dozen. She spend Rs.125 on a particular tax and she sold them at 50p per each bangle. What was her profit or loss percent?



31) Let us assume cost price is x

$$\text{ie., } x - 18 = \frac{1}{19}x$$

$$x - 18 = \frac{x}{19}$$

$$x - \frac{x}{19} = 18$$

$$18x = 18 \times 19$$

$$18x = 342$$

$$x = 342/18$$

$$x = 19$$

32) Total cost price = Rs(60*55) = Rs.3300

$$\text{Total selling price} = \text{Rs} [(15 \times 55 + 15 \times 6) + (37 \times 55 + 37 \times 7) + (8 \times 55 - 8 \times 30)]$$

$$= \text{Rs.} [915 + 2294 + 416]$$

$$= \text{Rs.} 3625$$

$$\text{Average profit} = \text{Rs} [3625 - 3300/60]$$

$$= \text{Rs.} (325/60)$$

$$= \text{Rs.} 5.416$$

Therefore the average profit per chair is Rs 5.41.

33) Let the C.P. of article be Rs. x.

$$110\% \text{ of } x - 60\% \text{ of } x = \text{Rs. } 200$$

$$50\% \text{ of } x = \text{Rs. } 200$$

$$x = \text{Rs. } (200 \times 100)/50$$

$$= \text{Rs. } 400$$

34) Let CP of 16 types = x

$$\text{CP of 1 type} = x/16$$

$$\text{Sp of rice } 20\% = 6x/16 + 6x/16 \times 20/100 = 9x/20$$

$$\text{Sp of rice without profit or loss} = 6x/16 = 3x/8$$

$$\text{Sp of rice at } 10\% \text{ loss} = 4x/16 - 4x/16 \times 10/100 = 9x/40$$

$$\text{Total selling price} = 9x/20 + 3x/8 + 9x/40 = 42x/40$$

$$\text{now profit\%} = [42x/40 - x]/x \times 100$$

$$= 5\%$$

35) Let cost price of table be Rs X

$$\text{Cost price of fan} = \text{Rs}(450 - X)$$

$$[15\% \text{ of } X] + [20\% \text{ of } (450 - X)] = 76.50$$



$$15/100 * X + 20/100 * (450 - X) = 76.50$$

$$X = 270$$

So cost price of table = Rs.270

Cost price of fan = Rs.180

Difference = Rs(270-180) = Rs 90

36) Let retail price = Rs.100, then commission = Rs.38

Selling price = Rs(100-38)

= Rs.62, but profit = 9%

Cost price = Rs[100/109*62] = 56.88

New commission = Rs.16, New selling price = Rs(100-16) = Rs.84

Gain = Rs[84 - 54.88] = 27.12

Gain% = [27.12*100/56.88]

= 47.6%

37) 1st selling price = 150% of x = 150x/100 = 15x/10

New Cost price = 60% of x = 60x/100 = 6x/10

2nd selling price = 160% of 6x/10 = 160/100 * 6x/10 = 96x/100

Therefore 15x/10 - 96x/100 = Rs.21.50

X = Rs.39.81

Therefore cost price of the article = Rs.40 (approx.)

38) Let the cost price be y and selling price be z.

Loss = y - z

When the cost price doubles, the loss gets tripled.

So it becomes like this, 2y - z = 3(y - z)

y = 2z

Loss % = (2z - z/2z * 100) = 50 %

39) Gowtham investment = 25000*12 = 3000000

Rithick investment = 15000*8 = 120000

Sudhir investment = 12000*7 = 84000

Ratio of their investment = 25:10:7

The difference between Rithick's and Sudhir's share = 3

That is = 4632 * 3/42 = Rs 331 (approx.)

40) Cost price of 1 dozen bangles = Rs.5



Cost price of 50 dozen bangles = $50 \times 5 = \text{Rs. } 250$

Amount of tax paid = Rs.125

Total cost price = $250 + 125 = 375$

Selling price of total number of bangles = $50 \times 12 \times \frac{1}{2} = 300$

Loss = $375 - 300 = 75$

loss percentage = $(75 \times 100) / 375 = 20\%$

- 41) Profit earned by an corporation is distributed among total officers and clerks in the ratio of 7:5 respectively. If the number of officers is 60 and the number of clerks is 100 and the amount received by an each officer is Rs.35,000. What was the total amount of profit earned?
- 42) Dharan bought a donkey and a carriage for Rs.3000. He sold the donkey at a gain of 20% and the carriage at a loss of 10%, thereby gaining 2% on the whole. Find the cost of the donkey?
- 43) In a certain office, the profit is 160% of the cost. If the cost increases by 12% but the selling price remains constant, approximately what is the percentage profit?
- 44) Vaishnavi purchased 35kg of wheat at the rate of Rs.19.50 per kg and another 35kg of wheat at a certain rate. She mixed the two and sold the entire quantity at the rate of the Rs.21.25 per kg and made 20%. Overall profit at what price per kg did she purchase the lot of another 35kg wheat?
- 45) A car worth Rs.2,50,000 is sold by usha to nandhini at 10 % profit. Nandhini sells the car back to usha at 4% loss. Then in the entire transaction total gain by usha is?
- 46) A shopkeeper sells a cricket bat whose marked price is Rs.60 at a discount of 20% and gives a ball costing Rs.3 free with each bat. Even then he makes a profit of 25%. His cost per bat is.
- 47) Murugan sold a book at a loss of 40%. If the selling price had been increased by Rs.200, there would have been a gain of 10%. What was the cost price of the book?
- 48) Swetha purchased 160kg of ragi at Rs.27 per kg and mixed it with 240kg ragi at Rs.32 per kg. At what rate should she sell the mixture to gain 32% profit?
- 49) In a shop the profit is 160% of the cost. If the cost increased by 12.5% but the selling price remains constant, approximately what percentage of the selling price is the profit?



50) By mixing two brands of dal and selling the mixture at the rate of Rs.354 per kg a shopkeeper makes a profit of 36%. If to every 4 kg of one brand costing Rs.400 per kg, 6kg of other brand is added. Then how much per kg does the other brand cost?

41) The total amount distributed among 60 officers = $35000 \times 60 = 21,00,000$

Let the total amount distributed to 100 clerks be 'Y'

Then $21,00,000/Y = 7/5$

$$Y = 15,00,000$$

Therefore total profit = $21,00,000 + 15,00,000 = 36$ lakhs

42) Let the cost price of the donkey be Rs 'X'

Then cost price of the carriage = Rs(3000-X)

$$20\% \text{ of } X - 10\% \text{ of } (3000 - X) = 2\% \text{ of } 3000$$

$$X/5 - (3000-X)/10 = 60$$

$$2X - 3000 + X = 600$$

$$X = 1200$$

Hence cost price of the donkey = Rs.1200

43) Let cost price = Rs.100 ; then profit = 160

Selling price = Rs.260 ; new cost price = 112% of Rs 100

New cost price = 122 ; new selling price = Rs 260

Profit = $260 - 112 = \text{Rs.}148$

Required percentage = $(148/112 \times 100)\%$

$$= 132.14\%$$

44) Let the required price per kg be Rs 'X'

Then cost price of 70 kg wheat = $\text{Rs}(35 \times 19.50 + 35 \times X)$

$$= \text{Rs} (682.5 + 35X)$$

Selling price of 70kg wheat = $\text{Rs} (70 \times 21.25)$

$$= \text{Rs.}1487.5$$

Total cost price = $1487.5 \times 100/120 = 1239.58$

$$35x = 1239.58 - 682.5 = 557.08$$

$$X = 15.91$$

So the cost price of second lot is Rs15.91 per kg

45) Money spent by usha = Rs.2,50,000

Money received by usha = 110% of Rs.2,50,000



$$= 2,75,000$$

$$\text{Cost price to usha} = 96\% \text{ of Rs. } 2,75,000 = \text{Rs. } 2,64,000$$

$$\text{Therefore usha gains Rs. } (2,75,000 - 2,64,000) = \text{Rs. } 11,000$$

46) Marked price = Rs.60

$$\text{Selling price} = \text{Rs. } [(80/100 * 60) - 3]$$

$$= \text{Rs. } 45$$

Let cost price be Rs 'x'.

$$\text{Then } 125\% \text{ of } x = 45$$

$$(125/100 * x) = 45$$

$$\text{Cost price of one bat} = \text{Rs. } 36$$

47) Let cost price be Rs 'x'

$$\text{Then } (110\% \text{ of } x) - (60\% \text{ of } x) = 200$$

$$(110x/100) - (60x/100) = 200$$

$$110x - 60x = 20000$$

$$X = 400$$

$$\text{So cost price of the book} = \text{Rs. } 400$$

48) Cost price of 400kg of mixture = Rs(160 * 27 = 240 *32)

$$= \text{Rs. } 12,000$$

$$\text{Selling price} = 132\% \text{ of Rs. } 12,000$$

$$= 132/100 * 12,000$$

$$= 15,840$$

$$\text{Rate of selling price of the mixture} = \text{Rs. } 15,840/400$$

$$= \text{Rs. } 39.60 \text{ per kg}$$

49) Let cost price be 'x'

$$\text{Then profit} = \text{Rs. } 160$$

$$\text{Selling price} = \text{Rs. } 260$$

$$\text{New cost price} = 112.5\% \text{ of Rs. } 100$$

$$= (112.5x/100 * 100)$$

$$= \text{Rs. } 112.5$$

$$\text{New selling price} = \text{Rs. } 260$$

$$\text{Profit} = \text{Rs. } (260 - 112.5)$$

$$= \text{Rs. } 147.5$$

$$\text{Required percentage} = (147.5/260 * 100) \% = 56.7\%$$



50) Let the cost price of other brand be Rs 'x' per kg

$$\text{cost price of 10 kg} = \text{Rs } (4 * 400 + 6 * x)$$

$$= \text{Rs } (1600 + 6x)$$

$$\text{Selling price of 10 kg} = \text{Rs } (10 * 354)$$

$$= \text{Rs.} 3540$$

$$\text{Therefore } 3540 - (1600 + 6x)/1600 + 6x * 100 = 36$$

$$1940 - 6x/1600 + 6x = 0.36$$

$$1940 - 6x = 576 + 2.16x$$

$$x = 167.15$$

so the cost of other brand = Rs.167.15

51) Bharani sells a novel at a gain of 40%. if he had bought it at 20% less and sold it for Rs. 70 more which equals to 350% of CP. The CP of the novel is

52) A salesman sold an book at a loss of 25%. If the selling price had been increased by Rs. 150, there would have been a gain of 15%. The cost price of the book was:

53) An product is sold at a loss of 10%. Had it been sold for Rs. 9 more, there would have been a gain of 12 1/2% on it. The cost price of the product is

54) Fresh grapes contains 80% of water by weight, where as dry grapes contains 50% of water by weight. Yamini buys 100kg of fresh grapes for a total price of Rs. 300. At what price should she sell the dry grapes (fresh grapes are dried up) to earn 80%profit?

55) Anamika purchased 60 tablets at a price of Rs.60 per tablet. she sold 15 tablets at profit of Rs.6per tablet and 38 tablets at a profit of Rs. 7per tablet. The remaining tablets were sold at a loss of Rs. 4 per tablet. What is the average profit percentage per tablets?

56) In order that there may be a profit of 15% after allowing a discount of 10% on the marked price, The marked price of an book has to be increased by %?

57) What is the highest % discount(approximately) that a trader can offer on his marked price, so that he ends up selling at no profit or loss, if he initially marked his goods up by 60%?



58) A shopkeeper sells speaker at the rate of Rs 914 each and earns the commission of 4%. He also sells phones at the rate of Rs 160 each and earns a commission of 20%. How much amount of commission will he earn in two weeks if he sells 20 speaker and 12 phones per day?

59) The price of a necklace, passing through a 3 persons, rises on the whole by 32.5%. If the 1st and the 2nd sellers earned 10% and 12.5% profit respectively. Find the percentage profit earned by the 3rd seller.

60) Varshini sold one – fourth of her books at a gain of 10% and the remaining at cost price. Find the gain earned by her in the whole transaction.

51) Let CP = x

$$SP = 140x/100 = 14x/10$$

$$CP = 80\% \text{ of } x = 8x/10$$

$$\text{then, } SP = 14x/10 + 70$$

$$14x/10 + 70 = 350\% \text{ of } 8x/10$$

$$14x/10 + 70 = 350/100 * 8x/10 = 28x/10$$

$$70 = 28x/10 - 14x/10$$

$$70 = 14x/10$$

$$X = 700/14$$

$$X = 50$$

52) Let the C.P. of book be Rs. x.

$$115\% \text{ of } x - 75\% \text{ of } x = \text{Rs. } 150$$

$$40\% \text{ of } x = \text{Rs. } 150$$

$$x = \text{Rs. } (150 \times 100)/40$$

$$x = \text{Rs. } 375$$

53) Let the cost price of the product = Rs. x

S.P. at 10% loss

$$= x \times 90/100 = \text{Rs. } 9x/10$$

S.P. at 12 1/2 % gain

$$x \times (100 + 12 \frac{1}{2})/100 = \text{Rs. } 225x/200$$

$$9x/10 + 9 = 225x/200$$

$$180x + 1800 = 225x$$

$$x = \text{Rs. } 40$$

54) In fresh grapes ratio of water to grapes is 80:20 = 4:1



In dry grapes ratio is = 50:50 =1:1

Weight of grapes is = $100 \times [1/5] = 20\text{kg}$

Weight of dry grapes = $20 \times 2 = 40\text{ kg}$

Required amount is = $300 \times 100 [180/100] / 40 = \text{Rs. } 1350$

55) Total CP= $60 \times 60 = 3600$

Total Sp= $[(15 \times 60 + 15 \times 6) + (38 \times 60 + 38 \times 7) + (7 \times 60 - 7 \times 4)] = 990 + 2546 + 392 = 3928$

Average profit = $3928 - 3600 / 60$

$= 328 / 60$

$= 5.46\%$

56) Mp= Rs x

Sp= $90x / 100 = 9x / 10$

Mp= $9x / 10 \times 100 / 115 = 18x / 23$

Mp has increased by

$(x - 18x / 23) / (18x / 23) \times 100$

$= 27.7\%$

57) Let CP= Rs 100

MP= Rs $100 + 60 = 160$

Discount= x%

then, $160 \times [100 - x / 100] = 100$

$100 - x = 100 \times 100 / 160$

$x = 37.5\%$

58) Sp of modem=Rs 914

Commission of one speaker = $4 \times 914 / 100$

Commission of 20 speakers = $4 \times 914 \times 20 / 100 = \text{Rs } 731.2$

Commission of one phone = $20 \times 160 / 100$

Commission of 12 phones = $20 \times 160 \times 12 / 100 = 384$

Total commission on one day= (RS. $731.2 + 384$) = 1115.2

The amount of commission will he earn in 2 weeks = $1115.2 \times 14 = \text{Rs } 15,612.8$

59) Let the original price of the necklace be Rs x and

Let the profit earned by the 3rd seller be P%

Then $(100 + P)\%$ of 112.5% of 110% of x = 132.5% of x

$(100 + P / 100) \times (112.5 / 100) \times (x) = 132.5 / 100 \times x$



$$(100+P) \times 112.5 \times 110 = 132.5 \times 100 \times 100 \times 100 / 100$$

$$100+P = 132.5 \times 100 \times 100 / 112.5 \times 110$$

$$= 1325000 / 12375$$

$$100+P = 107.07$$

$$P = 107.07 - 100 = 7.07\%$$

The percentage profit earned by the 3rd seller = 7%

60) Let cost price of whole be Rs x

Cost price of $1/4$ th = Rs $x/4$

Cost price of $3/4$ th = Rs $3x/4$

Total selling price = Rs [(110% of $x/4$) + $3x/4$]

$$= \text{Rs} [(110/100 \times x/4) + 3x/4]$$

$$= \text{Rs} [11x/40 + 3x/4]$$

$$= \text{Rs} (11x + 30x/40)$$

$$= \text{Rs} 41x/40$$

$$\text{Gain} = \text{Rs} 41x/40 - x = x/40$$

$$\text{Gain \%} = x/40 \times 100 \times 1/x = 100/40$$

$$\text{Gain \%} = 2.5\%$$

61) Find the single discount equivalent to a series discount of 40%, 20% and 10%

62) Kumar buys a car marked price at Rs 500000 with 35% and 30% off. He spends Rs 75000 for maintenance sell it for Rs 500000 What is the gain or loss percentage?

63) Rita bought a computer with a discount of 10% on its marked price. she sold it at a price 25% more than the price at which she bought it. The new SP is how much percentage more than marked price?

64) Terms of percentage loss, which of the following is the best transaction?

No options here

65) Ganesh purchased a bed and a washing machine for Rs 40,000. Later, he sold the bed at 40% profit and the washing machine at 20% loss. Thus, he gained 4% in the whole transaction. Find cost price of the bed?

66) A substance is purchased for Rs. 300. If one fourth of the substance is sold at a loss of 10% and the remaining at a gain of 5%, Find out the overall gain or loss percentage.



67) A vendor sells a radio at Rs. 1680 at a gain of 40% and another for Rs. 1920 at the loss of 8%. Find his total gain percent

68) A sells a gold ring to B for Rs 90,000 losing 20% in the transaction. B sells it to C at a price which would have given a profit of 20% to A. By what percent does B gain?

69) Aruna silks has announced 50% discount on prices of fancy sarees at the time of sale. If a purchase needs to have a discount of Rs 960, then how many sarees, each costing Rs 640 should be purchase?

70) The market price of a novel was 50% more than its cost price. Vadi was going to sell it at market price to a customer, but he showed vadi some defects in the novel, due to which vadi gave him a discount of 33%. Next day he came again and showed vadi some more defects, hence he gave him another discount that was equal to 14.5% of the cost price. What was the approximate profit/loss to vadi?

61) Let marked price be Rs 100

Then net selling price = 90% of 80% of 60% of Rs 100

$$= 90/100 * 80/100 * 60/100 * 100$$

$$= 90 * 80 * 60 / 10000$$

$$= \text{Rs } 43.2$$

$$\text{Required discount} = (100 - 43.2) \%$$

$$= 56.8\%$$

62) Total CP = (65% of 70% of 500000) + 75000

$$= 0.65 * 0.7 * 500000 + 75000$$

$$\text{CP} = \text{Rs } 302500$$

$$\text{SP} = \text{Rs } 5,00,000$$

$$\text{gain}\% = (500000 - 302500) / 302500 * 100$$

$$= 65.28\%$$

63) $M_p = \text{Rs } x$

$$S_p = \text{Rs } 90/100 * x = 9x/10$$

$$S_p = 9x/10 * 125/100 = 9x/8$$

$$\text{Required } \% = (9x/8 - x) / x * 100 = 12.5\%$$

64) $\% \text{loss} = \text{loss} / \text{CP} * 100$

$$\text{A. } C_p = \text{Rs } 15, \text{ loss} = \text{Rs } 3$$

$$\% \text{loss} = 3 / 15 * 100 = 20\%$$



B. CP=Rs18, loss=Rs4

$$\% \text{loss} = 4/18 * 100 = 22.2\%$$

C. CP=Rs 14, loss= Rs 3

$$\% \text{loss} = \text{Rs}3/14 * 100 = 21.4\%$$

D. CP=Rs 30, loss=Rs 5

$$\% \text{loss} = 5/30 * 100 = 16.6\%$$

Option D is the best transaction

65) CP of bed=x

$$x * 40/100 - (40,000 - x) * 20/100 = 40,000 * 4/100$$

$$40x - (800000 - 20x) = 160000$$

$$60x - 800000 = 160000$$

$$60x = 960000$$

$$X = \text{Rs}16000$$

66) Price Received by selling one fourth of the substance at a loss of 10% =

$$(1/4) * 300 * (90/100) = \text{Rs. } 67.5$$

Price Received by remaining substance at a gain of 5% =

$$(3/4) * 300 * (105/100) = \text{Rs. } 236.25 \text{ [Note: } 1 - (1/4) = 3/4]$$

$$\text{Total Selling Price} = \text{RS}303.75$$

$$\text{Profit} = 303.75 - 300 = 3.75$$

$$\text{Profit}\% = (\text{Gain}/\text{Cost} * 100)\%$$

$$= (3.75/300 * 100)\%$$

$$= 1.25\%$$

67) So, C.P. of 1st radio= $(100/140 * 1680) = 1200$

$$\text{C.P. of 2nd radio} = (100/92 * 1920) = 2086.95$$

$$\text{Total C.P.} = 3286.95$$

$$\text{Total S.P.} = 3600$$

$$\text{Gain} = 3600 - 3286.95 = 313.05$$

$$\text{Gain}\% = 9.5\%$$

68) A sells to B at 20% loss

$$\text{So CP} = 90000 * 100/80 = 112500$$

$$20\% \text{ profit to A} = 112500 * 120/100 = 135000$$

$$\text{Total gain} = (135000 - 90000) = 45000$$

$$\text{Gain}\% = 45000/90000 * 100 = 50\%$$



69) The cost of discount on a saree = $50 / 100 \times 640 = 320$

Number of sarees for taking the discount of Rs. 960

$\Rightarrow 960 / 320$

$\Rightarrow 3$ sarees

70) Let the cost price be Rs. 100

Then, market price is Rs. 150

Now, the first discount is of 33% Rs. 150 = Rs. 50

Hence, its selling price = $150 - 50 = \text{Rs. } 100$

since vadi's selling at cost price, any further discount will be equal to loss %

The next discount of 14.5% will be the loss percentage to vadi

71) Kabi buys wheat at Rs. 15/kg and puts a price tag on it so as to earn a profit of 10%. However, his faulty balance shows 1000 gm when it is actually 900 gm. What is his actual gain percentage?

72) A taxi driver makes a profit of 25% on every trip when he carries 4 passengers and the price of petrol is Rs. 35 a litre. Find the approximate % profit for the same journey if he goes for 5 passengers per trip and the price of petrol reduces to Rs. 28 litres?

73) On selling a fan at 8% loss and an iron box at 18% gain, a man gains rs.346. If he sells the fan at 7% gain and the iron box at 15% gain, then he gains rs.450. The actual price of the iron box is approximately?

74) A merchant marked his goods at 16% above the cost price. He sold half of the stock at the marked price, one quarter at a discount of 16% on the marked price and the rest at a discount of 32% on the marked price. His total gain is,

75) In a certain occupation, the profit is 110% of the cost. If the cost increases by 13% but the selling price remains constant, approximately what percentage of the selling price is the profit?

76) Hytech electronics is in recession. Find the marked price is what percentage of cost price, if there may be a profit of 10% after allowing a commission of 5% to middle man?

77) Harshith is a successful milk vector in salem. He sold half of the milk at 40% profit, half of the remaining milk at 40% loss and he rest was sold at his cost price. In the total transaction, his gain or loss will be



78) Usha purchased 10 fans for Rs 1000 each. She spent Rs 4000 on the maintenance of all fans. She sold five of them for Rs 1500 each and the remaining for 1100 each. Then the total gain or loss % is?

79) Preethi owns lenova mobile in a showroom. she labelled the price of mobile to earn a profit of 20% on the cost price. she sold the mobile by offering a discount of 10% on the labelled price. What is the actual percent profit earned?

80) Wipro is the leading IT company then the profit earned by same organization is distributed among HR and officers in the ratio of 13:7 respectively. If the number of HR is 104 and the number of officers is 156 and the amount received by HR is Rs 6000. What was the total amount of profit earned (in lakhs)?

71) CP of 1000gm = Rs. 15

SP of 900gm = Rs. 16.5

SP of 1000gm = $16.5 \times 1000 / 900$ = Rs. 18

Now take 1000gm as reference to calculate profit.

Profit = SP - CP = 18 - 15 = Rs. 3

Profit % = $3 \times 100 / 15$ = 20%

72) When 4 passengers income was 4x

Expense = Rs.35.

Profit = 25% of 35 = Rs.8.75

That means his earning is Rs.43.75. so that per passenger fare must be Rs.10.93

When 5 passengers earning = 10.93×5 = Rs.54.68

Expense = Rs.28

Profit = 95.28 % approx.

73) Let the cost price of the fan be Rs X and Cost of the iron box be Rs Y

Then $18\%Y - 8\%X = 346$; That is $18Y - 8X = 34600 \rightarrow 1$

And $15\%Y + 8\%X = 450$; that is $15Y + 8X = 45000 \rightarrow 2$

Solving 1 and 2 we get $X = 1102.275$ $Y = 2412.12$

therefore cost of ironbox is = 2412(approx.)

74) Let cost price whole stock = Rs.100

then marked price of whole stock = Rs.116

Marked price of half stock = Rs.58

marked price of one-fourth stock = Rs.29

Total selling price = $Rs[58 + (84\% \text{ of } 29) + (68\% \text{ of } 29)]$



$$=Rs[58+24.36+19.72]$$

$$=Rs.102.08$$

$$\text{Hence gain \%} = (102.08 - 100)\% = 2.08\%$$

75) Let Cp= RS.100

$$\text{Profit} = \text{Rs } 110$$

$$\text{Sp} = \text{Rs } 210$$

$$\text{New Cp} = 113\% \text{ of Rs. } 100 = \text{Rs. } 113$$

$$\text{New SP} = \text{Rs. } 210$$

$$\text{Profit} = \text{Rs. } (210 - 113) = \text{Rs. } 97$$

$$\text{Required \%} = 97/210 * 100 = 46\%$$

76) Let the CP= Rs.100

$$\text{Then, SP} = \text{Rs. } 110$$

$$\text{MP} = \text{Rs. } x$$

$$\text{Then, } 95\% \text{ of } x = \text{Rs } 110$$

$$x = 110 * 100 / 95 = 115.7\%$$

77) total CP= Rs 100

$$\text{total SP} = [140/2 + 60/4 + 100/4]$$

$$= 280 + 60 + 100/4$$

$$= 440/4$$

$$= 110$$

$$\text{Gain} = \text{sp} - \text{cp} = 110 - 100 = 10$$

$$\text{Gain\%} = 10/100 * 100 = 10\%$$

78) Total actual CP

$$= \text{Rs. } (1000 * 10 + 4000) = \text{Rs. } 14000$$

$$\text{Total Sp}$$

$$= \text{Rs. } (5 * 1500 + 5 * 1100) = \text{Rs. } 13000$$

$$\text{Loss} = \text{cp} - \text{sp} = 1000$$

$$\text{Loss \%} = (1000/14000) * 100 = 7.14\%$$

79) Let the CP of mobile= Rs 100

$$\text{Then the labeled price} = \text{Rs. } 120$$

$$\text{SP} = \text{Rs. } 120 - 10\% \text{ of } 120 = \text{Rs } 120 - 12 = \text{Rs } 108$$

$$\text{Gain} = \text{Rs } 108 - \text{Rs } 100 = \text{Rs } 8$$



Gain% = $\frac{8}{100} \times 100 = 8\%$

80) Total amount distributed among 104 HR's = Rs. $104 \times 6000 = \text{Rs. } 624000$

Let the amount distributed to 156 officers be x

Then $\frac{624000}{x} = \frac{13}{7}$

Then x = Rs. 336000

The total profit = Rs. $624000 + 336000 = \text{Rs. } 9.6 \text{ lakhs}$

81) Ananya invest in two schemes, in one scheme she get 15% profit and in other scheme he get 30% profit, what is his total profit if he invest in the ratio of 2:3 respectively.

82) Preethi bought 240 reams of brown sheet at Rs 200 per ream and the expenditure on transport Was Rs 960. she had to pay an octroi duty of 1Rs per ream and the labour charges were Rs 120. What should she charge per ream to gain 80%(in Rs)?

83) Mani went to purchase a mi mobile handset, the shopkeeper told him to pay 25% tax if he asked the bill. Mani manages to get the discount of 10% on the actual saleprice of the mobile and he paid the shopkeeper Rs.3275 without tax. Besides he manages to avoid to pay 25% tax on the already discounted price, what is the amount of discount that he has gotten?

84) Every year before the Diwali festival, the kumaran stores increases the price of the product by 48% and then introduce two successive discount of 12% and 13% respectively. What is percentage loss and percentage gain ?

85) A dealer allows a discount of 40 % on the marked price to the retailer. The retailer sells at 10% below the marked price. If the customer pays Rs.38 for an article, what profit is made by the retailer on it?

86) Sasi is a badham merchant in kerala. He has badham in sealed wooden boxes of 15kg each. The price of the badham increases by Rs.30 per kg for every year, but at the same time, 10% of the badham are eaten by rodents every year. If the price of a 1 kg of fresh badham is Rs.240, what is the change in his profits if he sells a sealed box after one year of storage, rather than selling it fresh ?(In Rs.)

87) A seller mixes 30% water to milk and then he sells the whole mixture at the price of milk. If the cost price of water be 50% of the cost price of milk, what is the net profit percentage?



88) The profit percentage of banu and renu is same on selling the articles at Rs 900 each but banu calculates his profit in the selling price while renu calculates it correctly on the cost price which is equal to 10%. What is the difference in their profits?

89) P and Q both are dealers of cars. The price of a car is Rs 56,000. P gives a discount of 10% on whole, while Q gives a discount of 12% on the first Rs 40,000 and 8% on the rest Rs 16000. What is the difference between their selling prices?

90) A Barbie doll is available at Ratna stores in salem at 20% discount and the same is available at only 18% discount at Royal stores in attur. Deepika has just sufficient amount of Rs 800 to purchase it at Ratna stores in salem. What is the amount that deepika has less than required amount to purchase it at Royal stores in attur?

81) Total profit = $(2/5 \times 15) + (3/5 \times 30)$
 $= 30/5 + 90/5$
 $= 6 + 18$
 $= 24\%$

82) Total CP = Rs (240×200) = Rs. 48000
Total expenditure = $(960 + 1 \times 240 + 120)$ = Rs. 1320
total Cp = $48000 + 1320$ = Rs. 49320
gain = 80%
sp of 240reams = $49320 \times 180/100$ = Rs. 88776
Sp per ream = $88776/240$ = Rs 369.9

83) CP = 100, SP (with tax) = 125
New SP = $100 - 10 = 90$
Effective discount = $125 - 90 = 35$
So, at SP of 90 ----> discount = 35
and at SP of 3275-----> discount = $35/90 \times 3275$ = Rs 1274(approx.)

84) Let CP = 100,
48 % increase => SP = 148
12 % discount in SP => $((148 \times 12)/100) = 17.76$
So 1st SP = $(148 - 17.76) = 130.24$



13 % discount in 1st SP $((130.24 \times 13)/100) = 16.93$

2nd SP = $130.24 - 16.93 = 113.31$

So finally CP = 100, SP = 113.31 \Rightarrow gain = 13.31%

85) Let dealer marked price = 100%, Retailer's C.P = 60%

And the retailer sells at 10% less than the marked price \Rightarrow S.P = 90%

If S.P of 90% of the retailer costs Rs.38 to customer,

So its C.P of 60% will cost $60 \times 38 / 90 = 25$

Profit made by the retailer = $38 - 25$

= Rs.13

86) Price of 1kg fresh batham= Rs.240

Therefore, price of 15kg = $Rs.15 \times 240 = 3600$

10% of 15kg which eaten by rodents = $10 \times 15 / 100 = 1.5\text{kg}$.

So, End of Year he had $15\text{kg} - 1.5\text{kg} = 13.5\text{kg}$

So, he sells that 13.5kg with Rs.30 per kg profit = $13.5 \times 270 = 3645$

He buy 15kg wooden box with badham for Rs.3600 and sell that for Rs. 3645

So, profit = $3645 - 3600 = Rs.45$ more money he get.

87) Let CP of 1litre of milk = Rs.200 & CP of 1litre of water = Rs. 100

CP of solution = $140 + 30 = 170$

Sp of 1litre solution = 200

Profit% = $(200 - 170) \times 100 / 170 = 17.64\%$

88) when profit calculate on SP the profit = 10% of 900 = 90

when profit calculate on CP(x) = $x + X/10 = 900$

$11X = 9000$

$X = 818.18$

profit = 81.82

required difference = $90 - 81.82 = Rs. 8.18$

89) discount offer by P = 10 % of 56000 = Rs. 5600

total discount offer by Q = 12% of 40,000 + 8% of 16000 = $4800 + 1280 = Rs. 6080$

required difference = $6080 - 5600 = Rs.480$

90) 80% = 800

100% = 1000



when discount 18%, then,

$$SP = 1000 - 180 = 820$$

$$\text{required difference} = 820 - 800 = \text{Rs. } 20$$

- 91) If novels bought at prices ranging from Rs 300 to Rs 470 are sold at prices ranging from Rs 400 to Rs 520, what is the greatest possible profit that might be made in selling 12 books?
- 92) A seller buys three types of apples at Rs 150, Rs 120, and Rs 110 per kg. He mixes them in the ratio of 5:6:7 by weight and sells them at a profit of 50%. At what price per kilogram does he sell the apples?
- 93) The ratio of the cost price of product A to that of B is 5:7. product A was sold at a profit of 80% and product B was sold at a profit of 20%. If the total profit earned after selling both the (products A and B is Rs 296) what is the difference between the cost prices of product A and B?
- 94) Femina is the famous magazine in India. In that company there is a profit of Rs 150. If $\frac{2}{3}$ part of n magazine is sold at 60% profit, $\frac{1}{4}$ part at 32% profit and remaining part at 24% profit and the find the cost price of the magazine?
- 95) Rahim is dealer of magnetic components. He imports the components from Russia. Rahim sells a radio valve at profit of 20%. If he bought it at 20% less and sold it for Rs 5 less than the previous selling price, he would have gained 25%. Find the cost price?
- 96) Helen went to a mall and then she bought earrings at Rs 120 per dozen. The selling price of hundred earrings so as to gain 30% will be(in Rs)?
- 97) Kumaran stores offered 60% discount on the marked price and there is a loss of 30%. If it is sold the MP, find the profit percentage?
- 98) Rithick wants to buy a computer. He bought a computer listed at Rs 6000 with discount 30% offer on the list price. What additional amount must be offered to rithick to bring the net price to Rs3950?
- 99) A marked price of a Chair is Rs 480. The seller offered the discount of 25% and gain 50%. If no discount is allowed, find his gain percentage?
- 100) Selvi, Deepi and Dinesh invest in the ratio of 4 : 5: 6. The percentage of return on their investments are in the ratio of 7 : 6 : 5. Find the total earnings, If Deepi earns Rs. 350 more than Selvi:



91) least cost price = $300 \times 12 = 3600$
greatest sold price = $520 \times 12 = 6240$
profit required = $6240 - 3600 = \text{Rs } 2640$

92) suppose the seller purchases 5kg, 6kg, 7kg apples.
then the price of the total apple
 $(5 \times 150) + (6 \times 120) + (7 \times 110) = 750 + 720 + 770 = 2240$
as the total apples weights 18kg and the dealer makes a profit of 50%
the selling price of apples per kg = $1.5 \times 2240 / 18 = 3360 / 18 = \text{Rs. } 186.66$

93) CP of product A = $5X$
CP of product B = $7x$
Total price = $(5x \times 0.8) + (7x \times 0.2) = 296$
 $4X + 1.4X = 296$
 $5.4X = 296$
 $x = 54.81 \approx 55$ (approx.)
difference of the CP = $7x - 5x = 2x = 2 \times 55$
 $= \text{Rs. } 110$

94) $S_1 = 2/3$, $P_1 = 60\%$
 $S_2 = 1/4$, $P_2 = 32\%$
 $S_3 = 1 - [2/3 + 1/4] = 1/12$, $P_3 = 24\%$
total profit = Rs 150
CP of an entire magazine = $(\text{total profit} \times 100) / (S_1 \times P_1 + S_2 \times P_2 + S_3 \times P_3)$
CP of an entire magazine = $(150 \times 100) / (2/3 \times 60 + 1/4 \times 32 + 1/12 \times 24)$
 $= 15000 / (40 + 8 + 2)$
 $= 15000 / 50$
 $= \text{RS. } 300$

95) let CP = Rs 100 then SP = 120
New CP = Rs. 80 then New SP = $80 \times 125 / 100 = 100$
from question,
Rs 120 - Rs 100 = Rs 20 is equivalent to Rs 5
Rs 100 is equivalent to Rs 25
CP = Rs 25

96) 12 earrings cost = 120 per dozen



1 earring cost = $120/12 = \text{Rs. } 10$

sp CP of 100 earrings = $100 * 10 = \text{Rs } 1000$

so SP = Rs x

from question,

$\text{SP} - \text{CP} / \text{CP} * 100 = \text{profit \%}$

$(x - 1000) / 1000 * 100 = 30$

$300 = x - 1000$

$x = \text{Rs } 1300$

97) MP = Rs X

Sp = $40/100 * x = 2x/5$

CP = $2x/5 * 100/70 = 4x/7$

Profit when sold at MP = $x - 4x/7 = 3x/7$

Profit% = $(3x/7) / (4x/7) * 100 = 75\%$

98) Mp = 6000

Sp = $6000 * 70/100 = 4200$

net amount = 3950

required % = $(4200 - 3950) / 4200 * 100$

$= 250/42 \Rightarrow 5.95\%$

99) MP = Rs. 480, discount = 25%

SP = $480 * 75/100 = 360$

CP = $360 * 100/150 = 240$

Required % = $(480 - 240) / 240 * 100 = 100\%$

100) Selvi deepi dinesh

investment	4x	5x	6x
Rate of return	7y%	6y%	5y%
Return	$28xy/100$	$30xy/100$	$30xy/100$

Total = $88xy/100$

deepi earnings – selvi earnings = $2xy/100 = \text{Rs } 350$

Total earning = $88xy/100 = \text{Rs } 15,400$

10. PARTNERSHIP



- 1). 3 people A, B, C invested in a business in the ratio of 5:6:9. After 3 months B withdraw half of her capital. If the Sum invested by A is 32000, then what is the profit earned by B at the end of the year out of the total profit of Rs. 48250?
- A) 17965.33
B) 70767.50
C) 46189.25
D) 10193.66
- 2). Two people abi and krish invested in a business with 7 lakh and 8 lakh rupees respectively. They agree that 46% of the profit should be divided equally among them and rest is divided between them according to their investment. If krish got Rs. 2100 more than abi, Then the total profit is,
- A) 55000
B) 56000.
C) 58333
D) None
- 3). P, Q, R invested in the ratio of 15:16:17. After the end of the business teram they receives the profit in the ratio 9:10:11. Find the ratio of time in which they invested in the business.
- A) 934:1699:1578
B) 1224:1275:1320
C) 1578:1668:8096.
D) None
- 4). Anu and Banu invested rupees Rs.26000 and Rs.22000 respectively. Anu being an active partner will get Rs.350 every month extra for running the business. In two years if Anu receives a total of Rs. 18000, then what is profit earned by Banu in two years.
- A) 2200
B) 3300
C) 4400
D) None
- 5). M and N invested in a business in which M invests Rs.385 more than N. N invested for 9 months while M invested for 5 months. If M get Rs.65 more than N out of profit of Rs.1350. Then then total amount invested in the business approximately is,
- A) 1452
B) 7413
C) 6298



D) 5778

6). 3 partners A , B, C starts a business. 4 times of A's capital is equal to 6 times of B's Capital and B's Capital is 8 times of C's capital if profit of B is Rs.6300. Then find the average profit A and C

A) 7000.50

B) 5118.75

C) 4475.25

D) none

7). Three partners A, B, C invest a total sum of Rs,114000. At the end of the year A gets Rs 6000 and B gets 5000 and C gets Rs 8000 as profit. Find the average amount invested by A and C.

A) 46677

B) 42000.

C) 53000.

D) None

8). X invested 13% more than Y's investment. Y invested 18% less than investment of Z. X's investment is what percent of investment made by both Y and Z?

A) 47.5.

B) 50.9.

C) 56.5

D) None

9. Two persons P and Q invested in a business with 21 lakh and 28 lakh rupees. They agree that 30% of the profit should be in the ratio 2:3 for P and Q and rest is divided between them according to their investment. If Q got Rs.1200 more than P, then the total profit Q is

A) 4350

B) 4567

C) 4467

D) None

10). Three persons enter into a partnership by investing in the ratio of 9:8:1. After one year P double its investment and R puts another Rs.6000 to the initial investment. Now the ratio of investment changes to 9:8:2. What is total investment P,Q, R after 2 years?

A) 108000.

B) 114000.

C) 126000.



D) None

1). Answer: D)

Let A, B, C put amounts be $5x, 6x, 9x$ respectively

Then A's investment is

$$5x = 32000 \Rightarrow x = \text{Rs. } 6400$$

Then, B, C puts amount is Rs. 38400 & 57600

$$= 32000 \times 12 : 38400 \times 3 + 19200 \times 9 : 57600 \times 12$$

$$\Rightarrow 384000 : 288000 : 691200$$

$$= 20 : 15 : 36$$

B's profit is $48250 \times \frac{15}{71}$

$$= \text{Rs. } 10193.66$$

2). Answer: C)

Ratio of profit abi and krish is,

$$\Rightarrow 7:8$$

46% of then profit should be divided equally among them, remaining share is 54% of x

$$\text{Abi share} = \frac{54}{100} \times x \times \frac{7}{15}$$

$$\text{Krish share} = \frac{54}{100} \times x \times \frac{8}{15}$$

$$\frac{54}{100} \times x \times \frac{8}{15} - \frac{54}{100} \times x \times \frac{7}{15} = 2100$$

$$X = 58333$$

3). Answer: B)

P, Q, R invest the amount in the ratio 15:16:17

T_1, T_2, T_3 are time for investment profit gained = investment \times time

$$\text{Profit ratio} = 9 : 10 : 11 = 15 \times T_1 : 16 \times T_2 : 17 \times T_3$$

$$T_1 : T_2 : T_3 = 1224 : 1275 : 1320$$

4). Answer: C)

Profit ratio at Anu & Banu is ,

$$\text{Anu : Banu} = 26000 : 22000.$$

$$\text{Anu : Banu} = 13 : 11$$

Anu being an active e partner will get Rs 350 / every month.

2 years receive = Rs. 8400

$$\text{Balance amount of Anu} = 18000 - 8400 = 9600$$

$$\text{Profit gained Banu in 2 years} = 9600 / 24 \times 11 = \text{Rs. } 4400$$



5). Answer: B)

Let investment of M is $X + 385$

Let investment of N is X

Profit earned of M&N is,

$$M/N = (X+385)*5 / x *9 \text{-----} > (1)$$

Profit of M = 65 + profit of N

Total profit = 1350 = 65 + profit of N + profit of N

Profit of N = Rs. 642.5

Profit of M = 65 + 642.5 = Rs. 707.5

Profit ratio of both = 707.5 : 642.5

$$= 283 : 257 \text{-----} > (2)$$

$$\text{From 1 \& 2, } 283 / 257 = (x + 385) * 5 / (x * 9)$$

$$X = 392.01$$

$$\text{Total investment} = (392 + 385) * 5 + (392 * 9)$$

$$= \text{Rs. } 7413$$

6). Answer: B)

Let the capital of C be y

Let the capital of B be $8y$

Let the capital of A be $48y/4 = 12y$

Ratio of their profit is ,

$$A:B:C = 12y : 8y : y$$

$$= 12:8:1$$

$$\text{Total of A \& C} = 6300/8 * 13$$

$$= \text{Rs. } 10237.5$$

Average profit of A&C

$$= 10237.5/2 = \text{Rs. } 5118.75$$

7). Answer: B)

Profits of A, B & C is 6000, 5000, 8000 rupees

Ratio of their profits is,

$$A:B:C = 6:5:8$$

Investment of A, B, C be

$$6x, 5x, 8x$$

$$6x + 5x + 8x = 114000$$

$$\Rightarrow x = 6000$$

Average amount invested by A & C is



$$6000/2 * 14 = \text{Rs.} 42000$$

8). Answer: B)

Let investment of Z be 100%

Let Y's investment is 82%

Also A's investment is 92.66%

$$\text{Required \%} = 92.66/182 * 100 = 50.9\%$$

9). Answer: A)

Ratio of profit of P&Q is,

$$P:Q = 21:28 \Rightarrow 3:4$$

Let total profit gained be X

Since ,30% of profit should be divided in ratio 2:3 for P&Q,

Remaining share is =70% of x

$$P's \text{ share} = 70/100 * x * 3/7 + 30/100 * x * 2/5$$

$$Q's \text{ share} = 70/100 * x * 4/7 + 30/100 * x * 3/5$$

$$(70/100 * x * 4/7 + 30/100 * x * 3/5) - (70/100 * x * 3/7 + 30/100 * x * 2/5)$$

$$= 1200$$

$$X = \text{Rs } 7500$$

$$Q's \text{ total profit} = 70/100 * 7500 * 4/7 + 30/100 * 7500 * 3/5$$

$$= \text{Rs } 4350$$

10). Answer: B)

Let investment of P, Q & R are 9x, 8x & x for 1 year.

After 1 year ratio of their investments.

$$9:8:2 = 9x : 8x : x \Rightarrow x+6000 = 27x : 8x \Rightarrow x+6000$$

$$X = \text{Rs.} 6000$$

Total investments of P, Q & R

After 2 years

$$= [9+8+2] * 6000 = \text{Rs.} 114000.$$

11). Mahesh and Devi invested Rs.20979 and Rs. 22977 respectively in a business. Devi being an active partner will get Rs.750 every month extra for running the business. In 18 months if Devi received a total amount of Rs.18250, then what is total profit earned by both in one and half years is,

A) 26888.

B) 22500.

C) 22587



D) 25874

12). X invested three- ninth, Y invested three-seventh of the remaining and Zth remaining. If Y earned Rs.840 as profit pr each year. Find the average monthly profit of all.

- A) 510
- B) 490
- C) 630
- D) 370

13). A Shop makes a profit of Rs. 85000 of which 15% as paid as taxes. If the rest is divided among the partners A,B,C in the ratio 8:7:6 then the total share of A and B is

- A) 54780
- B) 51607
- C) 56803
- D) None

14). In a partnership P invests $\frac{2}{6}$ th of the capital for $\frac{2}{3}$ rd of the time, Q invests $\frac{3}{5}$ th of the capital for $\frac{1}{3}$ rd of the time and R invests for $\frac{2}{5}$ th of the capital for $\frac{3}{4}$ th of the time. Out of the profit of Rs. 64375at the end of the year, find R's share in the profit

- A) 27854.
- B) 23000.
- C) 26740.
- D) 25784

15). Rs.10500 is divided among P, Q and R. So that P receives half as much as Q and Q receives half as much as R. Then then total share of P and R is

- A) 4500
- B) 3000
- C) 5000
- D) 7500

16). P, Q, R enter into a partnership. P initially invests Rs 15000 and withdrawn Rs. 7500 after 7 months. Q initially invests Rs 12500 and withdraws Rs 10000 after 5 months and R invests Rs 10000 and adds another Rs 5000 after few months. At the end of 1 year and 3 months profits of P and R is twice the profit of Q. Then after how many months did R invests Rs 10000?

- A) 2.5
- B) 2.6



- C) 2.7
- D) None

17). Ravi and kavi are partners in a business. Ravi contributes $\frac{3}{7}$ th of the total capital for 20 months and kavi received $\frac{3}{4}$ th of the profit. Then how long kavi invest the money in the business?

- A) 5
- B) 11
- C) 6
- D) 9

18). M and N invested in a work which M invest Rs 3015 more than N. N invested for 7 months while M invested for 5 months. If M gets Rs 425 more than N, out of a total profit of Rs 3400. Then the amount invested in the business by M approximately is,

- A) 6784
- B) 6258
- C) 7524
- D) 7275

19) X is a working and Y is sleeping partners in a business. X puts in Rs. 2500 and Y puts in Rs.3000. X receives $\frac{25}{2}\%$ of the profit for managing the business and the rest is divided in proportion to their capital. What does Y get out of a profit of Rs. 440?

- A) 210
- B) 200
- C) 250
- D) 275

20). P and Q entered into a partnership with capitals in the ratio 4:5. After 3 months, P withdrew $\frac{1}{3}$ of his capital and Q withdrew $\frac{1}{5}$ of his capital . The gain at the end of 9 Months was Rs. 775. P's shares of profit is

- A) 358
- B) 362
- C) 337
- D) 345

11). Answer: C)

Profit ratio of Mahesh: Devi =20979 :22977=:21:23

Devi is an active partner will get Rs,750/month

For 18 months ,she receives



Rs.13500

Balance amount of Devi

$=18250 - 13500 = \text{Rs } 4750$

Then profit gained by Devi in 18 months $=4750/23 * 21 = \text{Rs.}4337$

Total profit earned by both in one & half years $=18250+4337$

$=\text{Rs } 22587$

12). Answer: B)

Let total amount puts by X, Y & Z be P

X's investment $= 3/9 P$

Balance investment $=6/9 p$

Y's investment $=6/9 * P * 3/7 = 2/7 P$

Remaining investment $=8 p/21 = Z$'s amounts

Profit ratio of X, Y & Z,

$X:Y:Z = 3/9 * P : 2/7 * P : 8/21 * p = 7:6:8$

1 month share $=840/12 = \text{Rs } .70$

Average monthly profit of X, Y, Z $=70/3 * 21$

$=\text{Rs.}490$

13). Answer: B)

Profit by company $=\text{Rs.}85000$

After paying tax of 15%

Remaining profit $=85000 * 85/100$

$=\text{Rs } 72250$

Profit ratio of X, Y, Z

$=8:7:6$

Total share of X & Y

$=72250 * 15/21$

$=\text{Rs.}51,607$

14). Answer: C)

Ratio of their profits

$(2/6 * 2/3) * 12 : (3/5 * 1/3) * 12 : (2/5 * 3/4) * 12 = 40:36:54$

R's share $=64375 * 54/130$

$=\text{Rs.}26740$

15). Answer: D)



Let amount received by R is X

Amount received by Q is X/2

Amount received by P is X/4

Profit ratio of

P, Q & R = X/4 : X/2 : X

= 1 : 2 : 4

Total share of P & R

= $10500 \times \frac{5}{7}$ = Rs 7500

16). Answer: A)

Ratio of P, Q & R is ,

$15000 \times 7 + 7500 \times 8 : 12500 \times 5 + 2500 \times 10 : 10000 \times x + 15000 \times (15 - x)$

P : Q : R = 66 : 35 : 9 - 2x

Profit of Q = (profit of P + profit of R) / 2

$35 = (66 + 9 - 2x) / 2$

X = 2.5 months

17). Answer: A)

Total profit be X

kavi's profit is $\frac{3}{4}x$

Ravi's profit is $\frac{1}{4}x$

Ratio of ravi & kavi profit = $\frac{3}{4}x : \frac{1}{4}x = 3 : 1$

Let Ravi's investment = $\frac{3}{7} * P$ (for 20 months then, kavi's investment = $\frac{4}{7} P$)

Ratio of ravi & kavi

Profit = $3 : 1 = \frac{3}{7} * P * 20 : \frac{4}{7} * p * T$

T = 5 months = kavi investment time

18). Answer: A)

Let investment of N be x

Profit of N be y

Investment of M is x + 3015

Profit ratio of M & N is,

$M : N = [x + 3015] * 5 : x * 7 \rightarrow (1)$

Profit of M = 425 + profit of N

Total profit = 3400 = 425 + profit of N + profit of N

Profit of N = Rs 1487.5

Profit of M = Rs 1487.5 + 425



=Rs 1912.5

Profit ratio of

M&N=1912.5:1487.5

=153:119----->(2)

$153/119=(x+3015)*5/x*7$

X=Rs.3769

M's investment =x+3015

=3769+3015

=Rs6784

19). Answer: A)

Total profit = Rs. 440

X's share for managing the business i.e

$25/2 \% = \{25/100\}\{440/2\}=\text{Rs.}55$

Remaining profit of X and Y as per their capital = 440 - 55= Rs. 385

Ratio of amounts = 2500 : 3000 = 5 : 6

Sum of ratios = 5 + 6 = 11

X's share = $385\{5\}/\{11\}=\text{Rs.}175$

X's total share = 175 + 55= Rs. 230

Y's share = $385\{6\}/\{11\}=\text{Rs.}210$

20). Answer: C)

Investment initial of P=4x

Investment initial of Q=5x

After 3 months of P= $4x*(1/3)=4x/3$

After 3 months of Q= $5x*(1/5)= x$

Ratio of capitals = $(4x*3+3x*6: 5x*3+4x*6)=30x:39x=10:13$

Total profit =775

P's share = $10/23*775=337(\text{approx.})$

21). Agalya started a work with Rs. 144000 and after 3months Bhuvana joined with her the amount of Rs. 116000. At the end of the year bhuvana received a profit of Rs.20960 including 16% as a commission for maintain the work. Find the profit earned by agalya at the end of the year approximately?

a) 22045

b) 23040

c) 21450

d) 24500



22). A started a business with Rs. 28000 and is later joined by B with Rs. 49000. After how many months did B joined if the profit after 3 yrs divided in the ratio for 7:6 for B and A?

- a) 12
- b) 17
- c) 16
- d) 15

23). Ajay and vivek are active partner in a particular work. Ajay receive $\frac{1}{7}$ th of the capital for 84 months and vivek receives $\frac{1}{8}$ th of the profit, for how long vivek amount was used?

- a) 11
- b) 8.
- C) 4
- d) 2

24). In a work A and B invested amounts in the ratio 7:9, whereas the ratio between amounts invested by A and C was 5:11. If Rs. 12750 was their profit, how much amount did B gained?

- a) 2546
- b) 2475
- c) 2842
- d) 2656

25). M, N and O amounted plot. M invests 24 flat for 27months, N invests 18 flat for 24 months and O puts 48 plat for 27 months. If the rent of the plot is Rs.44649 then what is the average amount paid by M & O?

- a) 18116.5
- b) 18265.5
- c) 16878.5
- d) 12688.5

26). P and Q established a shop. P puts 7 times that of Q. Q also kept the amount puts for 5 as much time as P. If Q got a profit of Rs.12360. What was the total profit?

- A) 25748
- B) 27856
- C) 29664
- D) 28458



27). R being the silent partner contributes $\frac{2}{9}$ th of profit and the remaining is divided between S and T in the ratio of 7:5. If the difference between the profit shares of R and T is Rs.6600. What is the S's share?

- a) 27900
- b) 28000
- c) 29400
- d) 26889

28). L, M, N enter into a partnership work with L receives Rs. 54000. If out of a total profit of Rs. 4500. L gets Rs. 1500 and M gets Rs.2100. N gets Rs.900, then M capital is

- a) 70500
- b) 75600.
- c) 72700
- d) 74900

29). X, Y, Z started a business by investing Rs.60,000, Rs.70,000 and Rs.80,000 respectively. Find the share of each out of an annual profit of Rs.28350

- A) 8000, 9367, 11800
- B) 8500, 9400, 11000
- C) 8308, 9530, 10346
- D) 8100, 9450, 10800

30). Tonu started a business investing Rs. 90,000. After 3 months, reetu joined him with a capital of Rs. 1,20,000. After 6 months, shalu joined them with a capital of Rs.1,80,000. At the end of the year, they made a profit of Rs.33000. find the share of shalu.

- A) 13200
- B) 6600
- C) 7500
- D) 12000

21). Answer: B)

Ratio of agalya & bhuvana

$$144000 \times 12 : 116000 \times 9 = 48:29$$

Let the total profit be Z.

$$\text{Profit earned by bhuvana} = 16 \% \text{ of } Z + \frac{29}{77} \text{ of } 84 \% \text{ of } Z = 20960$$

$$524Z = 20960 \times 100 \times 11 \Rightarrow Z = \text{Rs.}44000.$$

Total profit by agalya

$$= \frac{48}{77} \times \frac{84}{100} \times 44000 = \text{Rs.}23040.$$



22). Answer: A)

Let number of months A invest by B be Y

Ratio of A after 2 yrs is,

$$6/7 = (2800 \times 36) / (4900 \times Y)$$

$$y = 24 \text{ months}$$

$$\text{No of month after A joined} = 36 - 24 = 12 \text{ months}$$

23). Answer: D)

Let total profit be A.

$$\text{Profit earned by vivek} = 1/8 \times A.$$

$$\text{Profit earned by Ajay} = 7/8 \times A$$

$$\text{Ratio of vivek \& Ajay} = 1:7$$

Let total capital investment be Z Ajay receive $1/7^{\text{th}}$ of Z for 84 months

Vijay receive $6/7^{\text{th}}$ of Z for Y months

$$7/1 = (1/7 \times Z \times 84) / (6/7 \times Z \times Y) \Rightarrow Y = 2 \text{ month}$$

24). Answer: C)

$$A \& B \text{ ratio} = 7:9$$

$$B \& A \text{ post ratio} = 9:7$$

$$A \& C \text{ post ratio} = 5:11$$

$$A:B:C = 45:35:77$$

$$\text{Amount received by B} = 35/157 \times 12750 = \text{Rs.}2842$$

25). Answer: B)

Ratio of M, N, O is,

$$24 \times 27 : 18 \times 24 : 48 \times 27 = 3:2:6$$

$$\text{Amount paid by M\&O} = 44649 \times 3/11 + 44649 \times 6/11$$

$$= \text{Rs.}36531$$

$$\text{Average amount paid by M\&O} = 36531/2 = \text{Rs.}18265.5$$

26). Answer: C)

Let amount put by Q be A

Let amount put by P be 7A

Let amount time of P be T

Let amount time of Q is 5T

Ratio of P & Q



$$7A:T:A*5T=>7:5$$

$$\text{Total received amount} = 12360/5 * 12 = 29664$$

27). Answer: C)

Let total profit be x

$$R's \text{ share} = 2/9 * x$$

$$\text{Balance share} = 7/9 * x$$

$$\text{Share of T} = 7/9 * x * 5/12 = 35/108 * x$$

Difference of R & T is,

$$35/108 * x - 2/9 * x = 6600 \Rightarrow x = 64,800$$

$$\text{Share of S} = 7/9 * 64800 * 7/12$$

$$= \text{Rs. } 29400.$$

28). Answer: B)

Profit ratio is L:M:N=1500:2100:900

$$L:M:N=5:7:3.$$

Let L,M,N be 5x,7x,3x

$$L's \text{ receives}, 5x = 54000, x = 10800$$

$$M's \text{ receives}, 7 * 10800 = \text{Rs. } 75600$$

29). Answer: D)

$$\text{Ratio of shares} = 60,000 : 70,000 : 80,000$$

$$= 6 : 7 : 8$$

$$A's \text{ share} = \text{Rs}(28350 * 6/21)$$

$$= \text{Rs. } 8100$$

$$B's \text{ share} = \text{Rs}(28350 * 7/21)$$

$$= \text{Rs. } 9450$$

$$C's \text{ share} = \text{Rs} (28350 * 8/21)$$

$$= \text{Rs. } 10,800$$

30) Answer: B)

$$\text{Ratio of their capitals} = (90000 * 12) : (1,20,000 * 9) : (1,80,000 * 3)$$

$$= 2:2:1$$

$$\text{Tonu's share} = \text{Rs}(33000 * 2/5) = \text{Rs. } 13200$$

$$\text{Reetu's share} = \text{Rs}(33000 * 2/5) = \text{Rs. } 13200$$

$$\text{Shalu's share} = \text{Rs}(33000 * 1/5) = \text{Rs. } 6600$$



- 31). P, Q & R enter into partnership. P invests 6 times as much as Q and Q invests two- sixth of what R invests. At the end of the year, the profit earned is Rs.7200. what is the share of Q?
- A) 720
B) 550
C) 670
D) 480
- 32). Meenu invested Rs.38000 in a business. After few months, ruba joined her with Rs.28500. At the end of the year, the total profit was divided between them in the ratio 2:1. After how many months did ruba joined?
- A) 2 months
B) 3 months
C) 4 months
D) 5 months
- 33). Four persons rented a grassland. P grazed 48 goats for 3 months, Q grazed 20 goats for 5 months, R grazed 70 goats for 4 months and S grazed 42 goats for 3 months. If p's share of rent is Rs.1420. Find the total rent of the field?
- A) 6410
B) 6200
C) 6400
D) 6300
- 34) Suja and Madhavi are partners in a business, Suja invests Rs.42000 for 9 months and Madhavi invests Rs.54000 for 12 months. Then, out of a profit of 38750 find suja's profit?
- A) Rs.14330
B) Rs.14590
C) Rs.14650
D) Rs.14276
- 35) X, Y, Z subscribe is Rs.25000 for a business. X subscribes Rs.2000 more than Y and Y Rs.2500 more than Z. out of a total profit of Rs.17500, X receives
- A) Rs.7700
B) Rs.7490
C) Rs.7350
D) Rs7320



36) P, Q & R are three partners start a business. Thrice P's capital is equal to four times Q's capital and Q's capital is 6 times R's capital. Out of a total profit Rs.35860 at the end of the year, Q's share is

- A) Rs.12334
- B) Rs.14344
- C) Rs. 21500
- D) Rs.17600

37) If $12 \text{ (M's capital)} = 18 \text{ (N's capital)} = 30 \text{ (O's capital)}$ then out of a profit of Rs.13950, How much amount O will receive?

- A) Rs.2700
- B) Rs.2600
- C) Rs.2500
- D) Rs.2400

38). Mano, kajal, kavin enter into partnership. Mano invests some money at the beginning kajal invests double the amount for 8 months and kavin invests thrice the amount for 10 months. If the annual profit be Rs.35000 then kavin's share is approximately

- A) Rs. 17567
- B) None
- C) Rs. 12985
- D) Rs. 19274

39). Three active partners A, B, C start a work. Twice of A's capital is equal to 6 times of B's capital is nine times C's capital. If B's profit is Rs. 7500. Then find the total profit.

- a) 30750
- b) 30833
- c) 45250
- d) 32745

40). Shyam and Ram are active partners in a business. Shyam contributes $\frac{2}{7}$ th received capital of the profit for 21 month and Ram received $\frac{1}{5}$ th of the profit. Then how many long Ram invest the money in the business.

- a) 8months.
- b) 7months.
- c) 3months
- d) 1.5 months



31). Answer: A)

Let R's capital = Rs.x

Q's capital = Rs. $2x/6 = x/3$

P's capital = $6x/3 = 2x$

Ratio of their capitals = $2x : x/3 : x$

= $6x : x : 3x$

= 6:1:3

Hence Q's share = $(7200 \times 1/10) = \text{Rs.} 720$

32). Answer: C)

Suppose Ruba joined after x months

Then Ruba's money was invested for $(12-x)$ months.

$$38000 \times 12 / 28500 \times (12-x) = 2/1$$

$$456000 = 684000 - 57000x$$

$$X = 4$$

Hence Ruba joined after 4 months.

33). Answer: A)

Ratio of shares P, Q, R, S = $48 \times 3 : 20 \times 5 : 70 \times 4 : 42 \times 3$

$$= 144 : 100 : 280 : 126$$

$$= 72 : 50 : 140 : 63$$

Let total rent be Rs x

Then P's share = Rs. $72x/325$

$$72x / 325 = 1420$$

$$X = \text{Rs.} 6410$$

34). Answer: D)

Ratio of their shares = $(42000 \times 9) : (54000 \times 12)$

$$= 378 : 648$$

$$= 7 : 12$$

Suja's share = Rs. $(38750 \times 7/19)$

$$= \text{Rs.} 14276$$

35). Answer: C)

Let Z = y, then Y = $y+2500$, X = $y+2500+2000$

$$X = y+4500$$

$$\text{So } y + y + 2500 + y + 4500 = 25000$$



$$3y = 18000 \Rightarrow y = 6000$$

$$X:Y:Z = 10500: 8500 : 6000$$

$$= 105 : 85 : 60$$

$$= 21:17 : 12$$

$$X's \text{ share} = \text{Rs.}(17500 \times 21/50)$$

$$= \text{Rs.}7,350$$

36). Answer: B)

$$\text{Let } R = c$$

$$Q = 6c$$

$$P = 24c/3 = 8c$$

$$P : Q : R = 8c:6c:c = 8: 6: 1$$

$$\text{So } Q's \text{ capital} = \text{Rs. } 35860 \times 6/15$$

$$= \text{Rs.}14344$$

37). Answer: A)

$$\text{Let } 12M = 18N = 30O = y$$

$$M = y/12, \quad N = y/18 \quad O = y/30$$

$$\text{Therefore } M : N : O = y/12 : y/18 : y/30$$

$$= 15 : 10 : 6$$

$$\text{Hence } O's \text{ share} = \text{Rs } (13950 \times 6/31)$$

$$= \text{Rs.}2700$$

38). Answer: B)

$$\text{Let } \text{mano's investment be Rs } x$$

$$\text{Then Ratio of capitals} = (x \times 12) : (2x \times 8) : (3x \times 10)$$

$$= 12x : 16x : 30x$$

$$= 6:8: 15$$

$$\text{Kavin's share} = \text{Rs.}(35000 \times 15/29)$$

$$= \text{Rs.}18103.$$

39). Answer: B)

$$\text{The capital of } C \text{ be } y.$$

$$\text{The capital of } B \text{ be } 9y.$$

$$\text{The capital of } A \text{ be } 54y/2 = 27y$$

$$\text{Ratio of } A:B:C = 27y:9y:y$$

$$\text{Total} = 7500/9 \times 37 = \text{Rs } 30833.$$



40). Answer: D)

Let total profit = P

Ram's profit = $\frac{1}{5} P$

Shyam profit = $\frac{4}{5} p$

Ratio of Shyam & Ram = $\frac{4}{5} p$: $\frac{1}{5}$

= 4:1

Total amount put be X

Shyam put = $\frac{2}{7} * p$ for 21 months.

Ram put = $\frac{5}{7} * p$

Ratio of Shyam & Ram = 4:1 = $\frac{2}{7} * p * 21$: $\frac{5}{7} * p * T$

T = 1.5 months = Ram amount investments time.

41). X, Y, Z started a business with their investment in the ratio of 4/5: 4/7: 5/9, after 6 months. X has withdrawn half of his investment. Also X will get 30% of profit for being an active partner. At the end of a year total profit earned was Rs. 54750. Then find the total profit earned by Y and Z?

- A) 25200
- B) 28600
- C) 25010
- D) 26867

42). L, M and N started a business in which L invested Rs.15000/- for 2 year, M invested Rs 25000/- for 3 years, N invested Rs.35000/- for 4 years. At the end of the profit received by them is Rs.9800/-. What is N's share?.

- A) 5600
- B) 5000
- C) 5500
- D) 4500

43) Q and K are partners in a Company. Q receives $\frac{4}{7}$ th of the capital for 9 months and K received $\frac{1}{5}$ th of the profit, for how long K money used?

- A) 3
- B) 4
- C) 5
- D) 6



- 44) Sharuk being the active partner receives $\frac{3}{5}$ th of profit and the remaining is divided between sanjay and Karthi in the ratio of 2:1. If the difference between the profit shares of Sharuk and sanjay is Rs.3400. What is Karthi share in Rs?
- A) 1540
B) 1360
C) 1698
D) None
- 45). X, Y, Z are becomes a partner in their business with X's share receives Rs.117000. If out of a total profit of Rs 8100,X gets Rs.3900 and Y gets Rs. 2700, Z gets Rs.1500 then total capital of Y and Z is,
- A) 36900
B) 146000
C) 126000
D) 247000
- 46) The amounts of P, Q and R in the ratio 3:4:5 and their spending are in the ratio 4:5:6. If P saves $\frac{1}{6}$ th of his income then then savings of P, Q, R are in the ratio
- A) 18:11:3.
B) 12:13:4.
C) 4:11:18.
D) None
- 47). Divide Rs 1728 among P, Q, R in such way that 8 times P's share is 12times Q's share and is 6 times R's share. How much does each get?
- A) Rs. 576,384,768
B) Rs. 588,392,484
C) Rs. 592, 384, 652
D) None of the above
- 48). The monthly income of M and N is in the ratio 5:3 and their expenses in the ratio 4:2. Both of them save Rs. 12000 each. Find the monthly income of M
- A) 68000
B) 72000
C) 60000
D) 64000



49. X, Y, Z are engaged to do a certain piece of work for Rs.8200. Y and Z are to execute $\frac{15}{26}$ of the work together. Amount to be paid to X is

- A) 4287
- B) 3469
- C) 6124
- D) 2865

50). Tarani and Ruba invest in a business ratio 7:8. If 24% of the total profit goes to charity and Ruba's share is Rs 1506. Then the profit goes to Tarani and Ruba is

- A) 1675
- B) 2688
- C) 2823
- D) 1495

41). Answer: C)

Let investment of X, Y, Z be $\frac{4}{5}x, \frac{4}{7}x$ & $\frac{5}{9}x \Rightarrow 252x, 180x$ & $175x$

Profit ratio of X, Y, Z is

$$252x \times 6 + 126x \times 6 : 180x \times 12 : 175x \times 12$$

$$= 189 : 180 : 175$$

Active partner X's amount = $54750 \times \frac{30}{100}$

$$= \text{Rs. } 16425$$

Remaining profit = $54750 - 16425$

$$= \text{Rs. } 38325$$

Total profit earned by

$$Y \times Z = 38325 \times \frac{355}{544} = \text{Rs. } 25010$$

42). Answer: A)

L = Rs.15000/- per 2 years

M = Rs.25000/- per 3 years

N = Rs.35000/- per 4 years

$$= 15000 \times 2 : 25000 \times 3 : 35000 \times 4$$

$$= 30000 : 75000 : 140000 = 30 : 75 : 140$$

$$= 6 : 15 : 28$$

Total = 49 parts -----> Rs.9800/- (profit)

$$= 1 \text{ part -----> Rs. } 200/-$$

Then, N's share is

$$= 28 \text{ parts} = \text{Rs. } 200 \times 28 \text{ parts}$$



= Rs.5600

43). Answer: A)

Let total profit gained be A

Profit earned by K = $\frac{1}{5} * A$

Profit earned by Q = $\frac{4}{5} * A$

Ratio of Q & K profit

$$= \frac{4}{5} * A : \frac{1}{5} * A = 4:1$$

Total investment be P

Q receives $\frac{4}{7}$ th of P for 9 months

K receives $\frac{3}{7}$ th of P for Y months.

Ratio of K & Q is,

$$\frac{1}{4} = \frac{(\frac{3}{7} * P * Y)}{(\frac{4}{7} * P * 9)} \Rightarrow Y = 3 \text{ months} \Rightarrow K$$

44). Answer: B)

Total profit = Y

Sharuk's share = $\frac{3}{5} * Y$

Balance share = $\frac{2}{5} * Y$

Share of sanjay = $\frac{2}{5} * Y * \frac{2}{3}$

$$= \frac{4}{15} * Y$$

Difference of sanjay & Sharuk share,

$$\frac{3}{5} * Y - \frac{4}{15} * Y = 3400 \Rightarrow Y = \text{Rs } 10200$$

$$\text{Karthi share} = \frac{2}{5} * 10200 * \frac{1}{3} = 1360$$

45). Answer: C)

Profit ratio is, X:Y:Z = 3900: 2700:1500

$$X:Y:Z = 13 : 9 : 5$$

Then, X,Y,Z capitals are

$$13x, 9x \text{ \& } 5x$$

X's receives amount is,

$$13x = 117000$$

$$\Rightarrow x = 9000$$

Total capital of Y&Z is,

$$= 9000 * 14 = 126000$$

46). Answer: C)

Income of P,Q,R = 3x:4x:5x



Expense of 4:5:6=4y:5y:6y.

Savings [income –expenditure]

$$=3x-4y : 4x-5y : 5x-6y \text{-----}>1$$

Given $3x-4y=x/6$

$$y=17x/24$$

Sub if (1) is,

$$=3x-4(17x/24) : 4x-5(17x/24) : 5x-6(17x/24)$$

$$=8x:22x:36x$$

$$= 4:11:18$$

47). Answer: A)

Given, $8P=12Q=6R$

$$4P=6Q=3R \Rightarrow 4P=6Q \Rightarrow 6/4Q \Rightarrow P=3/2Q$$

$$6Q=3R \quad R=6Q/3=2Q$$

Then, $P+Q+R=1728$

$$3/2Q+Q+2Q=1728$$

$$3Q+2Q+4Q=3456$$

$$9Q=3456$$

$$Q=384$$

$$P=3/2Q = 3/2 \times 384 = 576, R=2Q=768$$

$$A:B:C=576:384:768$$

48). Answer: C)

Income ratio of M=5x

Income ratio of N=3x

Savings of M=12000

Savings of N=12000

Expense of M=5x-12000

Expense of N =3x-12000

Expense order in ration 4:2

$$5x-12000:3x-12000=4:2$$

$$X=12000$$

$$M's \text{ income } = 5x = 5 \times 12000$$

$$=60000$$

49). Answer: B)

Y and Z are execute 15/26 of week



Balance = $1 - 15/26$

$11/26$ of work completed by X

X's share of revenue

$= 11/26 \times 8200$

= Rs 3469

50). Answer: C)

Let total profit = X

Balance profit after = 76% of X

Ruba's share = $76/100 \times x \times 8/15 = 1506$

X = Rs. 3715

Then the profit = $3715 \times 76/100 = \text{Rs} 2823$

51) X, Y, Z jointly engaged in a business. It was agreed that X would invest Rs. 14500 for 4 months, Y Rs 19000 for 7 months and Z Rs 25000 for 6 months. X wants to be a working partner and he was to receive 14% of the profit and total profit earned by X was Rs 43929. Calculate share of Z

A) 55750

B) 58472

C) 67500

D) 65250

52) Agalya and Bhairavi enter into a partnership and Agalya invests Rs 14000 in the partnership. At the end of 3 months she invests Rs 5000. At the end of another 4 months, she invests the another Rs 6000. If Bhairavi invests a certain sum in the partnership at the beginning of the year and leaves it and receives Rs 9720 as her share if the total of Rs 31320 a year, how much did Bhairavi invest in the company?

A) 37850

B) 42500

C) 41400

D) 35478

53). Among 3 Persons P, Q, R the profit Of Q is equal to one- third of the difference between the profit of R and triple of P. If at the end of the year, total profit is Rs 27000. Then find the profit of R?

A) 13000

B) 17850

C) 14500

D) 20250



54). In a business, X,Y and Z inversed Rs.20,000/- ,Rs.30,000/- and Rs.40,000/- respectively. After 1 year X adds Rs.10000/- to the initial investment.Y and Z withdrew Rs.10000/- and Rs.15,000/- respectively. After 2 years the total profit is Rs.9900/-. What is X's share?.

- A) 3000
- B) 2700
- C) 3600
- D) 4000

55). Two persons Ashok and Amit enter into a business. Ashok invests Rs 12500 in the first time and after 6months withdraws Rs 7000. Amit withdraws Rs 3000 after 8 months. Both have equal profit at the end of the year. What is the amount invested by Amit initially?

- A) 15000
- B) 20000
- C) 10000
- D) 16000

56). Jaya and sona invested amount of Rs 10000 and Rs 5000 respectively in their business. What percentage of the share of the profit that should be given to Jaya such that ratio of income is equal for both at the end of year?

- A) 5
- B) 7
- C) 4
- D) 6

57). Murugan, Anwar, Joseph started a business by a share of 7:8:9. The time for which they invested was 4:2:3. The difference in the profit of Murugan and Joseph is what % of Anwar?

- A) 7.5
- B) 8.2
- C) 6.4
- D) 6.25

58). P, Q, R enter in business partnership. P invests some money at the beginning, Q invests thrice times the amount after 4 months and R invests 6 times the amount after 8 months. If the annual profit be Rs 61260, R's share is

- A) 41700
- B) 45870
- C) 47860



D) 40840

59). Among 3 persons, P, Q, R the profit of R is equal to two-fifth of the sum of one-third profit of P and one-third of Q. If at the end of the year total profit is Rs 12750, then find the average profit of P and Q?

A) 4750

B) 5625

C) 7425

D) 6520

60). Durga invested Rs X for 5 months and Y for remaining time. Moushsree invested Rs Y for 9 months and X for the remaining time. At the end of the year profits are in the ratio 4:5. Then find what % of X is Y?

A) 6.2 %

B) 7.69%

C) 5.25%

D) 3.2%

51). Answer: C)

Ratio of X, Y, Z profit is $14500 \times 4 : 19000 \times 7 : 25000 \times 6 = 58 : 133 : 150$

Total profit be 'a'

X receives 14% of a as profit for active partner

Remaining profit = 86% of a

X's total profit = $\left[\frac{86}{100} \times a \times \frac{58}{341} \right] + \frac{14}{100} \times a = 43929$

$9762/341 \times a = 43929 \Rightarrow a = \text{Rs. } 153450$

Share of Z = $153450/341 \times 150 = \text{Rs } 67500$

52). Answer: C)

Let investment of Bhairavi be X rupees for 12 months

Agalya's investment for 12 months = $14000 \times 3 + 5000 \times 4 + 6000 \times 5$

= Rs 92000

Share received by Bhairavi = Rs 9720

Share received by Agalya = Rs 21600

Ratio of their profit $92000/X = 21600/9720$

X = Rs 41400

53). Answer: D)

$Q = \frac{1}{3}(R - 3P)$

$3Q = R - 3P$



$$R=3[P+Q]$$

$$R/(P+Q) = 3/1$$

$$R/(P+Q+R)=3/4$$

$$R/27000 = 3/4$$

$$R=\text{Rs.}20250$$

54). Answer: A)

X's Share = Rs.20000/- per first 1 year, Next year 10000/- added

$$= \text{Rs.}20000/- \times 1 + \text{Rs.}30000/- \times 1 = \text{Rs.}50000/-$$

Y's Share = Rs.30000/- per first 1 year, Next year 10000/- reduced

$$= \text{Rs.}30000/- \times 1 + \text{Rs.}20000/- \times 1 = \text{Rs.}50000/-$$

Z's Share = Rs.40000/- per first 1 year, Next year 15000/- reduced

$$= \text{Rs.}40000/- \times 1 + \text{Rs.}25000/- \times 1 = \text{Rs.}65000$$

$$\text{X's part} = 50 : \text{Y's part} = 50 : \text{Z's part} = 65$$

$$\implies 10 : 10 : 13$$

$$\text{Total 33 parts} \implies \text{Rs.}9900/-$$

$$1 \text{ part} \implies \text{Rs.}300/-$$

Then, X's share is

$$10 \text{ parts} = \text{Rs.}300/- \times 10 \text{ parts} = \text{Rs.}3000/-$$

55). Answer: C)

$$\text{Ashok's investment} = 12500 \times 6 + 5500 \times 6 = 108000$$

$$\text{Amit's investment} = x \times 8 + (x - 3000) \times 4$$

$$108000 = 8x + 4x - 12000 \implies X = \text{Rs.} 10000$$

Amount invest by Amit is Rs 10,000

56). Answer: C)

$$\text{Ratio of invest of jaya \& sona} = 10000:5000 = 2:1$$

Income of both at end of year is equal, then

Income is divided into 50 parts.

Income be 100%, then 1st part = 25, 2nd part = 25,

$$\text{Percentage} = 100/25 = 4\%$$

57). Answer: D)

$$\text{Ratio of investment} = 7:8:9$$

$$\text{Ratio of time} = 4:2:3$$

$$\text{Ratio of profit} = 28:16:27$$



$$= (\text{Joseph} - \text{Murugan}) / \text{Anwar} = (28 - 27) / 16 * 100 \\ = 6.25\%$$

58). Answer: D)

Let initial investment of P be X

Q's initial investment after 4 month is 3 X

R's initial investment after 8 months is 6X

Profit ratio of P,Q&R is,

$$X * 12 : 3x * 4 : 6x * 8 = 12 : 12 : 48 = 1 : 1 : 4$$

$$\text{R's share} = 61260 * 4 / 6 = \text{Rs.} 40840$$

59). Answer: B)

$$R = 2/5 (1/3 P + 1/3 Q)$$

$$15R = 2(P + Q)$$

$$R / (P + Q) = 2 / 15$$

$$\text{Take } R = 2x, P + Q = 15x$$

$$\text{Total profit} = 15x + 2x = 12750$$

$$\Rightarrow X = \text{Rs.} 750$$

$$\text{Average profit of P\&Q} = 750 / 2 * 15 = 5625$$

60). Answer: B)

$$\text{Durga investment} = 5X + 7Y$$

$$\text{Moushsree investment} = 9Y + 3X$$

$$(5X + 7Y) / (9Y + 3X) = 4 / 5$$

$$X / Y = 1 / 13 * 100 = 7.69\%$$

61). Bharathi started a business with Rs.50000 and after 4 months, sathya joined him with Rs.120000.

Bharathi received Rs.116000 including 20% of profit as commission for managing the business. What amount did sathya receive?

A) 112484.

B) 145826.

C) 134972.

D) 112540

62) X, Y, Z started a business by a share of 8:6:9. The time for which they invested was 6:7:8. The difference in the profit of X and Z is what % of difference in the profit of Z and Y?

A) 65



- B) 80
- C) 55
- D) 75

63) P, Q, R enter into a partnership. P initially invests Rs 54 lakh and withdraws Rs 18 lakhs after 4 years. Q initially Rs 72 lakh and adds another Rs 18 lakhs after 6 years and R invests Rs 108 lakh and adds another Rs 18 lakh few years. At the end of 10 years profit of R is equal to sum of profit of P and Q. Then for how many years did R invests Rs 126 lakh per annum

- A) 5
- B) 7
- C) 8
- D) 11

64) Saranya began a business with Rs 84000 and he joined by shalu with Rs 72000. At the end of the year their profit ratio 14:4 then after how many months does shalu joins the business?

- A) 5
- B) 6
- C) 8
- D) 9

65). Ajay and vijay entered into business with capital in ratio of 5:7. after 5 months Ajay withdraws $\frac{4}{7}$ th of his capital and vijay withdraws $\frac{2}{7}$ th of his capital. At the end of 8 months there was a profit of Rs 4470. Then find the profit

- A) 3678.
- B) 2000.
- C) 4000.
- D) 1500

66) P, Q, R hired a van for Rs. 640 and used it for 11, 12, 13 hours respectively. Hire charges paid by Q were.

- A) 213
- B) 312
- C) 123
- D) 412

67) X, Y & Z rent a pasture. X puts 20 cows for 5 months, Y puts 24 cows for 7 months and Z puts 30 cows for 3 months for grazing. If the rent of the pasture is Rs. 150, how much must Z pay as his share of rent?



- A) 32
- B) 39.65
- C) 37.70
- D) 35.20

68). In a company M and O invested amount in the ratio 3 : 2 whereas the ratio between amounts invested by M and N was 4 : 3. If Rs.1,80,000 was their profit, how much did N receive?(calculate approximate value)

- A) 75432
- B) 74483
- C) 76854
- D) 76443

69). Ananya and bheeman started a partnership business investing some amount in the ratio of 3:7. Chandru joined them after 6 months with an equal amount of bheeman. In what proportion should the profit at the end of 1 year be distributed among ananya, bheeman, and chandru?

- A) 5:6:7
- B) 7 : 12;4
- C) 6:11:5
- D) 6:14:7

70). Dhivya, Dinesh and Deepi enter into a partnership and their shares are in the ratio $\frac{1}{3} : \frac{1}{4} : \frac{1}{5}$. After 2 months, dhivya withdraws half of her capital and after 10 months, a profit of Rs. 462 is divided among them, what is Deepi's share?

- A) 123.56
- B) 165.45
- C) 143.3
- D) 146.43

61). Answer: A)

Ratio of the profits = $50000 \times 12 : 120000 \times 8$
= 5:8

Let the total profit = x.

Then Bharathi received $20x/100 = x/5$ as commission for managing the business

Remaining profit = $x - x/5 = 4x/5$ which is shared in the ration 5:8

Bharathi 's share = $x/5 + (4x/5) \times (5/13) = 116000$

= $x/5 + 4x/13 = 116000$

= $33x/65 = 116000$



$$\Rightarrow x = 228484$$

$$\text{Sathya's share} = 228484 - 116000 = 112484$$

62). Answer: B)

Ratio of investment = 8:6:9

Ratio of time = 6:7:8

Ratio of X, Y, Z = 48:42:72

$$= 8:7:12$$

$$(X-Z)/(Z-Y) = 4/5 * 100 = 80\%$$

63). Answer: C)

Ratio of their profit P, Q, R is

$$54*4 + 36*6 : 72*6 + 90*4 : 108*x + 126*(10-x)$$

$$= 12:22:35 - 0.5x$$

Profit of R = profit of P + profit of Q

$$35 - 0.5x = 12 + 22$$

$$X = 2 \text{ year}$$

The number of years for R invests Rs 126 lakh

$$= 10 - 2 = 8 \text{ years}$$

64). Answer: C)

Saranya invests Rs 84000 for 12 months

Shalu invests Rs 72000 for X months

Ratio of both profits,

$$\text{Saranya: Shalu} = 84000*12 : 72000*x$$

$$= 14:X$$

$$14/4 = 14/X \Rightarrow X = 4 \text{ months}$$

$$= 12 - 4 = 8 \text{ months}$$

65). Answer: B)

Profit ratio of Ajay & Vijay,

$$5x*5 + 3x*3 : 7x*5 + 5x*3$$

$$= 34:50 = 17:25$$

$$\text{Profit of Vijay} = 3360/42 * 25$$

$$= \text{Rs } 2000$$

66). Answer: A)



$$P : Q : R = 11 : 12 : 13$$

$$\text{Hire charges paid by Q} = \text{Rs.}(640 * 12/36)$$

$$= \text{Rs. } 7680 / 36$$

$$= \text{Rs.}213 \text{ (approx.)}$$

67). Answer: C)

$$X : Y : Z = 20 * 5 : 24 * 7 : 30 * 3$$

$$= 100 : 168 : 90$$

$$= 50 : 84 : 45$$

$$\text{Therefore Z's rent} = \text{Rs } (150 * 45 / 179)$$

$$= \text{Rs.}(6750/179)$$

$$\text{Rs.}37.70$$

68). Answer: B)

$$M : O = 3:2$$

$$O : M = 2:3 = 8:12$$

$$M : N = 4 : 3 = 12:9$$

$$O : M : N = 8:12:9$$

$$\text{Therefore N's share} = \text{Rs } (1,80,000 * 12/29)$$

$$= \text{Rs}(2160000/29)$$

$$= \text{Rs.}74483 \text{ (approx.)}$$

69). Answer: D)

Let the investments of ananya, bheeman be $3x$ and $5x$

$$\text{Ananya : bheema : chandru} = (3x * 12) : (7x * 12) : (7x * 6)$$

$$= 36x : 84x : 42x$$

$$= 6 : 14 : 7$$

70). Answer: C)

$$\text{Ratio of initial investments} = 1/3 : 1/4 : 1/5 = 20 : 15 : 12$$

Let their initial investments be $20x$, $15x$ and $12x$ respectively

$$\text{Dhivya : Dinesh : Deepi} = (20x * 2 + 10x * 10) : (15x * 12) : (12x * 12)$$

$$= 140x : 180x : 144x$$

$$= 70:90:72 = 35 : 45 : 36$$

$$\text{Deepi's share} = \text{Rs.}462 * 36/116$$

$$= \text{Rs}(16632/116)$$

$$= \text{Rs.}143.3$$



71). Aakash and Aravind are partners in a business. Aakash contributes $\frac{1}{5}$ of the capital of 16 months and aravind received $\frac{3}{4}$ of the profit. For how long Aravind money was used?

- A) 11 months
- B) 12 months
- C) 13 months
- D) 14 months

72) Two friends M & N started a business Investing in the ratio of 6 :7 . O joined then after 6 months investing an amount equal to that of N. at the end of the year 30% profit was equal to 105000. What was the amount invested by O?

- A) 148484
- B) 154326
- C) 146738
- D) 145783

73) Anu and Thanu start a business. Anu invests Rs.8000 for 8 months and Thanu remains in the business for 4 months out of total profit, Thanu claims $\frac{3}{7}$ of the profit. How much money was contributed by Thanu?

- A) Rs6000
- B) Rs.7000
- C) Rs.8000
- D) Rs.9000

74. Three partners shared the profit in a business in the ratio 7 :8 :9. They had partnered for 16 months, 10 months and 9 months respectively. What was the ratio of their investments?

- A) 2286:5599:7643
- B) 2346:76543:8754
- C) 5643;1254 :2345
- D) 2205 :4032:5032

75). Keerthi and Kavi invest in a business in the ratio 7:5. If 10% of the total profit goes to charity and Keerthi's share is Rs.2625 the total profit is.

- A) 5000
- B) 2000
- c) 3000
- D) 4000



- 76) Three friends started a Company, let their names be P, Q and R. What profit Q will get, if,
1. R invested Rs. 4000 for nine months, his profit was $\frac{3}{2}$ times that of Q's and his investment was four times that of P.
 2. P and Q invested for one year in the proportion 1 : 2 respectively.
 3. The three together got Rs. 500 as profit at the year end.
- A) Only 1 and 3
B) Only 1 and 2
C) All 1, 2 and 3
D) None of above
- 77). X, Y and Z enter into a partnership by investing in the ratio of 6 : 4 : 8. After 1 year, Y invests another Rs. 540,000 and Z, at the end of 2 years, also invests Rs. 540,000. At the end of three years, profit is shared in the ratio of 6 : 8 : 10. Find initial investment of Z.
- A) 7,20,000
B) 8,80,000
C) 6,50,000
D) 5,50,000.
- 78) P, Q and R jointly thought of engaging themselves in a business venture. It was agreed that P would invest Rs. 3250 for 6 months, Q, Rs. 4200 for 5 months and R, Rs. 5,000 for 3 months. P wants to be the working member for which, he was to receive 10% of the profits. The profit earned was Rs. 3700. Calculate the share of Q in the profit.
- A) Rs. 1800
B) Rs. 1260
C) Rs. 1580
D) Rs. 1940
- 79). A, B and C are 3 partners in a business. Their investments are respectively Rs 2000, Rs 4,000 and Rs 3,000. A gets 30% of total profit for managing the business. The remaining profit is divided among them in the ratio of their investments. At the end of the year, the profit of A is Rs 1100 less than the sum of the profit of B and C. What amount of income will C get?
- A) Rs 2100.75
B) Rs 2887.5
C) Rs 2705.75
D) Rs 2546.25



80). P started a business in 1990 by investing Rs.25,000. She invested Rs. 10,000 as additional amount in 1991 and her friend Q joined her with an amount of Rs.35,000. P invested another Rs. 10,000 in 1992 and R joined them with Rs. 35,000. At the end of these 3 years, they earned a profit of Rs. 150,000. Find Q's share?

- a) Rs.50,000
- b) Rs.65,000
- c) Rs.75,000
- d) Rs.15,000

71). Answer: B)

Let the total profit be Rs z

Then, Aravind share = $3z/4$

Aakash share = $z - 3z/4$

= $z/4$

Aakash : Aravind = $Z/4 : 3z/4$

= 1:3

Let the total capital be Rs x

Suppose Aravind's money was used for y months.then,

$$1/5x * 16/4/5x * y = 1/3$$

$$3 (16x/5) = 4x/5 * y$$

$$48 = 4y$$

$$Y = 48/4 = 12 \text{ months.}$$

72). Answer: A)

Let the total profit be x

Then 30% of x = 105000

$$X = 105000 * 100/30$$

$$X=350000$$

Let the capitals of M,N,O be Rs. 6x ,7x and 7x respectively. Then,

$$(6x*12) + (7x *12) +(7x *6) = 350000*12$$

$$72x +84x +42x = 4200000$$

$$198x = 4200000$$

$$X=21212$$

O's investment = Rs.148484

73). Answer: D)

Let the total profit be Rs.x

Then thanu = $3x/7$



$$\text{Anu} = (x - 3x/7) = 4x/7$$

$$\text{So, Anu : thanu} = 4x/7 : 3x/7$$

$$= 4:3$$

Lets thanu's capital be y. then,

$$8000 \times 8 / (y \times 4) = 4/3$$

$$24000 \times 24 = 4y \times 16$$

$$Y = 24000 \times 24 / (16 \times 4)$$

$$Y = \text{Rs.}9000$$

74). Answer: D)

Let their investments be Rs.x for 16 months, y for 10 months , Z for 9 months

$$\text{Then } 16x : 10y : 9z = 7:8:9$$

$$\text{Now } 16x / 10y = 7/8$$

$$128x = 70y$$

$$Y = 64/35x$$

$$16x/9z = 7/9$$

$$144x = 63z$$

$$Z = 144x/63$$

$$X:Y:Z = x:64x/35 : 144x/63$$

$$X:Y:Z = 2205:4032:5032.$$

75). Answer: A)

Let the total profit be Rs.100

$$\text{After playing to charity, keerthi's share} = \text{Rs}(90 \times 7/12)$$

$$=\text{Rs.}52.5$$

$$\text{If keerthi's share is Rs.}52.5 \text{ total profit} = \text{Rs } 100$$

$$\text{If keerthi's share is Rs. } 2625$$

$$\text{Total profit} = (100/52.5 \times 2625)$$

$$=\text{Rs.}5000$$

76). Answer: C)

1 and 2 will give :

$$R = \text{Rs. } (4000 \times 9) \text{ for 1 year} = \text{Rs. } 36000 \text{ for 1 year.}$$

$$P = \text{Rs. } (1/4 \times 4000 \times 12) \text{ for 1 year} = \text{Rs } 12000 \text{ for 1 year}$$

$$Q = \text{Rs } 24000 \text{ for one year}$$

$$R:P:Q = 36000 : 12000 : 24000 = 3 : 1 : 2$$



From 3, we will get total Profit = 500

Now from the ratio and total profit we can get Share of R.

R share will be = $500 \times \frac{2}{6} = 166.66$

77). Answer: A)

Let the initial investments of X, Y and Z be Rs. 6x, Rs. 4x and Rs. 8x respectively.

Then, $(6x \times 36) : [(4x \times 12) + (4x + 540000) \times 24] : [(8x \times 24) + (8x + 540000) \times 12] = 6:8:10$

$216x : (144x + 12960000) : (288x + 6480000) = 6 : 8 : 10$

$216x / (144x + 12960000) = 3/4$

$\Rightarrow 864x = 432x + 38880000$

$\Rightarrow 432x = 19440000$

$x = 90000$

Z's initial investment = $8x = \text{Rs. } 7,20,000$.

78). Answer: B)

For managing, P received = 10% of Rs. 3700 = Rs. 370.

Balance = Rs. $(3700 - 370) = \text{Rs. } 3330$.

Ratio of their investments = $(3250 \times 6) : (4200 \times 5) : (5000 \times 3)$

$= 19500 : 21000 : 15000$

$= 13 : 14 : 10$

Q's share = Rs. $3330 \times \frac{14}{37}$

= Rs. 1260

79). Answer: B)

The ratio of profit of A, B and C is $2000:4000:3000=2:4:3$.

Let the annual profit be P.

Then, A will get 0.3p for managing the business.

And, remaining 0.7p will be distributed in the ratio of their investment.

So, from the remaining investment, A will get,

$= \frac{2}{(2+4+3)} \times 0.7p = \frac{2}{9} \times 0.7p$

B gets $= \frac{4}{(2+4+3)} \times 0.7p = \frac{4}{9} \times 0.7p$

and C gets $= \frac{3}{(2+4+3)} \times 0.7p = \frac{3}{9} \times 0.7p$

A's total profit $= 0.3p + (\frac{2}{9}) \times 0.7p$

Given, at the end of the year, the profit of A is Rs 1100 less than the sum of the profit of B and C

$\Rightarrow \frac{4}{9} \times 0.7p + \frac{3}{9} \times 0.7p - 1100 = 0.3p + \frac{2}{9} \times 0.7p$

$\Rightarrow \frac{7}{9} \times 0.7p - \frac{2}{9} \times 0.7p - 0.3p = 1100$

$\Rightarrow p = 12,375$



So, C's share = $3/9 \times 0.7p = \text{Rs } 2887.5$

80). Answer: A)

P invested

Rs.25,000 for 12 months, Rs.(25000 + 10000) for 12 months, , Rs.(25000 + 10000 + 10000) for 12 months.

i.e., P invested Rs.25,000 for 12 months, Rs.35000 for 12 months Rs.45000 for 12 months.

Q invested Rs. 35000 for 2 years;

i.e., Rs.35000 for 24 months

And, R invested Rs.35000 for 1 year; i.e., Rs. 35000 for 12 months.

Their investing ratio: P : Q : R

= $(25,000 \times 12 + 35000 \times 12 + 45000 \times 12) : (35000 \times 24) : (35000 \times 12)$

= 252:168:84

= 3:2:1

Total profit for 3 years = Rs.1,50,000

them, Q's share = $\text{Rs.}(1,50,000 \times 2 / (3+2+1))$

= $\text{Rs.}(1,50,000 \times 2/6) = \text{Rs.}50,000$

11. PIPES AND CISTERN

1) Two faucet can fill a tank in 12hours and 16 hours .While a third faucet empties the full tank in 24 hours.If all the three faucet are operate simultaneously, In how much time will the tank be filled ?

- A) 4 hours 12mins
- B) 4hours 48min
- C) 9hours 36mins
- D) 5hours 48min

2) A tube can fill a cistern in 18hrs.After half the cistern is filled, three more similar tubes are opened. What is the total time taken to fill the cistern completely ?

- A) 9hrs 52min
- B) 10hrs 15 min
- C) 9hrs 45 min
- D) 10hrs 30min

3) Two taps can fill a tank in 4 hours and 5 hours .If two taps are operate simultaneously, In how much time will the tank be filled ?

- A) 4hrs 18min
- B) 10min 12min
- C) 2hrs 13min



D) 12hrs 10min

4) Two faucet p and q can fill a tank in 10 minutes and 20 minutes. If both faucet are opened simultaneously, after how much time should q be closed so that the tank is full in 9 minutes ?

A) 2 min

B) 9 min

C) 4 min

D) 7min

5) A pipe can fill the tank in 12 hours. Because of a leak in the tank it took $16\frac{1}{2}$ hours to fill the tank. If the tank is full, how much time will the leak take to empty it?

A) 18hrs 51mins

B) 18hrs 20min

C) 18hrs 40min

D) 18hrs 45min

E) None of these

6) One tap can fill a tank thrice as fast as another tap. If together the two taps can fill the tank in 12 minutes, then the slower tap alone will be able to fill the tank in

A) 30min

B) 33min

C) 32min

D) 35min

7) Two pipes can fill a dumper in 8 hours and 24 hours. If two pipes are operate simultaneously, In how much time will the dumper be filled ?

A) 3 hrs

B) 4 hrs

C) 8 hrs

D) 6 hrs

8) A tube can fill a tank completely in 18 hours. After half the tank is filled, one more similar tube is opened. What is the total time taken to fill the tank completely ?

A) 14hrs 20min

B) 13hrs 30min

C) 13hrs 10min

D) 14hrs 30min



9) A tap can fill a cistern in 11 hours, but due to a leakage it took 13 hours to fill the cistern. If the cistern is full, in what time will the cistern become empty due to leakage ?

- A) 73.30hrs
- B) 77.50hrs
- C) 71.5 hrs
- D) 72.30hrs
- E) None of these

10) Two faucet P and Q can fill a tank in 10 min. and 20 min. respectively. A water faucet R can empty the tank in 10 min. First P and Q are opened. After 3 min, R is also opened. In how much time, the tank is full?

- A) 17m
- B) 15m
- C) 11m
- D) 19m

1) C

$$1/12 + 1/16 - 1/24 = (4+3-2)/48$$

$$\Rightarrow 5/48$$

$$\text{Time taken to fill the tank} = 48/5$$

$$= 9\text{ hours } 36\text{ min}$$

2) D

$$\text{Time taken to fill the half cistern} = 18/2 = 9 \text{ hrs}$$

$$\text{Remaining part} = 1/2$$

$$\text{Time taken to fill the remaining part} = [1/(4 \times 1/12)] \times (1/2) = 3/2 \text{ hrs}$$

$$3/2 \text{ hrs} = 90 \text{ min} = 1\text{ hr } 30\text{ mins}$$

$$\text{Total time} = 9\text{ hrs} + 90 \text{ min} = 10\text{ hrs } 30\text{ mins}$$

3) C

$$1/(A+B) = 1/4 + 1/5$$

$$= (5+4)/20$$

$$= 9/20$$

$$\Rightarrow 20/9 = 2\text{ hrs } 13\text{ min to filled the tank}$$

4) A

$$p \text{ fill the tank in 1 minute } (10 \times 2 = 20) = 2 \text{ units}$$

$$q \text{ fill the tank in 1 minute } (20 \times 1 = 20) = 1 \text{ unit}$$



For 9 min(p) = $9 \times 2 = 18$ units

Remaining = $20 - 18 = 2$ units

Time for q be closed so that the tank is full in 9 minutes = $2/1 = 2$ min

5) A

$\Rightarrow 1/12 - 2/33 = 11 - 4/132$.

$\Rightarrow 7/132$

$\Rightarrow 132/7$ hrs

$\Rightarrow 132/7$ hrs $\Rightarrow 1131$ mins $\Rightarrow 18$ hrs 51 min

6) C

$(1/x) + (1/3x) = (1/12)$

$3 + 1/3x = 4/3x = 1/12$

$3x = 48$

$x = 32$ mins

7) D

$(A+B) = 1/8 + 1/24$

$\Rightarrow (3+1)/24$

$\Rightarrow 4/24 \Rightarrow 1/6$

6 hrs to filled the dumper

8) C

A tube can fill the half tank in 9hrs

Now another similar tube opened

$1/18 + 1/18 = 2/18 = 1/9$

Remaining half tank filled in 4.5hrs

Total time = $9 + 4.5 = 13.5 = 13$ hrs 30 min

9) C

$1/11 - 1/13 = 13 - 11/143$

$\Rightarrow 2/143$

$\Rightarrow 1/71.5$

$\Rightarrow 71.5$ hours

10) C

Part filled in 3 min. = $3 * ((1/10) + (1/20))$



$$= 3 * (2 + 1/20)$$

$$\Rightarrow 3(3/20) = 9/20$$

Remaining part $= (1 - (9/20)) = (11/20)$.

Net part filled in 1 min. when P, Q and R are opened $= (1/10) + (1/20) - (1/10) = (1/20)$.

Now, $(1/20)$ part is filled in one minute.

$(11/20)$ part is filled in $= (20 * (11/20)) = 11$ minutes.

11) Two filling tap can fill a dumper in 14 and 28 min. respectively and when the waste tap is open, they can together fill it in 35 min. The waste pipe can empty the full dumper in –

- A) 152/9 hrs.
- B) 137/7 hrs.
- C) 60/9 hrs.
- D) 140/11 hrs.

12) Three taps P, Q, R can fill a bunker in 3 hrs. After working at it together for 1 hr, R is closed and P, Q can fill the remaining part in 3 hrs. The number of hrs taken by R alone to fill the bunker.

- A) 9hrs
- B) 7hrs
- C) 11hrs
- D) 5hrs

13) two pipes X and Y can fill a cistern in 18 hrs and 24 hrs respectively. If both the pumps are opened simultaneously. How much time will be taken to fill the cistern?

- A) 10hrs 50mints
- B) 10 hrs 5mints
- C) 10hrs 17mints
- D) 10hrs 44mints

14) A tank has two faucet which fill it in 15 mins and 18 mins respectively. There is also a waste faucet in the tank. When all the 3 are opened the empty tank is full in 25 mins. How long the waste faucet take to empty the full tank?

- A) 450/17 mins
- B) 450/28 mins
- C) 450/37 mins
- D) 450/22 mins



15) An electric pump can fill a cistern in 6 hrs. Because of a leak in the cistern it took 7 hrs to fill the cistern. If the cistern is full, how much time will the leak take to empty it?

- A) 42hrs
- B) 24hrs
- C) 32hrs
- D) 16hrs

16) Two tap can fill a dumper in 7 hrs and 8 hrs respectively. The taps are opened simultaneously and it is found that due to leakage in the bottom it took 16 mins more to fill the dumper. When the dumper is full, in what time will the leak empty it?

- A) 56hrs
- B) 56hrs
- C) 46hrs
- D) 36hrs

17) Two tube A and B can fill a cistern in 48 mins and 64 mins. If both the tubes are opened simultaneously, after how much time B should be closed so that the cistern is full in 36 minutes?

- A) 20 mins
- B) 16mins
- C) 22mins
- D) 14mins

18) A tank can be filled by a tap in 8 hrs while it can be emptied by another tap in 18 hrs. if both the taps are opened simultaneously, then after how much time will the cistern get filled?

- A) 14hrs 24mins
- B) 14 hrs 12 mins
- C) 14hrs 56 mins
- D) 14hrs 30mins

19) A pump can fill a cistern in 12 hrs. After half the cistern is filled, 3 more similar pumps are opened. What is the total time taken to fill the cistern completely?

- A) 8 hrs
- B) 4 hrs
- C) 2hrs
- D) 7.5 hrs



20) Tap 1 can fill a tank in 10 hrs , tap 2 in 20 hrs and tap 3 in 60 hrs. if all the taps are open, in how many hour will the tank be filled?

- A) 3 hrs
- B) 5 hrs
- C) 7hrs
- D) 6 hrs

11) D

$$1/14 + 1/28 - 1/35$$

$$\Rightarrow 10 + 5 - 4/140$$

$$\Rightarrow 11/140$$

$$\Rightarrow 140/11 \Rightarrow \text{hence answer is } 140/11 \text{ hours.}$$

12) A

$$\text{Part filled in 1 hr} = 1/3$$

$$\text{Remaining part} = 1 - 1/3 = 2/3$$

$$(P + Q)\text{'s 3 hours work} = 2/3$$

$$(P+Q)\text{'s 1 hour work} = 2/9$$

$$R\text{'s 1 hr work} = [(P+Q+R)\text{'s 1 hr work} - (P+Q)\text{'s 1 hr work}]$$

$$= 1/3 - 2/9 = 3-2/9 = 1/9$$

R alone can fill the tank in 9 hours.

13) C

$$\text{Part filled by x in 1hour} = 1/18$$

$$\text{Part filled by y in 1 hour} = 1/24$$

$$\text{Part filled by (x+y) in 1 hour} = 1/18 + 1/24$$

$$\Rightarrow 4+3/72$$

$$\Rightarrow 7/72$$

The cistern will be full in $72/7$ hrs = 10 hrs 17mins.

14) C

Work done by the waste faucet in 1 minute

$$\Rightarrow 1/25 - (1/15 + 1/18)$$

$$\Rightarrow 1/25 - (6+5/90) = 1/25 - 11/90$$

$$\Rightarrow - 37/450$$

Here negative sign means emptying

Therefore waste faucet will empty the full tank in $450/37$ mins.



15) A

Work done by the leak in 1 hr = $[1/6 - 1/7]$

$$= 7-6/42$$

$$= 1/42$$

Therefore the leak will empty the cistern in 42 hrs.

16) A

Work done by 2 taps in 1 hr = $(1/7 + 1/8) = 15/56$

Time taken by these taps to fill the dumper = $56/15$ hrs

$$= 3 \text{ hrs } 44 \text{ mins}$$

Due to leakage, time taken = 3 hrs + 44 mins + 16 mins

$$= 4 \text{ hrs}$$

Work done by (2 pipes + leak) in 1 hr = $\frac{1}{4}$

Work done by the leak in 1 hr = $(15/56 - \frac{1}{4})$

$$= 15 - 4/56$$

$$= 1/56$$

Leak will empty the full cistern in 56 hrs.

17) B

Let B be closed after 'x' mins.

Then part filled by (A+B) in x mins + part filled by A in $(36 - x)$ mins = 1

$$\text{Therefore } x(1/48 + 1/64) + (36 - x) \cdot 1/48 = 1$$

$$7x/192 + 36 - x/48 = 1$$

$$7x + 4(36-x)/192 = 1$$

$$7x + 144 - 4x = 192$$

$$3x = 48 \Rightarrow x = 16$$

Here B must be closed after 16 mins.

18) A

Net part filled in 1hr = $(1/8 - 1/18)$

$$= 9 - 4/72$$

$$= 5/72$$

Therefore the tank will be filled in $72/5$ hrs i.e., 14 hrs 24mins

19) D

Time taken by 1 pump to fill the half tank = 6 hrs



Part filled by the 4 pumps in 1 hr = $4 \times \frac{1}{12}$

= $\frac{1}{3}$ => $\frac{1}{3}$

Remaining part = $(1 - \frac{1}{3}) = \frac{2}{3}$

Therefore $\frac{1}{3} : \frac{2}{3} :: 1 : x$

$x = 1.5$ hrs

So total time taken = 6hrs + 1.5 hrs = 7.5 hrs.

20) D

Net part filled in 1 hr = $\frac{1}{10} + \frac{1}{20} + \frac{1}{60}$

= $\frac{6}{60} + \frac{3}{60} + \frac{1}{60}$

= $\frac{10}{60}$

= $\frac{1}{6}$

Therefore all the 3 taps together fill tank in 6 hrs.

21) A water cistern is two-fifth full. Tap A can fill a cistern in 20 mins and tap B can empty it in 12mins. If both the taps are open, how long will take to empty or fill the cistern completely?

A) 10 mins

B) 12mins

C) 14mins

D) 16 mins

22) 3 faucet A,B,C can fill a cistern from empty to full in 45mins, 35mins, and 25 mins respectively. When the cistern is empty all the 3 faucets are opened. A,B,c discharge chemical solutions A,B,C respectively. What is the proportion of solution C in the liquid in the tank after 5 mins?

A) $\frac{63}{143}$

B) $\frac{72}{151}$

c) $\frac{67}{173}$

D) $\frac{81}{167}$

23) Two pipe P & Q fill a tab in 5 hrs and 20 hrs respectively. If both the pipes are open then due to the leakage, it took 30mins more to fill the tab. If the tab is full, how long will it take for the leakage alone to empty the tank?

A) 28

B) 24

C) 36

D) 12



24) One tap can fill a cistern four times as fast as another tap. If together the two taps can fill the cistern in 48 mins then the slower tap alone will be able to fill the cisterns.

- A) 1hr
- B) 2hr
- C) 3hr
- D) 4hr

25) A dumper is filled in 15hrs by 3 tubes P,Q,and R. the tube R is thrice as fast as Q and Q is thrice as fast as P. How much time will tube Q alone take to fill the tank?

- A) 195hrs
- B) 190hrs
- C) 185hrs
- D) 180hrs

26) A dumper is normally filled in 18 hours but takes 6 hours longer to fill because of a leak in the bottom of the dumper. If the dumper is full the leak will empty it in how many hours?

- A) 76 hours
- B) 78 hours
- C) 72 hours
- D) 74 hours

27) 24 pumps are connected to a tank. Some of them are inlet pumps and the others are outlet pumps. Each of the inlet pumps an fill the tank in 16hours and each of the outlet pumps can empty the tank completely in 12hours. If all the pumps are kept open, the empty tank gets filled in 48 hours. How many inlet pumps are there?

- A) 16
- B) 18
- C) 17
- D) 14

28) A barrier has four inlets A, B, C and D. The barrier can be filled in 24 minutes through the first three inlets and it can be filled in 30 minutes through the second, the third and fourth inlet also it can be filled through the first and the fourth inlet in 40 minutes. How much time required to fill up the barrier by all the four inlets?

- A) 10 mins
- B) 15 mins
- C) 20 mins
- D) 25 mins



E) None of the Above

29) A tank can be filled by an inlet tap at the rate of 8 litres per minute. A leak in the bottom of a tank can empty the full tank in 16 hours. When the tank is full, the inlet is opened and due to the leak, the tank is empty in 80 hours. How many litres does the tank hold?

- A) 8000 litre
- B) 9560 litre
- C) 8525 litre
- D) 9600 litre

30) Two faucet A and B can fill a cistern in 6 hours and 2 hours respectively. If they are opened on alternate hours and if faucet A is opened first, in how many hours will the cistern be full?

- A) 4 hours
- B) 5 hours
- C) 7 hours
- D) 6 hours

21) B

Clearly tap B is faster than the Tap A and so, the cistern will be emptied

Part to be emptied = $\frac{2}{5}$

Part emptied by (A+B) in 1 min = $(\frac{1}{12} - \frac{1}{20})$

= $\frac{5-3}{60}$

= $\frac{2}{60}$

= $\Rightarrow \frac{1}{30}$

Therefore $\frac{1}{30} : \frac{2}{5} :: 1 : x$

$x = \frac{1 \times \frac{2}{5} \times 30}{1} = 12 \text{ mins}$

so the tank will be emptied in 12mins.

22) A

Part filled by (A+B+C) in 5 mins = $5(\frac{1}{45} + \frac{1}{35} + \frac{1}{25})$

= $5(\frac{35+45+63}{1575})$

= $\frac{143}{315}$

Part filled by c in 5 mins = $\frac{5}{25} = \frac{1}{5}$

Required ratio = $\frac{1}{5} \times \frac{315}{143} = \frac{63}{143}$.

23) C

Part filled by (P+Q) in 1 hr = $\frac{1}{5} + \frac{1}{20}$



$$= \frac{1}{4}$$

So P & Q together can fill the tank in 4 hrs.

Work done by the leak in 1 hr = $1/4 - 2/9$

Leak will empty the tank in 36 hrs.

24) D

Let the slower tap alone fill the cistern in x mins

Then faster tap will fill it in x/4 mins

Therefore $1/x + 4/x = 1/48$

$$5/x = 1/48$$

$$X = 48 \times 5$$

$$x = 240 \text{ mins}$$

$$x = 4 \text{ hrs.}$$

25) A

Suppose tube P alone takes x hrs to fill the tank

Then tubes Q and R will take x/3 and x/9 hrs respectively to fill the dumper.

Therefore $1/x + 3/x + 9/x = 1/15$

$$13x = 1/15$$

$$X = 195 \text{ hrs}$$

26) C

Work done by leak in 1 hr = $(1/18 - 1/24)$

$$\Rightarrow 4 - 3/72$$

$$\Rightarrow 1/72$$

Leak will empty the dumper in 72 hours

27) D

$$(x/16) - [(24-x)/12] = 1/48$$

$$x/16 - 24/48 + x/12 = 1/48$$

$$(3+4)x/48 = 97/48$$

$$7x/48 = 97/48$$

$$7x = 97$$

$$X = 14$$

28) C

$$(1/A + 1/B + 1/C) = 1/24 \dots(i)$$



$$(1/B + 1/C + 1/D) = 1/30 \dots(ii)$$

$$(1/A + 1/D) = 1/40 \dots(iii)$$

From eqn (i) and (ii)

$$(1/A - 1/D) = 1/120 \dots(iv)$$

From eqn (iii) and (iv)

$$A=60, D=120.$$

Let the time taken to full the tank = s

$$S(1/A + 1/B + 1/C + 1/D) = 1$$

$$S(1/24 + 1/120) = 1$$

$$S = 20 \text{ mins}$$

29) D

Part emptied by the leak in 1 hour = $1/16$

part filled by (leak & inlet open) in 1 hour = $1/80$

Part filled by the inlet tap in 1 hour = $1/16 - 1/80 = 1/20$

Inlet tap fills the tank in = 20 hours

Inlet tap fills water at the rate of 8 litres a minute.

Capacity of tank = $20 * 60 * 8 = 9600$ litre

30) A

Faucet A can fill = $1/6$

faucet B can fill = $1/2$

For every two hour, $1/6 + 1/2 = 1 + 3/6$

$\Rightarrow 4/6 = 2/3$ Part filled

Total filled in 3 hours = $2/3 + 1/6 = 5/6$

In next hour it will be filled full. So total time will be 4 hours.

31) Two pumps M and N can fill a cistern in 10m and 15m respectively. If both the pumps are opened simultaneously, after how much time should N be closed so that the cistern is full in 8 minutes ?

A) 5min

B) 6min

C) 3min

D) 7min

32) Two pipes X and Y can fill a bunker in 24 hours. If only pipe X is open then it would take 12 hours longer to fill the bunker. Find how much longer would it take if only pipe Y is open.

A) 46hrs



- B) 32hrs
- C) 48hrs
- D) 34hrs

33) A tank is filled by 3 taps K, L and M with uniform flow. The second tap L takes 3 times the time taken by K to fill the tank, while M takes two times the time taken by L to fill the tank. If all the three taps can fill the tank in 14 hours, find the time required by tap K alone to fill the tank.

- A) 10hrs
- B) 21hrs
- C) 14hrs
- D) 22hrs

34) Taps P, Q and R can fill a tank in 3, 4 and 5 hours respectively. If all the taps are opened together and after 30 minutes taps Q and R are turned off, find the total time in which the tank is full.

- A) $2\frac{3}{8}$ hrs
- B) $1\frac{1}{7}$ hrs
- C) $2\frac{13}{40}$ hrs
- D) $3\frac{13}{43}$ hrs

35) Faucet A and B can fill a tank in 15 and 9 hrs respectively. Faucet C can empty it in 45 h. The tank is half full. All the three faucets are in operation simultaneously. After how much time the tank will be full ?

- A) $1\frac{7}{15}$ hrs
- B) $2\frac{1}{11}$ hrs
- C) $3\frac{3}{14}$ hrs
- D) $3\frac{3}{11}$ hrs

36) Three tubes A, B and C can fill a tank in 12hours. After working at it together for 4 hours, C is closed and A and B can fill the remaining part in 12 hours. The number of hours taken by C alone to fill the tank is

- A) 32hrs
- B) 30hrs
- C) 38hrs
- D) 36hrs

37) Two taps P and Q can fill a cistern in 24 min and 32 min respectively. Both the taps are opened together for a certain time but due to some obstruction the flow of water was restricted to $\frac{7}{4}$ of full flow in tap P and $\frac{5}{3}$ of full in tap Q. This obstruction is removed after some time and cistern is now filled in 6min from that moment. How long was it before the full flow.



- A) 8 min
- B) 3 min
- C) 5.6 min
- D) 4.5 min

38) Two pipes, X and Y can fill a tank in 36 and 30 minutes respectively. Both are opened together, but at the end of 3 minutes, X is turned off. In how many more minutes will Y fill the cistern?

- A) $7\frac{24}{5}$
- B) $7\frac{1}{2}$
- C) $24\frac{1}{3}$
- D) $8\frac{1}{4}$

39) A Bunker has a leak which would empty the completely filled bunker in 20 hours. If the bunker is full of water and a tap is opened which admits 4 litres of water per minute in the bunker, how many litres does the bunker hold?

- A) 2400
- B) 4500
- C) 4800
- D) 7200

40) Two pumps M and N can separately fill a dumper in 36 minutes and 45 minutes respectively. Both the pumps are opened together but 12 minutes after the start the pump M is turned off. How much time will it take to fill the dumper?

- A) 9 min
- B) 10 min
- C) 30 min
- D) 32 min

31) C

$$X\left(\frac{1}{10} + \frac{1}{15}\right) + (8-x)\frac{1}{10} = 1$$

$$5x/30 + 8-x/10 = 1$$

$$5x + 24 - 3x/30 = 1$$

$$2x + 24 = 30$$

$$2x = 6$$

$$X = 6/2 = 3$$

32) C



$$X = 24 + 12 = 36$$

$$X + Y = 1/24$$

$$Y = 1/24 - 1/36 = 3 - 2/72 = 1/72$$

$$Y = 72$$

$$X \text{ alone} = 72 - 24 = 48 \text{ HRS}$$

34) B

$$1/x + 1/(3x) + (1/6x) = 1/14$$

$$9/6x = 1/14$$

$$6x/9 = 14$$

$$6x = 126$$

$$X = 126/6$$

$$X = 21$$

34) C

$$\text{In 1 hr P, Q, R} = 1/3 + 1/4 + 1/5 = 20 + 15 + 12/60 = 47/60$$

$$\text{Filled in 30m} = 47/120$$

$$\text{Remaining} = 1 - 47/120 = 73/120$$

$$\text{Tap P} = 3 \times 73/120 = 219/120$$

$$\text{Total} = 219/120 + 1/2 = 219 + 60/120 = 279/120 = 2 \frac{13}{40} \text{ hrs}$$

35) C

$$\text{In 1 hr} = 1/15 + 1/9 - 1/45$$

$$\Rightarrow 3 + 5 - 1/45 = 7/45$$

$$\frac{1}{2} \text{ tank filled by 3 Faucets} = 45/7 \times \frac{1}{2}$$

$$\Rightarrow 45/14 \Rightarrow 3(3/14)$$

36) D

$$A + B + C \text{ in 1h} = 1/12$$

$$A + B + C \text{ in 4h} = 4/12 = 1/3$$

$$\text{Remaining} = 1 - 1/3 = 2/3$$

$$A + B \text{ in 12hrs} = 2/3$$

$$A + B \text{ in 1hr} = 2/36 = 1/18$$

$$C \text{ alone to fill the tank} = 1/12 - 1/18 = 3 - 2/36 = 1/36 = 36 \text{hrs}$$

37) D

Let the obstruction remain for X min.



Hence,

Part of cistern filled in X min + part of cistern filled in 6 min = full cistern

$$[(7X/4 \times 24) + (5X/3 \times 32)] + [(6/24) + (6/32)] = 1$$

$$(12X/96) + (7/16) = 1$$

$$12x/96 = 9/16$$

Thus,

$$X = 4.5 \text{ min.}$$

38) C

X can fill cistern in 36 minutes.

X fills cistern in 1 minute = $1/36$

Y can fill cistern in 30 minutes.

Y fills cistern in 1 minute = $1/30$ part.

X and Y together can fill cistern in 1 minute,

$$= \{(1/36) + (1/30)\} = 11/180 \text{ part.}$$

So, they can together fill cistern in 3 minute,

$$= 3 \times (11/180) = 33/180 \text{ part.}$$

Rest Cistern = $1 - (33/180) = 147/180$ part.

$147/180$ part cistern must be filled by Y in,

$$[(147/180) / (1/30)] = 24(1/3) \text{ minutes.}$$

39) C

Leak emptied the bunker per hour = $100/20 = 5\%$ of water per hour;

Quantity of water emptied per hour = $4 \times 60 = 240$;

Thus, $5\% = 240$ liter;

Hence, capacity of water,

$$100\% = 240 \times 100/5 = 4800 \text{ liter.}$$

40) C

$$12/36 + x/45 = 1$$

$$(12 \times 5)/180 + 4x/180 = 1$$

$$60 + 4x = 180$$

$$4x = 120$$

$$X = 120/4 = 30 \text{ min}$$

41) A dumper has a leak which would empty the dumper in 10 minutes. A tap is turned on which admits 4 liters a minute into the dumper, and it is emptied in 12 minutes. How many liters does the dumper hold?



- A) 480 liters
- B) 600 liters
- C) 320 liters
- D) 240 liters

42) Two faucet can separately fill a cistern 30minutes and 45 minutes respectively and when the waste faucet is open, they can together fill it in 54 minutes. The waste faucet can empty the full cistern in?

- A) 27 min
- B) 23 min
- C) 23 min
- D) 29 min

43) One tube can fill a tank five times as fast as another tube. If together the two tubes can fill tank in 42 min, then the slower tube alone will be able to fill the tank in?

- A) 252 min
- B) 208 min
- C) 244 min
- D) 192 min

44) A cistern is filled in 15 hours by three pipes P, Q and R. The pipe R is thrice as fast as Q and Q is thrice as fast as P. How much time will pipe P alone take to fill the tank?

- A) 120 hrs
- B) 195 hrs
- C) 135 hrs
- D) Cannot be determined

45) A cistern is filled by three faucets with uniform flow. The first two faucets operating simultaneously fill the cistern in the same during which the cistern is filled by the third faucet alone. The second faucet fills the cistern 5 hours faster than the first faucet and 4 hours slower than the third faucet. The time required by the first faucet is?

- A) 6 hrs
- B) 10 hrs
- C) 15 hrs
- D) 30 hrs

46) Pipes P, Q and R which fill the tank together in 12 hours are opened for 2hours after which pipe R was closed. Find the number of hours taken by pipe R to fill the tank if the remaining tank is filled in 14 hours.



- A) 16
B) 14
C) 20
D) 42
- 47) A tank is $\frac{1}{4}$ th full. Two pipes which fill the tank in 30 minutes and 40 minutes respectively are opened simultaneously. After 10 minutes, a third pipe which empties the full tank in 60 minutes is also opened. In how many minutes the tank will be full?
- A) 14
B) 12
C) 15
D) 17
- 48) Two taps M and N can alone fill a tank in 80 minutes and 120 minutes respectively. But due to a leakage of tank, it took 12 more minutes to fill the tank. In how many hours, the leak can alone empty the full tank?
- A) 240
B) 230
C) 248
D) 256
- 49) Three pumps, M, N and O are opened to fill a tank such that M and N can fill the tank alone in 18 min. and 23 min. respectively and O can empty it in 15 min. After 3 minutes the emptying pipe is closed. In how many minutes the tank will be full in this way?
- A) 20
B) 25
C) 18
D) 12
- 50) Two faucet A and B can fill a tank in 20 hours and 40 hours respectively. If they are opened simultaneously. Sometimes later, tap B was closed, then it takes total 14 hours to fill up the whole tank. After how many hours B was closed?
- A) 4 hours
B) 15.2 hours
C) 12 hours
D) 17.6 hours
- 41) D



$$1/x - 1/10 = -1/12$$

$$10-x/10x = -1/12$$

$$12(10-x) = -10x$$

$$120-12x = -10x$$

$$2x = 120$$

$$x = 60$$

$$\text{Therefore } 60 \times 4 = 240 \text{ litres}$$

42) A

$$1/30 + 1/45 - 1/x = 1/54$$

$$1/x = 1/30 + 1/45 - 1/54$$

$$1/x = 9+6-5/270$$

$$1/x = 10/270$$

$$1/x = 1/27$$

$$x = 27$$

43) A

Let the slower tube alone fill the tank in x min.

Then, faster tube will fill it in $x/5$ min.

$$1/x + 5/x = 1/42$$

$$6/x = 1/42$$

$$\Rightarrow x = 252 \text{ min.}$$

44) B

Suppose pipe P alone takes x hours to fill the tank.

Then, pipes Q and R will take $x/3$ and $x/9$ hours respectively to fill the tank.

$$1/x + 3/x + 9/x = 1/15$$

$$13/x = 1/15$$

$$\Rightarrow x = 195 \text{ hrs.}$$

45) C

Suppose, first faucet alone takes x hours to fill the cistern.

Then, second and third faucets will take $(x - 5)$ and $(x - 9)$ hours respectively to fill the cistern.

$$1/x + 1/(x - 5) = 1/(x - 9)$$

$$(2x - 5)(x - 9) = x(x - 5)$$

$$x^2 - 18x + 45 = 0$$

$$(x - 15)(x - 3) = 0 \Rightarrow x = 15$$



46) D

$$1/P + 1/Q + 1/R = 1/12$$

Now given that first all open for 2 hours, then R closed and P+Q completes in 14 hours, so

$$(1/P + 1/Q + 1/R) * 2 + (1/P + 1/Q) * 14 = 1$$

$$\text{Put } 1/P + 1/Q = 1/12 - 1/R$$

$$(1/12 - 1/R + 1/R) * 2 + (1/12 - 1/R) * 14 = 1$$

$$1/6 + 14/12 - 14/R = 1$$

$$\text{Solve, } R = 42$$

47) A

Since $1/4$ th is already filled, $3/4$ th is to be filled now.

$$(1/30 + 1/40) * (10+x) - (1/60) * x = 3/4$$

$$7/120(10+x) - x/60 = 3/4$$

$$7x - 2x/120 = 3/4 - 7/12$$

$$5x/120 = 1/6$$

$$30x = 120$$

$$X = 4$$

So total $10+4=14$ minutes

48) A

A and B can fill tank in $(1/80 + 1/120) = 1/48$ so 48 minutes

But it took 12 more minutes, this means the tank got full in $48+12=60$ minutes

$$\text{So } (1/80 + 1/120 - 1/x) = 1/60$$

$$1/X = 1/80 + 1/120 - 1/60$$

$$\text{Solve, } x = 240$$

49) D

Let the tank full in x minutes, then M and N opened for x minutes and O for 3 minutes.

$$(1/18 + 1/23) * x - (1/15) * 3 = 1$$

$$(23+18/414)X = 1 + 1/5$$

$$\text{Solve, } x = 12$$

50) A

Let x is the time when B is closed

$$X(1/20 + 1/40) + 14/20 = 1$$

$$X = 4 \text{ hours}$$



51) Two taps A and B are opened together to fill a tank. Both the taps fill the tank in time "x" If B separately took 25 minutes more time than "x" to fill the tank and B took 49 minutes more time than "x" to fill the tank, then find out the value of x?

- A) 48 minutes
- B) 24 minutes
- C) 54 minutes
- D) 35 minutes

52) A tap can fill a bunker in 4 hours. After half the bunker is filled, three more similar tap are opened. What is the total time taken to fill the bunker completely?

- A) 3 hours
- B) 2.5 hours
- C) 5 hours
- D) 4.2hours

53) 24 tins of water fill a bunker when the capacity of each bunker is 27litres. How many tins will be needed to fill the same bunker, if the capacity of each tin is 18litres?

- A) 36
- B) 26
- C) 46
- D) 56

54) Bucket A has twice the capacity as bucket B. It takes 120 turns for bucket A to fill the empty dumper. How many turns it will take for both the buckets A and B, having each turn together to fill the empty dumper.

- A) 40
- B) 50
- C) 70
- D) 80

55) Two taps P and Q can separately fill a tank in 120mins and 150 mins respectively. There is a 3rd tap in the bottom of the tank to empty it. If all of the 3 taps are simultaneously opened, then the tank is full in 100 mins. In how much time the 3rd pipe alone can empty the tank?

- A) 100
- B) 200
- C) 300
- D) 400



56) A large cistern can be filled by 2 pipes P & Q in 120 mins and 80 mins respectively. How many mins will it take to fill the cistern from empty state if Q is used for half the time and P & Q fill it together for the other half?

- A) 2hrs
- B) 1hr
- C) 3hrs
- D) 4hrs

57) A leak in the bottom of a bunker can empty the full bunker in 4 hrs. An inlet pump fills water at the rate of 3 litres a min. when the bunker is full, the inlet is opened and due to the leak, the bunker is empty in 6 hrs. How many litres does the bunker field?

- A) 1160 litrs
- B) 1610 litres
- C) 2160 litres
- D) 2610 litres

58) Two taps can fill a bunker in 40 and 48 mins respectively and a waste tap can empty 6 gallons per minute. All the 3 taps working together can fill the bunker in 30 mind. The capacity of the bunker is.

- A) 480
- B) 480
- C) 680
- D) 780

59) Two pumps P & Q can fill a tank in 12 mins and 15 mins respectively while a third pipe R can empty the full tank in 6 mins. P & Q kept open for 5 mins in the beginning and then R is also opened. In what time is tank emptied?

- A) 30mins
- B) 35mins
- C) 40mins
- D) 45 mins

60) 3 faucet P, Q & R can fill a cistern in 12 hrs. After working together for 4hrs, R is closed P and Q can fill the remaining part in 14 hrs. The number of hrs taken by R alone to fill the cistern is.

- A) 18 hrs
- B) 20 hrs
- C) 28hrs
- D) 30hrs



51) D

Time is taken to fill the tank by both taps $x = \sqrt{a*b}$

$$x = \sqrt{25*49}$$

$$\Rightarrow 5*7$$

$$\Rightarrow 35$$

52) B

In One hour tap can fill = $1/4$

Time is taken to fill half of the bunker = $1/2 * 4 = 2$ hours

Part filled by four taps in one hour = $(4*1/4) = 1$

Required Remaining Part = $1/2$

Total time = $2 + 1/2 = 2.5$ hrs

53) A

Capacity of the bunker = $(24 * 27)$ litres

= 648 litres

Capacity of each tin = 18 litres

Number of tins needed = $648/18$

= 36.

54) D

Let capacity of A be x litres

Then capacity of B = $x/2$ litres

Capacity of the dumper = $120x$ litres

Required number of turns = $120x / x = x/2$

$$= 2 (120x) / 3x$$

$$= 240x / 3x$$

= 80.

55) B

Work done by the 3 tap in 1 min

$$= 1/100 - (1/120 + 1/150)$$

$$= 1/100 - (5+4/600)$$

$$= 1/100 - 9/600$$

$$= 6-9/600 = -3/600$$

= $-1/200$ (negative signs mean emptying)



Therefore the 3rd tap alone can empty the tank in 200 mins

56) B

Part filled by (P+Q) in 1 min = $1/120 + 1/80$

$$= 2+3/240 = 5/240$$

$$= 1/48$$

Suppose the cistern is filled in x mins then, $x/2 (1/48 + 1/80) = 1$

$$x/2(5+3/240)=1$$

$$8x/480 = 1$$

$$x=480/8$$

$$x= 60 \text{ mins or } 1 \text{ hr}$$

57) C

Work done by the inlet in 1 hr = $(1/4 - 1/6)$

$$= (3-2/12)$$

$$= 1/12$$

Work done by the inlet in 1 min = $1/12 * 1/60 = 1/720$

Volume of $1/720$ part = 3 litres

Volume of whole = $(720 * 3) = 2160$ litres.

58) A

Work done by the waste tap in 1 min = $1/30 - (1/40 + 1/48)$

$$= 8 - (6+5)/240$$

$$= 8-11/240$$

$$= -3/240$$

= $-1/80$ (negative sign means emptying)

Volume of $1/80$ part = 60 gallons

Volume of whole = $(6*80) = 480$ gallons

59) D

Part filled in 5 min = $5(1/12 + 1/15)$

$$= 5*9/60 = 3/4$$

Part emptied in 1 min when all the pumps are opened,

$$= 1/6 - (1/12 + 1/15)$$

$$= 1/6 - 3/20$$

$$= 1/60$$

Now $1/60$ is part emptied in 1 min



Therefore $\frac{3}{4}$ part will be emptied in $60 \times \frac{3}{4} = 45$ mins

60) C

Part filled in 4 hrs = $\frac{4}{12} = \frac{1}{3}$

Remaining part = $\frac{2}{3}$

(P+Q)'s 14 hrs work = $\frac{2}{3}$

(P+Q)'s 1 hr work = $\frac{2}{3} \div 14 = \frac{1}{21}$

R's 1 hr work = (P+Q+R)'s 1 hr work – (P+Q)'s 1 hr work

= $\frac{1}{12} - \frac{1}{21}$

= $\frac{7-4}{84} = \frac{3}{84} = \frac{1}{28}$

R alone can fill the tank in 28 hrs.

12. SIMPLE INTEREST AND COMPOUND INTEREST

1) A sum of money invested for 7 years in Scheme 1 which offers SI at a rate of 8% pa. The amount received from Scheme 1 after 7 years invested for 2 years in Scheme 2 which offers CI rate of 10% pa. If the interest received from Scheme B was Rs.1638. What was the sum invested in Scheme 1?

- A) Rs.7500
- B) Rs.5000
- C) Rs.8200
- D) Rs.9000
- E) None of these

2) Rs.5200 was partly invested in Scheme A at 10% pa CI for 2 years and Partly invested in Scheme B at 10% pa SI for 4 years. Both the schemes earn equal interests. How much was invested in Scheme A?

- A) Rs.1790
- B) Rs.2200
- C) Rs.3410
- D) Rs.2670
- E) None of these

3) A sum of rupees 4420 is to be divided between rakesh and prakash in such a way that after 5 years and 7 years respectively the amount they get is equal, if compounded annually. The rate of interest is 10 percent.

Find the share of rakesh and prakash

- a) 2000, 2420
- b) 2420, 2000
- c) 2480, 2420



d) 2210, 2210

e) None of these

4) A sum of rupees 3200 is compounded annually at the rate of 25 paise per rupee per annum. Find the compound interest payable after 2 years.

a) 1200

b) 1600

c) 1800

d) 2000

e) None of these

5) Aishwarya saves an amount of 500 every year and then lent that amount at an interest of 10 percent compounded annually. Find the amount after 3 years.

a) 1820.5

b) 1840.5

c) 1920.5

d) 1940.5

e) None of these

6) What sum(principal) will be amount to Rs.34536.39 at compound interest in 3 years, the rate of interest for 1st, 2nd and 3rd year being 5%, 6% and 7% respectively?

a) Rs.25576

b) Rs.29000

c) Rs.28012

d) Rs.24000

e) none of these

7) A sum of money was put at SI at a certain rate for 2 years. Had it been at 1% higher rate, it would have fetched Rs 24 more. Find the sum.

a) 1500

b) 1200

c) 1300

d) 1600

e) none of these

8) The difference between simple interest and compound on Rs. 1200 for one year at 10% per annum reckoned half-yearly is:



- a) 5
- b) 6
- c) 3
- d) 4
- e) None of these

9) A man lends a certain sum of money at simple interest. Rate of interest for first one and half years is 6%, for next 9 months is 5% and after that 4%. If he received Rs. 11496 at the end of 4 years, his capital was

- a) Rs. 10000
- b) Rs. 9000
- c) Rs. 9600
- d) Rs. 9200
- e) None of these

10) Kriya deposits an amount of Rs. 65800 to obtain in a simple interest at the rate of 14 p.c.p.a. for 4 years. What total amount will Kriya get at the end of 4 years?

- a) Rs. 102648
- b) Rs. 115246
- c) Rs. 125578
- d) Rs. 110324
- e) None of these

1) B

$$SI \Rightarrow \text{Amount} = x \cdot 8 \cdot 7 / 100 + x = 56x + 100x / 100 = 156x / 100 = 39x / 25$$

$$CI \Rightarrow 39x / 25 [(1 + 10/100)^2 - 1] 1638 = 39x / 25 [121/100 - 1] = 39x / 100 [21/100] X = 1638 \cdot 100 \cdot 25 / 21 \cdot 39 = 5000$$

2) C

Amount invested in Scheme B = X

Amount invested in Scheme A = 5200 - x

$$X \cdot 10 \cdot 4 / 100 = (5200 - x) \cdot 21 / 100 \dots \dots \dots [(1 - 10/100)^2 - 1] = 21/100$$

$$40x / 100 = (5200 - x) \cdot 21 / 100$$

$$2x / 5 = (5200 - x) \cdot 21 / 100$$

$$200x = 5200 \cdot 21 \cdot 5 - x \cdot 5 \cdot 21$$

$$200x = 546000 - 105x$$

$$305x = 546000$$

$$X = 1790$$

$$\text{Scheme A} = 5200 - 1790 = 3410$$



3) B

$$R \cdot (1 + 10/100)^5 = (4420 - R) \cdot (1 + 10/100)^7$$

We get $R = 2420$, so $P = 2000$

4) C

Rate of interest is 25 paise per rupee per annum.

So for 100 rupees it is 2500 paise i.e. 25 percent

$$\text{Now, CI} = 3200(1 + 25/100)^2 - 3200 = 1800$$

5) A

$$\begin{aligned} \text{Total amount} &= 500 \cdot (1 + 10/100)^3 + 500 \cdot (1 + 10/100)^2 + 500 \cdot (1 + 10/100) \\ &= 1820.5 \end{aligned}$$

6) B

$$34536.39 = p(1 + 5/100)(1 + 6/100)(1 + 7/100)$$

$$= p(105/100) \times (106/100) \times (107/100)$$

$$p = 34536.39 \times 100 \times 100 \times 100 / 105 \times 106 \times 107$$

$$p = \text{Rs. } 29000$$

7) B

2 years, Rs 24 more

1 years, $24/2$, ie 12 more

1 % of $P = 12$ (since the rate increased by 1%)

$$p \cdot 1/100 = 12$$

$$P = 1200$$

8) C

$$\text{Solution: SI} = \text{Rs. } (1200 \times 10 \times 1)/100 = \text{Rs. } 120$$

$$\text{CI} = \text{Rs. } [1200 \times (1 + 5/100)^2 - 1200] = \text{Rs. } 123$$

$$\text{So CI-SI} = \text{Rs. } 3$$

9) C

$$p \cdot 6 \cdot 18/100 + p \cdot 5 \cdot 9/100 + p \cdot 4 \cdot (48 - 27) = 11496 - p$$

$$\text{or } 108p = 45p + 84p = 1200p = 11496 \cdot 1200$$

$$\text{or } p = 11496 \cdot 1200 / 1437 = \text{Rs } 9600$$



- 10) A
 $100 \implies 156$
 $65800 \implies ?$
102648
- 11) Adam borrowed some money at the rate of 6% p.a. for the first two years, at the rate of 9% p.a. for the next three years, and at the rate of 14% p.a. for the period beyond five years. If he pays a total interest of Rs. 11,400 at the end of nine years, how much money did he borrow ?
- a) 13000
 - b) 14000
 - c) 12000
 - d) 15000
 - e) None of these
- 12) The simple interest on a certain sum of money for 2.5 years at 12% per annum is Rs. 40 less than the simple interest on the same sum for 3.5 years at 10% per annum. Find the sum.
- a) 700
 - b) 800
 - c) 1000
 - d) 600
 - e) None of these
- 13) A certain sum of money amounts to Rs. 1008 in 2 years and to Rs. 1164 in 3.5 years. Find the rate of interest?
- a) 12
 - b) 14
 - c) 13
 - d) 18
 - d) None of these
- 14) The least number of complete years in which a sum of money put out at 10% CI will be more than doubled is
- A) 8yrs
 - B) 6yrs
 - C) 4yrs
 - D) 7yrs
 - E) None of these



15) If Rs. 1,200 amounts to rs 1,323 in two years at compound interest, then what will be the amount of rs 1,600 in three years at compound interest at the same rate per cent ?

- a) 1832.20
- b) 1852.20
- c) 1862.20
- d) 1872.20
- e) None of these

16) A and B each borrowed equal sums for 3 years at the rate of 5% simple and compound interest respectively. At the time of repayment B has to pay Rs. 76.25 more than A. The sum borrowed and the interest paid by A (in Rs.) is:

- a) Rs. 10,000, Rs. 1,500
- b) Rs. 11,000, Rs. 1,100
- c) Rs. 10,000, Rs. 1,400
- d) Rs. 9,000, Rs. 200
- e) None of these

17) A sum was put at 5% at a certain rate for 5 Years. Had it been put at 3% Per Annum higher rate, it would have fetched Rs. 900 more. Find the Sum?

- a) 5000
- b) 3000
- c) 6000
- d) 7000
- e) None of these

18) Manish took a loan of Rs. 4000 at S.I. After 2 Years he cleared the loan by paying Rs. 5600. Find the Rate % P.A?

- a) 10
- b) 20
- c) 30
- d) 40
- e) None of these

19) A lent Rs. 25000 to B for 4 years and Rs. 40,000 to C for 3 1/2 years and got Rs. 24,000 S.I from both B and C. Find the rate PCPA

- a) 10



- b) 20
- c) 30
- d) 15
- e) None of these

20) Equal amounts of each Rs. 43,892 is lend to two persons for 3 years. One at the rate of 30% S.I. and second at the rate of 30% C.I. annually. By how much percent the C.I. is greater than the simple interest received in this 3 years duration?

- a) 33%
- b) 35%
- c) 37%
- d) 30%
- e) 43%

11) C

$$12+27+56=95$$

$$95===11400$$

$$100===?$$

$$12000$$

12) B

$$7x/20 - 3x/10 = 40 \Rightarrow x = (40 \times 20) \Rightarrow x = 800$$

13) C

$$[1164-1008 = 156] \Rightarrow 156/3 \times 4 = 208 ; R = 208/2 \times 800 \times 100 \Rightarrow 13$$

14) A

$$P(110/100)^n > 2P$$

$$(11/10)^n > 2$$

$$1.1 \times 1.1 \times 1.1 \times 1.1 \times 1.1 \times 1.1 \times 1.1 \times 1.1 = 2.14 > 2$$

$$N = 8$$

15) B

$$1323 = 1200 [1 + r/100]^3$$

$$441/100 = [21/20]^2 = [1+r/100]^2$$

$$R = 5\%$$

$$A = P [1 + r/100]^n$$



$$A = 1600 \left[\frac{21}{20} \right]^3 = 1852.20$$

16) A

$$CI-SI=rs76.25$$

$$p[1+r/100]^n - p - PRN/100 = 76.25$$

$$p[1+5/100]^3 - p - p \cdot 5 \cdot 3/100 = 76.25$$

$$p[21/20 \cdot 21/20 \cdot 21/20] - p - 15p/100 = 76.25$$

$$9261p - 8000p - 1200p/8000 = 76.25$$

$$61p = 8000 \cdot 76.25$$

$$p = 10000$$

$$SI \text{ paid by } A = PNR/100 = 10000 \cdot 5 \cdot 3/100 = rs1500$$

17) C

$$P = (100 \times 900) / (5 \times 3) = 6000$$

18) B

$$\text{Interest will be } 5600 - 4000 = 1600$$

$$R = (100 \times 1600) / (400 \times 2) = 20$$

19) A

$$= 250 \times 4R = 400 \times (7/2) R = 2400R$$

$$\Rightarrow R = 10$$

20) A

$$SI = 43892 \cdot 30 \cdot 3 = 43892[9/10]$$

$$CI = 43892[(1 + 30/100)^3 - 1] = 43892(2197 - 1000/1000) = 43892(1197/1000)$$

$$CI - SI = 43892(297/1000)$$

$$\text{Desired}\% = 43892(297/1000) / 43892(900/1000) = 33\%$$

21) The present population of a village is 9,261. If the annual birth rate is $8\frac{1}{2}\%$ and the annual death rate is 3.5%, then calculate the population 3 years ago.

a) 10,721

b) 11,363

c) 11,391

d) 8,000

e) 10,561



22) Two equal sums of money are lent at the same times at 8% and 7% per annum simple interest. The former is recovered 6 months earlier than the latter and the amount in each case is Rs. 2560. The sums of money are lent out are :

- a) Rs. 2000
- b) Rs. 1500
- c) Rs. 2500
- d) Rs. 3000
- e) None of these

23) In what time will a man receive Rs. 85 as compound interest on Rs. 320 at $12\frac{1}{2}\%$ p.a. compounded yearly?

- a) $4\frac{1}{2}$ yrs.
- b) $2\frac{1}{2}$ yrs.
- c) 2 yrs.
- d) 5 yrs.
- e) $3\frac{1}{2}$ yrs.

24) If the compound interest on a certain sum for two years at 10% p.a. is Rs. 2,100 the simple interest on it at the same rate for two years will be

- a) Rs. 1,980
- b) Rs. 1,760
- c) Rs. 2,000
- d) Rs. 1,800
- e) Rs. 1,805

25) If Rs. 1,200 amounts to Rs. 1,323 in two years at compound interest, then what will be the amount of Rs. 1,600 in three years at compound interest at the same rate per cent?

- a) Rs. 1,850
- b) Rs. 1,852.20
- c) Rs. 1,752.20
- d) Rs. 1,905.50
- e) Rs. 1,951

26) A person invested some amount at the rate of 12% simple interest and a certain amount at the rate of 10% simple interest. He received yearly interest of Rs. 130. But if he had interchanged the amounts invested, he would have received Rs. 4 more as interest. How much did he invest at 12% simple interest?



- a) Rs. 700
- b) Rs. 500
- c) Rs. 800
- d) Rs. 400
- e) None of these

27) A tree increases annually by $\frac{1}{8}$ th of its height. By how much will it increase after $2\frac{1}{2}$ years, if it stand today 10 ft. high?

- a) data insufficient
- b) less than 12 ft.
- c) more than 3 ft.
- d) more than 2 ft.
- e) slightly more than 13 ft.

28) On a certain sum of money, compound interest earned at the end of three years = Rs. 1456. Compound interest at the end of two years is Rs. 880. Compute the principal invested.

- a) Rs. 2,400
- b) Rs. 2,800
- c) Rs. 2,000
- d) Rs. 1,600
- e) None of these

29) Sashidharan took a loan of Rs. 20,000 to purchase a colour TV set from Royal Finance Co. He promised to make the payment after three years. The company charges compound interest @ 10% p.a. for the same. But, suddenly the company announces the rate of interest as 15% p.a. for the last one year of the loan period. What extra amount Sashidharan has to pay due to his announcement of new rate of interest?

- a) Rs. 7,830
- b) Rs. 6,620
- c) Rs. 4,410
- d) Rs. 1,210
- e) Rs. 3,000

30) A bank offers 5% annually compound interest calculated on half-yearly basis. A customer deposits Rs. 1600 each on 1st January and 1st July of a year. At the end of the year, the amount he would have gained by way of interest is:

- A) Rs. 120
- B) Rs. 121



- C) Rs. 122
D) Rs. 123
e) None of these

21) D

$$\begin{aligned}\text{Eff rate} &= 8.5 - 3.5 = 5\% \\ X(1 + 5/100)^3 &= 9261 \\ X &= 8000\end{aligned}$$

22) A

$$\begin{aligned}X + (t - 1/2) * x * 8/100 &= x + x * t * 7/100 \\ 7xt/100 &= 2xt/25 - x/25 \\ xt/100 &= x/25 \\ t &= 4 \text{ yrs} \\ A = x + x * 8 * 3.5/100 &= 2560 \\ x &= 2000\end{aligned}$$

23) C

By using option

$$\begin{aligned}Ci &= 2(320 * 1/8) 40 * 1/8 \\ &= 80 + 5 = 85\end{aligned}$$

24) C

$$\begin{aligned}10\% 100 &= 10 \\ 10\% 10 = 1 &\Rightarrow 10 + 1 = 11 \\ Ci &= 10 + 11 = 21 \\ 21 &= 2100 \\ 20 &= 2000\end{aligned}$$

25) B

$$\begin{aligned}1323/1200 &= (1 + r/100)^2 \\ R &= 5\% \\ Ci &= 3(1600 * 1/20) + 2(80 * 1/20) + (4 + 4 * 1/20) = 252.2 \\ \text{Req amt} &= 1600 + 252.2 = 1852.2\end{aligned}$$

26) B

$$x * 12/100 = y * 10/100 = 130$$



$$12+10y=13000 \text{ is equ (1)}$$

$$x*10/100+y*12/100=134$$

$$10x+12y=13400 \text{ is equ (2)}$$

Solve both equ we get

$$x=\text{rs}500$$

27) C

$$\Rightarrow 10(1+1/8)^2(1+1/8)^{1/2}=10*81/64*17/16=13.44$$

$$\Rightarrow 13.44-10=3.44$$

28) C

$$1456-880=576/880=36/55$$

$$6^2/5(5+6)=1/5*100=20\%$$

$$20\% \text{ for 2 years}=44\%$$

$$44\%==880$$

$$100\%==2000$$

29) D

$$R=10, t=3$$

$$Ci=20000*33.1/100=6620$$

$$Ci \text{ for 2yrs}, r=10$$

$$Ci=20000*21/100=4200$$

$$Ci \text{ for 3rd}, r=15$$

$$24200*15/100=3630$$

$$\text{Total ci}=7830$$

$$\text{Amt}=7830-6620=1210$$

30) B

$$A=\{1600(1+2.5/100)^2 + 1600(1+2.5/100)\}$$

$$\square \text{rs.}3321$$

$$Ci=3321-3200=121$$

31) There is 60% increase in an amount in 6 years at simple interest. What will be the compound interest of Rs. 12,000 after 3 years at the same rate?

A) Rs. 2160

B) Rs. 3120

C) Rs. 3972



- D) Rs. 6240
- E) None of these

32) What is the difference between the compound interests on Rs. 5000 for 1 years at 4% per annum compounded yearly and half-yearly?

- A) Rs. 2.04
- B) Rs. 3.06
- C) Rs. 4.80
- D) Rs. 8.30
- E) None of these

33) The least number of complete years in which a sum of money put out at 20% compound interest will be more than doubled is:

- A) 3
- B) 4
- C) 5
- D) 6
- E) None of these

34) Hari took an educational loan from a nationalized bank for his 2 years course of MBA. He took the loan of Rs.5 lakh such that he would be charged at 7% p.a. at CI during his course and at 9% CI after the completion of the course. He returned half of the amount which he had to be paid on the completion of his studies and remaining after 2 years. What is the total amount returned by Hari?

- A) Rs. 626255
- B) .Rs. 626277
- C) Rs. 616266
- D) Rs. 626288
- E) None of these

35) Rs.200,000 was invested by Mahesh in a FD @ 10% pa at CI. However every year he has to pay 20% tax on the CI. How much money does Mahesh have after 3 years?

- A) 215662.4
- B) 216662.4
- C) 217662.4
- D) 218662.4
- E) None of these



36) Leela takes a loan of Rs. 8400 at 10% p.a. compounded annually which is to be repaid in two equal annual installments. One at the end of one year and the other at the end of the second year. The value of each installment is?

- A) 4200
- B) 4140
- C) 4840
- D) 5640
- E) None of these

37) A sum of money lent at compound interest for 2 years at 20% per annum would fetch Rs.723 more, if the interest was payable half yearly than if it was payable annually. The sum is ____

- A) Rs. 20000
- B) Rs. 15000
- C) Rs. 30000
- D) Rs. 45000
- E) None of these

38) A sum of Rs.7140 is to be divided between Anita and Bala who are respectively 18 and 19 yr old, in such a way that if their shares will be invested at 4% per annum at compound interest, they will receive equal amounts on attaining the age of 21 year. The present share of Anita is

- A) 4225
- B) 4352
- C) 3500
- D) 4000
- E) None of these

39) Suresh borrows Rs.6375 to be paid back with compound interest at the rate of 4 % pa by the end of 2 year in two equal yearly installments. How much will each installment will be?

- A) 3840
- B) 3380
- C) 4800
- D) Data inadequate
- E) None of these



40) During the first year the population of a village is increased by 5% and the second year it is diminished by 5%. At the end of the second year its population was 31500. What was the population at the beginning of the first year?

- A) 35500
- B) 31578
- C) 33500
- D) 33000
- E) None of these

31) C

$$Si = 100 \square r = 10\%$$

$$Ci \square 12000(1 + 10/100)^3 - 12000 = 3972$$

32) E

$$\text{yearly} = 5000 * 4 * 1/100 = 200$$

$$\text{half yearly} \Rightarrow 2\% 5000 = 100$$

$$2\% 100 = 2 \Rightarrow 100 + 2 = 102$$

$$Ci = 202$$

$$\text{Diff} = 202 - 200 = 2$$

33) B

$$\Rightarrow (6/5)^n > 2 \Rightarrow (6/5 * 6/5 * 6/5 * 6/5)$$

$$N = 4$$

34) D

$$5,00,000 * (1.07)^2 = 572450$$

$$\text{Returned amount} = 286225$$

$$\text{After two years} = 286225 * (1.09)^2 = 340063$$

$$\text{Total amount} = 286225 + 340063 = 626288$$

35) E

P I T Total

$$\text{1st year} - 200000 - 20000 - 4000 = 216000$$

$$\text{2nd year} - 216000 - 21600 - 4320 = 233280$$

$$\text{3rd year} - 233280 - 23328 - 4665.6 = 251942.4$$

36) C



$$8400 = x \cdot (210/121) \Rightarrow 4840$$

37) C

$$\text{C.I. compounded half yearly} = (4641/10000)x$$

$$\text{C.I. compounded annually} = (11/25)x$$

$$(4641/10000)x - (11/25)x = 723$$

$$x = 30000$$

38) C

$$\text{Amount got by Anita after 3 yr} = \text{Amount got by Bala after 2 yr}$$

$$x \cdot (26/25)^3 = (7140 - x) \cdot (26/25)$$

$$26/25 = 7140 - x / x$$

$$x = 3500$$

39) B

$$25x/26 + 625/676x = 6375$$

$$x = (6375 \cdot 676)/1275 = 3380$$

40) B

$$x \cdot 105/100 \cdot 95/100 = 31500$$

$$x = 31500 \cdot 100/105 \cdot 100/95$$

$$D = 31578$$

41. If Rs. 7200 amounts to Rs. 10368 at compound interest in a certain time, then Rs. 7200 amounts to what in half of the time?

A) 3400

B) 3600

C) 38000

D) 3520

E) None of these

42) The compound interest on a certain sum for 2 years is Rs. 756 and S.I. is Rs. 720. If the sum is invested such that the S.I. is Rs. 1296 and the number of years is equal to the rate per cent per annum, Find the rate of interest?

A) 4%

B) 5%

C) 6%



- D) 8%
- E) 2%

43) The difference between the total simple interest and total compound interest compounded annually at the same rate of interest on a sum of money at the end of two years is Rs. 50. What is definitely the rate of interest?

- A) 10
- B) 4
- C) Data provided are not adequate to answer the question
- D) 5
- E) 7.5

44) The compound interest on a certain sum of money for 2 years at 4% per annum be Rs. 2448, what would be the simple interest on the same sum for 2 years at the same rate?

- a) Rs2500
- b) Rs2400
- c) Rs2360
- d) Rs2250
- e) None of these

45) If the rate increases by 2%, the simple interest received on a sum of money increases by Rs. 108. If the time period is increased by 2 years, the simple interest on the same sum increases by Rs. 180. The sum is :

- a) Rs. 1800
- b) Rs. 3600
- c) Rs. 5400
- d) Data inadequate
- e) None of these

46. A person invested in all Rs. 2600 at 4%, 6% and 8% per annum simple interest. At the end of the year, he got the same interest in all the three cases. The money invested at 4% is :

- a) Rs. 200
- b) Rs. 600
- c) Rs. 800
- d) Rs. 1200
- e) None of these



47) Arun invested a sum of money at a certain rate of simple interest for a period of 4 yrs. The total interest earned by him would have been 50% more than the earlier interest amount when invested for 6 years. What was the rate of interest per cent per annum ?

- a) 4
- b) 8
- c) 5
- d) Can't be determined
- e) None of these

48) Find the compound interest on Rs. 64,000 for 1 year at the rate of 10% per annum compounded quarterly (to the nearest integer).

- a) Rs. 8215
- b) Rs. 8205
- c) Rs. 8185
- d) Can't be determined
- e) None of these

49) Amal borrowed a sum of money with simple interest as per the following rate structure:

- a. 6 p.c. p.a. for the first three years
- b. 8 p.c. p.a. for the next five years
- c. 12 p.c. p.a. for next eight years

If he paid a total of Rs. 5,040 as interest at the end of twelve years, how much money did he borrow?

- a) Rs. 8,000
- b) Rs. 10,000
- c) Rs. 12,000
- d) Rs. 6,000
- e) None of these

50) On a certain rate of interest a sum of Rs 5000 becomes Rs 16,200 in certain years at compound interest. In half of the time given, this sum will become?

- A) Rs 10,000
- B) Rs 5,600
- C) Rs 9,000
- D) Cannot be determined
- E) None of these

41) E



Let rate = R% and time = n year

Then, $10368 = 7200(1+R/100)^n$

$\Rightarrow (1+R/100)^n = 10368/7200 = 1.44$

$\therefore (1 + R/100)^{n/2} = \sqrt{1.44} = 1.2$

\therefore Required amount for n/2 yr

$= 7200(1+ R/100)^{n/2}$

$= 7200 \times 1.2 = \text{Rs. } 8640$

42) C

CI for 2 years = Rs. 756

SI for 2 years = Rs. 720

$36/360 \times 100 = 10\%$

P for first year = 3600

$P \times x \times x / 100 = 1296$

$x = 6\%$

43) C

Data provided are not adequate to answer the question.

44) B

let $p=100$

$\Rightarrow 4\%100=4$

$4\%4=0.16 \Rightarrow 4+0.16=4.16$

$Ci=8.16, si=8$

$8.16 \times 8 = 65.28$

$8 \times 8 = 64$

2400

45) D

The given data is not enough to solve this

46) D

$\Rightarrow 1/4:1/6:1/8 \Rightarrow 6:4:3$

$13 \times 200 = 2600$

$6 \times 200 = 1200$

1200.



47) D

=>cannot be determined

48) E

$$\Rightarrow 64000 \times (1.025)^4 = 70644.025$$

$$Ci = 6644.025$$

49) E

Let x be the amount Amal borrowed.

$$\therefore 18\% \text{ of } x + 40\% \text{ of } x + 48\% \text{ of } x = 5040$$

$$106\% = 5040$$

$$100\% = 4754$$

50) C

$$a \text{ ————— } b \text{ ————— } c$$

$$5000 \text{ ————— } X \text{ ————— } 16200$$

$$\text{————— } t \text{ ————— } t \text{ ————— }$$

As we have to calculate the sum for half time, both time period is same, and hence

$$a:b = b:c$$

$$5000:x = x:16200$$

$$x = \text{Rs } 9000$$

51) If a certain sum becomes double in 3 years at certain rate of interest at C.I. Then in how many years it will become 16 times?

A) 12 years

B) 24 years

C) 8 years

D) Cannot be determined

E) None of the above

52) Manivel invests two sum of money A and B at 10% p.a. and 20% p.a respectively at CI for 2 years. IF the total interest on both the sum is Rs 5350 then find the sum invested in A if the total sum of A and B was Rs 20,000?

A) Rs 5,000

B) Rs 10,000

C) Rs 12,000

D) Rs 15,000



E) None of these

53) The compound interest on a certain sum for 2 years at a certain rate of interest is Rs 1025 and Simple Interest on the same sum, same time and same rate of interest is Rs 1,000. Then find the C.I for same sum in 3 years.

- A) Rs 1575.25
- B) Rs 1576.25
- C) Rs 1576.75
- D) Rs 1575.75
- E) None of these

54) A sum becomes triple in 6 years at S.I. The same sum will become 19 times in how many years?

- A) 50 years
- B) 48 years
- C) 54 years
- D) 57 years
- E) None of these

55) A sum of Rs 343 becomes 512 in 3 years at C.I. Find the rate of interest.

- A) $14 \frac{2}{7} \%$
- B) 12.5 %
- C) $8 \frac{2}{3} \%$
- D) $16 \frac{2}{3} \%$
- E) None of these

56) Find the C.I on Rs 20,000 at 10% rate of interest in 2 years if compounded half yearly. (Approximately)

- A) Rs 4210
- B) Rs 4310
- C) Rs 4410
- D) Rs 4510
- E) None of these

57) A sum of Rs 6,000 was taken as a loan. This is to be repaid in two equal annual installments. If the rate of interest is 20% compounded annually then find the value of each installment.

- A) Rs 4400
- B) Rs 2220
- C) Rs 4320



- D) Rs 4420
- E) None of these

58) If the ratio of difference between CI and SI for 3 years and 2 years is 31:10, then find the Rate of Interest.

- A) 11.11%
- B) 10%
- C) 20%
- D) 25%
- E) None of these

59) If a sum of RS 2744000 becomes Rs 3176523 in three years on Compound Interest then find the rate of interest.

- A) 10%
- B) 5%
- C) 8%
- D) 20%
- E) None of these

59) B

Find the cube root of both numbers. Cube root \rightarrow 3 years

cube root(2744000): cube root(3176523)

140:147

rate = $(147 - 140) / 140 \times 100 = 5$

60) If the difference between Simple Interest and Compound Interest at 20% rate of Interest in 3 years is 5120, then find the sum.

- A) Rs 40,000
- B) Rs 50,000
- C) Rs 60,000
- D) Rs 30,000
- E) None of these

51) A

In C.I P increases like

P — 2P — 4P — 8P — 16P

— 3yrs — 3yrs — 3yrs — 3yrs

total = $3 + 3 + 3 + 3 = 12$ years



52) D

At 10% CI in 2 years=21 %

At 20% Ci in 2 years =44%

and 5350 is 107/4% of 20000, by using allegation

A	B
21	44
107/4	
3	1

$A = \frac{3}{4} \times 20000 = \text{Rs } 15000$

53) B

SI for 2 years = Rs 1000 \Rightarrow Si 1 year = Rs 500

In the second years Rs 25 is added in CI (1025-1000) which is 5% of 500

Hence $R=5\%$

$5\%=500$

$100\%=10000$

sum=10000

CI for 3 years= RS 1576.25

54) C

$SI=A-P \Rightarrow A=3P$ as sum triples

$SI=3P-P=2P$ in 6 years

In 19 times $SI=18P=54$ years (2:6 hence 18=54)

55) A

Sum=353; Amount=512

$\text{cuberoot}(343): \text{cuberoot}(512)$

7:8

$\text{rate} = \frac{(8-7)}{7} \times 100 = 14 \frac{2}{7}\%$

56) B

In half yearly \Rightarrow Time-double; Rate= half

Rate=5% ; Time=4 years; Sum = Rs 20,000

1 years	2 years	3 years	4 years
1000	1000	1000	1000
	50	50	50



_____50_____50
 _____2.5_____50
 _____2.5
 _____2.5
 _____2.5
 _____0.125

Total = Rs 4000 + 300 + 10 + 0.125 = Rs 4310.125

57) C

$$x / (1 + 20/100)^1 + x / (1 + 20/100)^2 = 6600 = 4320$$

58) B

Sum = A

Interest = B

A _____ A _____ A

_____ B _____ B

_____ B

_____ C

CI for 3 years = $3A + 3B + C$

SI for 3 years = $3A$

Diff = $3B + C$ CI for 2 years = $2A + B$

SI for 2 years = $2A$

diff = B

ratio = $(3B + C) / B = 31/10$

B = 10; C = 1

Rate = $C / B = 1/10 = 10\%$

59) B

Find the cube root of both numbers. Cube root → 3 years

cube root(2744000): cube root(3176523)

140:147

rate = $(147 - 140) / 140 * 100 = 5$

60) A

On SI interest = $20\% * 3 = 60\%$

On CI interest = $20\% = 1/5$

5 _____ 6



5——6

5——6

125——216

$(216-125)/125 \times 100 = 72.8\%$

diff = $72.8 - 60 = 12.8\%$

$12.8\% = 5120$

$100\% = 40,000$

61) Find the Compound Interest on Rs 30,000, if the rate of interest for first year is 5% second year is 10% and on the third year is 20%

- A) 11580
- B) 11500
- C) 10500
- D) 10000
- E) None of these

62) What is the difference between Simple Interest and Compound Interest on Rs 70,000 at 20% rate of interest in one and a half year if Compound Interest is compounded half yearly.

- A) Rs 2070
- B) Rs 2160
- C) Rs 2170
- D) Rs 2060
- E) None of these

63) Divide Rs 20,816 between A and B so that A's share at the end of 7 years is equal to B's share at the end of 9 years with compound interest being 4% p.a

- A) 10716, 10100
- B) 10616, 10200
- C) 10816, 10000
- D) 10800, 10016
- E) None of these

64) Find the simple interest and compound interest of Rs 15000 at 20% rate of interest after 3 years.

- A) 9000, 11000
- B) 8000, 11920
- C) 9000, 10920



- D) 6000, 9000
- E) None of these

65) A man borrows Rs 8000 at 10% compounded rate of interest. At the end of each year he pays back Rs 2200. How much amount should he pay at the end of the third year to clear all his dues?

- A) Rs 5500
- B) Rs 5466
- C) Rs 5666
- D) Rs 5566
- E) None of these

66) What sum of money at compound interest will amount to Rs 32000 in 3 years at the rate of interest 20% in first years, $16\frac{2}{3}\%$ in second year and $14\frac{2}{7}\%$ in third year.

- A) Rs 18,000
- B) Rs 20,000
- C) Rs 22,000
- D) Rs 25,000
- E) None of these

67) S.I on certain sum for 3years at any rate of interest is Rs225 while C.I on the same sum at the same rate for 2yrs is 153. Find the rate%?

- A) 5%
- B) 6%
- C) 4%
- D) 7%
- E) 8%

68) If a sum of Rs216 becomes 343 in 3yrs. Then find C.I on Rs43,200 in 3yrs at the same rate of interest?

- A) 20,000
- B) 25,000
- C) 24,400
- D) 25,400
- E) 26,000

69) Aishwarya invested Rs. 20,000 with rate of interest at 20 p.c.p.a. The interest was compounded half yearly for first year and in the next year it was compounded yearly. What will be the total interest earned at the end of two years?



- a) Rs. 8,800
- b) Rs. 9,040
- c) Rs. 8,040
- d) Rs. 9,800
- e) None of these

70) A sum of money is lent for 2 years at 20% p.a. compound interest. It yields Rs 482 more when compounded semi-annually than compounded annually. What is the sum lent?

- A) Rs 25,600
- B) Rs 20,000
- C) Rs 26,040
- D) Rs 40,500
- E) None of these

61) A

1st year $5\% = 1/20 \text{ ————— } 20 \text{ ————— } 21$
2nd year $10\% = 1/10 \text{ ————— } 10 \text{ ————— } 11$
3rd year $20\% = 1/5 \text{ ————— } 5 \text{ ————— } 6$
 $\text{—————} = 1000 \text{ ————— } 1386$
 $(1386 - 1000)/1000 * 200 = 38.6\%$
 $38.6\% \text{ of } 30000 = 11580$

62) C

SI on 1 (1/2) year = $20 * 1.5 = 30\%$
SI on 1 (1/2) years of compounded half yearly make rate half yearly and time double
 $r = 10\% = 1/10$; $t = 3 \text{ years}$
 $10 \text{ ————— } 11$
 $10 \text{ ————— } 11$
 $10 \text{ ————— } 11$
 $1000 \text{ ————— } 1331$
 $r = 331/1000 * 100 = 33.1$
 $33.1\% \text{ of } 70,000 = 23170$

63) C

Second part + 4% ci for 2 years of second part = first part
Second part + 8.16% of second part = first part
First part/second part = $108.16/100 = 10816/10000$



64) C

$$SI = 20 \times 3 = 60\% = 9000$$

CI =

$$3000 \text{ ————— } 3000 \text{ ————— } 3000$$

$$\text{————— } 600 \text{ ————— } 600$$

$$\text{————— } 600$$

$$\text{————— } 120$$

$$\Rightarrow 9000 + 1800 + 120 = 10920$$

65) D

$$\text{First year} = 8000 + 800 = 8800 - 2200 = 6600$$

$$\text{Second year} = 6600 + 660 = 7260 - 2200 = 5060$$

$$\text{Third year} = 5060 + 506 = 5566$$

66) B

$$1\text{st year} = 20\% = 1/5 \text{ ————— } 5 \text{ ————— } 6$$

$$2\text{nd year} = 16 (2/3) = 1/6 \text{ ————— } 6 \text{ ————— } 7$$

$$3\text{rd year} = 14 (2/7) = 1/7 \text{ ————— } 7 \text{ ————— } 8$$

$$\text{————— } = 210 \text{ ————— } 336 \text{ on simplifying } = 5:8$$

$$r = (8-5)/5 \times 100 = 60\%$$

$$160\% = 32000$$

$$100\% = 20000$$

67) C

$$S.I \text{ for } 1\text{yr} = 225/3 = 75$$

$$S.I \text{ for } 2\text{nd yr} = 150$$

$$S.I \quad 75 \quad 75$$

$$C.I \quad 3(153-150=3)$$

$$3/75 \times 100 = 4\%$$

68) D

$$(216)^{1/3} : (343)^{1/3}$$

$$6 : 7 - \text{difference is } 1. \text{ Now } 1/6 \times 100 = 16(2/3)\%$$

Now according to question C.I for 3 yrs

$$16(2/3)\% = 1/6 \quad 6 \text{ } 7$$

$$. \quad . \quad 6 \text{ } 7$$



. 67

$$216 - 343 = 127$$

$$216 = 43,200$$

$$1 = 200$$

$$127 = 25,400$$

69) B

$$A = 20000(110/100)(110/100)(120/100)$$

$$= 29040$$

$$ci = 29040 - 20000$$

$$= 9040$$

70) B

$$P[1 + (r/2)/100]^4 - P[1 + r/100]^2 = 482$$

$$P[1 + 10/100]^4 - P[1 + 20/100]^2 = 482$$

$$\text{Solve, } P = 20,000$$

71) A sum of money is accumulating at compound interest at a certain rate of interest. If simple interest instead of compound were reckoned, the interest for the first two years would be diminished by Rs. 20 and that for the first three years by Rs. 61. Find the sum.

- a) Rs. 7000
- b) Rs. 8000
- c) Rs. 7500
- d) Rs. 6500
- e) None of these

72) The difference between compound interest earned after 3 years at 5% p.a. and simple interest earned after 4 years at 4% p.a. is Rs 76. Find the principal amount.

- A) Rs 32,000
- B) Rs 28,000
- C) Rs 31,500
- D) Rs 32,500
- E) None of these

73) A sum of money is lent at simple interest and compound interest. The ratio between the difference of compound interest and simple interest of 3 years and 2 years is 35 : 11. What is the rate of interest per annum?



- A) $20 \frac{3}{4}\%$
- B) $17 \frac{2}{5}\%$
- C) $18 \frac{2}{11}\%$
- D) $22 \frac{1}{5}\%$
- E) $24 \frac{5}{6}\%$

74) Rs 3903 is to be divided in a way that A's share at the end of 7 years is equal to the B's share at the end of 9 years. If the rate of interest is 4% compounded annually, find A's share.

- A) Rs 2475
- B) Rs 1875
- C) Rs 2175
- D) Rs 1935
- E) Rs 2028

75) A sum of rupees 3903 is divided between P and Q such that the share of P at the end of 8 years is equal to the share of Q after 10 years. Find the share of P if rate of interest is 4% compounded annually.

- a) 2012
- b) 2029
- c) 2028
- d) 2081
- e) None of these

76) A man borrows Rs. 4000 from a bank at 7.5% compound interest. At the end of every year, he pays Rs. 1500 as part repayment of loan and interest. How much does he still owe to the bank after three such installments?

- a) Rs. 123.25
- b) Rs. 125
- c) Rs. 400
- d) Rs. 469.18
- e) None of these

77) A sum of money is lent for 2 years at 10% p.a. compound interest. It yields Rs 8.81 more when compounded semi-annually than compounded annually. What is the sum lent?

- a) 1000
- b) 1200
- c) 1400
- d) 1600



e) None of these

78) A sum of rupees 4420 is to be divided between venki and Kavi in such a way that after 5 years and 7 years respectively the amount they get is equal. The rate of interest is 10 percent compounded. Find the share of venki and kavi

- a) 2000, 2420
- b) 2420, 2000
- c) 2480, 2420
- d) 2210, 2210
- e) None of these

79) A part of 70000 is lent out at 10% annum. The rest of the amount is lent out at 5% per annum after one year. The ratio of interest after 3 years from the time when first amount was lent out is 1:2. Find the second part that was lent out at 5%.

- A) 40000
- B) 50000
- C) 60000
- D) 48000
- E) 55000

80) Vijay lends a certain amount to Vignesh on simple interest for two years at 20%. Vignesh gives this entire amount to kishore on compound interest for two years at the same rate annually. Find the percentage earning of Vijay at the end of two years on the entire amount.

- A) 3%
- B) $3\frac{1}{7}\%$
- C) 4%
- D) $5\frac{6}{7}\%$
- E) None of these

71) B

$$p(r/100)^2=40$$

$$p(r/100)^2(300+r)/100=61$$

solving both we will get $p=8000$

72) A

$$P[1 + 5/100]^3 - P] - P*4*4/100 = 76$$

$$P [9261/8000 - 1 - 16/100] = 76$$



$$P=32000$$

73) E

$$\text{Difference in 3 yrs} = Pr^2(300+r)/100^3$$

$$\text{Difference in 2 yrs} = Pr^2/100^2$$

$$\text{So } Pr^2(300+r)/100^3 / Pr^2/100^2 = 35/11$$

$$= (300+r)/100 = 35/11$$

$$= 18 \frac{2}{11}\%$$

74) B

$$A's \text{ share} = (1 + 4/100)^7$$

$$B's \text{ share} = (1 + 4/100)^9$$

$$\text{Divide both, } B/A = (1 + 4/100)^2 = 676/625$$

$$\text{So } A's \text{ share} = 625 \times 3903 / (676+625) = 1875$$

75) C

$$P \times (1 + 4/100)^8 = (3903 - P) \times (1 + 4/100)^{10}$$

$$p(104/100)^8 = (3903 - P) \times (104/100)^{10}$$

$$\text{solving it we get } P=2028$$

76) A

$$\text{Balance} = \text{Rs.} \{ [4000 \times (1 \times 15/2 \times 100)^3] - \{1500 \times (1 + 15/2 \times 100)^2 + 1500 \times (1 + 15/2 \times 100) + 1500\} \}$$

$$= \text{Rs. } 123.25$$

77) D

$$8.81 = p \times (1+5/100)^4 - p \times (1+10/100)^2$$

$$8.81 = p(105/100)^4 - p(110/100)^2$$

$$\text{solving it we will get } p=1600$$

78) B

$$R \times (1+10/100)^5 = (4420 - R) \times (1+10/100)^7$$

$$\text{We get } R = 2420, \text{ so } P = 2000$$

79) C

$$10^3 \times x / 5^2 \times y = 1/2$$

$$x/y = 1/6$$

$$6/7 \times 70000 = 60000$$



80) C

$$SI = 20 \times 2 = 40\%$$

$$CI = 20 + 20 + (400/100) = 44\%$$

$$\text{Diff} = 44 - 40 = 4\%$$

81) The difference between the total simple interest and the total compound interest compounded annually at the same rate of interest on a sum of money at the end of two years is Rs. 450. What is definitely the rate of interest per cent per annum?

- A) 8400
- B) 4800
- C) 7800
- D) Data inadequate
- E) None of these

82) Venkat and Vidhya have to clear their respective loans by paying 2 equal annual instalments of Rs.30000 each. Venkat pays at 10% pa of SI and Vidhyapays at 10% CI pa. What is the difference in their payments ?

- A) 200
- B) 300
- C) 400
- D) 500
- E) None of these

83) A sum is divided A and B in the ratio of 1:2. A purchased a car from his part which depreciates $14 \frac{2}{7}\%$ per annum and B deposited his amount in a bank, which pays him 20% interest per annum compounded annually. By what % will the total sum of money increase after two years due to this investment pattern (approx)?

- a) 20
- b) 26.66
- c) 30
- d) 25
- e) None of these

84) A sum of Rs.7140 is to be divided between Anita and Bala who are respectively 18 and 19 yr old, in such a way that if their shares will be invested at 4% per annum at compound interest, they will receive equal amounts on attaining the age of 21 year. The present share of Anita is

- A) 4225



- B) 4352
- C) 3500
- D) 4000
- E) None of these

85) During the first year the population of a village is increased by 5% and the second year it is diminished by 5%. At the end of the second year its population was 31500. What was the population at the beginning of the first year?

- A) 35500
- B) 31578
- C) 33500
- D) 33000
- E) None of these

86) In how much time will the simple interest on \$3,500 at the rate of 9% p.a be the same as simple interest on \$4,000 at 10.5% p.a for 4 years?

- A) 5years 4 month
- B) 5 years
- C) 6 years
- D) 7 years
- E) None

87) A father left a will of Rs.35 lakhs between his two daughters aged 8.5 and 16 such that they may get equal amounts when each of them reach the age of 21 years. The original amount of Rs.35 lakhs has been instructed to be invested at 10% p.a. simple interest. How much did the elder daughter get at the time of the will?

- a) Rs. 17.5 lakhs
- b) Rs. 21 lakhs
- c) Rs. 15 lakhs
- d) Rs. 20 lakhs
- e) None of these

88) What will Rs.1500 amount to in three years if it is invested in 20% p.a. compound interest, interest being compounded annually?

- a) 2400
- b) 2592
- c) 2678



- d) 2540
- e) None of these

89) Rs.100 doubled in 5 years when compounded annually. How many more years will it take to get another Rs.200 compound interest?

- a) 10 years
- b) 5 years
- c) 7.5 years
- d) 15 years
- e) 8 years

90) Rs. 5887 is divided between Shyam and Ram, such that Shyam's share at the end of 9 years is equal to Ram's share at the end of 11 years, compounded annually at the rate of 5%. Find the share of Shyam.

- a) 2088
- b) 2000
- c) 3087
- d) 3057
- e) None of these

81) D

$$\begin{aligned}\text{Difference} &= Pr^2/(100)^2 \\ &= (450 \times 100 \times 100)/(P \times r^2) \\ P &\text{ is not given}\end{aligned}$$

82) B

$$\begin{aligned}D &= [(30,000 \times 110/100 \times 110/100) - 30,000] - 30,000 \times 10^2/100 \\ &= [36300 - 30000] - 6000 \\ &= 6300 - 6000 \\ D &= 300\end{aligned}$$

83) A

let amt be 100 and 200
the value of 100 become $100 \times 6/7 \times 6/7 = 3600/49 = 73.46$
the value of 200 becomes $200 \times 1.2 \times 1.2 = 288$
total = $288 + 73.46 = 361.46$
 \Rightarrow approx 20% increases



84) C

$$x \cdot (26/25)^3 = (7140 - x) \cdot (26/25)$$

$$26/25 = 7140 - x / x$$

$$x = 3500$$

85) B

$$x \cdot 105/100 \cdot 95/100 = 31500$$

$$x = 31500 \cdot 100/105 \cdot 100/95$$

$$D = 31578$$

86) A

S.I on \$4,000 at rate 10.5% = $10.5/100 = 0.105$ for 4 years

$$S.I = (P \times R \times T) / 100$$

$$= 4000 \times 0.105 \times 4$$

$$S.I = \$ 1,680$$

The interest of \$1,680 is the same as that on \$3,500 at 9% p.a for suppose 't' years.

$$S.I \times 100$$

$$\text{Time} = t = \text{-----}$$

$$P \times R$$

$$1680 \times 100$$

$$\text{Time} = t = \text{-----}$$

$$3500 \times 9$$

$$168,000$$

$$\text{Time} = t = \text{-----}$$

$$31,500$$

$$\text{Time} = t = 5.33 \text{ years} = 5 \text{ year } 4 \text{ months}$$

87) B

$$x + 50x/100 = (3,500,000 - x) + 12.5 \cdot 10 \cdot (3500000 - x)/100$$

$$\Rightarrow 2x + 50x/100 + 125x/100 = 3,500,000 (1 + 5/4)$$

$$\Rightarrow 200x + 50x + 125x/100 = 9/4(3500000)$$

$$\Rightarrow x = 2,100,000 = 21 \text{ lakhs.}$$

88) B

$$20\%1500=300$$

$$20\%300=60 \Rightarrow 300+60=360$$

$$20\%360=72 \Rightarrow 360+72=432$$



$$Ci=432+360+300=1092$$

$$A=1500+1092=2592$$

89) B

Rs.100 invested in compound interest becomes Rs.200 in 5 years.

The amount will double again in another 5 years.

=>the amount will become Rs.400 in another 5 years.

So, to earn another Rs.200 interest, it will take another 5 years.

90) C

$$\text{Shyam's share} * (1+0.05)^9 = \text{Ram's share} * (1 + 0.05)^{11}$$

$$\text{Shyam's share} / \text{Ram's share} = (1 + 0.05)^{11} / (1+ 0.05)^9 = (1+ 0.05)^2 = 441/400$$

$$\text{Therefore Shyam's share} = (441/841) * 5887 = 3087.$$

91) A sum of money invested for a certain number of years at 8% p.a. simple interest grows to Rs.180. The same sum of money invested for the same number of years at 4% p.a. simple interest grows to Rs.120. For how many years was the sum invested?

- a) 15 years
- b) 40 years
- c) 33 years and 4 months
- d) 23years
- e) Cannot be determined

92) A man invests Rs.5000 for 3 years at 5% p.a. compound interest reckoned yearly. Income tax at the rate of 20% on the interest earned is deducted at the end of each year. Find the amount at the end of the third year.

- a) 5624.32
- b) 5630.50
- c) 5788.125
- d) 5627.20
- e) None of these

93) How long will it take a certain amount to increase by 30% at the rate of 15% simple interest?

- a) 3
- b) 2
- c) 6
- d) 4



e) None of these

94) A money lender lent Rs. 1000 at 3% per year and Rs. 1400 at 5% per year. The amount should be returned to him when the total interest comes to Rs. 350. Find the number of years.

- A) 3.5
- B) 3.75
- C) 4
- D) 4.5
- E) None of these

95) Apersom invests ₹ 12000 as fixed deposit at a bank at the rate of 10% per annum simple interest. But due to some pressing needs, he has to withdraw the entire money after 3 yr for which the bank allowed him a lower rate of interest. If he gets ₹ 3320 less than, what he would have got at the end of 5 yr then rate of interest allowed by bank is

- a) $7\frac{8}{9}\%$
- b) $8\frac{7}{9}\%$
- c) $8\frac{8}{9}\%$
- d) $7\frac{4}{9}\%$

96) Ajay takes some loan from Rashmi at the rate of 5% per annum and after 2 yr, Ajay gave back ₹ 8800 to Rashmi and this way paid his whole loan. Find the interest paid by Ajay.

- a) 825
- b) 975
- c) 800
- d) 850
- e) None of these

97) Ramesh invested an amount that is 10% of ₹ 10000 at simple interest. After 3 yr, the amount becomes ₹ 2500. Find out the 4 times of actual interest rate.

- a) 5000%
- b) 250%
- c) 200%
- d) 600%
- e) None of these

98) A sum of ₹ 1550 was lent partly at 5% and partly at 8% per annum simple interest. The total interest received after 4 yr was ₹ 400, The ratio of the money lent at 5% to that lent at 8% is



- a) 16 : 15
- b) 17 : 15
- c) 16 : 13
- d) 16 : 19
- e) None of these

99) The simple interest of a sum of money is $\frac{1}{144}$ of the principal and the number of years is equal to the rate per cent per annum. What will be the rate per cent per annum ?

- a) $\frac{3}{5}\%$
- b) $\frac{5}{6}\%$
- c) $\frac{7}{6}\%$
- d) $\frac{1}{6}\%$
- e) None of these

100) A sum of money amounts to ₹ 2240 at 4% per annum simple interest in 3 yr. The interest on the same sum for 6 months at 3.5% per annum is

- a) 30
- b) 50
- c) 35
- d) 150
- e) None of these

91) A

Principal + 8% p.a. interest on principal for n years = 180 (1)

Principal + 4% p.a. interest on principal for n years = 120 (2)

4% p.a. interest on principal for n years = Rs.60.

Principal + 60 = 120

= Principal = Rs.60.

$n = \frac{60}{4} = 15$ years.

92) A

5% is the rate of interest. 20% of the interest amount is paid as tax. That is 80% of the interest amount stays back. Therefore, if we compute the rate of interest as 80% of 5% = 4% p.a., we will get the same value.

The interest accrued for 3 years in compound interest = $3 \times \text{simple interest on principal} + 3 \times \text{interest on simple interest} + 1 \times \text{interest on interest on interest}$.
 $= 3 \times (200) + 3 \times (8) + 1 \times 0.32 = 600 + 24 + 0.32 = 624.32$

The amount at the end of 3 years = $5000 + 624.32 = 5624.32$



93) B

$$\text{Simple interest} = x \cdot 30 / 100 = 3x / 10$$

$$T = 100 \cdot \text{SI} / \text{PR} = 100 \cdot 3x / 10 / x \cdot 15 = 2 \text{ years}$$

94) A

$$1000 \cdot t \cdot 3 / 100 + (1400 \cdot t \cdot 5 / 100) = 350 \rightarrow t = 3.5$$

95) D

Let the rate of interest allowed by bank be $r\%$

According to the question,

$$[(12000 \times 5 \times 10) / 100] - [(12000 \times 3 \times r) / 100] = 3320$$

$$\Rightarrow 6000 - 360r = 3320$$

$$\Rightarrow 360r = 6000 - 3320 = 2680$$

$$\Rightarrow r = 2680 / 360 = 7 \frac{4}{9}\%$$

96) C

$$\text{SI} = (8800 \times 5 \times 2) / (100 + 5 \times 2)$$

$$= (8800 \times 10) / 110$$

$$= ₹ 800$$

97) C

$$\text{Investment of Ramesh} = 10\% \text{ of } 10000 = ₹ 1000$$

$$\text{After 3 yr} = 2500 - 1000 = ₹ 1500$$

$$\Rightarrow 1500 = (1000 \times R \times 3) / 100$$

$$\therefore R = (1500 \times 100) / (1000 \times 3) = 50\%$$

$$\therefore 4 \text{ times of } 50\% = 200\%$$

98) A

Let the sum lent at $5\% = P$

$$\therefore \text{Sum lent at } 8\% = (1550 - P)$$

$$\text{Then, } [(P \times 5 \times 4) / 100] + [(1550 - P) \times 8 \times 4] / 100 = 400$$

$$\Rightarrow 20P - 32P + 1550 \times 32 = 40000$$

$$\Rightarrow -12P + 49600 = 40000$$

$$\Rightarrow -12P = -9600$$

$$\therefore p = ₹ 800$$

$$\text{Sum lent at } 8\% = 1550 - 800 = ₹ 750$$

$$\therefore \text{Required ratio} = 800 : 750 = 16 : 15$$



99) B

Let the principal be P.

Then, according to the question,

$$(P \times T \times T) / 100 = P/144 \text{ [}\therefore \text{ time and rate are equal]}$$

$$\Rightarrow T^2 = 100/144$$

$$\therefore T = 10/12 = 5/6 \%$$

100) C

If the sum be ₹ P, then

$$(2240 - P) = (P \times 4 \times 3)/100$$

$$\Rightarrow 2240 = 12P/100 + P$$

$$\Rightarrow 2240 = 112P/100$$

$$\therefore P = (2240 \times 100)/112 = ₹ 2000$$

Now, required interest,

$$SI = PRT/100 = \{[2000 \times (7/2) \times (1/2)] / 100\}$$

$$= ₹ 35$$

101) 2/3 part of my sum is lent out at 3%, 1/6 part is Lent out at 6% and remaining part is lent out 12% All the three parts are lent out at simple interest. If the annual income is ₹ 25, what is the sum?

- a) 500
- b) 650
- c) 600
- d) 450
- e) None of these

102) A sum of ₹ 1521 lent out two parts in such a way that the interest on one part at 10% for 5 yr is equal to that of another part at 8% for 10 yr. What will be the two parts of sum ?

- a) 926 and 595
- b) 906 and 615
- c) 916 and 605
- d) 936 and 585
- e) None of these

103) Pratap borrowed some money from Arun at simple interest. The rate of interest for the first 3 years was 12% for the next 5 years was 16% and beyond this it was 20%. If the simple interest for 11 years was more than the money borrowed by Rs. 6080. What was the money borrowed?



- a) Rs. 7550
- b) Rs. 8500
- c) Rs. 8000
- d) Rs. 9000
- e) None of these

104) A person closes his account in an investment scheme by withdrawing ₹ 10000. One year ago, he had withdraw ₹ 6000. Two years ago, he had withdrawn ₹ 5000. Three years ago, he had not withdrawn any money. How much money had he deposited approximately at the time of opening the account 4 yr ago, if the annual compound interest is 10% ?

- a) 15600
- b) 16500
- c) 17280
- d) 16780
- e) None of these

105) The simple interest on a certain sum of money for $2\frac{1}{2}$ yr at 12% per annum is ₹ 20 less than the simple interest on the same sum for $3\frac{1}{2}$ yr at 10% per annum. Find the sum.

- a) 800
- b) 750
- c) 625
- d) 400
- e) None of these

106) Harsha makes a fixed deposit of ₹ 20000 in Bank of India for a period of 3 yr. If the rate of interest be 13% SI per annum charged half - yearly, what amount will he get after 42 months?

- a) 27800
- b) 28100
- c) 29100
- d) 30000
- e) None of these

107) Subraja borrowed some money at the rate of 6% per annum for the first 3 yr. at the rate of 9% per annum for the next 5 yr and at the rate of 13% per annum for the period beyond 8 yr. If she pays a total interest of ₹ 8160 at the end of 11 yr how much money did she borrow ?

- a) 12000
- b) 10000



- c) 8000
- d) 12000
- e) Data is inadequate

108) Reena had ₹ 10000 with her, out of this money she lent some money to Akshay for 2 yr at 15% simple interest. She lent remaining money to Brijesh for an equal number of years at the rate of 18%. After 2 yr Reena found that Akshay had given her 360 more as interest as compared to Brijesh. The amount of money which Reena had lent to Brijesh must be

- a) 4000
- b) 2500
- c) 3500
- d) 4200
- e) None of these

109) Mr. Pawan invests an amount of ₹ 24200 at the rate of 4% per annum for 6 yr to obtain a simple interest, later he invests the principal amount as well as the amount obtained as simple interest for another 4 yr at the same rate of interest. What amount of simple interest will be obtained at the end of the last 4 yr ?

- a) 4800
- b) 4850.32
- c) 4801.28
- d) 4700
- e) None of these

110) Harish invested certain sum in three different schemes P, Q and R with the rates of interest 10% per annum, 12% per annum and 15% per annum, respectively. If the total interest accrued in 1 yr was ₹ 3200 and the amount invested in scheme R was 150% of the amount invested in scheme P and the amount invested in R is 240% of amount invested in P. what was the amount invested in scheme Q ?

- a) 8000
- b) 9000
- c) 5000
- d) 3050
- e) None of these

101) A

$$[(2P/3) \times 3\%] + [(P/6) \times 6\%] + [1 - (2/3 + 1/6)] P \times 12\% = 25$$

$$\Rightarrow [(2P/3) \times (3/100)] + [(P/6) \times (6/100)] + [1 - 4/3 + 1/6] \times (12P/100) = 25$$

$$\Rightarrow 2P/100 + P/100 + 2P/100 = 25$$



$$\Rightarrow 5P = 2500,$$

$$\therefore P = 500$$

102) D

$$(P \times 5 \times 10)/100 = [(1521 - P) \times 10 \times 8]/100$$

$$\Rightarrow 5P = 12168 - 8P$$

$$\Rightarrow 13P = 12168$$

$$\Rightarrow P = ₹ 936$$

$$\text{So second part} = 1521 - 936 = ₹ 585$$

103) C

$$\Rightarrow P + 6080 = (P \times 12 \times 3) / 100 + (P \times 16 \times 5) / 100 + (P \times 20 \times 3) / 100$$

$$\Rightarrow P + 6080 = (36P + 80P + 60P) / 100$$

$$\Rightarrow 100 \times (P + 6080) = 176P$$

$$\therefore P = 608000 / 76 = 8000$$

104) A

$$\text{After one year he had } P + (P \times 10 \times 1)/100 = ₹ 11P/10$$

After two years, he had

$$11P/10 + (11P/10 \times 10 \times 1)/100 = ₹ 121P/100 \dots (i)$$

After withdrawn ₹ 5000 from ₹ 121P/100, the balance

$$= ₹ (121P - 500000)/100$$

After 3 yr, he had

$$(121P - 500000)/100 + [(121P - 500000)/100 \times 10 \times 1]/100$$

$$= 11(121P - 500000)/100 \dots (ii)$$

After withdrawn ₹ 6000 from amount (ii) the balance

$$= (1331P/1000 - 11500)$$

\therefore After 4 yr, he had ₹ $(1331P - 5500000)/1000 + 10\%$ of ₹ $(1331P - 5500000)/1000$

$$= ₹ (11/10) \times (1331P/1000 - 11500) \dots (iii)$$

After withdrawn ₹ 10000 from amount (iii) the balance = 0

$$\therefore 11/10(1331P/1000 - 11500) - 10000 = 0$$

$$\Rightarrow P = ₹ 15470$$

105) D

$$[(P \times 10 \times 7)/(100 \times 2)] - [(P \times 12 \times 5)/(100 \times 2)] = 20$$

$$\Rightarrow (7P/20) - (3P/10) = 20$$

$$\therefore P = 20 \times 20 = ₹ 400$$



106) C

$$SI = (20000 \times 13 \times 7) / (100 \times 2) = ₹ 9100$$

$$\therefore \text{Amount (A)} = 20000 + 9100 = 29100$$

107) C

$$(P \times 6 \times 3) / 100 + [(P \times 9 \times 5) / 100] + [(P \times 13 \times 3) / 100] = 8160$$

$$\Rightarrow (18P + 45P + 39P) / 100 = 8160$$

$$\Rightarrow 102P / 100 = 8160$$

$$\Rightarrow P = (8160 \times 100) / 102 = 8000$$

108) A

$$SI \text{ for Akshay} = (P \times 15 \times 2) / 100 = 3P / 10$$

$$SI \text{ for Brijesh} = \{(10000 - P) \times 18 \times 2\} / 100 = 9 / 25 (10000 - P)$$

$$\text{According to the given condition, } (3P / 10) - [(9 / 25) \times (10000 - P)] = 360$$

$$[\text{as } SI \text{ (Akshay)} - SI \text{ (Brijesh)} = 360]$$

$$\Rightarrow (3P / 10) - 3600 + 9P / 25 = 360$$

$$\Rightarrow 3P / 10 + 9P / 25 = 360 + 3600 = 3960$$

$$\Rightarrow 33P / 50 = 3960$$

$$\Rightarrow P = 3960 \times 50 / 33$$

$$\Rightarrow P = 6000$$

$$\therefore \text{The amount of money lent to Brijesh}$$

$$= 10000 - 6000 = 4000$$

109) C

$$SI = (P \times R \times T) / 100 = (24200 \times 4 \times 6) / 100 = 5808$$

$$SI = 24200 + 5808 = 30008$$

In the case II,

$$SI = (30008 \times 4 \times 4) / 100 = 4801.28$$

110) C

$$[(a \times 10 \times 1) / 100] + [(b \times 12 \times 1) / 100] + [(c \times 15 \times 1) / 100] = 3200$$

$$\Rightarrow 10a + 12b + 15c = 320000 \dots\dots(i)$$

$$\text{Now, } c = 240\% \text{ of } b = 12b / 5 \dots\dots(ii)$$

$$\text{and } c = 150\% \text{ of } a = 3a / 2$$

$$\Rightarrow a = 2c / 3 = (2 / 3 \times 12b / 5) \Rightarrow b = 8b / 5 \dots\dots(iii)$$

From Eqs. (i), (ii) and (iii), we get



$$16b + 12b + 36b = 320000$$

$$\Rightarrow 64b = 320000$$

$$\therefore b = 5000$$

\therefore Sum invested in scheme Q = ₹ 5000

111) Income of Shantanu was ₹ 4000. In the first 2 yr. his income decreased by 10% and 5% respectively but in the third year, the income increased by 15%. What was his income at the end of third year?

- a) 3933
- b) 4000
- c) 3500
- d) 3540
- e) None of these

112) An amount is invested in a bank at compound rate of interest. The total amount, including interest, after first and third year is ₹ 1200 and ₹ 1587, respectively. What is the rate of interest?

- a) 10 %
- b) 3.9 %
- c) 12 %
- d) 15 %
- e) None of these

113) Find what is that first years in which a sum of money will become more than double in amount if put out at compound interest at the rate of 10% per annum ?

- a) 6th years
- b) 7th years
- c) 8th years
- d) Data inadequate
- e) None of these

114) The difference of compound interest on Rs.800 for 1 year at 20% per annum when compound half yearly and quarterly is ?

- a) Nil
- b) Rs. 2.50
- c) Rs. 4.40
- d) Rs. 6.60
- e) None of these



115) The population of a country is 10 crore and it is the possibility that the population will become 13.31 crore in 3 yr. What will be the annual rate percent on this growth?

- a) 8%
- b) 12.7%
- c) 10%
- d) 15%
- e) None of these

116) A sum of ₹ 8448 is to be divided between A and B who are respectively 18 and 19 yr old, in such a way that if their shares be invested at 6.25 % per annum at compound interest, they will receive equal amounts on attaining the age of 21 yr. The present share of A is

- a) 4225
- b) 4352
- c) 4096
- d) 4000
- e) None of these

117) On a certain sum of money, compound interest earned at the end of three years = Rs. 1456. Compound interest at the end of two years is Rs. 880. Compute the principal invested.

- a) Rs. 2,400
- b) Rs. 2,800
- c) Rs. 2,000
- d) Rs. 1,600
- e) None of these

118) The cost of car, purchased 2 years ago, depreciates at the rate of 20% every year. If its present worth is Rs.315600, find :

- (i) its purchase price
- (ii) its value after 4 years.

- a) 493125 and 201884
- b) 582125 and 221384
- c) 482612 and 332172
- d) 493215 and 210884
- e) None of these



119) Ram invests Rs. 10,000 for 1 year at a rate of 10% per annum compounded yearly and Sita invests the same amount for same time at same rate per annum compounded half yearly. What is the difference between the interests earned by both?

- A) Rs. 25.50
- B) Rs. 25
- C) Rs.20.50
- D) Rs.23.75
- e) None of these

120) What sum will be amount to Rs.30000 at CI in 3 years, if the rate of interest for 1st, 2nd and 3rd year being 10%, 20% and 30% respectively?

- A) 17482.5
- B) 20145
- C) 16524
- D) 17000
- E) None of these

111) A

$$\begin{aligned} &= P(1 - R_1/100)(1 - R_2/100)(1 + R_3/100) \\ &= 4000(1 - 10/100)(1 - 5/100)(1 + 15/100) \\ &= 4000 \times (9/10) \times (19/20) \times (23/20) \\ &= 9 \times 19 \times 23 \\ &= 3933 \end{aligned}$$

112) D

Amount after 1st yr = ₹ 1200

$$\Rightarrow P(1 + R/100) = 1200 \dots(i)$$

Amount after 3rd yr = 1587

$$\Rightarrow P(1 + R/100)^3 = 1587 \dots(ii)$$

On dividing Eq. (ii) from Eq. (i), we get

$$(1 + R/100)^2 = 1587/1200 = 529/400$$

$$\Rightarrow 1 + R/100 = 23/20$$

$$\Rightarrow R/100 = 3/20$$

$$\therefore R = 15 \%$$

113) C

Here, $P(1 + 10/100)^t > 2P$



$$\Rightarrow (11/10)^t > 2$$

$$\text{When } t = 8 \rightarrow (11/10)^8 = 2.14358$$

$$t = 7 \rightarrow (11/10)^7 = 1.9487$$

$$\text{By trial, } [11 \times 11 \times 11 \times 11 \times 11 \times 11 \times 11 \times 11] / [10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10] > 2$$

Hence, the first years in which sum of money will become more than double in amount is 8th year

114) C

C.I. when reckoned half yearly

$$= \text{Rs.} [800 \times (1 + 10/100)^2 - 800]$$

$$= \text{Rs. } 168$$

C.I. when reckoned quarterly

$$= \text{Rs.} 800[(1 + 5/100)^4 - 1]$$

$$= 800[(1.94481 - 1.60000)/1.60000]$$

$$= 34481/200$$

$$= \text{Rs. } 172.40$$

$$\therefore \text{Required difference} = \text{Rs.} (172.40 - 168)$$

$$= \text{Rs. } 4.40$$

115) C

$$13.31 = 10 (1 + R/100)^3$$

$$\Rightarrow 1331/1000 = (1 + R/100)^3$$

$$\Rightarrow (11/10)^3 = (1 + R/100)^3$$

$$\Rightarrow 1 + R/100 = 11/10$$

$$\Rightarrow R/100 = 11/10 - 1 = 1/10$$

$$\therefore R = 10\%$$

116) C

$$N(1 + 6.25/100)^3 = (8448 - N) \times (1 + 6.25/100)^2$$

$$\Rightarrow 1 + 6.25/100 = (8448 - N)/N$$

$$\Rightarrow 1 + 1/16 = (8448 - N)/N$$

$$\Rightarrow 17/16 = (8448 - N)/N$$

$$\Rightarrow 17N = 135168 - 16N$$

$$\Rightarrow N = 4096$$

117) C

$$r^2 + 3r + 3 \times 440 = (r + 2) \times 728$$

$$(r^2 + 3r + 3) \times 55 = (r + 2) \times 91$$



$$55r^2 + 165r + 165 = 91r + 182$$

$$55r^2 + 74r - 17 = 0$$

$$55r^2 + 85r - 11r - 17 = 0$$

$$5r(11r + 17) - 1(11r + 17) = 0$$

$r = 0.2$ or a negative number. Or, r has to be 20%.

2000

118) E

Here, V = present value = Rs315600, $t = 2$ years, $r = 20\%$,

V_0 = purchase price = ?

Using $V = V_0(1 - r/100)^n$,

$$315600 = V_0(1 - 20/100)^2$$

$$\text{or, } 315600 = V_0(80/100)^2 = V_0(4 \times 4)(5 \times 5) = V_0(16/25)$$

$$\text{or, } V_0 = 315600 \times 25/16 = \text{Rs.}493125. [\text{Ans.}]$$

(ii) Again, $V_0 = \text{Rs.}493125$, V = value after 4 years, $t = 4$ years, $n = 4$, $r = 20\%$.

Using, $V = V_0(1 - r/100)^n$

$$V = 493125(1 - 20/100)^4$$

$$= 493125(80/100)^4$$

$$= 493125(256/625)$$

$$= \text{Rs.}201984.$$

119) B

$$\text{Amount} = 10000.[1 + 10/100]^1 = \text{Rs.}10000 \times 11/10 = \text{Rs.}11000$$

For Sita:

$$\text{Amount} = \text{Rs. } 10000.[1 + (10/2)/100]^2 = 10000 \times (21/20)^2 = \text{Rs.}11025$$

$$\text{Difference} = \text{Rs.}(11000 - 11025) = \text{Rs.}25$$

120) A

$$30000 = p(1 + 10/100)(1 + 20/100)(1 + 30/100)$$

$$= p(110/100) \times (120/100) \times (130/100)$$

$$p = 30000 \times 100 \times 100 \times 100 / (110 \times 120 \times 130)$$

$$p = 17482.5$$

121) David invested certain amount in 3 different schemes A, B and C with the rate of interest 10% p.a, 12% p.a and 15% p.a (simple interest) respectively. If total accrued in one year was Rs.3200 and the amount invested in C was 150% of the amount invested in A and 240% of the amount invested in scheme B, what was the amount invested in scheme B?



- a) Rs.5000
- b) Rs.6500
- c) Rs.8000
- d) Cannot be determined
- e) None of these

122) bank offers 5% compound interest calculated on half-yearly basis. A customer deposits Rs. 1600 each on 1st January and 1st July of a year.

At the end of the year, the amount he would have gained by way of interest is:

- A) 123
- B) 122
- C) 121
- D) 120
- E) None of these

123) A lent Rs. 5000 to B for 2 years and Rs. 3000 to C for 4 years on simple interest at the same rate of interest and received Rs. 2200 in all from both of them as interest. The rate of interest per annum is:

- A) 5 %
- B) 7%
- C) 10 %
- D) 12%
- e) None of these

124) person borrows Rs. 5000 for 2 years at 4% p.a. simple interest. He immediately lends it to another person at 6.25% p.a. for 2 years. Find his gain in the transaction per year.

- A) Rs. 112.50
- B) Rs. 175
- C) Rs. 150
- D) Rs. 125.50
- E) None of these

125) Vinay deposited Rs. 3,000 at 10% simple interest for 2 years. How much more money will Vijay have in her account at the end of two years, if it is compounded semi annually.

- a) Rs. 50
- b) Rs. 40
- c) Rs. 77.50
- d) Rs. 85.50



e) None of these

126) here is 100% increase to an amount in 8 year, at simple interest. Find the compound interest of Rs. 8000 after 2 year at the same rate of interest .

- a) Rs. 2500
- b) Rs. 2000
- c) Rs. 2250
- d) Rs. 2125
- e) None of these

127) sum of money becomes 25 times of itself in 20 years at compound interest, compounded yearly. In how many years can the same sum become 5 times of itself?

- a) 4 years
- b) 10 years
- c) 5 years
- d) 15 years
- e) None of these

128) a sum of money, simple interest for 2 years is Rs 660 and compound interest is Rs 696.30, the rate of interest being the same in both cases.

- a) 5 %
- b) 12%
- c) 10%
- d) 11%
- e) None of these

129) What would be the compound interest accrued on an amount of Rs. 7,400 @13.5 p.c.p.a.at the end of two years? (Rounded off to two digits after decimal)

- a) Rs. 2,136.87
- b) Rs. 2,306.81
- c) Rs. 2,032.18
- d) Rs. 2,132.87
- e) None of these

130) Determine the compound amount and compound interest on Rs.1000 at 6% compounded semi-annually for 6 years. Given that $(1 + i)^n = 1.42576$ for $i = 3\%$ and $n = 12$.

- a) 420



- b) 500
- c) 600
- d) 425.76
- e) None

121) A

x, y and z be the amounts invested in A, B and C respectively. Then

$$10x + 12y + 15z / 100 = 3200$$

$$\Rightarrow z = 150 / 100 x,$$

$$z = 240 / 100 y$$

$$\text{Solving and substituting we get } \Rightarrow 64y = 3200 \times 100 \Rightarrow 5000$$

122) C

$$= \text{Rs. } [1600 \times (1 + 5/200)^2 + 1600 \times (1 + 5/200)]$$

$$= \text{Rs. } 3321$$

So CI = Amount - Principal

$$= \text{Rs. } 3321 - \text{Rs. } 3200 = \text{Rs. } 121$$

123) C

$$5000 \times r \times 2 / 100 + (3000 \times r \times 4) / 100 = 2200.$$

$$100R + 120R = 2200$$

$$R = 2200 / 220 = 10.$$

$$\text{Rate} = 10\%.$$

124) A

$$= \text{Rs. } \{[(5000 \times 6.25 \times 2) / 100] - [(5000 \times 4 \times 2) / 100]\}$$

$$= \text{Rs. } (625 - 400) = \text{Rs. } 225.$$

$$\text{So gain in 1 year} = \text{Rs. } 225 / 2 = \text{Rs. } 112.50$$

125) E

$$= 3000(1 + 5/100)^4 = 3000(21/20)^4 = 3646.5$$

$$\text{C.I.} = 3646.5 - 3000 = 646.5$$

$$\text{Required Difference} = 646.5 - 600 = 46.5$$

126) D

$$P = (P \times R \times 8) / 100, R = 12.5\%$$

$$A = 8000(1 + 12.5/100)^2 = 10125$$



$$C.I.=10125-8000=2125$$

127) B

The sum is becoming 25 times of itself in 20 years, so it will become 5 times of itself in 10 years

128) D

Difference between C.I and S.I for 2 years = 36.30

S.I. for one year = 330

S.I. on Rs 330 for one year = 36.30

$$\text{So } R\% = \{100 \times 36.30\} / \{330 \times 1\} = 11\%$$

129) D

$$=7400[1+(13.5/100)^2]-1]$$

$$=7400[1.288225-1]=7400 \times 0.288225$$

$$=\text{Rs } 2132.87$$

130) D

$$i = 0.06/2$$

$$= 0.03; n = 6 \times 2 = 12$$

$$P = 1,000$$

$$\text{Compound Amount (A)}_n = P (1 + i)^n$$

$$= \text{Rs. } 1,000(1 + 0.03)^{12}$$

$$= 1,000 \times 1.42576$$

$$= \text{Rs. } 1,425.76$$

$$\text{Compound Interest} = \text{Rs. } (1,425.76 - 1,000)$$

$$= \text{Rs. } 425.76$$

131) What annual rate of interest compounded annually doubles an investment in 7 years? Given that $1+i$ $^{1/7} = 1.104090$

a) 10.41%

b) 10%

c) 11%

d) 12%

e) None



132) A person opened an account on April, 2001 with a deposit of Rs.800. The account paid 6% interest compounded quarterly. On October 1 2001 he closed the account and added enough additional money to invest in a 6 month time-deposit for Rs. 1,000, earning 6% compounded monthly.

(a) How much additional amount did the person invest on October 1?

- a) 175.82
- b) 180
- c) 190
- d) None
- e) None

133) Rs. 5,000 is invested in a Term Deposit Scheme that fetches interest 6% per annum compounded quarterly. What will be the interest after one year? What is effective rate of interest?

- a) 6.13
- b) 6.03
- c) 6.23
- d) 6.33
- e) None of these

134) Shantha bought Rs 7000 at simple interest from village moneylender. At the end of 3 years he again borrows Rs3000 and closes his account after paying Rs 4615 as interest after 8 years from the time he made the first borrowing. Find the rate of interest.

- a) 3.5
- b) 4.5
- c) 5.5
- d) 6.5
- e) None

135) Raghav borrows Rs.2550 to be paid back with compound interest at the rate of 4% per annum by the end of 2 years in two equal yearly instalments. How much will each instalment be?

- a) Rs.1275
- b) Rs.1283
- c) Rs.1352
- d) Rs.1377
- e) None of these



136) The difference between simple interest and compound interest on Rs.1200 for one year at 10% per annum reckoned half-yearly is :

- a) Rs.2.50
- b) Rs.3
- c) Rs.3.75
- d) Rs.4
- e) None of these

137) if the annual rate of simple interest increases from 10% to 12.5% .Then a man's yearly income from an investment increases by Rs.1250. His principle amount is:

- a) Rs,45000
- b) Rs.50,000
- c) Rs. 60,000
- d) Rs.65,000
- e) None of these

138) Simple interest on a certain sum of money for 3 years at 8% per annum is half the compound interest on Rs. 4000 for 2 years at 10% per annum. The sum placed on simple interest is:

- a) Rs.1550
- b) Rs.1650
- c) Rs.1750
- d) Rs.2000
- e) None of these

139) If the simple interest on a sum of money for 2 years at 5% per annum is Rs.50, what is the compound interest on the same at the same rate and for the same time?

- a) Rs. 52
- b) Rs. 51.25
- c) Rs. 54.25
- d) Rs. 60
- e) None of these

140)The rate of simple interest in two banks is in the ratio of 4 : 5 . Amith wants to deposit his total saving in these two banks in such a way that he should receive equal half yearly interest from both. He should deposits the saving in the banks in the ratio of:

- a) 2 : 5
- b) 5 : 4



- c) 5 : 3
- d) 4 : 5
- e) None of these

131) A

Solution:

If the principal be P then An

$$= 2P.$$

Since An

$$= P(1 + i)^n$$

$$2P = P(1 + i)^7$$

$$2^{1/7} = (1 + i)$$

$$1.104090 = 1 + i$$

$$i = 0.10409$$

Required rate of interest = 10.41% per annum

132) A

Given that $(1 + i)^n$

is 1.03022500 for $i = 1\frac{1}{2}\%$ $n = 2$ and $(1 + i)^n$

is 1.03037751 for $i = \frac{1}{2}\%$ and

$$n = 6.$$

initial investment earned interest for April-June and July- September quarter

i.e. for two quarters. In this case $i = 6/4 = 1\frac{1}{2}\% = 0.015$, n

$$n =$$

$$12$$

$$6/4 = 2$$

and the compounded amount = $800(1 + 0.015)^2$

$$= 800 \times 1.03022500$$

$$= \text{Rs. } 824.18$$

The additional amount invested = Rs. $(1,000 - 824.18)$

$$= \text{Rs. } 175.82$$

133) A

$$5000(1 + 6/400)^4 = 306.82$$

For effective rate of interest using $I = PEt$ we find

$$306.82 = 5,000 \times E \times 1.$$

$$= 0.0613 \text{ or } 6.13\%$$



134) D

The interest would be paid on 7000 for 3 years + 10000 for 5 years 6.5%

$$\Rightarrow 7000 \times 3 \times 6.5 / 100 + 10000 \times 5 \times 6.5 / 100 = 1365 + 3250 = 4615$$

$$= 6.5\%$$

135) C

$$x / (1 + 4/100) + x / (1 + 4/100)^2 = 2550 = 25x/26 + 625x/676 = 2550$$

$$1275x = 2550 \times 676$$

$$x = (2550 \times 676) / 1275 = 1352.$$

∴ Value of each instalment = Rs.1352

136) B

$$S.I = (1000 \times 10 \times 4) / 100 = \text{Rs.}400$$

$$C.I = 1200 \times (1 + 5/100)^2 - 1200 = 123.$$

$$\text{Difference} = \text{Rs.}(123 - 120) = \text{Rs.}3$$

137) B

$$(x \times 25/2 \times 1/100) - (x \times 10 \times 1/100) = 1250$$

$$25x - 20x = 250000 ; \quad x = 50000$$

138) C

$$C.I = 4000 \times (1 + 10/100)^2 - 4000$$

$$= 4000 \times 11/10 + 11/10 - 4000 = \text{Rs.}840$$

$$\therefore \text{Sum} = \text{Rs.}(420 \times 100) / (3 \times 8) = \text{Rs.}1750$$

139) B

Simple interest for 2 years = Rs.50 i.e. For 1 year Rs. 25. ∴ In the first year the S.I and C.I are

Same i.e. Rs. 25. So in the 2nd year in C.I calculated for 1 year's interest also. So in second year for

Rs.25 interest is $25 \times 5/100 = 1.25$. ∴ So total C.P = 51.25.

140) B

$$X + 4x \times 1/2 \times 1/100 = Y + 5x \times 1/2 \times 1/100 \text{ or } X/Y = 5/4 \text{ i.e. } X : Y = 5 : 4$$



141) Rakesh invested an amount of Rs.12000 at the rate of 10% simple interest and another amount at the rate of 20% simple interest. The total interest earned at the end of one year on the amount invested became 14 p.c.p.a. Find the total amount invested .

- a) Rs.20000
- b) Rs.22000
- c) Rs.24000
- d) Rs.25000
- e) None of these

142) If the simple interest on a sum of money at twelve percent per annum for two years is Rs.3800, compound interest on the same sum for the same period at the same rate of interest is

- a) Rs.4028
- b) Rs.4100
- c) Rs.4128
- d) 4228
- e) None of these

143) A sum of Rs.100 is lent at simple interest of 3% p.a. for the first month, 9% p.a. for the second month, 27% p.a. for the third month and so on. What is the total amount of interest earned at the end of the year approximately

- a) Rs.797160
- b) Rs.791160
- c) Rs.65930
- d) Rs.66430
- e) None of these

144) Mr.Govind invested an amount of Rs.13900 divided in two different schemes S1 and S2 at the simple interest rate of 14% p.a. and 11% p.a. respectively. If the total amount of simple interest earned in two years was Rs.3508, what was the amount invested in Scheme S2?

- a) Rs.6400
- b) Rs.6500
- c) Rs.7200
- d) Rs.7500
- e) None of these

145) The simple interest on a certain sum of money for 2 1/2 years at 12% per annum is Rs. 40 less than the simple interest on the same sum for 3 1/2 years at 10% per annum. Find the sum.



- A) 800
- B) 850
- C) 900
- D) 950
- E) None of these

146) There is 80% increase in an amount in 8 years at simple interest. What will be the compound interest of Rs. 14,000 after 3 years at the same rate?

- A) Rs.3794
- B) Rs.3714
- C) Rs.4612
- D) Rs.4634
- E) None of these

147) Simple interest on a certain sum of money for 4 years at 5% per annum is half the compound interest on Rs. 3000 for 2 years at 10% per annum. The sum placed on simple interest is:

- A) Rs.1575
- B) Rs. 2200
- C) Rs. 1200
- D) Rs. 1625
- E) None of these

148) A man borrows Rs. 20,000 at 10% compound interest. At the end of every year he pays Rs. 2000 as part repayment. How much does he still owe after three such installments?

- A) Rs.24000
- B) Rs.15000
- C) Rs.20000
- D) Rs.10000
- E) None of these

149) If the compound interest on a certain sum for 2 years is Rs. 80.80 and the simple interest Rs. 80; then the rate of interest per annum is

- A) 2%
- B) 1%
- C) 3%
- D) 4%
- E) None of these



150) A sum of Rs. 6600 was taken as a loan. This is to be repaid in two equal annual instalments. If the rate of interest be 20% compounded annually then the value of each instalment is

- A) Rs. 4320
- B) Rs. 2220
- C) Rs. 4400
- D) Rs.4500
- E) None of these

141) A

$$(12000 \times 10 \times 1)/100 + (x \times 20 \times 1)/100 = ((12000 + x) \times 14 \times 1)/100$$

$$= 1200 + x/5 = (168000 + 14x)/100$$

$$600000 + 100x = 840000 + 70x$$

$$30x = 240000; X = 8000$$

$$\text{Total investment} = 12000 + 8000 = \text{Rs.}20000$$

142) A

$$\text{S I for 2 years} = 3800 \text{ ie for one year} = 1900$$

$$\text{The compound interest for Rs.1900 for the second year} = 1900 \times 12/100 = 228$$

$$\text{The CI for two years } 3800 + 228 = 4028$$

143) D

$$I = P/100 \times 1[3/12 + 9/12 + 27/12 \dots 312/12]$$

$$\text{Where } P = 100; I = 1/12 (3+9+\dots+312)$$

$$I = 1/12(3(312-1))/3-1$$

$$= 531440 \times 3/12 \times 2 = \text{Rs.}66430$$

144) A

$$(x \times 14 \times 2)/100 + ((13900 - x) \times 11 \times 2)/100 = 3508;$$

$$28x - 22x = 3350800 - (13900 \times 22);$$

$$6x = 45000; x = 7500$$

$$\text{So sum invested in Scheme S2} = \text{Rs. } (13900 - 7500) = \text{Rs.}6400$$

145) A

$$(x \times 10 \times 7)/(100 \times 2) - (x \times 12 \times 5)/(100 \times 2) = 40$$

$$7x/20 - (3x/10) = 40$$

$$x = (40 \times 20) = 800$$



146) D

$$P=100, si=80$$

$$\Rightarrow r=10\%$$

$$Ci: \Rightarrow 10\% 14000=1400$$

$$10\% 1400=140 \Rightarrow 1400+140=1540$$

$$10\% 1540=154 \Rightarrow 1540+154=1694$$

$$Ci=1400+1540+1694=4634'$$

147) A

$$Ci: \Rightarrow 10\% 3000=300$$

$$10\% 300=30 \Rightarrow 300+30=330$$

$$Ci=300+330=630$$

$$SI=630/2=315$$

$$20===100$$

$$315===? \Rightarrow 315*5=1575$$

148) C

$$2000(110/100)^3 - [2000(110/100)^2 + 2000*(110/100) + 2000]$$

$$\Rightarrow 20000$$

149) A

$$\text{Shortly} \Rightarrow 200 + r/200 = CI/SI$$

$$\Rightarrow 200 + r/200 = 80.80/80$$

$$\Rightarrow r=2\%'$$

150) A

$$\Rightarrow x [5/6 + 25/36] = 6600$$

$$\Rightarrow x = 120*36 = 4320.$$

13. RATIO AND PROPORTION

1) Three friends Alice, Bond and Charlie divide \$1105 amongst them in such a way that if \$10, \$20 and \$15 are removed from the sums that Alice, Bond and Charlie received respectively, then the share of the sums that they got will be in the ratio of 11 : 18 : 24. How much did Charlie receive?

a) \$495

b) \$510



- c) \$480
- d) \$375
- e) \$360

2) The ratio of marks obtained by Vinod and Basu is 6:5. If the combined average of their percentage is 68.75 and their sum of the marks is 275, find the total marks for which exam was conducted.

- A) 150
- B) 200
- C) 400
- D) 450
- E) None

3) In a pocket of A, the ratio of Rs.1 coins, 50p coins and 25p coins can be expressed by three consecutive odd prime numbers that are in ascending order. The total value of coins in the bag is Rs 58. If the number of Rs.1, 50p, 25p coins are reversed, find the new total value of coins in the pocket of A?

- A) Rs 68
- B) Rs 43
- C) Rs 75
- D) Rs 82
- E) NONE

4) Joseph bought two varieties of rice, costing 5 cents per ounce and 6 cents per ounce each, and mixed them in some ratio. Then he sold the mixture at 7 cents per ounce, making a profit of 20 percent. What was the ratio of the mixture?

- A) 1:10
- B) 1:5
- C) 2:7
- D) 3:8
- E) NONE

5) Manish, Rahul and Bharti have some stones with each of the. Five times the number of stones with Rahul equals seven times the number of stones with Manish while five times the number of stones with Manish equals seven times the number of stones with Bharti. What is the minimum number of stones that can be there with all three of them put together?

- A) 113
- B) 109
- C) 93



- D) 97
- E) NONE

6) Rs.432 is divided amongst three workers A, B and C such that 8 times A's share is equal to 12 times B's share which is equal to 6 times C's share. How much did A get?

- A) Rs.192
- B) Rs.133
- C) Rs.144
- D) Rs.128
- E) None

7) An outgoing batch of students wants to gift a PA system worth Rs 4,200 to their school. If the teachers, offer to pay 50% more than the students and an external benefactor gives three times the teacher's contribution, then how much should the teachers donate?

- A) Rs 600
- B) Rs 840
- C) Rs 900
- D) Rs 1,200
- E) NONE

8) Two cogged wheels of which one has 32 cogs and other 54 cogs, work into each other. If the latter turns 80 times in three quarters of a minute, how often does the other turn in 8 seconds?

- A) 48
- B) 24
- C) 38
- D) 39
- E) None of these

9) The monthly incomes of A and B are in the ratio 4:5, their expenses are in the ratio 5 : 6. If 'A' saves Rs.25 per month and 'B' saves Rs.50 per month, what are their respective incomes?

- A) Rs.400 and Rs.500
- B) Rs.240 and Rs.300
- C) Rs.320 and Rs.400
- D) Rs.440 and Rs.550
- E) NONE



10) IBM and KTC quote for a tender. On the tender opening day, IBM realizes that their quotations are in the ratio 7 : 4 and hence decreases its price during negotiations to make it Rs 1 Lakh lower than KTC's quoted price. KTC realizes that the final quotes of the two were in the ratio 3:4. What was the price at which IBM won the bid?

- A) Rs 7 Lakh
- B) Rs 4 Lakh
- C) Rs 3 Lakh
- D) Rs 1.5 Lakh

1) Answer: A

Let the sums of money received by A, B and C be x, y and z respectively.

Then $x - 10 : y - 20 : z - 15$ is $11a : 18a : 24a$

When \$10, \$20 and \$15 are removed, we are removing a total of \$45 from \$1105.

Therefore,

$$11a + 18a + 24a = 1105 - 45 = 1060$$

$$53a = 1060$$

$$\text{or } a = 20$$

$$\text{We know that } z - 15 = 24a = (24 \times 20) = 480$$

$$\text{Therefore, } z = 480 + 15 = \$495$$

2) Answer: B

$$\text{The sum of the marks} = 6x + 5x = 11x$$

But the sum of the marks is given as $275 = 11x$. We get $x = 25$ therefore, Vinod's marks is $6x = 150$ and Basu's marks = $5x = 125$.

$$\text{Therefore, the combined average of their marks \%} = \frac{150 + 125}{2} = 137.5$$

If the total mark of the exam is 100 then their combined average of their percentage is 68.75

$$\text{Therefore, if their combined average of their percentage is 137.5 then the total marks would be } 137.5 \times \frac{100}{2} = 6875$$

3) Answer: D

Since the ratio of the number of Rs. 1, 50p and 25p coins can be represented by 3 consecutive odd numbers that are prime in ascending order, the only possibility for the ratio is 3:5:7.

Let the number of Re1, 50p and 25p coins be 3k, 5k and 7k respectively.

Hence, total value of coins in paise

$$\Rightarrow 100 \times 3k + 50 \times 5k + 25 \times 7k = 725k = 5800$$

$$\Rightarrow k = 8.$$



If the number of coins of Rs. 1, 50p and 25p is reversed, the total value of coins in the

Bag (in paise) = $100 \times 7k + 50 \times 5k + 25 \times 3k = 1025k$ (In above we find the value of k).

$\Rightarrow 8200p$

= Rs 82.

4) Answer: B

1) 20% profit at the price of 7 cents means that cost of the mixture should be 70/12 cents per ounce (7 = 120% and $x = 100\% \Rightarrow x = 7 \times 100 / 120$)

2) Let the amount of 5 cent rice will be x and the amount of 6 cent one – y. The price of ounce of mixture will be: $(5x + 6y) / (x + y)$, which as we know should equal to 70/12

3) $(5x + 6y) / (x + y) = 70/12 \Rightarrow x/y = 1/5$

5) Answer: B

Let the stones with Manish, rahul and Bharti be m, r and b respectively.

Given, $5r = 7m$ and $5m = 7b$

$\Rightarrow 25r = 35m$ and $35m = 49b$

$\Rightarrow 25r = 35m = 49b = k$

$\Rightarrow \frac{r}{49} = \frac{m}{35} = \frac{b}{25}$

The least possible integral values for r, m, b will be $r = 49, m = 35$ and $b = 25$

$\Rightarrow \text{Total} = 49 + 35 + 25 = 109.$

6) Answer: C

8 times AA's share = 12 times BB's share = 6 times CC's share

Note that this is not the same as the ratio of their wages being 8:12:68:12:6

In this case, find out the L.C.M of 8, 12 and 6 and divide the L.C.M by each of the above numbers to get the ratio of their respective shares.

The L.C.M of 8, 12 and 6 is 24.

Therefore, the ratio A:B:C = $24/8 : 24/12 : 24/6$

A:B:C = 3:2:4

The sum of the total wages = $3x + 2x + 4x = 432 \Rightarrow 9x = 432$ or $x = 48$.

Hence, A who gets 3x will get $3 \times 48 = \text{Rs. } 144$.

7) Answer: C

The ratio of the share students : teacher: benefactor = 1:1.5 : 4.5

So the proportion to teacher's share = $1.5/7$

Hence, the teachers would donate $1.5/7 \times 4200 = \text{Rs } 900$

8) Answer: B



Number of turns required = $80 \times 54/32 \times 8/45 = 24$

24 times

9) Answer: A

Let AA's income be = $4x$

AA's expenses, therefore = $4x - 25$

Let BB's income be = $5x$

BB's expenses, therefore = $5x - 50$

We know that the ratio of their expenses = $5:6$

$$\Rightarrow 24x - 150 = 25x - 250$$

\Rightarrow Therefore, $x = 100$

A's income = $4x = 400$ and B's income = $5x = 500$

10) Answer: C

IBM initially quoted Rs $7x$ lakh. KTC quoted $4x$ lakh.

IBM's final quote = $(4x - 1)$ Lakh

Thus, $(4x - 1/4x) = 3/4 = x = 1$

IBM's bid winning price = Rs 3 Lakh

So IBM wins the bid at $4x - 1 =$ **Rs 3 lakh.**

11) One year ago the ratio between Laxman and Gopal salary was 3:4. The individual ratios between their last year's and this year's salary are 4:5 and 2:3 respectively. At present the total of their salary is Rs.4160.

The salary of laxman now is?

- a) 1800
- b) 1500
- c) 2160
- d) 2560
- e) 1600

12) Rs 4830 is divided among Abhishek, Dishant and Prashant such that if Abhishek's share diminishes by Rs 5, Dishant's share diminishes by Rs 10 and Prashant's share diminishes by Rs 15, their shares will be in the ratio 5:4:3. Find the Dishant's original share

- A) 1610
- B) 2010
- C) 2410
- D) 1590
- E) NONE



13) A, B and C play cricket. A's runs are to B's runs and B's runs are to C's as 3:2 , 3:2. They get altogether 342 runs. How many runs did A make?

- A) 162
- B) 108
- C) 72
- D) 78
- E) None

14) On a certain day, the ratio of the passenger in the 1st class and the second class travelling by train is 1:3. the ratio of the fares collected from each first class and second class passengers is 30:1. If the total amount collected from all the passengers is Rs 1,320. Find the amount in Rs, collected from the second class passengers.

- A) 240
- B) 360
- C) 480
- D) 120
- E) None

15) If a carton containing a dozen mirrors is dropped, which of the following cannot be the ratio of the broken mirror to the unbroken mirror?

- a) 2 :1
- b) 7:5
- c) 3:2
- d) 1:5
- e) None of these

16) One year ago, the ratio between A's and B's salary was 4:5. The ratio of their individual salaries of last year and present year are 3:5 and 2:3 respectively. If their total salaries for the present year is Rs 6800, the present salary of A is

- A) Rs 4080
- B) Rs 3200
- C) Rs 4533.40
- D) Rs 2720
- E) NONE



17) A noodles merchant buys two varieties of noodles the price of the first being twice that of the second. He sells the mixture at Rs 17.50 per kilogram thereby making a profit of 25% . If the ratio of the amounts of the first noodles and the second noodles in the mixture is 2:3, then the respective costs of each noodles are

- A) Rs 20, Rs 10
- B) Rs 24, Rs 12
- C) Rs 16, Rs 8
- D) Rs 26, Rs 13
- E) NONE

18) The ratio of incomes of Pankaj and Gauri is 3:5 and the ratio of their expenditures is 2:3. Who does save more? (You have to assume that no one takes any loan from anywhere)

- A) Pankaj
- B) Gauri
- C) Both save equally
- D) Depends upon the incomes of Pankaj and Gauri
- E) NONE

19) In a house, there are dogs, cats and parrot in the ratio 3:7:5. If the number of cats was more than the number of dogs by a multiple of both 9 and 7, what is the minimum of pets in the house?

- A) 945
- B) 630
- C) 252
- D) 238
- E) NONE

20) A sum of money is to be distributed among A, B, C, D in the proportion of 5:2:4:3. If C gets Rs. 1000 more than D, what is B's share?

- A) Rs. 500
- B) Rs. 1500
- C) Rs. 2000
- D) Rs.2500
- E) NONE

11) Answer: E

Let the salaries of Laxman and Gopal one year before be x_1 , y_1 respectively.

$$\therefore x_1/y_1 = 3/4 \dots\dots(1)$$

$$x_2 + y_2 = 4160 \dots\dots(2)$$



From equations (1) and (2)

$x_2 = \text{Rs. } 1600.$

12) Answer: A

Let actual share of Abhishek, Dishant and Prashant be A, D, P respectively.

$$A + D + P = 4830$$

Hence, A's, D's and P's share are diminished by Rs 5, Rs 10 and Rs 15, their net share will be Rs.4800.

$$\text{Dishant's diminished share} = (4/12) \times 4800 = \text{Rs } 1600$$

Hence, Dishant actual share = Rs 1600 + Rs 10 = **Rs 1610.**

13) Answer: A

$$A:B = 3:2 = 9:6;$$

$$B:C = 3:2 = 6:4 \text{ (making B equal)}$$

Therefore, $A:B:C = 9:6:4$

Therefore, the runs made by A = $(9/19) \times 342 = 162.$

14) Answer: D

Let the number of passengers travelling by first class and second class be x and 3x respectively.

Lets the fares collected from each of the first class and second class passengers be 30y and y respectively.

$$\text{Hence } x(30y) + 3x(y) = 30xy + 3xy = 33xy = 1320$$

$$xy = 40.$$

Total amount collected from the second class = $3xy = 3 \times 40 = \text{Rs } 120.$

15) Answer: C

The carton contains a dozen mirror Hence, when dropped, a few mirrors may break. Here, the ratio obtained, no matter whatever is the number of broken mirrors, will always sum up its terms such that they divide 12 exactly. From the given choices, we add up terms of each ratio to check, if they divide 12 or not.

For 2 : 1, $2 + 1 = 3$, which divides 12

For 7 : 5, $7 + 5 = 12$, which divides 12

For 1 : 5, $1 + 5 = 6$, which divides 12

For 11 : 1, $11 + 1 = 12$, which divides 12

But for 3 : 2, $3 + 2 = 5$, which does not divides 12.

Hence, 3 : 2 cannot be the ratio.

For dividing 12 into two whole numbers the sum of the terms of the ratio must be a factor of 12. So they cannot be in the ratio of 3 : 2



16) Answer: B

Given, the Ratio of A's last year and present year salary = 3:5.

Let salary be 3x and 5x respectively.

Also, the Ratio of B's in last year and present year salary = 2:3

Let salary be 2y and 3y respectively.

Given, $3x/2y=4/5$.

$$\Rightarrow 15x=8y \quad \text{----- (i)}$$

$$\text{Also, } 5x+3y=6800. \quad \text{----- (ii)}$$

From equation (i) and (ii), we get :-

$$y=1200 \text{ and } x=640.$$

Hence, A's present salary is $5x=5 \times 640=3200$.

17) Answer: A

let the price of one noodles = k

$$\Rightarrow \text{the price of other noodle} = \frac{k}{2}$$

$$\text{Price of 1 kg} = \frac{2k}{5} + \left(\frac{3}{5} \times \frac{k}{2}\right) = \frac{7k}{10}$$

$$\text{But CP} = \frac{17.50 \times 100}{125} = 14$$

$$\Rightarrow 7 \frac{k}{10} = 14$$

$$\Rightarrow k = 20$$

So price of the noodles's are **20 and 10**.

18) Answer: B

The ratio of income of Pankaj and Gauri is 3:5 Ratio of their expenditures is 2:3 i.e 3:4.5

Had the ratio of expenditures been 3:5, ratio of savings also would have been 3:5, but since ratio of their expenditures is 3:4.5 only. Obviously

Savings of Gauri will be something more than 5/3 of savings of Pankaj.

Thus **Gauri** is the answer.

19) Answer: A

If three kinds of pets are taken be 3k, 7k and 5k respectively, then $7k-3k=63p$ (where pp is any positive integer).

As the number is a multiple of both 9 and 7, it has to be multiple of 63.

$$k = 63p/4$$

Minimum value of pp for which kk is a natural number is 4.



Thus, $k = 63$

Hence, the number of pets $= 15k = 945$

20) Answer: C

Let the shares of A, B, C, D be Rs. $5x$, Rs. $2x$, Rs. $4x$ and Rs. $3x$ respectively.

Then, $4x - 3x = 1000$

$\Rightarrow x = 1000$.

B's share $= \text{Rs. } 2x = \text{Rs. } (2 \times 1000) = \text{Rs. } 2000$

21) The salary of two friends Ramu and Raju are in the ratio 4:5. If the salary of each one increases by Rs.6000, then the new ratio becomes 48:55. What is Raju's present salary?

- a) Rs.10500
- b) Rs.10500
- c) Rs.11500
- d) Rs.12500

22) The number of candidates writing three different entrance exams is in the ratio 4:5:6. There is a proposal to increase these numbers of candidates by 40%, 60% and 85% respectively. What will be the ratio of increased numbers?

- a) 14:15:16
- b) 12:15:19
- c) 13:19:21
- d) 14:16:19
- E) None of these

23) The ratio of salary of two persons X and Y is 5:8. If the salary of X increases by 60% and that of Y decreases by 35% then the new ratio of their salaries become 40:27. What is X's salary?

- a) Rs.15000
- b) Rs.12000
- c) Rs.19500
- d) Data inadequate.
- e) NONE

24) Seven men, five women and eight children were given as assignment of distributing 2000 books to students in a school over a period of three days. All of them distributed books on the first day. One of the second day two women and three children remained absent and on the third day three men and five children



remained absent. If the ratio of the number of books distributed in a day by a man, a woman and a child was 5 : 4 : 2 respectively, a total of approximately how many books were distributed on the second day?

- a) 1000
- b) 800
- c) 650
- d) 900
- e) Cannot be determined

25) A bag contains one rupee, 50 paise and 25 paise coins in the ratio 2 : 3 : 5. Their total value is Rs. 144.

The value of 50-paise coins is:

- a) Rs. 24
- b) Rs. 36
- c) Rs. 48
- d) Rs. 72
- e) None of these

26) Determine the ratio of the number of people having characteristic X to the number of people having characteristic Y in a population of 100 subjects from the following table

People having X and Y are 20

People having X but not Y are 10

People having Y but not X are 30

People having neither X nor Y are 40.

- a) 3 : 5
- b) 3 : 2
- c) 1 : 2
- d) 2 : 3
- e) None of these

27) The students in three classes are in the ratio 4 : 6 : 9. If 12 students are increased in each class, the ratio changes to 7 : 9 : 12. Then the total number of students in the three classes before the increase is:

- a) 95
- b) 76
- c) 100
- d) 114
- e) None of these



28) If x is subtracted from the numbers 7, 31 and 199, then the remainders will be in continued proportion.

What is the value of x?

- a) 5
- b) 3
- c) 8
- d) 4
- e) None of these

29) Two jars having a capacity of 3 and 5 litres respectively are filled with mixtures of milk and water. In the smaller jar 25% of the mixture is milk and in the larger 25% of the mixture is water. The jars are emptied into a 10 litre cask whose remaining capacity is filled up with water. Find the percentage of milk in the cask.

- a) 55%
- b) 50%
- c) 45%
- d) 25%
- e) None of these

30) Three friends A, B and C started a business by investing a sum of money in the ratio of 5 : 7 : 6. After 6 months C withdraws half of his capital. If the sum invested by 'A' is Rs 40,000, out of a total annual profit of Rs 33,000, C's share will be

- a) Rs 9,000
- b) Rs 12,000
- c) Rs 11,000
- d) Rs 10,000
- e) None of these

21) Answer : B

Ratio their salary is 4:5

Let the original salary of Ramu and Raju be 4k and 5k respectively.

After increasing Rs.6000, the ratio becomes 48:55

That is,

$$(4k+6000)/(5k+6000) = 48/55$$

$$55(4k+6000) = 48(5k+6000)$$

$$220k+330000 = 240k+288000$$

$$20k = 42000$$

We have to find the original salary of Raju; that is, 5k.

If $20k = 42000$ then $5k = 10500$.



Hence the required answer is Rs.10500

22) Answer : E

Given ratio of number of candidates is 4:5:6

Let the number of candidates for 3 exams be 4k, 5k and 6k respectively.

After increasing, number of candidates become (140% of 4k), (160% of 5k) & (185% of 6k)

That is, $(140 \times 4k)/100$, $(160 \times 5k)/100$ and $(185 \times 6k)/100$

= $56k/10$, $80k/10$ and $111k/10$

Now, the required new ratio is: $56k/100 : 80k/10 : 111k/10$

= 56 : 80 : 111

23) Answer : D

Ratio of salary of X and Y is 5:8

Let the original salary of X and Y be Rs.5k and Rs.8k respectively.

After increasing 60%, new salary of X = 160% of 5k = $160 \times 5k/100 = 80k/10$...(1)

After decreasing 35%, new salary of Y = $(100-35)\%$ of 8k = 65% of 8k = $52k/10$...(2)

Given that, new ratio is 40:27

That is, $80k/10 : 52k/10 = 40/27$

This does not give the value of k; so that we cannot find X's exact salary.

Hence the answer is data inadequate.

24) Answer: C

Sol. Let the books distributed by man, a woman and a child be 5x, 4x and 2x respectively.

∴ No. of books distributed in 1st day

$$= 7 \times 5x + 5 \times 4x + 8 \times 2x = 71x$$

No. of books distributed in 2nd day

$$= 7 \times 5x + 3 \times 4x + 5 \times 2x = 57x$$

And no. of books distributed in IIIrd day

$$= 4 \times 5x + 5 \times 4x + 3 \times 2x = 46x$$

$$71x + 57x + 46x = 2000, x = 2000/174$$

$$57x = 2000/174 \times 57 = 655$$

650 (Approx)

25) Answer: B

Sol. Let the number of one-rupee coins, 50-paise coins and 25-paise coins be 2k, 3k and 5k, respectively.

$$\therefore 2k \times 1 + 3k \times 0.50 + 5k \times 0.25 = 114$$

$$\Rightarrow 2k + 1.50k + 1.25k = 114$$



$$\Rightarrow 4.75k = 114$$

$$\Rightarrow k = 24.$$

$$50 \text{ paise value} = 1.5x = 1.5 \times 24 = 36$$

26) Answer: A

Number of people having characteristic X = $10 + 20 = 30$

Number of people having characteristic Y = $20 + 30 = 50$

Therefore Required ratio = $30 : 50 = 3 : 5$

27) Answer: B

Let originally were $4x$, $6x$ and $9x$ student there in classes receptively.

After 12 students increase in each student then students were $7x$, $9x$ and $12x$ in each class respectively.

Now,

$$\text{Total Students} = 7x + 9x + 12x$$

$$4x + 6x + 9x + 3 \times 12 = 28x$$

$$9x = 3 \times 12$$

$$x = 4.$$

Then toatl number of student in three classes,

$$= 4x + 6x + 9x = 19x = 19 \times 4 = 76.$$

28) Answer: B

$$(7-x)/(31-x) = (31-x)/(199-x)$$

gives $x=3$

29) Answer: D

$$0.75 + 3.75 = 4.5 / 10 + 8 \times 100 = 4.5 / 18 \times 100 = 25\%$$

30) Answer: A

Sum invested by A , B and C is

$$5 \times 12 : 7 \times 12 : 6 \times 6 + 3 \times 6$$

$$\text{or } 60 : 84 : 54$$

$$\text{or } 10 : 14 : 9$$

$$\therefore \text{Share of C} = (9 / 33) \times 33000 = \text{Rs. } 9000$$

31) In 1 kg mixture of sand and iron, 20% is iron. How much sand should be added so that the proportion of iron becomes 10%?

a) 1 kg



- b) 200 gms
- c) 800 gms
- d) 1.8 kg
- e) None of these

32) When 30 percent of a number is added to another number the second number increases to its 140 per cent. What is the ratio between the first and the second number?

- a) 3 : 4
- b) 4 : 3
- c) 3 : 2
- d) 4 : 5
- e) None of these

33) In Ram nagar Colony, the ratio of school going children to non-school going children is 5 : 4. If in the next year, the number of non-school going children is increased by 20%, making it 35,400 what is the new ratio of school going children to non-school going children?

- a) 4 : 5
- b) 3 : 2
- c) 25 : 24
- d) 6 : 7
- e) None of these

34) The salaries of A,B and C are in the ratio 5:3:2.If the increments of 20% ,10% and 20% are allowed in their salaries, then what will be the new ratio of their salaries ?

- A) 22:11:9
- B) 22:10:8
- C) 20:11:8
- D) 20:10:9
- E) None of these

35)Two numbers are respectively 40% and 60% more than than the third number. The ratio of the two number is

- A) 6:7
- B) 7:8
- C) 8:7
- D) 7:5
- E) None of these



- 36) Ratio of earnings of A and B is 3:5. If the earnings of A increase by 25% and those of B decrease by 30%, the new ratio of their earnings become 6:8. What is A's earnings ?
- A) 16,000
B) 34,000
C) 15,000
D) 32,000
E) Data inadequate
- 37) The sum of the three number is 68. If the ratio of the first to second is 3:2 and that of the second to the third is 5:3, then the second number is approximately
- A) 21
B) 22
C) 23
D) 24
E) None of these
- 38) The ratio of prices of 2 dresses is 10:15. If the price of the first dress is increased by 10% and that of the second dress by Rs.400 then the ratio of their prices is 4:7. What are the initial prices of the dresses ?
- A) 910, 1375
B) 920, 1380
C) 930, 1395
D) 940, 1410
E) None of these
- 39) The ratio of the number of boys to that of girls in a school is 3:2. If 30% of boys and 70% of girls appeared in an examination, the ratio of students appeared in the examinations to that not appeared in the examination is
- A) 23:27
B) 22:25
C) 21:17
D) 18:17
E) None of these
- 40) In a bag there are coins of 25p, 10p and 5p in the ratio 1:2:3. If there are Rs.45 in all then find how many 25p coins are there?
- A) 60



- B) 65
- C) 70
- D) 75
- E) None of these

31) Answer: A

If we add x grams of sand, the total amount would be $1,000 + x$ grams of mixture and we need 200 grams of iron to be 10% of that: $0.1(1,000 + x) = 200 \rightarrow x = 1,000$.

32) Answer: B

of $x = 140\%$ of y

$$\text{or, } y + 0.3x = 1.4y$$

$$\text{or, } 0.3x = 0.4y$$

$$\therefore x : y = 0.4 : 0.3 = 4 : 3$$

33) Answer: C

$$5 : 4 \rightarrow 5 : 4.8 \rightarrow 25 : 24$$

34) Answer: C

$$5:3:2 = 500:300:200$$

$$500 \times (20/100) = 100, 500 + 100 = 600$$

$$300 \times (10/100) = 30, 300 + 30 = 330$$

$$200 \times (20/100) = 40, 200 + 40 = 240$$

$$600:330:240 = 20:11:8$$

35) Answer: B

Let third number = x

$$(140/100)x = (7/5)x$$

$$(160/100)x = (8/5)x$$

$$(7/5) : (8/5) = 35 : 40 = 7 : 8$$

36) Answer: E

Data inadequate

We cannot derive the earnings from the given details

37) Answer: B

$$A : B = 3 : 2$$

$$B : C = 5 : 3$$



$$B:C = (5 \times [2/5]) : (3 \times [2/5]) = 2 : (6/5)$$

$$A:B:C = 3:2:(6/5) = 15:10:6$$

$$\text{Second number} = (10/31) \times 68 = 21.9 = 22$$

38) Answer: D

Let the initial price of the dress = $10x$ and $15x$

$$\text{Price of the 1st dress after increment} = 10x \times (110/100) = 11x$$

$$\text{Price of the 2nd dress after increment} = 15x + 400$$

$$[11x / (15x + 400)] = 4/7$$

$$77x = 60x + 1600$$

$$17x = 1600$$

$$x = 1600/17 = 94.11 = 94$$

So dresses will be 940, 1410

39) Answer: A

$$3:2 = 30:20$$

$$30\% \text{ boys} = (30/100) \times 30 = 9$$

$$70\% \text{ girls} = (70/100) \times 20 = 14$$

$$(9+14) : (50-23) = 23 : 27$$

40) Answer: D

$$[(25x) + (10x \times 2) + (5x \times 3)] / 100 = 45$$

$$[25x + 20x + 15x] / 100 = 45$$

$$60x = 4500$$

$$x = 4500/60 = 75$$

41) The ratio of two persons A and B salaries in the ratio 12:7 if 12% increased salary yearly then what will be the B Salary after 2 yrs if salary of A is 12000.

A) 7808

B) 8700

C) 7,500

D) 8781

42) The price of a diamond is proportional to the square of its weight. The diamond accidentally fell and broke into four pieces whose weights are in the ratio of 1:2:3:4. If the price fetched is Rs. 70,000 less than the original price, find the original price?

a) Rs. 100,000



- b) Rs. 70,000
- c) Rs. 160,000
- d) Rs. 10800
- e) Rs. 150,000

43) In a mixture of milk and water, their ratio is 5:6 respectively in the first container. And the same mixture has ratio 7:2 respectively in the second container. What is the ratio should the mixture be extracted from each container and poured in to the third container, so that the ratio of milk and water comes to 6:5 respectively in the third container?

- a) 99:253
- b) 253:99
- c) 243:88
- d) 88:243
- e) None of these

44) The ratio of the price of two houses was 17:24. Two years later, when the price of the first had risen by 20% while the price of second house increases by Rs.500 and their prices become 16:25. Find the original prices of the two houses together?

- a) Rs.2603
- b) Rs.2503
- c) Rs.2403
- d) Rs.2303
- e) None of these

45) A working partner gets 25% as his commissions after his commissions paid that is equal to Rs.7500, then what is the total profit ?

- A) Rs.32,000
- B) Rs.30,000
- C) Rs.37,500
- D) Rs.40,000
- E) None of these

46) Equal quantities of 3 mixtures of milk and water are mixed in the ratio 1:3, 2:3 and 3:4. The ratio of water and milk in the new mixture is

- A) 45:76
- B) 151:269
- C) 123:154



- D) 145:245
- E) None of these

47) The ratio of income of X and Y is 4:3. The sum of their expenditure is Rs.12,000 and the amount of savings is X is equal to the amount of expenditure of Y. What is the salary of Y?

- A) 9000
- B) 7000
- C) 12000
- D) 15000
- E) None of these

48) When 7 is added to the numerator and denominator of the fraction, then the new ratio of numerator and denominator becomes 13:19, what is the original ratio ?

- A) 11:13
- B) 7:9
- C) 4:7
- D) Can't be determined
- E) None of these

49) A school has 4 sections of class 12, such that half the number of students of 1st section, $\frac{1}{3}$ rd of 2nd section, $\frac{1}{4}$ th of 3rd section and $\frac{1}{5}$ th of the 4th section are equal. If total number of students in class 12 is 420, find the number of students in sections 1st and 2nd.

- A) 180
- B) 120
- C) 240
- D) 150
- E) 260

50) Brother A and B had some savings in the ratio 5:6. They decided to buy a gift for their sister, sharing the cost in the ratio 4:5. After they bought, A is left with three-fourth of his amount, while B is left with Rs.497.

Then, the value of the gift is

- a) 215
- b) 115
- c) 315
- d) 415
- e) None of these



41) Answer: D

$$12:7 = 12,000 : 7,000$$

$$12\% = B = 840 \dots\dots 1\text{st yr and } B = 941 \dots\dots 2\text{nd yr}$$

$$\text{New inc B} = 7000 + 840 + 941 = 8781$$

42) Answer: A

let price of diamond as kx^2 where k is a constant

total price for 4 pieces

$$kx^2[1+4+9+16]=30kx^2$$

$$\text{price of original diamond} = 100kx^2$$

$$\text{difference } 70kx^2 = \$70000 \text{ or } kx^2 = 1000$$

$$\text{original price of the diamond} = 100 \times 1000 = 100000$$

43) Answer: B

x litres of mixture be taken from the first container and poured into the third container.

Let y litres of mixture be taken from the second container and poured into the third container.

$$\text{Quantity of milk in } x \text{ litres} = \frac{5}{11}x$$

$$\text{Quantity of milk in } y \text{ litres} = \frac{7}{9}y$$

$$\text{Quantity of milk in third container} = \frac{5}{11}x + \frac{7}{9}y$$

Similarly, quantity of water in third container,

$$= \frac{6}{11}x + \frac{2}{9}y$$

$$\left(\frac{5x}{11} + \frac{7y}{9}\right) : \left(\frac{6x}{11} + \frac{2y}{9}\right) = 6 : 5$$

$$\left(\frac{45x + 77y}{99}\right) : \left(\frac{54x + 22y}{99}\right) = 6 : 5$$

$$\Rightarrow 324x - 225y = 385y - 132y \Rightarrow 99x = 253y \Rightarrow x/y = 253/99$$

$$= 253 : 99$$

44) Answer: A

$$\text{Let, new price of the first house} = 17x \times 120/100 = 102x/5$$

$$\text{Let, new price of the second house} = 24x + 500$$

According to the question,

$$(102x/5) : (24x + 500) = 16 : 25$$

$$\left(\frac{102x}{5}\right) : (24x + 500) = 16 : 25 \Rightarrow 102x \times 5 = (24x + 500)16 \Rightarrow x = 8000/126 = 4000/63$$

$$\text{Original price of first house} = 17 \times 4000/63 = 1079.37 \sim \text{Rs. } 1079$$

$$\text{Original price of second house} = 24 \times 4000/63 = 1523.81 \sim \text{Rs. } 1524$$

$$\text{Required answer, } = 1079 + 1524 = 2603$$

$$\text{Answer} = \text{d) Rs. } 2603$$



45) Answer: C

X = total profit

$$25/100[x - 7500] = 7500$$

$$x - 7500 = 7500 \times 100/25 = 30,000$$

$$x = 37,500$$

46) Answer: B

$$\text{Milk} = 1/4 : 2/5 : 3/7$$

$$= 35/140 : 56/140 : 60/140$$

$$\text{Quantity of milk in new mix} = 35 + 56 + 60 = 151$$

$$\text{Quantity of water in new mix} = 140 \times 3 - 151 = 269$$

$$M:W = 151:269$$

47) Answer: A

$$X's \text{ saving} = \text{Expenditure of } Y = S$$

$$4x - S + S = 12000$$

$$X = 3000$$

$$3x = 3 \times 3000 = 9000$$

48) Answer: D

$$X + 7/y + 7 = 13/19 \quad x \text{ and } y \text{ are different variable, so original fraction cannot be determined}$$

49) Answer: D

Let number of students in 4 sections be A, B, C, D respectively. Then

$$1/2 \text{ of } A = 1/3 \text{ of } B = 1/4 \text{ of } C = 1/5 \text{ of } D$$

$$\text{So } A : B : C : D = 2 : 3 : 4 : 5 \quad [\text{When } A/2 = B/3 = C/4, \text{ then ratio } A : B : C = 2 : 3 : 4] \quad \text{So students in 1st and 2nd section} = [(2+3)/(2+3+4+5)] \times 420 = 150$$

50) Answer: C

Let the savings of A and B are 5x, 6x and the share cost of gift are 4y, 5y respectively.

According to question,

$$\text{For A, } 5x - 4y = 3/4 \times 5x \Rightarrow x = 16y/5$$

$$\text{For B, } 6x - 5y = 497 \Rightarrow 6 \times 16y/5 - 5y = 497 \Rightarrow y = 35$$

$$\text{Cost of gift} = 4y + 5y = 9 \times 35 = 315$$

51) The ratio of the monthly salaries of A and B is in the ratio 15 : 16 and that of B and C is in the ratio 17 : 18. Find the monthly income of C if the total of their monthly salary is Rs 1,87,450.



- A) Rs 66,240
- B) Rs 72,100
- C) Rs 62,200
- D) Rs 65,800
- E) Rs 60,300

52) The ratio of the incomes of A and B last year was 9 : 13. Ratio of their incomes of last year to this year is 9 : 10 and 13 : 15 respectively. The sum of their present incomes is Rs 50,000. What is the present income of B?

- A) Rs 32,000
- B) Rs 24,000
- C) Rs 20,000
- D) Rs 30,000
- E) None of these

53) A sum of Rs 315 consists of 25 paise, 50 paise and 1 Re coins in the ratio 3 : 4 : 6. What is the number of each kind of coin respectively?

- A) 216, 144, 27
- B) 108, 144, 216
- C) 27, 72, 216
- D) 120, 35, 108
- E) 102, 150, 210

54) Rs 650 was divided among 3 children A, B, C in the ratio 2 : 4 : 7. Had it been divided in the ratio $\frac{1}{2}$: $\frac{1}{4}$: $\frac{1}{7}$, who would have gained the most and by how much?

- A) C, Rs 246
- B) C, Rs 264
- C) B, Rs 18
- D) A, Rs 246
- E) A, Rs 264

55) The ratio of the number of boys to the number of girls in a school is 6 : 5. If 20% of boys and 45% of girls come by bus to school, what percentage of students opt transport other than bus to come to school?

- A) $68\frac{9}{11}\%$
- B) $68\frac{7}{11}\%$
- C) $72\frac{7}{11}\%$
- D) 73%



E) 73 5/11%

56) The incomes of A and B are in the ratio 1 : 2 and their expenditures are in the ratio 2 : 5. If A saves Rs 20,000 and B saves Rs 35,000, what is the total income of A and B?

- A) Rs 30,000
- B) Rs 70,000
- C) Rs 90,000
- D) Rs 60,000
- E) Rs 80,000

57) Rs 5750 is divided among A, B, and C such that if their share be reduced by Rs 10, Rs 15 and Rs 25 respectively, the remainder amounts with them shall be in the ratio 4 : 6 : 9. What was C's share then?

- A) Rs 2700
- B) Rs 2725
- C) Rs 2750
- D) Rs 2625
- E) None of these

58) Two candles of same height are lighted at the same time. The first is consumed in 3 hours and second in 2 hours. Assuming that each candles burns at a constant rate, in how many hours after being lighted, the ratio between the first and second candles becomes 2:1?

- A) 2 hour
- B) 2.5 hour
- C) 4 hour
- D) 1.5 hour
- E) None of these

59) A bag contains 25p coins, 50p coins and 1 rupee coins whose values are in the ratio of 8:4:2. If the total values of coins is X and the total amount in rupees is Y, then which of the following is true

- A) $X = 840$; $Y = 360$
- B) $X = 966$; $Y = 345$
- C) $X = 840$; $Y = 280$
- D) $X = 740$; $Y = 260$
- E) None of these

60) Nandita scores 60% marks in five subjects together, viz., Hindi, Science, Mathematics, English and Sanskrit, where in the maximum marks of each subject were 105. How many marks did Nandita score in



Science, if she scored 69 marks in Hindi, 62 marks in Sanskrit, 68 marks in Mathematics and 51 marks in English?

- a) 66
- b) 68
- c) 55
- d) 65
- e) None of these

51) Answer: A

$$A/B = 15/16 \text{ and } B/C = 17/18$$

$$\text{So } A : B : C = 15 \times 17 : 16 \times 17 : 16 \times 18$$

$$= 255 : 272 : 288$$

$$\text{So C's salary} = [288 / (255 + 272 + 288)] \times 1,87,450 = \text{Rs } 66,240$$

52) Answer: D

ratio of the incomes of A and B last year was $9x : 13y$

Now given that ratio of the incomes of A and B last year was $9 : 13$.

$$\text{So } 9x/13y = 9/13$$

This gives $x = y$

$$\text{Total of incomes of A and B this year} = 10x + 15y = 10x + 15x = 25x \quad (\text{because } x=y)$$

$$\text{So } 25x = 50,000$$

$$\text{This gives } x = 2,000$$

$$\text{So present income of B} = 15y = 15x = 15 \times 2000 = 30,000$$

53) Answer: B

$$25 \text{ paise} = 25/100 \text{ Rs, } 50 \text{ paise} = 50/100 \text{ Rs}$$

$$\text{So value ratio of these coins become} = 3 \times (25/100) : 4 \times (50/100) : 6 \times (1)$$

$$= 3/4 : 2 : 6 = 3 : 8 : 24$$

$$\text{So 25 paise coins value} = [3 / (3 + 8 + 24)] \times 315 = \text{Rs } 27, \text{ so coins} = 27 \times (100/25) = 108$$

$$\text{So 50 paise coins value} = [8 / (3 + 8 + 24)] \times 315 = \text{Rs } 72, \text{ so coins} = 72 \times (100/50) = 144$$

$$\text{So 1 paise coins value} = [24 / (3 + 8 + 24)] \times 315 = \text{Rs } 216, \text{ so coins} = 216 \times (100/100) = 216$$

54) Answer: E

$$\text{New ratio} = 1/2 : 1/4 : 1/7 = 14 : 7 : 4$$

So both ratio suggests that C has not gained any money, rather he has lose the money.

For both ratio find the shares of A and B

$$\text{With ratio } 2 : 4 : 7, \text{ A gets} = [2 / (2 + 4 + 7)] \times 650 = 100, \text{ B gets} = [4 / (2 + 4 + 7)] \times 650 = 200$$



With ratio 14 : 7 : 4, A gets = $[14/(14+7+4)] * 650 = 364$, B gets = $[7/(14+7+4)] * 650 = 182$

B has also lose the money, A gain the money and = $364 - 100 = 264$

55) Answer: B

If 20% of boys and 45% of girls come by bus, then 80% of boys and 55% of girls opt transport other than bus.

Let total number of students in school = x

So boys who opt other transport are $(80/100) * 6/(6+5) * x = 24x/55$

And girls who opt other transport are $(55/100) * 5/(6+5) * x = x/4$

So total students who opt other transport = $(24x/55) + (x/4) = 151x/220$

So required % = $[(151x/220)/x] * 100 = 68 \frac{7}{11} \%$

56) Answer: C

Income of A = x , of B = $2x$

Expenditure of A = $2y$, of B = $5y$

Savings is (income – expenditure). So

$$x - 2y = 20,000$$

$$2x - 5y = 35,000$$

Solve the equations, $x = 30,000$

So total = $x+2x = 3x = 3*30,000 = 90,000$

57) Answer: B

When the shares reduce, the total amount will also reduce which is to be divided among them. So after reducing shares by Rs 10, Rs 15 and Rs 25 respectively, total amount is $5750 - (10+15+25) = 5700$

So C's share shall be $[9/(4+6+9)] * 5700 = 2700$

Actually C would have received = $2700 + 25 = 2725$

58) Answer: D

Height of both candles are same i.e. h

First one takes 3 hours to burn completely, so in one hour = $h/3$

Similarly second one will burn in one hour = $h/2$

Let after t time, ratio between their height is 2:1

so, remaining height of first candle = $h - t*(h/3)$

similarly for second candle = $h - t*(h/2)$

ratio given 2:1,

$$h - t*(h/3) / h - t*(h/2) = 2/1$$

Solving we get $t = 1.5$



59) Answer: A

Value is given in the ratio 8:4:2.

By option,

$$(8x \times 0.25) + (4x \times 0.5) + (2x \times 1) = 840.$$

$$\text{So } X=840 \quad Y=360$$

60) Answer: D

Total of maximum marks of all subjects = $105 \times 5 = 525$

$$75\% \text{ of } 525 = 525 \times 60/100 = 315$$

Obtained marks of four subjects (Hindi, Sanskrit, mathematics and English)

$$= 69 + 62 + 68 + 51 = 250$$

$$\text{So, the obtained marks in Science} = 315 - 250 = 65$$

61) Mr. Shrimant inherits 4325 gold coins and divides them among his three sons; Bharat, Parat and Marat; in a certain ratio. Out of the total coins received by each of them, Bharat sells 40 coins; Parat donates his 20 coins and Marat loses 30 coins. Now, the ratio of gold coins with them is 41:34:46, respectively. How many coins did Parat receive from his father?

- a) 1210
- b) 1211
- c) 1212
- d) 1213
- e) None of these

62) The sum of the ages of the 4 members of Sinha family is 172 years. 8 years ago the ages of the 4 members Nishu, Vicky, Mrs. Sinha and Sinha were in the ratio of 2:3:7:8. After how many years would Nishu be as old as the present age of his mother?

- a) 33 years
- b) 35 years
- c) 36 years
- d) 37 years
- e) None of these

63) Seats for Mathematics, Science and arts in a school are in the ratio 5:7:8. There is a proposal to increase these seats by X%, Y% and Z% respectively. And the ratio of increased seats is 2:3:4, which of the following is true?

- A) $X = 50$; $Z = 40$
- B) $Y = 40$; $Z = 50$



- C) $X = 40$; $Z = 75$
- D) $X = 50$; $Z = 40$
- E) $Y = 50$; $X = 75$

64) If a certain amount X is divided among A, B, C in such a way that A gets $\frac{2}{3}$ of what B gets and B gets $\frac{1}{3}$ of what C gets, which of the following is true

- A) C's Share = 1053 and $X = 1666$
- B) A's Share = 238 and $X = 1638$
- C) B's Share = 234 and $X = 1666$
- D) C's Share = 1053 and $X = 1638$
- E) A's Share = 351 and $X = 1638$

65) A bus and a truck are available to cross a jungle. The speed of the truck is thrice that of the bus. The capacity of the truck is 60 persons and that of bus is 40 persons. The average occupancy of the bus is twice that of the truck. The tickets for the bus and the truck cost Re 1 and Re 1.50 respectively. What is the ratio of the average rupee collection of the truck to that of the bus in a day? Assume there is no wastage time between trips and the occupancy of the bus/truck is defined as the ratio of the actual number of persons boarding it and its capacity.

- a) 9:17
- b) 17:9
- c) 8:27
- d) 27:8
- e) None of these

66) Ramana divides two sums of money among his four sons Ganesh, Mahesh, Anil and Sunil. The first sum is divided in the ratio 4: 3: 2: 1 and second in the ratio 5: 6: 7: 8. If the second sum is twice the first, the largest total is received by

- a) Ganesh
- b) Mahesh
- c) Anil
- d) Sunil
- e) Both Ganesh and Mahesh

67) An amount of money is to be distributed among P, Q and R in the ratio of 5:4:7 respectively. If the total share of P and R is 3 times the share of Q, what is definitely Q's share?

- a) 2000



- b) 4000
- c) 6000
- d) Data inadequate
- e) None of these

68) Two candles of same height are lighted at the same time. The first is consumed in 6 hours and second in 4 hours. Assuming that each candles burns at a constant rate, in how many hours after being lighted, the ratio between the first and second candles becomes 2:1?

- a) 1 hour
- b) 2 hour
- c) 3 hour
- d) 4 hour
- e) None of these

69) An employer reduces the number of his employees in the ratio of 7:4 and increases their wages in the ratio 3:5. State whether his bill of total wages increases or decreases and in what ratio.

- a) increases 20:21
- b) decreases 21:20
- c) increases 21:22
- d) decreases 22:21
- e) None of these

70) A vessel contains milk and water in the ratio of 4:3. If 14 litres of the mixture is drawn and filled with water, the ratio changes to 3:4. How much milk was there in the vessel initially?

- a) 24
- b) 32
- c) 40
- d) 48
- e) None of these

61) Answer: A

$$41x + 40 + 34x + 20 + 46x + 30 = 4325 \Rightarrow 121x = 4325 - 90 \Rightarrow x = 35$$

Required answer,

number of coins received by parat

$$= 34x + 20 = 34 \times 35 + 20 = 1210$$

62) Answer: B



Let their ages 8 years ago be $2x$, $3x$, $7x$, and $8x$.

Their ages now $2x+8$, $3x+8$, $7x+8$, $8x+8$.

According to the question,

$$=2x+8+3x+8+7x+8+8x+8=172$$

$$20x+32=172 \Rightarrow x=140/20=7$$

Present age of Nishu $=2 \times 7 + 8 = 22$ years

Present age of mother $=7 \times 7 + 8 = 57$ years

Hence, required years $(57-22)=35$ years

63) Answer: C

Number of increased seats are (140% of $5x$), (150% of $7x$) and (175% of $8x$)

i.e., $(140/100 \times 5x)$, $(150/100 \times 7x)$ and $(175/100 \times 8x)$

i.e., $7x$, $21x/2$ and $14x$

Required ratio = $7x:21x/2:14x$

$$= 14x : 21x : 28x = 2:3:4$$

40% of 5 = 2, total seats $5+2=7$

50% of 7 = $7/2$ total seats $7+7/2=21/2$

75% of 8 = 6 total seats $8+6=14$

Now compare ratios of all $7:21/2:14 \Rightarrow 14:21:28$

$$\Rightarrow 2:3:4$$

64) Answer: D

$A = 2/3 B$; $B = 1/3 C$;

$A:B = 2:3$; $B:C = 1:3$;

$A:B:C = 2:3:9$

$$C = 9/14 \times 1638 = 1053$$

$$X=1638$$

65) Answer: D

Average Rupee collection = Speed \times capacity \times Occupancy \times Ticket rate

Ratio of average Rupee collection of truck to that of bus = product of above rate

According to question,

$$(3 \times 60 \times 1 \times 1.5):(1 \times 40 \times 2 \times 1) = 270:80 = 27:8$$

66) Answer: A

Let the first sum be $4x$, $3x$, $2x$, x

Second sum be $5y$, $6y$, $7y$, $8y$



The second sum is twice the first sum

$$26y = 20x; 13y = 10x$$

Take $y=10$ $x= 13$

G:M:A:S

$$4X+5Y: 3X+6Y: 2X +7Y: X+8Y$$

$$102: 99: 96: 93$$

67) Answer: D

Data inadequate

68) Answer: C

Let height of both candles is 'h' and let after t times ratio between the height be 2:1

$$h - t \cdot h/6 : h - t \cdot h/4 = 2:1$$

$$t = 3$$

69) Answer: B

Let initial employees be 7x and then 4x similarly initial wages be 3y and then 5y

so total wage = 21xy initially and then 20xy

so wages decreases and ratio = 21:20

70) Answer: B

milk = 4x and water = 3x

$$\text{milk} = 4x - 14 \cdot \frac{4}{7} \text{ and water} = 3x - 14 \cdot \frac{3}{7} + 14$$

$$4x - 8: 3x + 8 = 3:4$$

$$X = 8, \text{ so milk} = 8 \cdot 4 = 32 \text{ litres}$$

71) The sum of three numbers is 210. If the ratio between the first and second number be 2:3 and that between the second and third be 4:5, then the difference between the first and third number?

- a) 21
- b) 35
- c) 42
- d) 56
- e) None of these

72) 180 sweets are divided among friends A, B, C and D in which B and C are brothers also such that sweets divided between A and B are in the ratio 2 : 3, between B and C in the ratio 2 : 5 and between C and D in ratio 3 : 4. What is the number of sweets received by the brothers together?



- A) 78
- B) 84
- C) 92
- D) 102
- E) 88

73) Two alloys contain platinum and gold in the ratio of 1:2 and 1:3 respectively. A third alloy C is formed by mixing alloys one and alloy two in the ratio of 3:4. Find the percentage of gold in the mixture

- a) 79.2/7%
- b) 71.2/7%
- c) 73.2/7%
- d) 71.3/7%
- e) None of these

74) One year ago the ratio between rahul salary and rohit salary is 4:5. The ratio between their individual salary of the last year and current year is 2:3 and 3:5 respectively. If the total current salary of rahul and rohit is 4300. Then find the current salary of rahul.

- a) 1200
- b) 1800
- c) 2400
- d) 3600
- e) None of these

75) The sum of the squares between three numbers is 5000. The ratio between the first and the second number is 3:4 and that of second and third number is 4:5. Find the difference between first and the third number.

- A) 20
- B) 30
- C) 40
- D) 50
- E) None of these

76) A sum of 12600 is to be distributed between A, B and C. For every rupee A gets, B gets 80p and for every rupee B gets, C get 90 paise. Find the amount get by C.

- A) 3200
- B) 3600
- C) 4200



- D) 4600
- E) None of these

77) Rs.1870 is divided into three parts in such a way that half of the first part, one-third of the second part and one-sixth of the third part are equal. The third part is

- A) Rs.510
- B) Rs.680
- C) Rs.850
- D) Rs.1020
- E) None of these

78) The ratio between the number of boys and girls in a school is 4:5. If the number of boys are increased by 30 % and the number of girls increased by 40 %, then what will the new ratio of boys and girls in the school.

- A) 13/35
- B) 26/35
- C) 26/41
- D) 23/13
- E) None of these

79) If 40 percent of a number is subtracted from the second number then the second number is reduced to its $\frac{3}{5}$. Find the ratio between the first number and the second number.

- A) 1:3
- B) 1:2
- C) 1:1
- D) 2:3
- E) None of these

80) Two vessels contains equal quantity of solution contains milk and water in the ratio of 7:2 and 4:5 respectively. Now the solutions are mixed with each other then find the ratio of milk and water in the final solution?

- A) 11:7
- B) 11:6
- C) 11:5
- D) 11:9
- E) None of these



71) Answer: C

a: b = 2:3 and b:c = 4:5

a:b:c = 8:12:15

Difference between first and third number = $(7/35) \times 210 = 42$

72) Answer: B

A : B : C : D

$2 \times 2 \times 3 : 3 \times 2 \times 3 : 3 \times 5 \times 3 : 3 \times 5 \times 4$

4 : 6 : 15 : 20

B and C together = $[(6+15)/(4+6+15+20)] \times 180 = 84$

73) Answer: D

Platinum = 1/3 and 1/4

gold = 2/3 and 3/4

Alloy one and two are mixed in the ratio of 3:4, so ratio of platinum and gold in final ratio – 2:5

So gold % = $(5/7) \times 100$

71.3/7%

74) Answer: B

4x and 5x is the last year salary of rahul and rohit respectively

Rahul last year to rahul current year = 2/3

Rohit last year to rohit current year = 3/5

Current of rahul + current of rohit = 4300

$(3/2) \times 4x + (5/3) \times 5x = 4300$.

X = 300.

So rahul current salary = $3/2 \times 4 \times 300 = 1800$

75) Answer: A

$a^2 + b^2 + c^2 = 5000$

a:b:c = 3:4:5

$50x^2 = 5000$.

X = 10.

$5x - 3x = 2 \times 10 = 20$

76) Answer: B

Ratio of money between A and B – 100:80 and that of B and C – 100:90



so the ratio between A : B : C – 100:80:72

so $252x = 12600$, $x = 50$. So C get = $50 \times 72 = 3600$

77) Answer: D

$$F/2 = S/3 = T/6$$

$$T = 2S = 3F$$

$$F + S + T = 1870$$

$$T(1/3 + 1/2 + 1) = 1870$$

$$T = 1870 \times 6/11$$

$$= 170 \times 6 = 1020$$

Or the third part is a multiple of 6 and is large

78) Answer: B

boys = $4x$ and girls = $5x$.

$$\text{Required ratio} = [(130/100) \times 4x] / [(140/100) \times 5x]$$

$$26/35$$

79) Answer: C

$$[b - (40/100)a] = (3/5)b.$$

So we get $a = b$.

$$1:1$$

80) Answer: A

milk = $7/9$ and water = $2/9$ – in 1st vessel

milk = $4/9$ and water = $5/9$ – in 2nd vessel

$$(7/9 + 4/9) / (2/9 + 5/9) = 11:7$$

81) The ratio between the present age of Maha and Deepa is 5:X. Maha is 9yrs younger than Parveen. Parveen's age after 9yrs will be 33yrs. The difference between the Deepa and Maha age is same as the present age of Parveen. Find X.

a) 13

b) 10

c) 11

d) 14

e) None of these



82) 180 sweets are divided among friends A, B, C and D in which B and C are brothers also such that sweets divided between A and B are in the ratio 2 : 3, between B and C in the ratio 2 : 5 and between C and D in ratio 3 : 4. What is the number of sweets received by the brothers together?

- A) 78
- B) 84
- C) 92
- D) 102
- E) 88

83) Number of students in 4th and 5th class is in the ratio 6 : 11. 40% in class 4 are girls and 48% in class 5 are girls. What percentage of students in both the classes are boys?

- A) 62.5%
- B) 54.8%
- C) 52.6%
- D) 55.8%
- E) 53.5%

84) Consider two alloys A and B. 50 kg of alloy A is mixed with 70 kg of alloy B. A contains brass and copper in the ratio 3 : 2, and B contains them in the ratio 4 : 3 respectively. What is the ratio of copper to brass in the mixture?

- A) 8 : 5
- B) 7 : 5
- C) 5 : 11
- D) 4 : 9
- E) 5 : 7

85) In a mixture of milk and water, their ratio is 5:6 respectively in the first container. And the same mixture has ratio 7:2 respectively in the second container. What is the ratio should the mixture be extracted from each container and poured in to the third container, so that the ratio of milk and water comes to 6:5 respectively in the third container?

- a) 99:253
- b) 253:99
- c) 243:88
- d) 88:243
- e) None of these



86) The ratio of the price of two houses was 17:24. Two years later, when the price of the first had risen by 20% while the price of second house increases by Rs.500 and their prices become 16:25. Find the original prices of the two houses together?

- a) Rs.2603
- b) Rs.2503
- c) Rs.2403
- d) Rs.2303
- e) None of these

87) Brother A and B had some savings in the ratio 5:6. They decided to buy a gift for their sister, sharing the cost in the ratio 4:5. After they bought, A is left with three-fourth of his amount, while B is left with Rs.497. Then, the value of the gift is

- a) 215
- b) 115
- c) 315
- d) 415
- e) None of these

88) Nandita scores 60% marks in five subjects together, viz., Hindi, Science, Mathematics, English and Sanskrit, where in the maximum marks of each subject were 105. How many marks did Nandita score in Science, if she scored 69 marks in Hindi, 62 marks in Sanskrit, 68 marks in Mathematics and 51 marks in English?

- a) 66
- b) 68
- c) 55
- d) 65
- e) None of these

89) The ratio of income of A to that of B is 5: 4 and the expenditure of A to that of B is 3: 2. If at the end of the year, each saves Rs.800, the income of A is

- a) Rs.1600
- b) Rs.1800
- c) Rs.2000
- d) Rs.2200
- e) None of these



90) The sum of the ages of the 4 members of Sinha family is 172 years. 8 years ago the ages of the 4 members Nishu, Vicky, Mrs.Sinha and Sinha were in the ratio of 2:3:7:8. After how many years would Nishu be as old as the present age of his mother?

- a) 33 years
- b) 35 years
- c) 36 years
- d) 37 years
- e) None of these

81) Answer: A

$$P \text{ present age} = 33 - 9 = 24$$

$$M = 24 - 9 = 15$$

$$D - M = 24$$

$$D - 15 = 24$$

$$D = 24 + 15 = 39$$

$$15:39 = 5:13$$

$$X = 13$$

82) Answer: B

$$A/B = N1/D1 \quad B/C = N2/D2 \quad C/D = N3/D3$$

$$A : B : C : D = N1 \cdot N2 \cdot N3 : D1 \cdot N2 \cdot N3 : D1 \cdot D2 \cdot N3 : D1 \cdot D2 \cdot D3$$

$$A/B = 2/3 \quad B/C = 2/5 \quad C/D = 3/4$$

$$A : B : C : D$$

$$2 \cdot 2 \cdot 3 : 3 \cdot 2 \cdot 3 : 3 \cdot 5 \cdot 3 : 3 \cdot 5 \cdot 4$$

$$4 : 6 : 15 : 20$$

$$B \text{ and } C \text{ together} = [(6+15)/(4+6+15+20)] \cdot 180 = 84$$

83) Answer: B

$$\text{Total students in both} = 6x + 11x = 17x$$

$$\text{Boys in class 4} = (60/100) \cdot 6x = 360x/100$$

$$\text{Boys in class 5} = (52/100) \cdot 11x = 572x/100$$

$$\text{So total boys} = 360x/100 + 572x/100 = 932x/100 = 9.32x$$

$$\% \text{ of boys} = [9.32x/17x] \cdot 100 = 54.8\%$$

84) Answer: E

$$\text{Brass in A} = 3/5 \cdot 50 = 30 \text{ kg, Brass in B} = 4/7 \cdot 70 = 40 \text{ kg}$$

$$\text{Total brass} = 30 + 40 = 70 \text{ kg}$$



So copper in mixture is $(50+70) - 70 = 50$ kg

So copper to brass = $50 : 70 = 5 : 7$

85) Answer: B

x litres of mixture be taken from the first container and poured into the third container.

Let y litres of mixture be taken from the second container and poured into the third container.

Quantity of milk in x litres = $\frac{5}{11}x$

Quantity of milk in y litres = $\frac{7}{9}y$

Quantity of milk in third container = $\frac{5}{11}x + \frac{7}{9}y$

Similarly, quantity of water in third container,

= $\frac{6}{11}x + \frac{2}{9}y$

$(\frac{5x}{11} + \frac{7y}{9}) : (\frac{6x}{11} + \frac{2y}{9}) = 6 : 5$

$(\frac{45x + 77y}{99}) : (\frac{54x + 22y}{99}) = 6 : 5$

$\Rightarrow 324x - 225x = 385y - 132y \Rightarrow 99x = 253y \Rightarrow x/y = 253/99$

= 253 : 99

86) Answer: A

Let, new price of the first house = $17x \times 120/100 = 102x/5$

Let, new price of the second house = $24x + 500$

According to the question,

$(102x/5) : (24x + 500) = 16 : 25$

$((102x/5)) / ((24x + 500)) = 16/25 \Rightarrow 102x \times 5 = (24x + 500)16 \Rightarrow x = 8000/126 = 4000/63$

Original price of first house = $17 \times 4000/63 = 1079.37 \sim \text{Rs. } 1079$

Original price of second house = $24 \times 4000/63 = 1523.81 \sim \text{Rs. } 1524$

Required answer, = $1079 + 1524 = 2603$

87) Answer: C

Let the savings of A and B are 5x, 6x and the share cost of gift are 4y, 5y respectively.

According to question,

For A, $5x - 4y = 3/4 \times 5x \Rightarrow x = 16y/5$

For B, $6x - 5y = 497 \Rightarrow 6 \times 16y/5 - 5y = 497 \Rightarrow y = 35$

Cost of gift = $4y + 5y = 9 \times 35 = 315$

88) Answer: D

Total of maximum marks of all subjects = $105 \times 5 = 525$

75% of 525 = $525 \times 60/100 = 315$

Obtained marks of four subjects (Hindi, Sanskrit, mathematics and English)



$$=69+62+68+51=250$$

So, the obtained marks in Science = $315 - 250 = 65$

89) Answer: C

Income - expenditure for A is $5x - 3y$

Income - expenditure for B is $4x - 2y$

$$5x - 3y = 800; 4x - 2y = 800$$

Subtracting $x - y = 0$; $x = y$

$$2x = 800; x = 400; 5x = 2000$$

90) Answer: B

Let their ages 8 years ago be $2x$, $3x$, $7x$, and $8x$.

Their ages now $2x+8$, $3x+8$, $7x+8$, $8x+8$.

According to the question,

$$=2x+8+3x+8+7x+8+8x+8=172$$

$$20x+32=172 \Rightarrow x=140/20=7$$

Present age of Nishu = $2 \times 7 + 8 = 22$ years

Present age of mother = $7 \times 7 + 8 = 57$ years

Hence, required years $(57 - 22) = 35$ years

91) A bus and a truck are available to cross a jungle. The speed of the truck is thrice that of the bus. The capacity of the truck is 60 persons and that of bus is 40 persons. The average occupancy of the bus is twice that of the truck. The tickets for the bus and the truck cost Re 1 and Re 1.50 respectively. What is the ratio of the average rupee collection of the truck to that of the bus in a day? Assume there is no wastage time between trips and the occupancy of the bus/truck is defined as the ratio of the actual number of persons boarding it and its capacity.

- a) 9:17
- b) 17:9
- c) 8:27
- d) 27:8
- e) None of these

92) Mani, Ram and Bhuvana have some stones with each of them. Seven times the number of stones with Ram equals nine times the number of stones with Mani while seven times the number of stones with Mani equals nine times the number of stones with Bhuvana. What is the minimum number of stones that can be there with all three of them put together?

- a) 193



- b) 195
- c) 197
- d) 199
- e) None of these

93) A, B and C invest in a business. If the ratio of their time periods are 4 : 5 : 6 and their profits are in the ratio 7 : 8 : 9. Find the ratio in which the investment are made by A, B and C.

- a) 45 : 35 : 27
- b) 35 : 32 : 30
- c) 27 : 37 : 44
- d) 30 : 32 : 35
- e) 41 : 42 : 34

94) A certain amount to be distributed among A, B, and C in the ratio 2:3:4 respectively but was erroneously distributed in the ratio 7:2:5 respectively. As a result of this, B got Rs. 40 less. What is the amount?

- a) Rs.210
- b) Rs.270
- c) Rs.230
- d) Rs.280
- e) None of these

95) Mr. Venku invested a certain amount in Debit and Equity funds in the ratio of 4 : 5 respectively. At the end of one year, he earned a total dividend of 30% on his investment. After one year he reinvested the amount including dividend in the ratio of 6 : 7 in Debt and Equity Funds. If the amount reinvested in Equity Funds was Rs. 94,500/-, what was the original amount invested in Equity Funds?

- a) Rs. 75,000/-
- b) Rs. 81,000/-
- c) Rs. 60,000/-
- d) Rs. 65,000/-
- e) None of these

96) The ratio of the monthly salaries of A and B is in the ratio 15 : 16 and that of B and C is in the ratio 17 : 18. Find the monthly income of C if the total of their monthly salary is Rs 1,87,450.

- a) Rs 66,240
- b) Rs 72,100
- c) Rs 62,200
- d) Rs 65,800



e) Rs 60,300

97) The income of A, B, and C are in the ratio 3 : 4 : 7. If their incomes be changed such that the new income of A is 50% increased, 25% increased for B and 25% decrease for C. Find the ratio of their new incomes.

a) 18 : 40 : 23

b) 17 : 12 : 21

c) 18 : 20 : 21

d) 28 : 20 : 21

e) None of these

98) If Rs. 1540 be divided amongst A, B and C in such a way that the share of B is equal to of what A and C together receive. Then, B's share will be:

a) Rs. 770

b) Rs. 420

c) Rs. 880

d) Rs. 1210

e) None of these

99) RS.73,689/- are divided between A and B in the ratio 4:7. What is the difference between thrice the share of A and twice the share of B?

a) Rs. 35699/-

b) Rs. 46,893/-

c) Rs. 20,097/-

d) Rs. 26796/-

e) Rs. 13,398/-

100) The price of diamond is directly prortional to the square of its weight. The diamond accidentally fell and broke into four pieces whose weights are in the ratio of 1:2:3:4. If the price fetched is Rs. 70,000 less than the original price, find the original price?

a) Rs. 100,000

b) Rs. 70,000

c) Rs. 160,000

d) Rs. 10800

e) Rs. 150,000

91) Answer: D

$(3 \times 60 \times 1 \times 1.5) : (1 \times 40 \times 2 \times 1) = 270 : 80 = 27 : 8$



92) Answer: A

Let the stones with Mani, Ram and Bhuvana be M, R and B respectively.

Given, $7R=9M$; $7M=9B$

$R/M=9/7$; $M/B=9/7$ \Rightarrow so, $R:M=9:7$; $M:B=9:7$

The least possible integral values for R, M, B will be $R=81$, $M=63$ and $B=49$

\Rightarrow Total $= 81+63+49=193$

93) Answer: B

Ratio of their investment

$= 7/4 : 8/5 : 9/6$ \Rightarrow take LCM

$= 7 \times 15 : 8 \times 12 : 9 \times 10$

$A : B : C = 35 : 32 : 30$

94) Answer: A

Let the amount be X the distribution For B is $3/9$

The error amount calculated for B $2/14$

By this we got Rs.40 Less

$x/3 - x/7 = 40$

$4x = 40 \times 210$

$x = 210$

95) Answer: A

Amount invested in Debit funds = 4.

Amount invested in equity funds = 5.

After 1 yr Mr. Xaviers total amount $= 4x \times 130/100 + 5x \times 130/100 \Rightarrow 11.7$,

Amount invested in equity funds $= 11.7 \times 7/13$

$11.7 \times 7/13 = 94500$

$= 15000$

The original amount invested in equity funds $= 5 \times 15000$

$= \text{Rs. } 75000$

96) Answer: A

A: B = 15: 16

B: C = 17: 18

A: C = 255: 288

A: B: C = 255: 272: 288



$$C = (288/815) * 187450 \\ = 66240$$

97) Answer: C

A: B: C :: 3: 4: 7

New income ratio = 4.5: 5: 5.25

= 18: 20: 21

98) Answer: A

if a get 100 and c get 200 then b get 300.

So the ratio is 1:3:2

B's share = $1540 * \frac{3}{6} = 770$

99) Answer: E

The A's Share is = $73687 * \frac{4}{11} = 26795.27$

The B's Share is = $73687 * \frac{7}{11} = 46891.73$

Difference between Twice B's Share & thrice A's Share = $93783.45 - 80385.82 = 13397.64$

A's Share = $93783.45 - 80385.82 = 13397.64 = 13398$

100) Answer: A

If we assume weight of diamond 10x, will I come up with 10x because the ratio, given 1: 2: 3: 4 add upto 10.

So, individual weights of diamonds will be x, 2x, 3x and 4x

Original price = $K (10x)^2$

Price for pieces = $K (x^2 + 4x^2 + 9x^2 + 16x^2)$

= $K 30x^2$

Thus change in price we see in $100 Kx^2 - 30Kx^2 = 70Kx^2$ which is given is 70,000

So, the original price is Rs. 100,000

14. PROBLEMS ON AGES

1) If the current age of a person be X, then

- age after n years = $X + n$

- age n years ago = $X - n$

- n times the age = nX

- If ages in the numerical are mentioned in ratio A : B, then A : B will be AX and BX



2) If sum of ages of x and y is A and ratio of their ages is p : q respectively, then u can determine age of y by using the formula shown below:

Age of y = (Ratio of y/Sum of ratios) *sum of ages

$$\text{Age of y} = (q/(p+q)) * A$$

Type1: Calculate Present age

1) What is Kishore present age, if after 30 years his age will be 15times of his age 15 years back.

- a) 16.2 years
- b) 17.7 years
- c) 18.2years
- d) 15.4 years

2) Amit is 18 years elder than Rohit. If 8 years ago, Amit was 6 times as old as Rohit, then find Amit's present age.

- a). 32.5 years
- b) 27.5 years
- c) 29.6 years
- d) 24.9 years

3) The age of vaishu is 18 times that of her daughter raiza. If the age of raiza is 6years, what is the age of vaishu?

- a) 98
- b) 110
- c) 90
- d) 108

4) The father's age 7years ago was 11 times the age of his daughter. At present the father's age is 7 times that of his daughter. Find the daughter's present age.

- a) 17.5
- b) 18.2
- c) 23
- d) None

5)12 years ago M was half of N in age. If the ratio of their present ages is 4 : 5, what will be the total of their present ages

- a) 30



- b) 35
c) 36
d) 32
- 6) The sum of the ages of a Mother and son is 54 years. Eight years ago, the product of their ages was 6 times the mother's age at that time. The present age of mother and son
- a) 34,17
b) 14,40
c) 40,14
d) 50,17
- 7) Mani is 32years older than his son Dinesh. In 4 years, his age will be twice the age of his son. The present age of his son is
- a) 26 years
b) 28years
c) 22 years
d) 24 years
- 8) The sum of the current ages of a father and his son is 84 years. 7 years ago, father's age was 3 times the age of the son. After 7 years, son's age will be
- a) 35 years
b) 28 years
c) 56years
d) 53 years
- 9) The total age of x and y is 48 years more than the total age of y and z. z is how many year younger than x
- a) 44
b) 24
c) 96
d) 48
- 10) The ages of two sisters differ by 32 years. 12 years ago, the elder one was 7 times as old as the younger one. What are their present ages of the elder person
- a) 46.9
b) 49.3
c) 42.7
d) 45.4



1) C

Let kishore's present age be x

kishore's age before 15 years = $(x - 15)$

kishore's age after 30 years = $(x + 30)$

We are given that,

kishore's age after 30 years $(x + 30)$ is 15 times his age 15 years back $(x - 15)$

Therefore,

$$(x + 30) = 15(x - 15)$$

Solving the equation, we get

$$x + 30 = 15x - 225$$

$$14x = 255$$

$$x = 18.2 \text{ years}$$

2) C

Let age of Rohit be y

Amit is 18 years elder than Rohit = $(y + 18)$.

So Amit's age 8 years ago = $(y + 18 - 8)$

Rohit's age before 8 years = $(y - 8)$

8 years ago, Amit is 6 times as old as Rohit

$$(y + 18 - 8) = 6(y - 8)$$

$$(y + 10) = (6y - 48)$$

$$5y = 58$$

$$y = 11.6$$

Rohit's age = 11.6 years

Amit's age = $(y + 18) = (11.6 + 18) = 29.6$ years

3) D

Vaishu's present age = x

Vaishu's age is 18 times her daughter's age.

Daughter's age = 6.

Therefore, 18 times of 6 = x

$$18 \times 6 = x$$

$x = 108$ years = Vaishu's age.

4) A

Daughter's present age = x



At present the father's age is 7 times that of his daughter

i.e., Father's present age = $7x$.

'Father's age 7 years ago was 11 times the age of his daughter'

$$(7x - 7) = 11 * (x - 7)$$

$$x = 17.5 \text{ years,}$$

The daughter's present age = 17.5 years

5) C

Let M's age 12 years ago = x years.

Then, N's age 12 years ago = $2x$ years.

$$(x + 12) / (2x + 12) = 4/5$$

$$\Rightarrow x = 4.$$

So, the total of their present ages = $(x + 12 + 2x + 12)$

$$= (3x + 24) = 36 \text{ years.}$$

6) C

Let sons age = x years. Then mothers age = $(54 - x)$ years.

$$(x-8)(54-x-8) = 6(54-x-8) \text{ hence } (x-8) = 6 \text{ so } x = 14$$

Their ages are 40 years and 14 years.

7) B

Let the son's present age be x years.

Then, mani's present age = $(x + 32)$ years

$$\Rightarrow (x + 32) + 4 = 2(x + 4)$$

$$\Rightarrow x + 36 = 2x + 8$$

$$\text{So, } x = 28$$

8) A

Son's current age = x years.

Then father's age = $(84 - x)$ years

$$(84 - x) - 7 = 3(x - 7)$$

$$2x = 56$$

$$x = 28; \text{ after 7 years it will be turn on } 35$$

9) D

Given that $x + y = 48 + y + z$

$$x - z = 48 + y - y = 48$$



z is younger than x by 48 years

10) B

Let's take the present age of the elder person = x

and the present age of the younger person = x – 32

$$(x - 12) = 7(x - 32 - 12)$$

$$\Rightarrow x - 12 = 7x - 308$$

$$\Rightarrow 6x = 296$$

$$\Rightarrow x = 49 \text{ years } 3 \text{ months}$$

Type 2: Numerical to Determine Ages in ratio form

11) Three year ago, ratio of Tom and Ram age's was 5 : 6 respectively. After 12 years, this ratio becomes 6 :

7. How old is Ram at present?

- a) 39 years
- b) 93 years
- c) 78 years
- d) 87 years

12) Age of father 30 years ago was 9 times the age of her son. After 30 years, father's age will be thrice that of his son. Find the ratio of their present ages.

- a) 21 : 5
- b) 29 : 5
- c) 27 : 4
- d) 21 : 3

13) Ratio of ages of three girls are 5:8:10, six years ago, the sum of their ages was 28. Find their present ages.

- a) 16,10,20
- b) 12,28,36
- c) 10,16,20
- d) 16,28,36

14) Eight years ago, the ratio of the ages of micky and Donald was 6:5, 12 years hence, the ratio of their ages will be 11:10. What is Donald age at present

- a) 30 years
- b) 28 years



- c) 34 years
- d) 36 years

15) Shyam is younger than Sharuk by 22 years. If the ratio of their ages is 5:7, find the age of Shyam

- a) 55
- b) 77
- c) 66
- d) 88

16) Keerthi's grandfather was 16 times older to her 32 years ago. He would be 6times of her age 16 years from now. What was ratio of ages of keerthi and her grandfather 16 years ago.

- a) 1:10
- b) 11:10
- c) 10:11
- d) 10:1

17) The ratio between the present ages of M and N is 8:9. If N is 6 years old than M, what will be the ratio of the ages of M and N after 6 years

- a) 9:10
- b) 7:9
- c) 9:8
- d) 11:10

18) Total of the ages of P, Q and R at present is 99 years. Eight years ago, the ratio of their ages was 4: 5: 6. What is the age of Q at present

- a) 44
- b) 30
- c) 45
- d) 33

19) Ratio between vinodha and swetha is 7:6, After 8 Years vinodha's age will be 29 years. What is swetha present age.

- a) 16
- b) 18
- c) 20
- d) 22



20) The ratio of the ages of Bala and Babu is 13: 11. The total of their ages is 3.6decades. The proportion of their ages after 0.95decades will be [1 Decade = 10 years]

- a) 24:23
- b) 12:11
- c) 27:24
- d) 29:26

11) B

We are given that age ratio of tom and ram = 5 : 6

Tom's age = $5x$ and Ram's age = $6x$

3 years ago, their age was $5x$ and $6x$.

Hence at present, Tom's age = $5x + 3$ and Ram's age = $6x + 3$

After 12years,

Tom's age = $(5x + 3) + 12 = (5x + 15)$

Ram's age = $(6x + 3) + 12 = (6x + 15)$

After 12years, this ratio becomes $\Rightarrow 6 : 7$. Therefore,

Tom's Age/ram's Age = $6/7$

$(5x + 15) / (6x + 15) = 6 / 7$

$7(5x + 15) = 6(6x + 15)$

$X = 15$

Ram's present age = $(6x + 3) = 93$ years

12) A

At age of son be x and as father's age is 9 times the age of her son, let it be $9x$, nine years ago.

At present: father's age will be $(9x + 30)$ and son's age will be $(x + 30)$

After 30 years: father's age will be $(9x + 30) + 30$ and son's age will be $(x + 30) + 30$

father's age is thrice that of son

$(9x + 30) + 30 = 3[(x + 30) + 30]$

$(9x + 60) = 3[x + 60]$

Solving the equation, we get $x = 20$

We are asked to find the present ratio.

$(9x + 30) : (x + 30) = 210 : 50 = 21:5$

13) C

Let the present ages are $5x$, $8x$, $10x$.

$\Rightarrow (5x - 6) + (8x - 6) + (10x - 6) = 28$

$\Rightarrow 23x = 46$



$$\Rightarrow x = 2$$

So their present ages are: 10,16,20

14) B

Let 8 years ago the age of Micky and Donald be $6x$ and $5x$ resp.

then,

$$((6x+8)+12) / ((5x+8)+12) = 11/10$$

$$10(6x+20) = 11(5x+20)$$

$$5x = 20 \Rightarrow x = 4$$

So Donald age is $(5x+8) = 28$

15) A

If sharuk age is x , then Shyam age is $x-22$,

$$\text{so } (x-22)/x = 5/7$$

$$\Rightarrow 7x-154 = 5x$$

$$\Rightarrow 2x = 154$$

$$\Rightarrow x = 77$$

So shyam age is $77 - 22 = 55$

16) A

Let, keerthi's age 32 years ago = x ,

Grandfather's age 32 years ago = $16x$.

$$16 \text{ years from now, } 6(x+32+16) = (16x+32+16)$$

$$\Rightarrow x = 24$$

16 years ago ratio was:

$$(x+16) / (16x+16) = (24+16) / (16*24+16)$$

$$40 / 400 = > 1 / 10$$

17) A

Let M age and N age be $8x$ years and $9x$ years.

$$\text{Then } 9x - 8x = 6 \Leftrightarrow x = 6$$

So required ratio will be $(8x+6) : (9x+6)$

$$54:60$$

$$9:10$$

18) D

Let their ages 8 years ago is $4x$, $5x$ and $6x$ years.



$$4x+8+5x + 8 + 6x + 8= 99$$

hence $x= 5$

$$\begin{aligned}\text{Q's present age} &= (5x + 8) \\ &= 33 \text{ years}\end{aligned}$$

19) B

Present age is $7x$ and $6x$,

$$\Rightarrow 7x + 8 = 29 \Rightarrow x = 3$$

So swetha age is $= 6(3) = 18$

20) D

Let, Bala's age = $13A$ and babu's age = $11A$

$$\text{Then } 13A + 11A = 36$$

$$A = 1.5$$

Bala's age = 19.5 years

and Babu's age = 16.5 years

$$\begin{aligned}\text{Proportion of their ages after 9.5 is} &= (19.5+9.5) : (16.5 + 9.5) \\ &= 29 : 26\end{aligned}$$

Type 3: Determine Age of a Person after / before x Years

21) Nandhu is 80 years old and Nalini is 90 years old. How many years ago was the ratio of their ages 8 : 10?

- a) 40 years
- b) 35 years
- c) 20 years
- d) 25 years

22) The ratio of kabil's age 6 years ago and sahu's age after 6 years is 3 : 3. If at present, the ratio of their ages is 7: 5, then find the ratio between kabil's age 6 years hence and sahu's age 6 years ago.

- a) 1 : 3
- b) 2 : 1
- c) 4 : 3
- d) 3 : 4

23) The sum of the current ages of two persons M and N is 129. If the age of M is twice that of N, find the sum of their ages 8 years hence.

- a) 125



- b)145
c)137
d)149
- 24) The ratio of the age of a rithick and his wife is 12:9. At the time of marriage the ratio was 10:6 and After 6 years this ratio will become 18:14. How many years ago were they married?
- a) 27
b) 12
c) 18
d) 14
- 25) The sum of ages of 4 puppies born at the intervals of 2 years each is 48 years. What is the age of the youngest puppy?
- a) 9years
b) 8 years
c) 10 years
d) None of these
- 26) Vasu said to his son, "I was as old as you at the time of your birth". If vasu's age is 76 years now, the son's age ten years back was:
- a)14 years
b)19 years
c)33 years
d)28 years
- 27) P is 6 years older than Q who is twice as old as R. If the total of the ages of P, Q and R be 81, the how old is Q?
- a) 27
b) 28
c) 29
d) 30
- 28) Fathima's father was 76 years of age when she was born while her mother was 72years old when her brother 8 years younger to her was born. What is the difference between the ages of her parents?
- a)12 years
b)14 years
c)16 years



d) 18 years

29) Mr. Nagar is 6 times more aged than his daughter. If after 10 years, he would be 6 times of daughter's age, then further after 10 years, how many times he would be of his daughter's age?

- a) 5.5 times
- b) 5.8 times
- c) 2.5 times
- d) 5.1 times

30) 15 years ago, vaishali age was 15 times the age of her brother and the sum of present ages of vaishali and brother is 94 years. What will be the age of her brother after 18 years?

- a) 32 years
- b) 33.5 years
- c) 37 years
- d) 30 years

21) A

Let us assume x years ago

At present: Nandhu is 80 years and Nalini is 90 years

x years ago: Nandhu's age = $(80 - x)$ and Nalini's age = $(90 - x)$

Ratio of their ages x years ago was 8 : 10

$$(80 - x) / (90 - x) = 8/10$$

$$800 - 10x = 720 - 8x$$

$$2x = 80$$

$$x = 40$$

Therefore, 40 years ago, the ratio of their ages was 8:10

22) B

At present: Ratio of their ages = 7 : 5. Therefore, 7: 5 will be 7x and 5x.

kabil's age 6 years ago = $7x - 6$

sahul's age after 6 years = $5x + 6$

Ratio of kabil's age 6 years ago and sahu's age after 6 years is 3 : 3

Therefore,

$$(7x - 6) / (5x + 6) = 3/3$$

Solving, we get $x = 6$

We are asked to find the ratio between kabil's age 6 years hence and sahu's age 6 years ago.



kabil's age : $(7x + 6)$

sahul's age: $(5x - 6)$

Ratio of sahu's age and kabil's age

$$(7x + 6) / (5x - 6) = 48/24 = 2/1 = 2:1$$

23) B

$$M + N = 129$$

$$\text{Given } M = 2N$$

$$\text{From Which } N = 43, M = 86$$

8 years their age will be 51 and 94 ,so the sum of their ages is 145

24) C

Let the present age of the rithick and his wife be $12x$ and $9x$ respectively.

After 6 years this ratio will become $18:14 \Rightarrow 9:7$

$$(12x+6): (9x+6) = 9:7$$

$$84x+42 = 81x+54$$

$$x=4$$

$$\text{Present age of the rithick} = 12x = 48$$

$$\text{Present age of his wife} = 9x = 36$$

Assume that they got married before t years. Then,

$$(48-t):(36-t)=10:6$$

$$144-3t=180-5t$$

$$2t=36$$

$$t=18$$

25) A

Let the ages of puppies be x , $(x + 2)$, $(x + 4)$ and $(x + 6)$ years.

$$\text{Then, } x + (x + 2) + (x + 4) + (x + 6) = 48$$

$$4x = 36, x = 9$$

Age of the youngest puppy = $x = 9$ years

26) D

Let the son's present age be x years.

$$\text{Then, } (76 - x) = x$$

$$2x = 76$$

$$x = 38$$

Son's age 10 years back $(38-10) = 28$ years



27) D

Let R's age be x years.

Then, Q's age = $2x$ years.

P's age = $(2x + 6)$ years.

$$(2x + 6) + 2x + x = 81$$

$$5x = 75 \Rightarrow x = 15.$$

Hence, Q's age = $2x = 30$ years

28) A

Mother's age when Fathima's brother was born = 72 years.

Father's age when Fathima's brother was born = $(76+8)$ years = 84 years.

Required difference = $(84-72)$ years = 12 years

29) D

Let daughter's age be x and father's age be $6x$.

Father's age is 6 times more aged than his daughter, therefore father's present age = $x + 6x = 7x$

After 10 years, father's age is 6 times more than his daughter age.

$$(7x + 10) = 6(x + 10)$$

$$(7x+10)=6x+60$$

$$x = 50$$

After 10 years it was $(7x + 10)$, then after further 10 years, father's age = $(x + 20)$ and daughter's age = $(x + 20)$

$$(7x+10)/(x+20) = ?$$

Substitute the value of x , we get

$$= (350+10) / 70$$

$$= 360 / 70$$

$$= 5.14$$

After further 10 years, father will be 5.1 times of daughter's age

30) C

Let present age of brother be x and vaishali's age be $94 - x$.

	Past Age (15 Yrs Ago)	Present Age	Future Age (After 18Yrs)
Brother	$(x - 15)$	x	$(x + 18) = ?$
Sister	$(94 - x) - 15$	$(94 - x)$	

We are given, 15 years ago sister's age was 15 times the age of her brother.



Therefore,

$$(94 - x) - 15 = 15(x - 15)$$

$$94 - x - 15 = 15x - 225$$

$$15x + x = 94 - 15 + 225$$

$$16x = 304$$

$$x = 19$$

$$\text{Future age (after 18 yrs)} = (x + 18) = (19 + 18) = 37 \text{ years}$$

15. TIME, SPEED AND DISTANCE

1) In a 2280 m race Dinesh beats Aarav by 360 m or 6 seconds. In another race on the same track at the same speeds. Aarav and karthick start at one end while Dinesh starts at the opposite end. How many metres would Aarav have covered ,by the time Dinesh meets karthick given that Dinesh speed is 16 m/sec more than that of karthick

- a) 1140 m
- b) 2280 m
- c) 2460 m
- d) 1180 m

2) kajal rides his scooter 14km at an average speed of 16 km/hr and again travels 16km at an average speed of 14 km/hr. What is her average speed for the entire trip approximately?

- a) 15.36 km/hr
- b) 17.46 km/hr
- c) 13.56 km/hr
- d) 14.86 km/hr

3) A bus can travel 25% faster than a jeep. Both start from point P at the same time and reach point Q, 225 kms away from P, at the same time. On the way, however, the bus lost about 37.5 minutes while stopping at the certain place. What is the speed of the jeep?

- a) 64 km/hr
- b) 72 km/hr
- c) 68 km/hr
- d) 56 km/hr

4) A race course is 250 m long. P and Q run a race and P wins by 4m. Q and R run over the same course and Q win by 3m. R and S run over it and S wins by 12m. If P and S run over it, then who would win and by how much?



- a) P by 4.82m
- b) S by 5.30m
- c) P by 7.25m
- d) Q by 6.54m

5) Kishore is travelling on his bike and has calculated to reach point P at 4 pm if he travels at 20 kmph. He will reach there at 12 noon if he travels at 30 kmph. At what speed must he travel to reach P at 2 pm?

- a) 18 kmph
- b) 12 kmph
- c) 24 kmph
- d) 16 kmph

6) The speed of a van increases by 5 kmph after every one hour. If the distance travelled in the first one hour was 55 km, what was the total distance travelled in 8 hours?

- a) 580km
- b) 116km
- c) 147km
- d) 240km

7) The distance between salem and trichy is 170 km. A bus starts from salem at 6 a.m. and travels towards trichy at 20 km/hr. Another bus starts from trichy at 7 a.m. and travels towards salem at 30 km/hr. At what time will they meet?

- a) 7a.m
- b) 8a.m
- c) 9a.m
- d) 10a.m

8) Tharun has to cover a distance of 84 km in 40 minutes. If he covers one-half of the distance in one-fourth of the total time, to cover the remaining distance in the remaining time, what should be his speed in km/hr?

- a) 42 km/hr
- b) 64km/hr
- c) 84km/hr
- d) 76km/hr

9) In a 2700 m race around a round track of length 300m, abi and kabi meet at the end of the 3rd minute, for the first time after the start of the race. All the runners maintain uniform speed throughout the race. If abi runs at twice the speed of the kabi. Find the time taken by abi to finish the race.



- a) 27 mints
- b) 32 mints
- c) 5 mints
- d) 23 mints

10) Three friends X, Y and Z run a running race, Y finished 12 meters ahead of Z and 18 m ahead of X, while Z finished 8m ahead of X. If each friends runs the entire distance at their respective constant speeds, what is the length of the race?

- a) 16m
- b) 48m
- c) 24m
- d) 12m

1) B

Aarav 's speed = $360/6 = 60$ m/s

Time taken by Aarav to cover 2280 m = $2280/60 = 38$ seconds

Dinesh 's speed = $2280/60 = 38$ m/s

karthick 's speed = 22 m/s

Time taken by Dinesh to meet karthick in 2280m race in opposite direction:

Distance covered by Aarav:

$$= 2280 / (38 + 22)$$

$$= 2280 / 60$$

$$= 38 \text{ seconds}$$

$$= (38 * 60) \text{ m}$$

$$= 2280 \text{ m}$$

2) D

Total distance travelled

$$= 14 + 16 = 30 \text{ Km}$$

Time taken to travel 14 km at an average speed of 16 km/hr

$$= 14 / 16 = 7/8 \text{ Hr}$$

Time taken to travel 16 km at an average speed of 14 km/hr

$$= 16 / 14 = 8/7 \text{ hr}$$

$$\text{Total time taken} = 7/8 + 8/7$$

Average speed = Total distance travelled / Total time taken

$$= 30 / (7/8 + 8/7)$$

$$= 30 / (113/56)$$



$$=30 \times 56 / 113 = 1680 / 113$$

$$=14.86 \text{ km/hr}$$

3) B

Let speed of the jeep = x kmph

Then, speed of the bus = $(100+25)x/100$

$$=125x/100 = 5x/4 \text{ kmph}$$

Time taken by the jeep to travel from P to Q

$$=225/x \text{ hours}$$

Time taken by the bus to travel from p to Q

$$=225/(5x/4) + (37.5/60)$$

Since both start from P at the same time and reach point Q at the same time,

$$225/x = 225/(5x/4) + (37.5/60)$$

$$225/x = 900/5x + 37.5/60$$

$$225/x = 180/x + 37.5/60$$

$$45/x = 37.5/60$$

$$37.5x = 45 \times 60$$

$$X = 72 \text{ km/hr}$$

4) B

If P covers 250m, Q covers 246 m

If Q covers 250m, R covers 247 m

If S covers 250m, R covers 238m

Now if Q covers 246 m, then R will cover $=247/250 \times 246 = 243.048$

If R covers 243.048 m, then S will cover $=250/238 \times 243.048 = 255.30$

If P and S run over 250 m, then S win by $=(255.30-250)$

S win by = 5.30 m

5) C

Let the distance be x km

Travelling at 20 kmph, Kishore will reach point P at 4pm.

Travelling at 30 kmph, Kishore will reach point P at 12noon.

Therefore, time taken when travelling at 20km - time taken when travelling at 30 km = 4 hours

$$x/20 - x/30 = 4$$

$$(3x - 2x)/60 = 4$$

$$x/60 = 4$$

$$x = 240$$



Time needed if travelled at 20 kmph $= 240/20 = 12$ hours Therefore, to reach at 2 pm, his travelling time must be $(12-2) = 10$ hours

Hence, required speed $= 240/10 = 24$ kmph

6) A

Distance travelled in 1st hour $= 55$ km

Speed of the van increases by 5 kmph after every one hour. Hence,

distance travelled in 2nd hour $= 60$ km

distance travelled in 3rd hour $= 65$ km

and so on

Total distance travelled

$= (55 + 60 + \dots + (8 \text{ terms}))$

$= \frac{8}{2}(2 \times 55 + (8-1)5)$

$= 4(110 + 35)$

$= 580$ km

7) D

Assume that they meet x hours after 6 a.m.

Then, Bus 1, starting from Salem, travels x hours till the bus meet.

Distance travelled by bus 1 in x hours $= 20x$ km

Bus 2, starting from Trichy, travels $(x-1)$ hours till the bus meet.

Distance travelled by bus 2 in $(x-1)$ hours $= 30(x-1)$ km

Total distance travelled

$= \text{Distance travelled by bus 1} + \text{Distance travelled by bus 2}$

$\Rightarrow 170 = 20x + 30(x-1)$

$170 = 20x + 30x - 30$

$170 + 30 = 50x$

$200 = 50x$

$x = 4$

Hence, the bus meet 4 hours after 6 a.m., i.e. at 10 a.m.

8) C

Tharun needs to cover 84 km in 40 minutes

Given that he covers one-half of the distance in one-fourth of the total time

\Rightarrow he covers half of 84 km in one-fourth of 40 minutes

\Rightarrow He covers 42 km in $\frac{1}{4} \times 40$ minutes



⇒ He covers 42 km in 10 minutes

Now he needs to cover the remaining 42 km in remaining 30 minutes

Distance = 42 km

Time = 30 minutes = $\frac{1}{2}$ hr

Required Speed = Distance / Time

$= 42 / (\frac{1}{2}) = 84$ km/hr

9) A

As, abi is twice as fast as the kabi, abi would have completed two rounds by the time kabi completes one round.

And that is their second meeting.

Their first meeting takes place after the abi takes 3 min to complete one round.

$300 \times 1 = 300$ m

⇒ He takes $2700 / 300 \times 3 = 27$ mins

Hence he takes 27 minutes to finish the race.

10) B

Let the length of the race track be 'd'.

When Y finished the race, X and Z would have run (d-18) and (d-12) meters respectively.

When Z finishes the race, X would have run (d-8) meters.

The ratio of speeds of Z and X is:

$$(d-12)/(d-18) = d/(d-8)$$

$$(d-8)(d-12) = d(d-18)$$

$$d^2 - 12d - 8d + 96 = d^2 - 18d$$

$$d^2 - 20d + 96 = d^2 - 18d$$

$$20d - 18d = 96$$

$$d = 96 / 2 = 48 \text{ m}$$

hence the length of the race track is 48 m

11) A car covers a distance of 1120 metres in 1 minute whereas a bus covers a distance of 56 kms in 44 minutes. What is the ratio of their speed?

a) 22:25

b) 25:22

c) 11:15

d) 15:11



12) Anushiya covered a definite distance at some speed. If she had moved 5 kmph faster, she would have taken 55 minutes less. If he had moved 4 kmph slower, she would have taken 55 minutes more. What is the distance in km?

- a) 110 Km
- b) 220 km
- c) 330 km
- d) 440 km

13) Shreya travel the first part of her journey at 160 kmph and the second part at 240 kmph and cover the total distance of 3840 km to her destination in 20 hours. How long did the first part of her journey last?

- a) 8 hrs
- b) 12 hrs
- c) 16 hrs
- d) 10 hrs

14) Ravi walks to and fro to a Gym. He spends 30 minutes in gym. If he walks at speed of 20 km an hour, he returns to home at 8.00 a.m. If he walks at 30 km an hour, he returns to home at 7.30 a.m. How fast must he walk in order to return at 7.15 hours?

- a) 40 km/hr
- b) 30 km/hr
- c) 60 km/hr
- d) 50 km/hr

15) A passenger train without stopping running at an average speed of 120 km/hr and with stoppages at an average speed of 80 km/hr. What is the total time taken by the train for stoppages on a route of length 480km?

- a) 2 hours
- b) 3 hours
- c) 4 hours
- d) 5 hours

16) Siva leaves chennai at 3 am and reaches Hyderabad at 11 am . Anirudh leaves Hyderabad at 5 am and reaches chennai at 12:00 noon. At what time do they cross each other?

- a) 7 : 52am
- b) 8 : 25am
- c) 6 : 52am
- d) 9 : 25am



17) A monkey takes 16 jumps for every 20 jumps of a dog but 12 jumps of a monkey are equal to 16 jumps of the dog. Compare their speeds

- a) 15:16
- b) 17:16
- c) 16:15
- d) 16:17

18) A hare is spotted by a tiger from a distance of 50 metres. When the tiger starts a chase, the hare also starts running. If the speed of the hare be 4 km/hr and that of a tiger 5 km/hr, how far the hare will have run before its over taken?

- a) 100m
- b) 200m
- c) 300m
- d) 400m

19) A royal enfield bike starts with the speed of 210 km/hr with its speed increasing every 2 hrs by 30km/hr, in how many hrs will it cover 1035km?

- a) 2 1/2 hr
- b) 4 1/2 hr
- c) 6 1/2 hr
- d) 7 1/2 hr

20) Jackson travels a distance of 100km in 5 hrs. How much faster in kilometer per hr, on an average, must he travel to make a journey in 5/3 hr less time?

- a) 5 km/hr
- b) 10km/hr
- c) 6 km/hr
- d) 8 km/hr

11) A

Speed of the Car = 1120 m/minute

Speed of the bus=56 kms in 44 minutes

=56/44 km/m

=56000/44 m/mints

Speed of the car : Speed of the bus,

=1120:56000/44



$$=280:14000/44$$

$$=20:1000/44$$

$$=880:1000$$

$$=88:100$$

$$\text{Required ratio} = 22:25$$

12) C

$$\text{speed} = 2V_1V_2/(V_1 - V_2)$$

$$= 2 \times 5 \times 4 / (5 - 4)$$

$$= 40 \text{ km/hr}$$

$$\text{Distance} = vt_1 (1 + v/v_1)$$

$$= 40 \times 55/60 (1 + 40/5)$$

$$= 40 \times 11/12 (1 + 8)$$

$$= 40 \times 11/12 \times 9$$

$$= 330 \text{ km}$$

Therefore the distance is 330km

13) B

The total time of journey = 20 hours.

Let 'x' hours be the time that shreya travelled at 160 kmph

Therefore, 20-x hours would be time that she travelled at 240 kmph.

Hence, she would have covered $x \times 160 + (20-x) \times 240$ kms in the 20 hours = 3840 kms

$$x \times 160 + (20-x) \times 240 = 3840$$

$$160x + 4800 - 240x = 3840$$

$$240x - 160x = 4800 - 3840$$

$$80x = 960$$

$$X = 960/80 = 12 \text{ hrs}$$

14) A

As per the question, let D be the total distance and

't' is the time taken.

So we have:

$$D = 20t$$

$$20t = 30(t - 0.5)$$

$$20t = 30t - 15$$

$$10t = 15$$



$$t=3/2$$

$$D= 30 \text{ km}$$

Now, for the condition given we have:

$$30=S(t-3/4)$$

$$30=S(3/2-3/4)$$

$$30=S((6-3)/4)$$

$$30=S(3/4)$$

$$S=40 \text{ km/hr}$$

15) A

Let r = running time of the train

s = stoppage time of the train

D = total distance travelled by train

We have:

$$D/r = 120 \text{ and} \dots\dots\dots(1)$$

$$D/(r+s) = 80 \dots\dots\dots(2)$$

Dividing (1)&(2),

$$D/r \cdot (r+s)/D = 120/80$$

$$(r+s)/r = 3/2$$

$$1 + s/r = 3/2$$

$$s/r = 3/2 - 1$$

$$s/r = 1/2 \dots\dots\dots(3)$$

As, $D=480 \text{ kms}$

$$480/r = 120$$

$$r=4$$

put r value in (3), we get

$$s/4 = 1/2$$

$$S = 2 \text{ hours}$$

16) C

Time taken by Siva = 8 h

Time taken by Anirudh = 7 h

For your convenience take the product of times taken by both as a distance.

Then the distance = 56km

Since, Siva covers half of the distance in 2 hours (i.e at 5 am)

Now, the rest half (i.e 28 km) will be covered by both Anirudh and Siva

Time taken by them = $28/15 = 1 \text{ hr } 52 \text{ min}$



Thus , they will cross each other at 6 : 52am.

17) C

Let the distance covered in 1 jump of the monkey be x and,

Distance covered in 1 jump of the dog be y

Then $12x = 16y$

$X = 16 / 12 y$ ----->1

Ratio of speed of monkey and dog = Ratio of distances covered by them in the same time

= $16x : 20y$

= $256 / 12 y : 20y$ (from 1)

= $256 : 240$

= 16:15

18) B

Relative speed of the tiger = $(5-4)$ km/hr

= 1 km/hr

Time taken by tiger to cover 50 m,

= $(50/1000)$ hr = $1/20$ hr

In $1/20$ hrs, the tiger cover a distance of $(4 * 1/20)$ km

= $1/5$ km => $(1/5 * 1000)$ m

= 200m

19) B

Distance covered in 1st 2 hrs = $(210 * 2)$ km

= 420km

Distance covered in next 2 hrs = $(240 * 2)$ km

= 480km

Remaining distance = $1035 - (420 + 480)$

= $1035 - 900$

= 135km

Speed in 5th hr = 270 km/hr

Time taken to cover 135 km = $135/270 = \frac{1}{2}$ hr

Total time taken = $(2 + 2 + 1/2)$

= $4 \frac{1}{2}$ hrs

20) B

Time required = $(5 \text{ hrs} - 5/3 \text{ hrs})$



= (5 hrs – 100 mints)

= (5 hrs – 1 hr 40 mints)

= 3 hrs 20 mints

= 3 $\frac{1}{3}$ hrs

Required speed = $(100 \times \frac{3}{10})$ km/hr

= 30 km/hr

Original speed = $(100/5)$ km/hr = 20 km/hr

Difference speed = required speed – original speed

= (30 - 20)

= 10 km/hr

21) Anitha takes 8 hrs 20 mints in walking to a temple and riding back. She would have gained 3 hrs by riding both ways. The time she would take to walk both ways is.

- a) 15 hrs 40 mints
- b) 16 hrs 40 mints
- c) 18 hrs 40 mints
- d) 19 hrs 40 mints

22) A taxi driver make a trip from the plains to ooty which are 340 km apart at an average speed of 60 km/hr. In the return trip, he covers the same distance at an average of 30 km/hr. the average speed of the taxi over the entire distance of 680 km is

- a) 30
- b) 40
- c) 50
- d) 60

23) Robert travels from his home to Anna Park at a distance of 125 miles in $11\frac{1}{4}$ hrs. He returns to home in 2 hrs 15 mints. His average speed is.

- a) 50
- b) 40
- c) 30
- d) 20

24) The average speed of a bus in the upward journey is 50% more than that in the return journey. The bus halts for 2 hrs on reaching the destination. The total time taken for the complete to and from trip is 34 hrs covering a distance of 1600 km. the speed of the bus in the upward journey is.

- a) 63.24



- b) 65.67
- c) 63.49
- d) 62.49

25) Senthil started bike at 5 a.m to reach a temple. After going temple, his bike went out of order. Consequently he rested for 45 mins and came back to his house walking all the way. Senthil reached home at 8 a.m. if bike speed is 20 km/hr and his walking speed is 1 km/hr, then on bike he covered a distance of.

- a) 3.12
- b) 2.76
- c) 4.13
- d) 2.14

26) P,Q & R are on a journey by scorpio. P drives during the 1st 2 hrs at an average speed of 60 km/hr. Q drives during the next 3 hrs at an average speed of 58 km/hr R drives for the next 4 hrs at an average speed of 62 km/hr. They reached their destination after exactly 5 hrs. Their main speed is.

- a) 60 $\frac{2}{9}$
- b) 62 $\frac{2}{9}$
- c) 60 $\frac{4}{8}$
- d) 62 $\frac{4}{8}$

27) Karthiga jogs a speed of 18 km/hr at a distance of 27 km. at what speed would she need to jog during the next 4.5 hrs to have an average of 27km/hr for the entire jogging session.

- a) 40km/hr
- b) 30 km/hr
- c) 20 km/hr
- d) 35 km/hr

28) Ganesh is travelling on his motorbike and has calculated to reach golden temple at 8 p.m if he travels at 30 km/hr; he will reach there at 6 p.m if he travels at 45 km/hr. At what speed must he travel to reach the golden temple at 7 p.m?

- a) 36
- b) 46
- c) 32
- d) 30

29) A girl covered a definite distance at same speed. Had she moved 6 km/hr faster, she would have taken 30 mins less. If she had moved 4 km/hr slower, she would have taken 30 mins more. The distance (in km) is.



- a) 50
- b) 40
- c) 70
- d) 60

30) Anitha travels 400 km by bus at 70 km/hr, 600 km by train at 80km/hr, 250 km by bike at 60 km/hr and 50 km by car at 40 km/hr. what is the average speed for the total distance?

- a) 68.45
- b) 69.45
- c) 67.45
- d) 69.77

21) D

Let the distance be x km. then,

$$(\text{time taken to walk } x \text{ km}) + (\text{time taken to ride } x \text{ km}) = 25/3 \text{ hrs}$$

$$(\text{time taken to walk } 3x \text{ km}) + (\text{time taken to ride } 3x \text{ km}) = 25/3 * 3 = 25 \text{ hrs}$$

$$\text{But the time taken to ride } 3x \text{ km} = (25/3 - 3) \text{ hrs}$$

$$= (25 - 9)/3 \text{ hrs}$$

$$= 16/3 \text{ hrs}$$

$$\text{Time taken to walk } 3x \text{ km} = (25 - 16/3) \text{ hrs}$$

$$= (75 - 16)/3$$

$$= 59/3$$

$$= 19 \text{ hrs } 40 \text{ mins}$$

22) B

$$\text{Average speed} = (2xy / (x+y)) \text{ km/hr}$$

$$\text{Given } x = 60 \text{ km/hr} \quad y = 30 \text{ km/hr}$$

$$\text{Average speed} = (2 * 60 * 30 / (60 + 30)) \text{ km/hr}$$

$$= (3600 / 90)$$

$$= 40 \text{ km/hr}$$

23) A

Speed from home to annapark:

$$(125 * 4 / 11) \text{ mph} = (500 / 11) \text{ mph}$$

Speed from annapark to home:

$$(125 * 4 / 9) \text{ mph} = (500 / 9) \text{ mph}$$

$$\text{Average speed} = 2xy / (x+y) \text{ mph}$$



$$\begin{aligned}&= [(2 \times 500 / 11 \times 500 / 9) / (500 / 11 + 500 / 9)] \text{mph} \\&= (500000 / 99) / ((4500 + 5500) / 99) \\&= (500000 / 99) / 10000 / 99 \\&= 50 \text{mph}\end{aligned}$$

24) D

Let the speed in return journey be x km/hr

Then speed in upward journey = $150 / 100 x = (3/2 x)$ km/hr

Average speed = $(2 \times 3x / 2 \times x) / (3x/2 + x)$

$$\begin{aligned}&= 3x^2 / (5x/2) \\&= 6x^2 / 5x \\&= 6x/5 \text{ km/hr}\end{aligned}$$

Therefore $(1600 \times 5/6x) = 32$

$$\begin{aligned}1600 \times 5 &= (32 \times 6x) \\192x &= 8000 \\X &= 41.66\end{aligned}$$

Speed in upward journey = $(3/2 x)$ km/hr

$$\begin{aligned}&= (3/2 \times 41.66) \\&= 62.49 \text{ km/hr}\end{aligned}$$

25) D

Time taken = 2 hr 15 mins = $2 \frac{1}{4}$ hrs

Time = $9/4$ hrs

Let the required distance be x km

Then $x/20 + x/1 = 9/4$

$$\begin{aligned}(X+20x) / 20 &= 9/4 \\21x / 20 &= 9/4 \\84x &= 180 \\X &= 2.14 \text{ km}\end{aligned}$$

Therefore the required distance is 2.14 km

26) A

Distance covered by P = $2 \times 60 = 120$ km

Distance covered by Q = $3 \times 58 = 174$ km

Distance covered by R = $4 \times 62 = 248$ km

Total distance = $(120 + 174 + 248)$ km

$$= 542 \text{ km}$$



Total time taken = $2+3+4 = 9$ hrs

Mean speed = distance/ time

$= (542 / 9) \text{ km/hr}$

$= 60 \frac{2}{9} \text{ km/hr}$

27) B

Let the speed of jogging be x km/hr

Total time taken = $(27/18 \text{ hrs} + 4.5 \text{ hrs})$

$= (1.5 \text{ hrs} + 4.5 \text{ hrs})$

$= 6 \text{ hrs}$

Total distance covered = $(27+4.5x) \text{ km}$

Therefore $(27 + 4.5x) / 6 = 27$

$27+4.5x = 162$

$4.5x = 135$

$X = 135/4.5$

$= 30$

So jogging speed is 30 km/hr

28) A

Let the distance travelled be x km

$x/30 - x/45 = 2$

$(3x - 2x) / 90 = 2$

$x/90 = 2$

$x = 180 \text{ km}$

Time taken to travel 180 km at $30 \text{ km/hr} = 180 / 30 = 6 \text{ hrs}$

So Ganesh started 6 hrs before 8 pm

That is 2 pm

Required speed = distance / time

$= (180/5)$

$= 36 \text{ km/hr}$

29) D

Let distance = x km

Rate = y km/hr

$x/y - x / (y+6) = 30/60$

$(x(y+6)-xy) / y(y+6) = \frac{1}{2}$

$(xy + 6x - xy) / y(y+6) = \frac{1}{2}$



$$12x = y(y+6) \text{ -----}>1$$

$$\text{And } x/(y-4) - x/y = 30/60$$

$$(Xy - x(y-4)) / y(y-4) = \frac{1}{2}$$

$$2(xy - xy + 4x) = y(y-4)$$

$$8x = y(y-4) \text{ -----}>2$$

Dividing 1 by 2

$$12x / 8x = y(y+6) / y(y-4)$$

$$3/2 = (y+6) / (y-4)$$

$$3y - 12 = 2y + 12$$

$$Y = 24\text{km}$$

Put y value in 1 we get

$$12x = 24(24+6)$$

$$12x = 24 * 30$$

$$X=60\text{km}$$

30) D

$$\text{Total distance} = (400+250+50+600)\text{km}$$

$$=1300 \text{ km}$$

$$\text{Total time taken} = (400/70 + 600/80+250/60+50/40) \text{ hrs}$$

$$=(40/7 + 60/8+25/6+5/4)$$

$$=(24*40)+(21*60)+(28*25)+(42*5) / 168$$

$$=960+1260+700+210 / 168$$

$$=(3130 / 168)$$

$$\text{Average speed} =(1300*168 / 3130) \text{ km/hr}$$

$$=218400/3130$$

$$=69.77 \text{ km/hr}$$

31) A van travels from namakkal to Madurai at a constant speed. If its speed were increased by 40km/hr it would have taken 1 hr lesser to cover the distance. It would have taken further 45 mins lesser if the speed was further increased by 40km/hr. what is distance between the 2 cities.

a) 1680

b) B1660

c) 1670

d) 1675

32) Raghu starts a bike at 40 km/hr and he increases his speed in every hour by 4 km/hr. Then the maximum distance covered by him in 12 hours is:



- a) 744 km
- b) 658 km
- c) 436 km
- d) 512 km

33) A bike starts with a speed of 60 km/hr at 8a.m. Due to the problem in engine it reduces its speed as 20 km/hr for every 1 hour. After 9 am, the time taken to covers 15 km is:

- a) 13 minutes and 20 seconds
- b) 15 minutes and 09 seconds
- c) 18 minutes and 15 seconds
- d) 22 minutes and 30 seconds

34) Mr.Aneesh left for city 1 from city 2 at 3.00 pm. He travelled at the speed of 60km/hr for 1 and half hours. After that the speed was reduced to 15 km/hr. If the distance between two cities is 120 kms, at what time did Mr.Aneesh reach city 1 ?

- a) 6.30 pm.
- b) 5.30 pm.
- c) 7.30 pm.
- d) 8.30 pm.

35) Geetha runs at a speed of 12 km per hour and she increases her speed in every hour by 1 km per hour. In how many hours will he covers 27.8km ?

- a) 1 $\frac{1}{4}$ hours
- b) 2 $\frac{1}{3}$ hours.
- c) 3 $\frac{1}{2}$ hours.
- d) 2 $\frac{1}{5}$ hours.

36) A bus starts at bus stop and reaches a destination in 4 hours. If it travels first and second half at the speed of 40 km/hr and 50 km/hr respectively then the distance between bus stop and destination is

- a) 177.7 km
- b) 154.2 km
- c) 163.5 km
- d) 147.3 km

37) Anand takes 9 hours more than Babu to cover 150 km. Suppose the time taken by Anand is 30 minutes less than Babu he must double his speed. Then the speed of Anand will be:



- a) 7.64 km/hr.
- b) 7.43km/hr.
- c) 7.89 km/hr.
- d) 7.25 km/hr.

38) Find the speed and average speed of a bus which leaves salem at 4 p.m. and reaches madurai in the same day at 8 p.m. The distance between the two stations is 216 km and the total time for stoppage is 1 hour between these stations.

- a) 54,72
- b) 62,84
- c) 72,54
- d) 82,64

39) I reach the bus stop 15 min late if I walk at 2 kmph Starting from my office . Instead, if I walk at 3 kmph, I reach the bus stop 10 min early. How far is bus stop from my office?

- a) 1.5 km
- b) 2.5 km
- c) 3.5 km
- d) 4.5 km

40) If Gowtham ride a bike at 30 km/hr, then he arrives at a certain place at 3 p.m. If he ride at 45 km/hr, he will arrive at the same place at 1 P.m. At what speed must he ride to get there at noon?

- a) 18 km/hr
- b) 24 km/hr
- c) 36 km/hr
- d) 28 km/hr

31) A

Let distance = x km

Usual rate = y km/hr

Then $x/y - x/(y+40) = 1$

$X(y+40) / y(y+40) = 1$

$Xy+40x - xy = y(y+40)$

$40x = y(y+40) \quad \text{-----}>1$

$x/y - x/y+80 = 7/4$

$x(y+80) - xy / y(y+80) = 7/4$

$xy +80x - xy / y(y+80) = 7/4$



$$320x = 7y(y+80) \quad \text{-----}>2$$

Dividing 1 by 2 we get

$$8 = 7y(y+80) / y(y+40)$$

$$8(y+40) = 7y + 560$$

$$8y + 320 = 7y + 560$$

$$Y = 240$$

Substitute y value in 1

$$40x = 240 \times 280$$

$$X = 1680 \text{ km}$$

32) A

Speed of the rider = 40km/hr.

Distance covered in 1st hour = 40 km.

He increased his speed in every 1 hour by 4 km/hr.

Distance covered in every 1 hours will be, 44, 48, upto 12 terms.(for 12 hours).

The above series is an A.P series;

$$\text{Sum of first } n \text{ terms} = (n/2)(2a + (n-1)d)$$

Here, $a = 40$, $d = 4$ and $n = 12$.

$$\text{Sum of first 12 terms} = (12/2)(2(40) + (11)4) = 6(80 + 44)$$

$$= 6(124) = 744.$$

Hence, he covers 744 km in 12 hours.

33) D

Initial speed of the bike = 60 km/hr

Due to engine problem, speed is reduced to 20km for every 1 hour

Speed of the car at 9 am = $(60 - 20) = 40\text{km/hr}$

Time to cover 15 km at 40 km/hr = distance/speed

$$= 15/40 \text{ hours.} = 3/8 \text{ hours}$$

$$= 3/8 \times 60 \text{ minutes} = 45/2 \text{ minutes} = 22 \text{ minutes} + 1/2 \text{ minutes}$$

$$= 22 \text{ minutes} + 1/2 \times 60 \text{ seconds}$$

$$= 22 \text{ minutes and } 30 \text{ seconds.}$$

34) A

Mr.Aneesh travelled 60 km/hr for $1 \frac{1}{2}$ hours ($3/2$ hours).

Distance covered in $3/2$ hours = $60 \times 3/2 = 90 \text{ km.}$

Therefore, remaining distance = $120 - 90 = 30 \text{ km}$



After $3\frac{1}{2}$ hours, the speed was reduced to 15 km/hr.

Time taken to cover the remaining 30 km = $30/15 = 2$ hours

Total time taken = $3\frac{1}{2} + 2$ hours = $7\frac{1}{2}$ hours = 3 hours 30 minutes.

So, Mr. Aneesh reached village 2 at 3.00 pm + 3 hours 30 minutes
= 6.30pm

Hence the required answer is 6.30 pm.

35) D

Geetha starts with 12 kmph.

Distance covered in first 1 hour = 12 km

she increases her speed in every hour by 1 km.

Speed in 2nd hour = 13 km/hr

Distance covered in 2nd hour = 13 km

Remaining distance = $27.8 - (12+13) = 2.8$ km

Speed in the third hour = 14 km/hr

Time taken to cover 2.8 km at 14 km/hr = $2.8/14 = 1/5$ hour.

Therefore, total time = $1 + 1 + 1/5$ hours = $2\frac{1}{5}$ hours.

Hence the answer is $2\frac{1}{5}$ hours.

36) A

Let the distance between bus stop and destination be X.

The total time taken by the bus to cover X = 4 hours

Since X/2 by 40km/hr and remaining X/2 by 50km/hr

Then by Time = distance/speed, we have

$$(X/2)/40 + (X/2)/50 = 4$$

$$X/80 + X/100 = 4$$

$$5X + 4X = 1600$$

$$9X = 1600$$

$$X = 1600/9 = 177.7$$

Hence 177.7 km is the required answer.

37) C

Let Anand's speed be X km/hr.

And let the time taken by Babu be Y.

Since Anand takes $9+Y$ hours to cross 150km at X km/hr.

$$\text{i.e., } 150 / X = 9+Y \text{ ---eqn1}$$

And he takes $Y - 1/2$ hours to cross 150km at $2X$ km/hr.



i.e., $150/2X = Y - 1/2$ ---eqn2

Subtract eqn2 from eqn1, we have

$$150/X - 150/2X = 9 + Y - Y + 1/2 = 19/2$$

$$(300 - 150) / 2x = 19/2$$

$$150/2X = 19/2$$

$$150/X = 19$$

$$X = 7.89$$

Hence Anand 's speed is 7.89 km/hr.

38) C

Total time taken = 4 hours;

Time of stoppage = 1 hour, that is, actual time taken = 4 hours - 1 hours = 3 hours

Speed = Distance/Time

$$= 216/3$$

$$= 72 \text{ km/hr}$$

Average speed = Total Distance/ Total Time

$$= 216/4$$

$$= 54 \text{ km/hr}$$

39) B

Let the distance between the office and the bus stop be 1 km

Time required at 2 kmph

$$= 1/2 = 30 \text{ mins}$$

Time required at 3 kmph

$$= 1/3 = 20 \text{ mins}$$

Difference = 30 - 20 = 10 min.

Actual difference in timings = 15 + 10 = 25 min

If difference is 10 min, distance is 1 km

⇒ If difference is 25 min, distance is 2.5 km

Hence the required answer is 2.5 km

40) C

When speed of gotham = 30 km/hr

$$= d/t \text{ and,}$$

When speed of the gotham = 45 km/hr

$$= d/(t-2)$$

Equating the value of d:



$$30t = 45(t-2)$$

$$30t = 45t - 90$$

$$15t = 90$$

$$t = 6 \text{ hours}$$

Finally desired speed

$$= d/(t-1)$$

$$= 30t/(t-1)$$

$$= 30 \times 6 / (6-1)$$

$$= 180/5$$

$$= 36 \text{ km/hr}$$

41) A certain thing is thrown twice from a place with the gap of 45 minutes between the two shots. A girl approaching this point in a train heard the second shot 44 minutes after she heard the first shot. What is the speed of train (in kmph) if sound travels at 660 m/s?

- a) 62 km/hr
- b) 54 km/hr
- c) 48 km/hr
- d) 27 km/hr

42) A bus can travel 25% faster than a van. Both start from a certain shop at the same time and reach point P, 37.5 kms away from the shop at the same time. On the way, however, the bus lost about 6.25 mins while shopping at the some such places. The speed of the van is.

- a) 72
- b) 73
- c) 74
- d) 75

43) In covering a definite distance, the speeds of P & Q are in the ratio of 5:6. P takes 45 mins more than Q to reach the target. The time taken by P to reach the target is.

- a) 4 hrs 20 mins
- b) 4 hrs 45 mins
- c) 2hrs 30 mins
- d) 4hrs 30 mins

44) A 1800 km journey of 24 hrs, if 360km is done by van and the rest by train. It takes 60 mins more, if 600km is done by van and the rest by train. The ratio of the speed of the van to that of the train is.

- a) 2:4



- b) 4:3
c) 3:4
d) 5:3
- 45) P is thrice as fast as Q and Q is 4 times as fast as R. If the journey covered by R is 48 mins, then the time to be covered by Q.
- a) 12
b) 14
c) 10
d) 6
- 46) A goat is noticed by a lion from a distance of 350m. the goat starts running and the lion chases him. The goat and the lion run at the ratio of 30km and 31km per hr respectively. What is the distance between them after 12 mins?
- a) 120m
b) 100m
c) 150m
d) 170m
- 47) 2 pistol were shoot from the same place at an interval of 15 mins and 15 secs but a boy in the train approaching the place hears the second shot 15 mins after the first. The speed of the train(in km/hr),supposing that speed travels at 320 metres per second is.
- a) 15.166
b) 17.144
c) 18.563
d) 19.188
- 48) Arun steals a van at 8.30 am and drives it at 40km/hr. The theft is discovered at 9 a.m and the owner sets off in another van at 55km/hr. when will he overtake arun?
- a) 10.20 am
b) 12.20am
c) 11.20am
d) 10.15am
- 49) Two bike A & B start at the same time from salem to Rasipuram which are 60km apart. If the 2 bikes travel in opposite directions, they meet after 1 hr and if they travel in same direction(from salem towards Rasipuram), then A meets B after 3 hrs. what is the speed of bike A?



- a) 50
- b) 70
- c) 90
- d) 30

50) 2 bus start from A & B respectively and travel towards each other at a speed of 150 km/hr and 120 km/hr respectively. By the time they meet, the first bus has travelled by 300km more than the second. The distance between A & B is

- a) 2700
- b) 2800
- c) 2750
- d) 2457

41) B

Actual time between the two shots being fired = 45 minutes.

If a girl was stationary she would have heard the shots after 44 minutes. But since the train was moving towards the source,

she heard the second shot after only 44 minutes = Distance travelled by the sound in 1 min.

the train speed .

$$= 1/44 * (\text{Speed of sound})$$

$$= 1/44 * (660)$$

$$= 15 \text{ m/s}$$

Convert m/s into km/hr

$$15 \text{ m/s} = (15 * 18/5) \text{ km/hr}$$

$$= 54 \text{ km/hr}$$

Hence the speed of the train is 54 km/hr

42) A

Let speed of the car be x kmph

The speed of the train = $125x/100$

$$= 5x/4 \text{ km/hr}$$

$$\text{Therefore } 37.5 / x - 37.5 / (5x/4) = 6.25 / 60$$

$$37.5 / x - (37.5 * 4) / 5x = 6.25 / 60$$

$$37.5 / x - 150 / 5x = 6.25 / 60$$

$$37.5 / x - 30/x = 6.25 / 60$$

$$7.5 / x = 6.25 / 60$$

$$6.25x = 7.5 * 60$$



$X=72$ km/hr

43) D

Ratio of speeds = 5:6

Ratio of time = 6:5

Suppose P takes $6x$ hrs and Q takes $5x$ hrs to reach the target. Then,

$$6x - 5x = 45/60$$

$$X=3/4$$

Time taken by P = $6x$ hrs

$$=(6 \times 3/4) \text{ hrs}$$

$$=4.5 \text{ hrs}$$

i.e., the time taken by P to reach the target is 4hrs 30mins

44) C

Let the speed of the van be x km/hr

And that of the train be y km/hr

$$360/x + 1440/y = 24 \quad \text{-----} \rightarrow A$$

Dividing by 24 on both sides

$$15/x + 60/y = 1 \quad \text{-----} \rightarrow 1$$

$$\text{And } 600/x + 1200/y = 25$$

Dividing by 25 on both sides

$$24/x + 48/y = 1 \quad \text{-----} \rightarrow 2$$

$$\text{Multiply 1 by 24, } 360/x + 1440/y = 24$$

$$\text{Multiply 2 by 15 } 360/x + 720/y = 15$$

Subtract the above equation

$$720/y = 9$$

$$Y=80$$

Put y value in A

$$360/x = 24 - 18$$

$$X=360/6$$

$$X=60$$

$$\text{Ratio of speeds} = 60:80 = 3:4$$

45) A

Let R's speed = x km/hr

Then Q's speed = $4x$ km/hr

P's speed = $12x$ km/hr



Ratio of speeds of P<Q<R = $12x : 4x : x$

= $12:4:1$

Ratio of time taken = $1/12 : 1/4 : 1$

= $1:3:12$

If R takes 12 mins, then Q takes 3 mins

If R takes 48 mins, then

Q takes = $(3/12 * 48)$ mins

= $(144/120)$ mins

=12mins

46) C

To find out the relative speed of the goat and lion

$(31-30) = 1$ km/hr

Distance covered in 12 mins = $(1/60 * 12)$ km

= $1/5$ km

= $(1000/5)$ m

=200m

Distance between the goat and lion = $(350 - 200)$ m

=150m

47) D

Let the speed of the train be x m/sec

Then distance travelled by the train in 15mins = distance travelled by sound in 15secs

$X * 15 * 60 = 320 * 15$

$900x = 4800$

$X = 4800/900$

$X = 5.33$

Speed of the train 5.33 m/s

Convert m/s into km/hr

$5.33m = (5.33 * 18/5)$

= $(95.94/5)$

=19.188 km/hr

48) A

Suppose the arin is overtaken x hrs after 8.30 a.m

Then distance covered by arun in x hrs = distance covered by the owner in $(x-1/2)$ hrs

$40x = 55(x-1/2)$



$$40x = 55x - 55/2$$

$$55x - 40x = 55/2$$

$$15x = 55/2$$

$$X = 55/2 \times 1/15$$

$$x = 55/30$$

$$x = 1 \text{ hr } 50 \text{ mins}$$

so the thief is overtaken at 10.20 a.m

49) B

Let their speed be x km/hr and y km/hr respectively

$$\text{Then } 60 / (x+y) = \frac{1}{2}$$

$$X+y = 120 \quad \text{-----}>1$$

Now when they move in same direction

$$(\text{distance travelled by A in 3 hrs}) - (\text{Distance travelled by B in 3 hrs}) = 60 \text{ km}$$

$$3x - 3y = 60$$

$$X - y = 20 \quad \text{-----}>2$$

Adding 1 & 2 we get

$$2x = 140$$

$$X = 70$$

Put x value in 1 we get

$$Y = 120 - 70 = 50$$

$$Y = 50$$

Therefore A's speed = 70 km/hr

50) A

At the time of meeting,

Let the distance travelled by the second bus be x km

Then distance covered by the 1st bus is $(x+300)$ km

$$x/120 = (x+300)/150$$

$$150x = 120(x+300)$$

$$150x = 120x + 36000$$

$$30x = 36000$$

$$X = 36000/30$$

$$X = 1200$$

So the distance covered between A & B $= (x+x+300)$

$$= (1200+1200+300)$$

$$= 2700 \text{ km.}$$



16. TIME AND WORK

1) P and Q together can complete a job in 30 days. Q and R together can complete the same job in 40 days. P and R together can complete the same job in 40 days. What is the respective ratio of the number of days taken by P when completing the same job alone to the number of days taken by R when completing the same job alone?

- a) A.2:5
- b) B.1:2
- c) C.3:4
- d) D.2:3

2) 6 boys and 5 girls can do a job in 8 days. When 7 boys and 10 girls work on the same job, the work gets completed in 5 days. How many days will a boy take to do the job, if he works alone on it?

- a) A.25
- b) B.50
- c) C.75
- d) D.100

3) Among 4 persons A, B, C and D. A takes twice as much time as B to complete a piece of work. B takes twice as much time as C and C takes twice as much time as D to complete the same work. One group of three of the four men can complete the work in 11 days while another group of three can do so in 7 days. Which is the group that takes 11 days?

- a) A.B.C
- b) A,B,D
- c) B,C,D
- d) None of the above

4) A task is done by 46 persons not all of them have the same capacity to task. Every day exactly 2 persons, do the task with no pair of persons working together twice. Even after all possible pairs have worked once, all the persons together works for two more days to finish the task. Find the number of days in which all the persons together will finish the whole task?

- a) 44
- b) 45
- c) 46
- d) 47



- 5) A officer undertakes to complete a job in 250 days. He employs 300 male for 50 days and they complete $\frac{1}{2}$ of the work. He then reduces the number of male to 100, who work for 120 days, after which there are 20 days holidays. How many male must be employed for the remaining period to finish the work?
- a) 25
 - b) 50
 - c) 45
 - d) 35
- 6) Hanisha can do a work in 25 days, while sudha can do the same work in 50 days. They started the work jointly. Few days sughana also joined them and thus all of them completed the whole work in 12 days. All of them were paid total Rs.900. What is the Share of sughana?
- a) 252
 - b) 346
 - c) 454
 - d).359
- 7) X does half as much work as Y and Z does half as much work as X and Y together. If Z alone can finish the work in 120 days, then together, all will finish the work in ?
- a) $14 \frac{1}{2}$
 - b) 40
 - c) $24 \frac{1}{2}$
 - d) $17 \frac{1}{3}$
- 8) P and Q can do a piece of job in 24 days; Q and R can do it in 30 days while R and P can finish it in 40 days. If P, Q, R works together, in how many days will they finish the job? In how many days will each one of them finish it, working alone?
- A) 15,25,35,45
 - B) 20,30,40,120
 - C) 20,30,40,50
 - D) 20,25,30,60
- 9) P,Q, & R can complete a piece of job together in 20 days. All the 3 started working at it together and after 8 days P left. Then Q & R together completed a job in 20 more days. P alone could complete the work in.
- a) 60
 - b) 50
 - c) 40
 - d) 30



10) M do a piece of work in 45 days and N can finish it in 40 days. They work together for 5 days and then M leaves. In how many days will N finish the remaining work?

- a) 30 $\frac{5}{9}$
- b) 29 $\frac{4}{9}$
- c) 31 $\frac{3}{5}$
- d) 29 $\frac{5}{9}$

1) B

Efficiency of P and Q = $\frac{1}{30}$ per day _____ 1

⇒ Efficiency of Q and R = $\frac{1}{40}$ per day _____ 2

⇒ Efficiency of R and P = $\frac{1}{40}$ per day _____ 3

Taking equation 2 and 3 together

⇒ $Q + R = \frac{1}{40}$ and $R + P = \frac{1}{40}$

⇒ R and $\frac{1}{40}$ will be removed. Hence $P = Q$

⇒ Efficiency of $P = Q = \frac{1}{60}$

⇒ Efficiency of $R = \frac{1}{40} - \frac{1}{60} = \frac{1}{120}$

⇒ P can do the job in 60 days and R can do the job in 120 days if they work alone.

⇒ Ratio of number of days in which P and R can complete the job 1:2.

2) D

Let the amount of work done by a boy in a day be 'B' and the amount of work done by a girl in a day be 'G'.

Therefore, 6 boys and 5 girls will do $6B + 5G$ amount of work in a day.

If 6 boys and 5 girls complete the entire work in 8 days, they will complete $\frac{1}{8}$ of the work in a day.

$$6B + 5G = \frac{1}{8} \dots \dots \dots (1)$$

$$7B + 10G = \frac{1}{5} \dots \dots \dots (2)$$

Solving eqn (1) and eqn (2), we get

$$12B - 7B = \frac{1}{4} - \frac{1}{5}$$

$$5B = \frac{1}{20}$$

$$B = \frac{1}{100}$$

i.e. a boy does $\frac{1}{100}$ th of the work in a day.

Hence he will take 100 days to do the work.

3) B

From the given information B is twice as efficient as A.

C is twice as efficient as B.

D is twice efficient as C.



If work done by A in a day is 'n' units, the work done in a day by B, C and D would be 2n, 4n and 8n units respectively.

It can be seen that, A, B and C working together can do 7n units in a day while A, B and D working together can do 11n units in a day.

Hence, the ratio of times taken to complete the work by the former and later groups is 11:7

A, B and D take 11 days.

4) D

46 persons task in pairs, with no same pair of persons working together.

Each person will be working with other 45 which means each person will work for 45 days in pair.

Let the time taken by each person be $T_1, T_2, T_3, \dots, T_{45}$ respectively

According to Question

{ task done when the persons work in pairs } + { task done when all the persons work together for two days } = 1

$$45(1/T_1 + 1/T_2 + 1/T_3 + \dots + 1/T_{46}) + 2(1/T_1 + 1/T_2 + 1/T_3 + \dots + 1/T_{46}) = 1$$

$$47(1/T_1 + 1/T_2 + 1/T_3 + \dots + 1/T_{46}) = 1$$

$$(1/T_1 + 1/T_2 + 1/T_3 + \dots + 1/T_{46}) = 1/47$$

If all the persons work together they will finish the whole task in 47 days.

5) B

300 male in 50 days do = $1/2$ work

1 male in 1 day does = $1/2 \times 1/50 \times 1/300$ work

100 male in 120 days do = $1/2 \times 1/50 \times 1/300 \times 100 \times 120 = 2/5$ work

Total work done = $1/2 + 2/5 = (5+4)/10 = 9/10$

Remaining work = $1 - 9/10 = 1/10$

Remaining time = $(250 - 50 - 120 - 20) = 60$ days

$1/2$ work is done in 50 days by 300 male

$1/10$ work is done in 60 days by

$$= 300 \times 50 \times 1/2 \times 10 \times 60$$

$$= 50 \text{ male}$$

6) A

Efficiency of Hanisha = $1/100 \times 25$

$$= 25/100 = 1/4 = 25\%$$

Efficiency of Sudha = 2%

Thus, in 12 days working together they will complete only 72% of the work.

$$[(4+2) \times 12] = 72$$

Hence, the remaining work will surely be done by Sughana, which is $=(100-72)=28\%$



Thus, sughana will get 28% of Rs. 900,

$$= 28/100 \times 900$$

which is Rs. 252

7) B

Z alone can finish the work in 120 days.

As given Z does half as much work as X and Y together

$\Rightarrow (X + Y)$ can do it in 60 days

$(X + Y)$'s 1 day's work = $1/60$.

X's 1 day's work : Y's 1 day's work = $1/2 : 1 = 1:2$ (given)

X's 1 day's work = $(1/60) \times (1/3) = (1/180)$

X's 1 day's work = $(1/60) \times (2/3) = 1/90$

$(X + Y + Z)$'s 1 day's work = $(1/180) + (1/90) + (1/120)$

$$= (2 + 4 + 3)/360$$

$$= 9/360$$

$$= 1/40$$

All the three together will finish it in 40 days

8) B

Time taken by $(P + Q)$ to finish the job = 24 days.

$(P + Q)$'s 1 day's job = $1/24$

Time taken by $(Q + R)$ to finish the job = 30 days.

$(Q + R)$'s 1 day's job = $1/30$

Time taken by $(R + P)$ to finish the job = 40 days.

$(R + P)$'s 1 day's job = $1/40$

Therefore, $2(P + Q + R)$'s 1 day's job = $(1/24 + 1/30 + 1/40)$

$$= (5 + 4 + 3)/120$$

$$= 12/120 = 1/10$$

$$\Rightarrow (P + Q + R)$$
's 1 day's job = $\frac{1}{2} \times 1/10 = 1/20$

Therefore, P, Q, R together can finish the job in 20 days.

Now, P's 1 day's job

$$= \{(P + Q + R)$$
's 1 day's job\} - \{(Q + R)'s 1 day's job\}

$$= (1/20 - 1/30) = 2/60 = 1/30$$

Hence, P alone can finish the job in 30 days.

Q's 1 day's work

$$\{(P + Q + R)$$
's 1 day's job\} - \{(R + P)'s 1 day's job\}

$$= (1/20 - 1/40) = 1/40$$



Hence, Q alone can finish the job in 40 days.

R's 1 days work

$$= \{(P + Q + R)\text{'s 1 day's job}\} - \{(P + Q)\text{'s 1 day's job}\}$$

$$= (1/20 - 1/24) = 1/120$$

Hence, R alone can finish the job in 120 days.

9) B

Work done by P, Q & R in 8 days = $1/20 * 8$

$$= 2/5$$

$$\text{Remaining work} = (1 - 2/5) = 3/5$$

Now $3/5$ work is done by Q & R in 20 days

Whole work will be done by Q & R in $(20 * 5/3) = 100/3$ days

$$(P+Q+R)\text{'s 1 day work} = 1/20$$

$$(Q+R)\text{'s 1 day work} = 3/100$$

$$P\text{'s 1 day work} = (P+Q+R)\text{'s 1 day work} - (Q+R)\text{'s 1 day work}$$

$$= 1/20 - 3/100$$

$$= 5 - 3/100$$

$$= 2/100 = 1/50$$

P alone could complete the work in 50 days..

10) A

Time taken by M to finish the work = 45 days.

$$M\text{'s 1 day's work} = 1/45$$

Time taken by N to finish the work = 40 days.

$$N\text{'s 1 day's work} = 1/40$$

$$(M + N)\text{'s 1 day's work} = (1/40 + 1/45) = (9+8)/360 = 17/360$$

$$(M + N)\text{'s 5 day's work} (5 \times 17/360) = 85/360 = 17/72$$

$$\text{Remaining work} (1 - 17/72) = 55/72$$

Now, $55/72$ work is done by N in 1 day

Therefore, $55/72$ work will be done by N in $(55/72 * 40)$ days = 30 and $5/9$ days.

Hence, the remaining work is done by B in 30 and $5/9$ days.

11) After finishing the work by Aswin for 9 days, Ajay finds that only $1/4$ of the work has been done. He employs Ajay who is 80% as efficient as Aswin. How many days more would Ajay take to complete the work?

a) 32

b) 28

c) 34



d) 26

12) Adam and Smith are working on a project. Adam takes 18 hrs to type 108 pages on a computer, while Smith takes 15 hrs to type 120 pages. How much time will they take, working together on two different computers to type a project of 360 pages?

- a) 23 hrs 24 min
- b) 45 hrs 42 min
- c) 25 hrs 42 min
- d) 42 hrs 45 min

13) Arfath is thrice as good workman as deekshith and together they finish a piece of work in 27 days. In how many days will arfath alone finish the work?

- a) 9 days
- b) 10 days
- c) 11 days
- d) 12 days

14) Pranesh can do a piece of job in 60 days. He works at it for 4 days and then sarvesh alone finishes the remaining work in 28 days. In how much time will pranesh and sarvesh working together, finish the work?

- a) 35 days
- b) 30 days
- c) 25 days
- d) 20 days

15) 90 persons can complete a job in 32 days. 12 days after they started working, 60 more persons joined them. How many days will they now take to complete the remaining work?

- a) 10 days
- b) 12 days
- c) 14 days
- d) 16 days

16) 4 male and 6 female do a piece of work in 20 days while 6 male and 4 female can do the same work in 16 days. In how many days can 4 male and 2 female do the work?

- a) $3\frac{62}{142}$
- b) $2\frac{18}{124}$
- c) $4\frac{81}{165}$
- d) $1\frac{67}{133}$



17) Rishwi can finish a work in 6 days working 4 hours a day. Dhiviksha can complete the same work in 4 days working 5 hrs a day. If both rishwi and dhiviksha work together, working 4 hrs a day, in how many days can they finished the work?

- a) 30/11
- b) 11/120
- c) 11/30
- d) 30/13

18) Nandhu, naren and abishek can do a piece of work in 10,15, and 30 days respectively. In how many days can Nandhu do the work if he is assisted by naren and abishek on alternate days?

- a) 6.6 days
- b) 7.5 days
- c) 8.4 days
- d) 9.1 days

19) X,Y and Z can do a certain job in 72,108 and 144 days respectively. They started the job but X left 16 days before the completion of the job while Y left 24 days before the completion. The number of days for which Z worked is.

- a) 12 days
- b) 24 days
- c) 36 days
- d) 48 days

20) X and Y can do a job in 24 days, Y & Z can do the same job in 36 days. X,Y,Z together can finish it in 18 days. X and Z together will do it in.

- a) 24
- b) 36
- c) 12
- d) 26

11) C

Aswin has completed $\frac{1}{4}$ of the work in 9 days

Then he can complete the total work in

$$\frac{1}{4} \text{ ---- } 9$$

$$1 \text{ ---- } ?$$

$$= 36 \text{ days}$$



But given Ajay is only 80% as efficient as Aswin

$$\text{Ajay} = 1/36 * 80/100 = 1/45$$

Ajay can complete the total work in 45 days

Now, remaining $\frac{3}{4}$ of work can be completed in

$$1 \text{ ----- } 45$$

$$\frac{3}{4} \text{ ----- } ?$$

$$= \frac{3}{4} * 45 = 33.75 = 34 \text{ days (approx.)}$$

12) C

Number of pages typed by Adam = 108

Number of pages typed by Adam in 1 hour = $108/18 = 6$

Number of pages typed by Smith = 120

Number of pages typed by Smith in 1 hour = $120/15 = 8$

Number of pages typed by both in 1 hour = $(6 + 8) = 14$

Time taken by both to type 360 pages,

$$= (360 * 1/14) = 25 \text{ hrs } 42 \text{ min}$$

13) A

Arfath's 1 days work = 3

Deekshith 1 day's work = 1

Arfath 1 day's work : Deekshith 1 days work = 3:1

(Arfath + deekshith)'s 1 day's work = $1/27$

Divide $1/27$ in the ratio 3:1

$$\text{Arfath's 1 days work} = 1/27 * 3/1 = 3/27$$

$$= 1/9$$

Hence Arfath's alone can finish the work in 9 days

14) D

Work done by pranesh in 4 days = $1/60 * 4$

$$= 1/15$$

Remaining work = $1 - 1/15$

$$= (15 - 1)/15$$

$$= 14/15$$

Now $14/15$ work done by sarvesh in 28 days

Whole work will be done by sarvesh in $(28 * 15 / 14) = 2 * 15 = 30$ days

Pranesh 1 day's work = $1/60$

Sarvesh 1 day's work = $1/30$



(pranesh + sarvesh)'s 1 day's work = $\frac{1}{60} + \frac{1}{30}$

$$= \frac{(1+2)}{60} = \frac{3}{60}$$

$$= \frac{1}{20}$$

Hence both will finish the work in 20 days

15) B

(90 * 32) persons can complete the work in 1 day.

$$1 \text{ person 1 day's work} = \frac{1}{(90 * 32)}$$

$$\text{i.e., } \frac{1}{2880}$$

$$90 \text{ person's 12 day's work} = \frac{1}{32} * 12 = \frac{3}{8}$$

$$\text{Remaining work} = (1 - \frac{3}{8}) = \frac{5}{8}$$

$$150 \text{ persons 1 day work} = \frac{150}{2880}$$

$$= \frac{5}{96}$$

Now $\frac{5}{96}$ work is done by them in 1 day .

Therefore $\frac{5}{8}$ work is done by them,

$$= (\frac{96}{5} * \frac{5}{8})$$

$$= 12 \text{ days.}$$

16) D

Let 1 male's 1 day's work = x

1 female's 1 day's work = y

$$\text{Then } 4x + 6y = \frac{1}{20} \text{ -----} \rightarrow A$$

$$80x + 120y = 1 \text{ -----} \rightarrow 1$$

$$6x + 4y = \frac{1}{16} \text{ -----} \rightarrow B$$

$$96x + 64y = 1 \text{ -----} \rightarrow 2$$

$$\text{Multiply 1 by 96} \rightarrow 7680x + 11520y = 96 \text{ -----} \rightarrow 3$$

$$\text{Multiply 2 by 80} \Rightarrow 7680x + 5120y = 80 \text{ -----} \rightarrow 4$$

Subtracting above equation

$$6400y = 16$$

$$y = \frac{16}{6400} = \frac{1}{400}$$

Substitute y value in B

$$6x + 4(\frac{1}{400}) = 1$$

$$6x + \frac{1}{100} = 1$$

$$6x = 1 - \frac{1}{100} = \frac{99}{100}$$

$$x = \frac{99}{(100 * 6)} = \frac{33}{200}$$

(4 male + 2 female)'s 1 day work = $4x + 2y$

$$= 4(\frac{33}{200}) + 2(\frac{1}{400})$$



$$=132/200+1/200 = 133/200$$

So 4 male and 2 female together can finish the work in $200/133 = 1 \frac{67}{133}$ days

17) A

Rishwi can complete the work in $(6 \times 4) = 24$ hrs

Dhiviksha can complete the work in $(4 \times 5) = 20$ hrs

Rishwi's 1 hr work = $1/24$

Dhiviksh's 1 hr work = $1/20$ (Rishwi and dhivikasha)'s 1 hr work = $(1/24 + 1/20)$

$$= (5+6)/120 = 11/120$$

So both rishwi and dhiviksha will finish the work in $(120/11)$ hrs

Number of days of 4 hrs each = $120/11 \times 1/4$

$$=120/44$$

$$=30/11 \text{ days}$$

18) B

Nandhu's 1 day work = $1/10$

Naren's 1 day work = $1/15$

Abishek's 1 day work = $1/30$

Nandhu's 2 day's work = $(1/10 \times 2) = 1/5$

(nandhu + naren + abishek)'s 1 day work = $1/10 + 1/15 + 1/30$

$$= 3/30 + 2/30 + 1/30$$

$$= 6/30$$

$$= 1/5$$

Work done in 3 days = $1/5 + 1/5$

$$= 2/5$$

Now $2/5$ work is done in 3 days

Whole work will be done in $3 \times 5/2 = 15/2 = 7.5$ days

19) D

Suppose the work was finished in 'a' days

Then X's $(a - 16)$ day's work + Y's $(a - 24)$ days + Z's a days work = 1

$$(a-16)/72 + (a-24)/108 + a/144 = 1$$

Lcm of 72, 108, 144 is 432

$$6(a-16) + 4(a-24) + 3a = 432$$

$$6(a-16) + 4(a-24) + 3a = 432$$

$$6a - 96 + 4a - 96 + 3a = 432$$

$$13a - 192 = 432$$



$$13a = 624 \Rightarrow a = 48$$

Therefore Z worked in 48 days.

20) A

$$(X+Y+Z)'s \text{ 1 day work} = 1/18$$

$$(X+Y)'s \text{ 1 day work} = 1/24$$

$$(Y+Z)'s \text{ 1 day work} = 1/36$$

$$(X+Z)'s \text{ 1 day work} = 2[X+Y+Z]'s \text{ 1 day work} - [(X+Y)'s \text{ 1 day work} + (Y+Z)'s \text{ 1 day work}] = 2 [1/18] - (1/24 + 1/36)$$

$$= 1/9 - (1/24 + 1/36) = 1/9 - 1/24 - 1/36$$

$$= (8-3-2)/72$$

$$= 3/72 = 1/24$$

So X & Z together will do the work in 24 days

21) P and Q finished a work in 36 days; Q and R can do it in 60 days; P and R can do it in 45 days. In what time can P alone do it.

- a) 30 days
- b) 60 days
- c) 90 days
- d) 120 days

22) Karthik is 2 times as good workman as Raghu and together they complete a piece of work in 42 days. The number of days taken by Karthik alone to finish the work is.

- a) 55 days
- b) 60 days
- c) 63 days
- d) 67 days

23) M & N can do a work together in 12 days. M is $2\frac{1}{2}$ times as efficient as N. the same work can be done by M alone in.

- a) $84/5$
- b) $6/84$
- c) $82/5$
- d) $6/82$

24) Vinay can do a work in 28 days. Vikram is 75% more efficient than Vinay. The number of days taken by Vikram to do the same piece of work.



- a) 12 days
- b) 14 days
- c) 16 days
- d) 18 days

25) Sai and Ram working together completed a job in 10 days. If Sai worked twice as efficiently as he actually did and Ram worked $\frac{2}{3}$ as efficiently as he actually did, the work would have been completed in 6 days. Sai alone could complete the work in.

- a) $\frac{40}{3}$ days
- b) $\frac{42}{4}$ days
- c) $\frac{44}{6}$ days
- d) $\frac{43}{3}$ days

26) A bakery P can sell 500 breads in 4 hours, bakery Q can sell the same number of bread in 5 hrs while bakery R can sell them in 6 hrs. All the bakeries are opened at 8 a.m while bakery P is closed at 9 p.m and the remaining 2 bakeries complete their target. Approximately at what time will the work be finished?

- a) 10
- b) 8
- c) 12
- d) 6

27) M & N do a certain work in 40 days and 24 days respectively. M started the work alone and then after 8 days N joined him till the completion of the work. How long did the work last?

- a) 16 days
- b) 18 days
- c) 20 days
- d) 22 days

28) Arul can do a certain work in 9 days while Ravi can do the same work in 7 days. Both of them complete the work together and get Rs.288. What is the share of Arul?

- a) Rs.124
- b) Rs.126
- c) Rs.128
- d) Rs.130

29) 60 girls can do a work in 48 days. 48 boys can finish the same work in 45 days. What is the ratio between the capacity of a boy and girls?



- a) 2:1
- b) 3:6
- c) 2:4
- d) 4:3

30) 6 male , 8 female and 12 children can complete a work in 14 days .a female does twice the work of a male does and a child does half the work a male does . how many female alone can complete this work in 14 days?

- a) 15
- b) 10
- c) 12
- d) 14

21) B

(P+Q)'s 1 day work = $1/36$ ----→1

(Q+R)'s 1 day work = $1/60$ ----→2

(P+R)'s 1 day work = $1/45$ ----→3

Adding 1 & 2 & 3 we get

$2(P+Q+R)$'s 1 day work = $1/36 + 1/60 + 1/45$

$= (5+3+4)/180 = 12/180 = 1/15$

(P+Q+R)'s 1 day work = $1/15 \times \frac{1}{2} = 1/30$

So P's 1 day work = (P+Q+R)'s 1 day work – (Q+R)'s 1 days work

$= 1/30 - 1/60 = 2-1/60$

$= 1/60$

P alone can do the work in 60 days.

22) C

Karthik's 1 day work : Raghu's 1 day work = 2:1

(Karthik + Raghu)'s 1 day work = $1/42$

Divide $1/42$ in the ratio 2:1

Therefore karthick's 1 day work = $1/42 \times \frac{2}{3}$

$= 1/63$

Hence karthik alone can finish the work in 63 days.

23) A

M's 1 day work = $2 \frac{1}{2} = 5/2$

N's 1 day work = 1



Ratio of M and N = $5/2 : 1 = 5:2$

Let M's and N's 1 day work be $5x$ and $2x$ respectively.

Then $5x+2x = 1/12$

$7x=1/12$

$X= 1/(12*7)$

$X=1/84$

M's 1 day work = $1/84 * 5 = 5/84$

Hence M alone can finish the work in $84/5$ days.

24) C

Given a certain work done by vinay = 28 days

Efficient percentage of vikram = 75%

Ratio of time taken by vinay and vikram = $175 : 100 = 7:4$

Suppose vikram takes 'x' days to do the work.

$7:4 :: 28 : x$

$7x = 4*28$

$X= 4*28/7$

$X= 4*4 = 16$ days

So vikram takes 16 days to do the work.

25) A

Let sai's 1 day work = x

Ram's 1 day work = y

Then $x+y = 1/10 \implies 1$ and $2x + 2y / 3 = 1/6$

$(6x+2y) / 3 = 1/6$

$6x + 2y = 1/2 \implies 2$

Multiply 1 by 6 $\implies 6x+6y = 6/10$

$2 \implies 6x+2y = 1/2$

Subtracting above equation we get,

$6y - 2y = 3/5 - 1/2$

$4y = 6-5/10 = 1/10$

$4y = 1/10$

$Y=1/40$

Substitute y value in equ 1

$X=1/10 - 1/40 = 4-1/10$

$=3/40$

Sai's 1 day work = $3/40$



So sai alone could complete the work in $40/3$ days.

26) A

$(P+Q+R)$'s 1 hour work = $(1/4 + 1/5 + 1/6)$

$= (15+12+10)/60$

$= 37/60$

Remaining work = $1 - 37/60 = 23/60$

$(Q+R)$'s 1 hour work = $(1/5 + 1/6)$

$= 11/30$

Now $11/30$ work is done by Q and R in 1 hour

So $23/60$ work will be done by Q and R in $(30/11 * 23/60)$

$= 23/22$ hrs = 1hr

So the work will be finished approximately 1 hr after 9.am i.e., around 10 a.m

27) C

Work done by M in 8 days = $1/40 * 8$

$= 1/5$

Remaining work = $1 - 1/5 = 4/5$

$(M+N)$'s 1 day work = $1/40 + 1/24$

$= (3+5)/120 = 8/120$

$= 1/15$

Now $1/15$ work is done by M & N in 1 day.

So $4/5$ work will be done by X and Y is,

$= 15 / 1 * 4/5$

$= 12$ days

Hence total time taken = $12+8 = 20$ days

28) B

Arul's 1 day work = $1/9$

Ravi's 1 day work = $1/7$

Arul's salary : Ravi's salary = Arul's 1 day work : Ravi's 1 day work

$= 1/9 : 1/7$

$= 7 : 9$

Arul's share = Rs. $(7/16 * 288)$

= Rs. 126

29) D



Total number of girls =60

Total number of boys =48

(60*48) girls can complete the work in 1 day

2880 girls can complete the work in 1 day

1 girls 1 day work =1/2880

(48*45) boys can complete the work in 1 day

2160 boys can complete the work in 1 day

1 boys 1 day work =1/2160

So required ratio =1/2160 : 1/2880

=2880 : 2160

=4:3

30) D

Let 1 female 's 1 day work= x

Then 1 male's 1 day work =x/2

And 1 child's 1 day work =x/4

So $6x/2 + 8x + 12x/4 = 1/14$

$3x+8x+3x = 1/14$

$14x = 1/14$

X=196

1 female alone can complete the work in 196 days

So, to complete the work in 14 days number of female required = 14.

31) 8 male can finish a work in 6 days.12 female can complete the same work in 9 days. 6 male and 4 female started working and after 4 days 3 more female joined them. How many days will they now take to complete the remaining work?

a) 76/41 days

b) 25/62days

c) 3/31days

d) 4/77days

32) Praneetha and Pooja together can do a piece of work in 24 days ,which pooja and priya can do in 32 days. After praneetha has been working at it for 10 days and pooja for 14 days, Priya finishes it in 26 days. In how many days Priya alone will do the work?

a) 12 days

b) 24 days.

c) 48 days



d) 50 days

33) A sum of amount of money is adequate to pay peter's salary for 42 days and Harish's salary for 56 days. The same money is adequate to pay the salary of both for.

- a) 12 days
- b) 24 days
- c) 36 days
- d) 48 days

34) If 24 women and 32 girls can do a piece of work in 5 days; 26 women and 48 girls can do it in 4 days then the ratio of the daily work done by a women to that of a girl is.

- a) 2:1
- b) 1:3
- c) 3:1
- d) 1:2

35) 2 male, 6 female, and 8 girls can do a work in 192 hrs, 4 male and 16 girls can do it in 160 hrs, 4 male and 6 female can do it in 240 hrs. 10 male and 24 girls can do it in.

- a) A. $87 \frac{3}{11}$ hrs
- b) B. $78 \frac{4}{11}$ hrs
- c) C. $88 \frac{6}{12}$ hrs
- d) 80 $\frac{4}{5}$ hrs

36) P and Q undertake to do a piece of job for Rs.1200. P alone can do it in 12 days while Q alone can do it in 16 days. With the help of R, they finish it in 6 days. Find the share of P, Q & R.

- a) 400,600,200
- b) 200,400,600
- c) 450,400,250
- d) 600,450,150

37) A cistern can be filled in 25 minutes. There is a leakage which can empty it in 50 minutes. In how many minutes cistern can be filled?

- a) 20 mints
- b) 25mints
- c) 45 mints
- d) 50 mints



38) Rakchita can do a piece of work in 28 days, while Shreya can do the same work in 42 days. They started the work together but 6 days before the completion of the work, Rakchita left the work. The total number of days to complete the work is

- a) 3
- b) 4
- c) 5
- d) 6

39) 8 men and 8 boys can finish a piece of work in 10 days. 9 women and 7 boys can finish the same work in 10 days. Also 7 men and 6 women can finish the same work in 10 days. In how many days 1 man, 1 woman and 1 boy can finish the work, at their double efficiency?

- a) 25 days
- b) 20 days
- c) 15 days
- d) 10 days

40) A motor bike tyre has two punctures. The 1st puncture alone would have made the tyre flat in 27 minutes and the 2nd alone would have done it in 18 minutes. If air leaks out at a constant rate, how long does it take both the punctures together to make it flat?

- a) $20 \frac{4}{3}$ minutes
- b) $15 \frac{4}{7}$ minutes
- c) $10 \frac{4}{5}$ minutes
- d) $25 \frac{4}{3}$ minutes

31) A

1 male's 1 day work = $\frac{1}{48}$

1 female's 1 day work = $\frac{1}{108}$

Work done in 4 days = $4 \left(\frac{6}{48} + \frac{4}{108} \right)$

$= 4 \left(\frac{1}{8} + \frac{1}{27} \right)$

$= \frac{1}{2} + \frac{4}{27}$

$= \frac{(27+8)}{54}$

$= \frac{35}{54}$

Remaining work = $(1 - \frac{35}{54}) = \frac{19}{54}$

(6 male + 7 female)'s 1 day work = $\frac{6}{48} + \frac{7}{108}$

$= \frac{1}{8} + \frac{7}{108}$

$= \frac{(27+14)}{216}$

$= \frac{41}{216}$



Now $41/216$ work is done by them in 1 day

Therefore time taken = $216/41 * 19/54 = 76/41$ days

32) C

Praneetha's 10 day's work + Pooja 14 day's work + Priya's 26 days work = 1

(Praneetha's +pooja's) 10 day's work + (pooja + priya)'s 4 day's work +priya's 22 days work = 1

=> $10/24 + 4/32 + \text{priya's } 22 \text{ day's work} = 1$

Priya's 22 day's work = $1 - (10/24 + 4/32)$

= $1 - (5/12 + 1/8)$

= $1 - ((10+3)/24)$

= $1 - 13/24$

= $11/24$

Priya's 1 day's work = $11/24 * 1/22$

= $1/48$

Priya can finish the work in 48 days.

33) B

Let the total money be Rs.x

Peter's 1 day salary = Rs. $x/42$

Harish 1 day salary = Rs. $x/56$

(peter+harish)'s 1 day salary = Rs($x/42+x/56$)

= $(4x+3x)/168$

= $7x/168$

= $x/24$

Money is adequate to pay the salary of both for 24 days.

34) A

Let 1 women's 1 day work = x

1 girl's 1 day work = y

Then $24x+32y = 1/5 \Rightarrow 6x+8y = 1/20$ ----->1

$26x + 48y = 1 / 4 \Rightarrow 13x + 24y = 1/8$ ----->2

Multiply 1 by 3

$18x + 24y = 3/20$

$13x + 24y = 1/8$

Subtracting above equations we get

$5x = 3/20 - 1/8$

= $(6-5)/40 = 1/40$



$$X = 1/(40 \times 5)$$

$$X = 1/200$$

Put x value in 1 we get

$$8y = 1/20 - 6/200$$

$$= (10 - 6) / 200 = 4/200$$

$$8y = 1/50$$

$$Y = 1/400$$

$$\text{Required ratio} = x:y = 1/200 : 1/400$$

$$= 400:200$$

$$= 2:1$$

35) A

Let 1 males 1 hr work = x

1 female 1 hour work = y

1 girl 1 hour work = z

$$\text{Then } 2x + 6y + 8z = 1/192 \quad \text{-----}>1$$

$$4x + 16z = 1/160 \quad \text{-----}>2$$

$$4x + 6y = 1/240 \quad \text{-----}>3$$

Adding 2 and 3

$$8x + 6y + 16z = 1/160 + 1/240$$

$$= (3+2) / 480 = 5/480$$

$$8x + 6y + 16z = 1/96 \quad \text{----}>4$$

Subtract 1 from 4

$$6x + 8z = 1/96 - 1/192$$

$$= (2-1) / 192$$

$$6x + 8z = 1/192 \quad \text{----}>5$$

Solving 2 and 5 we get

$$X = 1/1920 ; \quad y = 1/2880 ; \quad z = 1/3840$$

$$(10 \text{ male} + 24 \text{ girl})'s \text{ 1 hr work} = 10/1920 + 24 / 3840$$

$$= 1/192 + 1/160$$

$$= (5+6) / 960 = 11/960$$

10 male and 24 girls can do work in 960/11 hrs

i.e., 87 3 / 11 hrs

36) D

$$R's \text{ 1 day work} = 1/6 - (1/12 + 1/16)$$

$$= 1/6 - 1/12 - 1/16$$



$$= (8-4-3)/48 = 1/48$$

$$P:Q:R = \text{ratio of 1 day work} = 1/12:1/16 : 1/48$$

$$=4:3:1$$

$$P's \text{ share} = Rs(1200 \times 4/8)$$

$$=Rs.600$$

$$Q's \text{ share} = Rs(1200 \times 3/8)$$

$$=Rs.450$$

$$R's \text{ share} = Rs(1200 \times 1/8)$$

$$=Rs.150$$

37) D

$$\text{Efficiency of filling faucet} = 100/25 = 4\%$$

$$\Rightarrow \text{Efficiency of leakage faucet} = 100/50 = 2\%$$

$$\Rightarrow \text{Net filling efficiency} = (4-2)\%$$

$$=2\%$$

$$\text{So, t cistern can be filled in} = 100/2$$

$$= 50 \text{ minutes}$$

38) D

6 days before the completion of the work Rakchita left the work means in last 6 days only Shreya has worked alone

$$\text{So, in last 6 days worked done by Shreya} = 6 \times 1/42 = 6/42 = 1/7$$

$$\text{So, the rest} = 1 - 1/7 = 6/7$$

So 6/7 work was done by Rakchita

$$\text{and Shreya worked together} = 6/7 \times 70/10$$

$$= 420/70 = 6 \text{ days}$$

39) A

$$\text{Efficiency of 8 men and 8 boys} = 10\%$$

$$\text{Efficiency of 9 women and 7 boys} = 10\%$$

$$\text{Efficiency of 7 men and 6 women} = 10\%$$

$$\text{So, Efficiency of 15 men, 15 women and 15 boys} = 30\%$$

$$\text{So, efficiency of 1 man, 1 woman and 1 boy} = 2\%$$

Now, since they will work at double their efficiency

$$\text{Efficiency of 1 man, 1 woman and 1 boy} = 4\%$$

$$\text{Required number of days} = 100/4 = 25 \text{ days}$$



40) C

1st puncture made the tyre flat in 27 mins

2nd puncture made the tyre flat in 18 mins

1 minute's work of both the punctures = $(1/27 + 1/18)$

$= (2+3)/54$

$= 5/54$

So, both the punctures will make the tyre flat in $54/5$ mins

$\Rightarrow 10 \frac{4}{5}$ minutes

41) A single petrol tank supplies the petrol to the whole city, while the petrol tank is fed by a single pipeline filling the tank with the stream of uniform volume. When the petrol tank is full and if 20,000 litres of petrol is used daily, the supply fails in 45 days. If 16,000 litres of petrol is used daily, it fails in 30 days. How much petrol can be used daily without the supply every failing?

a) 28000

b) 47000

c) 24000

d) 42000

42) The total number of male, female and children working in a factory is 72. They earn Rs.16000 in a day. If the sum of the wages of all male, all female and all children is in the ratio of 36 : 20 : 24 and if the wages of an individual male, female and child is in the ratio 6 : 5 : 3, then how much a female earn in a day?

a) Rs 500

b) Rs 1000

c) Rs 1500

d) Rs 1200

43) Rubika can do the 12 times the actual work in 72 days while sathya can do the one-half of the original work in 6 days. In how many days will both working together complete the 6 times of the original work?

a) 20 days

b) 25 days

c) 30 days

d) 35 days

44) Prabu and balaji are two workers. Working together they can complete the whole work in 20 hours. If the Prabu worked for 5 hours and balaji worked for 17 hours, still there was half of the work to be done. In how many hours Prabu working alone, can complete the whole work?

a) 17 hours



- b) 23 hours
- c) 34 hours
- d) 37 hours

45) A and B together can complete a work in 24 days. A alone can complete it in 40 days. If B does the work only for half a day daily, then in how many days A and B together will complete the work?

- a) 24 days
- b) 15 days
- c) 21 days
- d) 19 days

46) P, Q and R together earn Rs.420 per day, while P and R together earn Rs.296 and Q and R together earn Rs.164. The daily earning of R is :

- a) Rs.50
- b) Rs.80
- c) Rs.40
- d) Rs.60

47) 48 boys complete a work in 36 days. After they have worked for 24 days, 24 more boys join them. How many days will they take to complete the remaining work?

- a) 8 days
- b) 6 days
- c) 4 days
- d) 3 days

48) Faucet A basically used as inlet pipe and Faucet B is used as outlet pipe. Faucet A and B both are opened simultaneously, all the time. When Faucet A fills the tank and Faucet B empty the tank, it will take thrice the time than when both the pipes fill the tank. When Faucet B is used for filling the tank, its efficiency remains constant. What is the ratio of efficiency of Faucet A and Faucet B respectively?

- a) 1:2
- b) 2:1
- c) 1:3
- d) 3:1

49) Pump A can fill the empty bunker in 6 hours, but due to a leak in the bottom it is filled in 7.5 hours, if the bunker is full and then Pump A is closed then in how many hours the leak can empty it?

- a) 30 hours.



- b) 45 hours.
- c) 50 hours.
- d) 35 hours.

50) Madhesh does half work as much as Vinith in three eighths of the time. If together they take a day to complete the work, how much time shall Vinith take to do it?

- a) 21
- b) 22
- c) 23
- d) 24

41) A

Let x litre be the per day filling and

y litre be the capacity of the tank, then

$$45x + y = 20000 \times 45 = 900000 \dots (1)$$

$$30x + y = 16000 \times 30 = 480000 \dots (2)$$

Solving eq. (1) and (2), we get

$$15x = 420000$$

$$x = 420000/15$$

$$x = 28000$$

Hence, 28000 litres per day can be used without the failure of supply

42) B

Ratio of number of male, female and children = $36/6:20/5:24/3$

$$= 6x:4x:8x$$

$$\text{So, } (6x + 4x + 8x) = 72$$

$$18x = 72$$

$$x = 72/18 = 4$$

$$\text{So, } x = 4$$

Therefore, number of female = 16

$$\text{Share of all female} = 20/80 \times 16000$$

$$= \text{Rs } 4000$$

$$\text{So, Share of each female} = 4000/4$$

$$= \text{Rs } 1000$$

43) C

$$\text{Efficiency of Rubika} = 16.666\%$$



Efficiency of sathya = 4.166%

Total efficiency of rubika and sathya = $(16+4) = 20\%$

Actual work $100/20=5$

So, they can do actual work in 5 days

So, 6 times work requires 30 days.

44) C

Efficiency of Prabu and balaji = 5%

Prabu worked for 5 hours and balaji worked separately 17 hours.

Which means it can be considered that Prabu and balaji worked together for 5 hours and balaji worked alone for 12 hours.

Thus, Prabu and balaji in 5 hours can complete 25% work.

It means the remaining $(50 - 25) = 25\%$ of the work was done by balaji in 12 hours.

Therefore, balaji can do 100% work in 48 hours.

It means the efficiency of balaji = 2.08%

Therefore, efficiency of prabu = $(5-2.08) = 2.92\%$

Thus, prabu require . = 34 hours to complete the work alone.

45) A

B's 1 day's work = $(1/24 - 1/40)$

$= (5-3)/120$

$= 2/120 \Rightarrow 1/60$

Now, (A + B)'s 1 day's work = $(1/40 + 1/60)$

$= (3+2)/120$

$= 5/120$

So, A and B together will complete the work in $120/5 = 24$ days.

46) D

(P+Q+R)'s earning = Rs. 420

(P+R)'s earning = Rs 296

(Q+R)'s earning = Rs 164

Q's daily earning = Rs. $(420 - 296) = \text{Rs.} 124$

P's daily earning = Rs. $(420 - 164) = \text{Rs.} 256$

Now (P+Q)'s earning = Rs 360

R's daily earning = Rs. $[420 - 360] = \text{Rs.} 60$



47) A

$$1 \text{ boy's } 1 \text{ day's work} = 1/(36 \times 48)$$

$$= 1/1728$$

$$48 \text{ boy's } 24 \text{ day's work} = 48 \times 24/1728 = 2/3$$

$$\text{Remaining work} = 1 - 2/3 = 1/3$$

$$72 \text{ boy's } 1 \text{ day's work} = 72/1728 = 1/24$$

1/24 work is done by them in 1 day.

So, 1/3 work is done by them in $24/3 = 8$ days

48) B

Efficiency when both pipes used to fill = A + B

And efficiency when Faucet A is used to fill and Faucet B is used to empty the tank = A - B

$$\text{So } (A+B)/(A-B) = 3/1$$

$$A/B + 1/(A/B - 1) = 3/1$$

$$A/B + 1 = 3(A/B - 1)$$

$$3A/B - A/B = 4$$

$$2A/B = 4$$

$$A/B = 2$$

Thus, the ratio of efficiency of Faucet A and B = 2:1

49) A

Efficiency of A = 16.666%

Effective of leak = 13.333% when there is leakage

So, efficiency of leakage = (Efficiency of A - Effective of leak)

$$= 16.666\% - 13.333\% = 3.333\%$$

It means due to leakage a full bunker will be empty in 30 hours.

50) A

Suppose Vinith takes x days to do the work

$$\text{Madhesh takes } (2 \times \frac{3}{8} x) = \frac{6}{8}x$$

i.e., $\frac{3}{4}x$ days to do it

$$(\text{Madhesh} + \text{Vinith's}) 1 \text{ day work} = 1/9$$

$$\text{Therefore } 1/x + 4/3x = 1/9$$

$$(3+4) / 3x = 1/9$$

$$7/3x = 1/9$$

$$3x = 9 \times 7$$

$$X = 63/3$$



=21

Vinith takes 21 days to do the work.

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