

## TIME AND WORK:

1) A can do a piece of work in 10 days and B can do the same work in 15 days , In how many days both wil finish the work ?

L.C.M of 10 and 15 = 30( Total work )

Total work	Persons	Per day work
10	A	3
15	B	2

Total per day work = 3+2=5

Both will finish the work in  $30/5 = 6$  days.

2) A can do a piece of work in 12 days and B can do the same work in 15 days , In how many days both wil finish the work ?

L.C.M of 12 and 15 = 60( Total work )

Total work	Persons	Per day work
12	A	5
15	B	4

Total per day work = 5+4=9

Both will finish the work in  $60/9 = 6 \frac{2}{3}$  days.

3) A and B together do a piece of work in 15 days ,A can alone do it in 20 days ,In how many days B alone can do the work ?

A+B=15

A=20

L.C.M =60

Work done per day , A= 3, A+B= 4 , so B = 1

Therefore B can complete a work in 60 days .

4) A can complete the work in 25 days , B can do it in 20 days , they start the work together after 5 days ,A left , B will do the remaining work in how many days?

A=25

B = 20 → L.C.M = 100 ( TOTAL WORK)

Total work	Persons	Per day work
25	A	4
20	B	5

For first 5 days both A and B worked together →  $9 \times 5 = 45$

45 works are completed ,remaining works= 55

B will complete it in =  $55/5 = 11$  days.

5) A can complete the work in 10 days , B can do it in 15 days , they start the work together after 3 days ,B left , A will do the remaining work in how many days?

A=10

B = 15 → L.C.M = 30 ( TOTAL WORK)

Total work	Persons	Per day work
10	A	3
15	B	2

For first 3 days both A and B worked together →  $5 \times 3 = 15$

15 works are completed ,remaining works= 15

A will complete it in =  $15/3 = 5$  days.

6) A can complete the work in 25 days , B can do it in 20 days , A started the work And after 10 days,B also joined him , How many days the work lasts ?

A=25

B = 20 → L.C.M = 100 ( TOTAL WORK)

Total work	Persons	Per day work
25	A	4
20	B	5

A worked for 10 days , work completed is 40

Remaining work = 60

The remaining work wil be completed in  $60/9 = 6 \frac{2}{3}$  days

Total no of days =  $10 + 6 \frac{2}{3}$  days =  $16 \frac{2}{3}$  days

7) A can complete the work in 10 days , B can do it in 15 days , B started the work And after 5 days,A also joined him , How many days the work lasts ?

A=10

B = 15 → L.C.M = 30 ( TOTAL WORK)

Total work	Persons	Per day work
10	A	3
15	B	2

B worked for 5 days , work completed is 10

Remaining work = 20

The remaining work wil be completed in  $20/5 = 4$  days

Total no of days =  $5 + 4$  days = 9 days

8) A can do a work in 45 days and B in 40 days , They work together , After Some days, A left .B wil do remaining work in 23 days , After how many days A left ?

A=45

B = 40 → L.C.M = 360 ( TOTAL WORK)

Total work	Persons	Per day work
45	A	8
40	B	9

B worked for 23 days =  $9 \times 23 = 207$

Remaining work =  $360 - 207 = 153$

A left in =  $153/117 = 9$  days

9) A complete work in 24 days , B in 36 days , & C in 48 days . They start working together .After 4 days , C left ,A left 3 days before completion of work , The work last for how many days ?

A-24

B- 36

C-48 → L.C.M = 144

Total work	Persons	Per day work
24	A	6
36	B	4
48	C	3

First 4 days all together =  $13 \times 4 = 52$

$52 + 12 = 64$

$80 / 10 = 8$  days.

$4 + 3 + 8 = 15$  days

10) A can complete in 12 days , B in 16 days ,C in 24 days .They all started the work together After 2 days C left , A left 3 days before completion of work ,the work last for ??

A-12

B- 16

C-24 → L.C.M = 48

Total work	Persons	Per day work
12	A	4
16	B	3
24	C	2

First 2 days all together =  $9 \times 2 = 18$

$18 + 9 = 27$

$21 / 7 = 3$  days.

$2 + 3 + 3 = 8$  days

11) A can do a piece of work in 9 days ,B in 12 days . They work for a day alternatively beginning with A so the work lasts for ??

L.C.M = 36

Total work	Persons	Per day work
9	A	4
12	B	3

2 Days the wil complete 7 works

So they take 10 days to complete 35 works

Remaining we have only one work

→  $10 \frac{1}{4}$  days

12) A can do a piece of work in 8 days ,B in 7 days . They work for a day alternatively beginning with A so the work lasts for ??

L.C.M = 36

Total work	Persons	Per day work
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8	A	7
7	B	8

2 Days the wil complete 15 works

So they take 7 days to complete 52 works

Remaining we have 4 works

→  $7 \frac{1}{2}$  days

13) A and B together can do a piece of work in 12 days , B and C in 15 days , C and A in 20 days . In how many days , altogether and separately do it ?

L.C.M = 60

$A + B = 12 \rightarrow 5$

$B + C = 15 \rightarrow 4$

$C + A = 20 \rightarrow 3$

→ adding all three equations

$2(A + B + C) = 12$

All together they work for  $A + B + C = 6$  DAYS

$A + B + C = 6$ ,  $B + C = 4$ , →  $A = 2$  DAYS

$A + B + C = 6$ ,  $C + A = 3$ , →  $B = 3$  DAYS

$A + B + C = 6$ ,  $A + B = 5$  →  $C = 1$  DAYS

14) A can do a piece of work in 80 days . He worked only for 10 days and the remaining work done by B in 42 days .Both together in how many days ?

L.C.M = 80

A's per day work is 1

A worked for 10 days So 10 works wil be completed ,Remaining works = 70

$B = 70 / 42 = 5/3$  work per day

Both  $1 + 5/3 = 8/3 \rightarrow 80 / 8/3 = 30$  days

15) 12 men can do a piece of work in 8 days , They start working together after 3 days , 3 more men joined them .The remaining work done by 15 men in how many days ?

12 men  $\times 1 = 12$  piece per day

Today work =  $12 \times 8 = 96$

$12 \times 3 = 36 \rightarrow 96 - 36 = 60$

→  $60 / 15 = 4$  days

16) A is twice as good workman as B and together take 14 days to complete the work ,In how many days ,B alone can do the work ?

$A \times 2 = 2$

$B \times 1 = 1$

Total per day work = 3

14 days  $\times 3 = 42$

B can do it in  $= 42 / 1 = 42$  days ...

**17)** A is thrice as good workman as B and together take 15 days to complete the work ,In how many days ,B alone can do the work ?

$$A=3,B=1$$

$$\text{Total per day work} = 4$$

$$4 \times 15 = 60$$

$$B \text{ can do it in} = 60/1 = 60 \text{ days}$$

**18)** A can do the piece of work in 12 days ,B is 60 % more efficient than A .In how many days ,B alone can do the work ?

$$A (1) \times 12 = 12$$

$$B = 1 + 0.6 = 1.6$$

$$\rightarrow 12/0.6 = 7.5 \text{ days}$$

**19)** A can do the piece of work in 30 days ,B is 50 % more efficient than A .In how many days ,B alone can do the work ?

$$A=1 \rightarrow 30$$

$$B = 1.5$$

$$\rightarrow 30/1.5 = 20 \text{ days}$$

**20)** If 3 men or 4 women can do a piece of work in 43 days ,In how many days 7 men and 5 women working together could complete the same work ?

$$3m \text{ or } 4w = 43$$

$$7m \text{ \& } 5w = ?$$

$$1m = 4/3w \Rightarrow 7m = 28/3w + 5w = 43/3w$$

$$\rightarrow 4 \times 43/3 = 12 \text{ days (Or) } 3 \times 4 \times 43/3 \times 5 + 7 \times 4 = 12 \text{ days}$$

**21)** If 5 men or 9 boys can do a piece of work in 19 days , In how many days 3 men & 6 boys working together can complete the work ?

$$5m \text{ or } 9b = 19$$

$$3m \text{ \& } 6b = ?$$

$$\rightarrow 5 \times 9 \times 19/57 = 15 \text{ days}$$

**22)** If 4 men & 6 women can do a piece of work in 8 days , while 3 men and 7 women take 10 days . in how many days 10 women working together can complete the work??

$$4m \quad 6w \quad 8 : 3m \quad 7w \quad 10$$

$$32m \quad 48w : 30m \quad 70w$$

$$\rightarrow 50w = 8$$

$$10w = ?$$

$$50 \times 8/10 = 40 \text{ days}$$

**23)** If 6 men and 8 boys take 10 days while 26 men & 48 boys take 2 days .In how many days 15 men and 20 boys working together could complete ?

$$6m \quad 8b \quad 10 : 26m \quad 48b \quad 2$$

$$60 \quad 80 : 52 \quad 96$$

$$10m = 10$$

$$15m + 10mm = ?$$

$$10 \times 10/25 \Rightarrow 4 \text{ days}$$

## PIPES AND CISTERNS

**24)** Pipe A takes 10 hrs to fill the tank and pipe B takes 15 hrs to fill the tank.If the both are opened how long will it take to fill the tank?

$$A - 10 = 3$$

$$B - 15 = 2/5 \rightarrow \text{LCM} = 30$$

$$\text{Capacity.}$$

$$30/5 = 6 \text{ hrs.}$$

**25)** A pipe can fill a tank in 15 hrs.Due to a leakage in the bottom,it is filled in 20 hrs.If the tank is filled,how long the leak take to empty the tank?

$$15 = 4$$

$$20 = 3$$

$$\text{Capacity} = 60$$

$$\text{leakage} = 1 / \text{hour} = 60/1 = 60 \text{ hrs.}$$

**26)** Pipe A can fill a tank in 20 hrs and B in 30 hrs and C can empty the tank in 40 hrs. When all the 3 pipes are opened together, how long will it take to fill the tank?

A - 20	6	Capacity-120	10	20,30,40
B - 30	4		2	2,3,9
C - 40	3			1,3,2
	7			

$$\rightarrow 120/7 = 17 \frac{1}{7} \text{ hrs.}$$

**27)** Pipe A takes 10 hrs to fill the tank. Pipe B takes 15 hrs to fill the tank and Pipe C takes 9 hrs to empty the tank. When all of them are opened together, how long will it take to fill?

$$A - 10 = 9$$

$$B - 15 = 6$$

$$\text{Capacity} - 90$$

$$C - 9 = \frac{10}{5}$$

5	10,15,9
3	2,3,9
	2,1,3

$$90/5 = 18 \text{ hrs.}$$

**28)** Pipe A takes 12 hrs to fill the tank,Pipe B takes 15 hrs to fill the tank,Pipe C takes 6 hrs to empty the tank.For 5 hrs in the beginning and then the third pipe also open.After how much time,tank will be filled or empty?

$$\left. \begin{array}{l} A - 12 = 5 \\ B - 15 = 4 \\ C - 9 = \frac{10}{5} \end{array} \right\} 9$$

$$\text{Capacity} = 60 \quad (\text{Since, one litre will get reduced for every one hr})$$

$$9 \times 5 = 45 = 45/1 = 45 \text{ hrs (Empty)}$$

**29)** Pipe A takes 12 hrs to fill the tank,pipe B 15 hrs to fill the tank Pipe c 5 hrs to empty.The first 2 are kept open for 5 hrs and then C also opened after how much time

tank will be filled or empty ?

$$A - 12 = 5$$

$$B - 15 = 4$$

$$C - 5 = 12 \quad \text{Capacity 60.}$$

$$\begin{array}{r|l} 3 & 12, 15, 5 \\ \hline 5 & 4, 5, 5 \\ \hline & 2, 1, 1 \end{array}$$

$$9 \times 5 = 45 \quad 45/3 = 15 \text{ hrs (Empty)}$$

**30)** Two pipes A and B can fill a tank in 24 hrs, 32 hrs respectively. If both are opened together, then after how much time pipe B should be closed so that the tank is filled in 18 hrs?

$$A - 24 = 4 \times 18$$

$$B - 32 = 3 \quad \text{Capacity 96 litre}$$

$$\begin{array}{r|l} 4 & 24, 32 \\ \hline 2 & 6, 8 \\ \hline & 3, 4 \end{array}$$

$$96 - 72 = 24 - 3 \times 8 \text{ hrs}$$

**31)** Pipe X and Y can fill a tank in 12 hrs and 8 hrs respectively. If both are opened together, then after how much time pipe Y should be closed so that tank is filled in 6 hrs?

$$X - 12 = 12 \times 6 \quad \text{Capacity 24 litres}$$

$$Y - 8 = 3$$

$$24 - 12 = 12/3 = 4 \text{ hrs.}$$

$$\begin{array}{r|l} 4 & 12, 8 \\ \hline & 3, 2 \end{array}$$

**32)** Three Pipes A, B, C can fill a tank in 6 hrs. All are opened together after 2 hrs C is closed and pipe A and B take 7 hrs to fill the remaining part of the tank. Pipe C alone will take how long to fill the tank?

$$A + B + C = 6$$

$$\text{after two hours} \quad \text{LCM} = 28 \text{ (for } 2/3)$$

$$A + B + C = 4 = 7 \quad \text{Capacity} = 3 \times 28/2 = 42 \text{ litres.}$$

$$A + B = 7 = 4$$

$$C = 3.$$

$$= 42/3 = 14 \text{ hrs.}$$

#### PROBLEMS ON AGES

**33)** The average age of husband and wife who were married 5 years ago was 23 years. Now the average age of husband and wife and child is 20 years. How old is the child now?

$$23 \times 2 = 46.$$

$$\text{After 5 years sum} = 56$$

$$20 \times 3 = 60$$

$$\text{Diff} = 4 \text{ years (age of child)}$$

**34)** Average age of husband and wife who was married 5 years ago was 20 years. Now the average age of husband, wife and child is 18 years. Age of child?

$$20 \times 2 = 40$$

$$\text{After 5 years, sum} = 50$$

$$18 \times 3 = 54 \quad \text{Diff} = 4 \text{ years.}$$

**35)** Average age of thirty children in a class is 9 years. If the teacher's age be included the average becomes 10 years, what is the age of teacher?

$$9 \times 30 = 270$$

$$10 \times 31 = 310$$

$$= 40 \text{ years.}$$

**36)** Average age of 35 children in a class is 13 years. If a teacher's age be included the average becomes 14 years what is the age of teacher?

$$35 \times 13 = 455$$

$$36 \times 14 = 504$$

$$49$$

**37)** Sum of the ages of father and son at present is 50 years and also 5 years ago the father's age was 7 times that of his son's age. What's the present ages of father and son?

$$\text{Ratio } 7 : 1 \text{ (before 5 years)}$$

$$50$$

$$\frac{-10}{40} \text{ (before 5 yrs)}$$

$$40$$

$$\text{Present}$$

$$40 \times 7/3 = 35 + 5 = 40$$

$$40 \times 1/8 = 5 + 5 = 10.$$

**38)** Sum of ages of father and son at present is 56 years. After 4 years father's age will be 3 times that of his son's age. What is the Present age of father and son?

$$\text{Ratio } 3 : 1$$

$$56$$

$$64 \times 3/4 = 48 - 4 = 44$$

$$\frac{8}{64} \text{ (After 4 years)}$$

$$64 \times 1/4 = 16 - 4 = 12$$

$$64$$

**39)** The ratio of the ages of father and son at present is 11 : 3. The difference of their age is 24 years. What will be their ratio after 3 years?

$$\text{Diff} = 24$$

$$24/8 = 3 \text{ years}$$

$$\text{Ratio} = 11 : 3$$

$$33 : 9$$

$$\text{Diff} = 8$$

$$\text{After 3 years, } 36 : 12$$

$$3 : 1$$

**40)** The ratio of the ages of father and son at present is 6 : 1. After 5 years the ratio will become 7 : 2. Find the ages of father and son at present.

$$\text{At present } 6 : 1$$

$$\text{Both increase for 5 years once, } 1 \text{ ratio} = 5 \text{ years}$$

$$\text{After 5, } 7 : 2$$

$$= 30 : 5$$

$$\frac{6}{1} + \frac{5}{5} + \frac{7}{2}$$

$$12$$

$$10$$

$$\frac{7}{5} : \frac{35}{25} = 1 : 5 \text{ years.}$$

41) The ratio of ages of father and son at present is 3: 1, After 18 years the ration will become 2 : 1.What is the present age of father?

$$\frac{3}{1} : \frac{18}{18} = \frac{2}{1}$$

$$\frac{3}{2} = \frac{36}{18}$$

$$1 = 18 \text{ years.}$$

Father = 54 years.

42) The ratio of the ages of father and son 10 years ago was 4 : 1 and after 10 years 2 : 1 .What is the present age of father and son.?

$$\frac{4}{1} * \frac{20}{20} = \frac{2}{1} \quad \text{Present}$$

$$\frac{4}{2} = \frac{20}{20}$$

$$1 = 10 \text{ yrs.}$$

Father = 50  
son = 20

43) The ratio of ages of father and son 10 year ago was 3: 1 and after 10 years 2 : 1?

$$\frac{3}{1} * \frac{20}{20} = \frac{2}{1} \quad \text{Present}$$

$$\frac{3}{2} = \frac{20}{40}$$

$$1 : 20 \text{ yrs}$$

Father = 70  
son = 30

44) The ratio of the ages of father and the sum of the ages of his two sons is 3 : 1.After 5 years, the ratio will become 2 : 1.What's the present age of the father?

(two sons)

$$\frac{3}{1} * \frac{5}{10} = \frac{2}{1} \quad \text{Present Father} = 45$$

$$\frac{3}{2} = \frac{5}{20}$$

$$1 = 15$$

45) What is Present age of father? The ratio of ages of father and son 5 years ago was 5 : 1.The ratio of ages of father and son at present is 2 : 1.The ratio of the ages of father and son after 10 year will be 3: 1?

(A) 1 and 2 (B) 1 and 3.

## PARTNERSHIP

46) 3 Partners A,B & C investing rupees 10,000 ,13,000 & 17,000. The profit was made Rs 4000 at the end of the year .Find A's Profit ?

Ratio of A:B:C = 10:13:17

A's Profit =4000 \*10/40 = Rs 1000

47) A started a business investing Rs 9000 , 5 months later ,B joining the business investing Rs 8000.The profit was made Rs 6970 at the end of year .Find B 's profit ?

9000\*12/8000\*7 =108/56 → 27:14

6970\*14/41=2380

48) A and B started a business investing Rs 4000 & RS 3000 .A removed his money after 1 year and B continued for one more year .The Profit was made of Rs 5000 at the end of second year .Find B's Profit .

4000\*12/3000\*24=2/3 → 2:3

5000\*3/5= 3000

49) A and B started a business investing Rs 20,000 & RS 15,000.After 6 months ,C joined by investing Rs 25000 , The profit was made of Rs 19000 at the end of the year .Find A's profit?

20000\*12:15000\*12:25000\*6

→ 8:6:5

19000\*8/19=8000

50) A and B started a business investing Rs 16,000 & RS 12,000.After 3 months ,A withdraw Rs 5000 while B investing Rs 5000 more .After 3 more months ,C joined investing Rs 21000. The profit is Rs 26400 at the end of year.Find C's profit?

16000\*3 ,

11000\*9,

→ 48+99=147

12000\*3,

17000\*9,

→ 36+153=189

21000\*6=126

Ratio → 147:189:126

→ 7:9:6

C's Profit = 26400\*6/22=7200

51) Three partners A,B,C investing rupees 20000 each .After 5 months ,A withdrew 5000 and B withdraw 4000 & C investing 6000 more. The profit was made of Rs 69900 at the end of the year ,Find A's Profit??

20000\*5,15000\*7 → 100+105 → 205

20000\*5,16000\*7 → 100+112 → 212

20000\*5,26000\*7 → 100+182 → 282

205:212:282

$$69000 \times 205/699 \rightarrow 20500$$

**52)** A started a business by investing Rs 8000 .After how many months ,B” joining the business invest 12000 so that the profit sharing ratio will be equal at the end of the year ..

$$8000 \times 12 = 96000$$

$$12000 \times x = 96000$$

$$\rightarrow x = 8 \text{ months}$$

#### PROFIT AND LOSS

**53)** A man sold an article for Rs 100 & gain s Rs 10. Find his gain percentage .

$$100 \times 100/90 = 11.11\%$$

**54)** A man sold an article for Rs 100 & loss s Rs 10. Find his loss percentage

$$100 \times 100/110 = 9.09 \%$$

**55)** A man sold an article Rs 1980 & gains 10 % ,Find C.P ?

$$100 \times 1980/110 = 1800$$

**56)** A man sold an article per piece for Rs 150,a man loses 25 % ,Find C.P

$$100 \times 150/75 = 200$$

**57)** By Selling an article for Rs 1140 ,A man loses 5 % , In order to gain 5 % , the article must be sold for ?

$$\text{C.P} = \text{Rs } 1200$$

$$\rightarrow 1140 \times 105/95 \rightarrow \text{Rs } 1260 .$$

**58)** A man buys at the rate of 2 lemons for rs 1 & sells them 5 for rs 3 .Find his gain % .

$$0.5 \times 100/2.5 = 20 \%$$

**59)** A man buys 6 lemons for rs 10 & sold 4 lemons for rs 10. find gain %?

$$2 \times 100/4 = 50 \%$$

**60)** If the C.P of 15 articles is equal to selling price of 12 articles .Find gain % ?

$$3 \times 100/12 = 25 \%$$

**61)** A dealer proposing to sell at C.P & uses 900 gms weight for 1 kg .Find his gain %

$$100 \times 100/900 = 11 \frac{1}{9} \%$$

**62)** A shop keeper mixing 2 variety of tea powder 1 costs Rs 35/kg & other Rs 45/kg in the ratio 3:2 ,If he sells the mixture at Rs 41.6/kg .Find gain %?

Ratio :

$$35 \times 3 = 105$$

$$45 \times 2 = 90$$

$$\hline 195$$

$$41.6 \times 5 = 208$$

$$\text{Diff} = 208 - 195 = 13$$

$$\rightarrow 13 \times 100/195 = 6 \frac{2}{3} \%$$

**63)** A shopkeeper mixing 3 varieties of tea powder 1 at Rs 50/kg , 2<sup>nd</sup> at 30/kg,3 rd at Rs20/kg in the ratio 2:3:4.If he sells the mixed variety at Rs 33/kg.Find gain %

$$1 \rightarrow 100, 2 \rightarrow 90, 3 \rightarrow 80$$

$$\text{Total} = 270$$

$$33 \times 9 = 297$$

$$297 - 270 = 27$$

$$27 \times 100/270 = 10\%$$

**64)** A man bought paper sheets for Rs 7200 & spent Rs 200 on transport & paying Rs 600 for 330 boxes made , which he sold at Rs 28 each box. Find his gain %?

$$\text{Total C.P} = 7200 + 200 + 600 = \text{Rs } 8000$$

$$\text{S.P} = 330 \times 28 = 9240$$

$$\text{Profit} = 9240 - 8000 = 1240$$

$$\text{P}\% = 1240 \times 100/8000 = 15.5\%$$

**65)** A man purchased sugar cost Rs 400 .He sold 3/4<sup>th</sup> at a loss of 10%.And remainder at gain of 10%,the entire transaction resulted how much % gain or loss?

$$\frac{3}{4} \times 400 = 300 , 10\% \text{ loss} \rightarrow 270$$

$$\frac{1}{4} \times 400 = 100, 10\% \text{ gain} \rightarrow 110$$

$$\text{Total S.P} = 380 \rightarrow \text{loss} = 20$$

$$\text{L} \% = 20 \times 100/400 = 5\% \text{ loss}$$

**66)** A man purchased sugar cost Rs 450.He sold 1/3 rd at 10% loss.At what gain % should his remainder be sold so as to gain 20 % overall?

$$1/3 \times 450 = 150, \text{loss of } 10\% \rightarrow 135$$

$$20/100 \times 450 = 90$$

$$2/3 \times 450 = 300$$

$$\rightarrow 30\% + 5\% = 35\%$$

**67)** A man purchased sugar cost Rs 600.He sold 1/3 rd at 10% loss.At what gain % should his remainder be sold so as to gain 20 % overall?

$$1/3 \times 600 = 200, 10\% \text{ loss} \rightarrow 180$$

$$20/100 \times 600 = 120$$

$$2/3 \times 600 = 400$$

$$\rightarrow 140/400 \times 100 = 35\%$$

**68)** 2/3<sup>rd</sup> sold at 5% gain & remainder sold at a loss of 2 % .In this transaction , the trader gets Rs 400 as profit .Find the value of goods ?

Assume (300)

$$2/3 \times 300 = 200, 5 \%$$
 gain  $\rightarrow 210$

$$1/3 \times 300 = 100, 2\% \text{ loss} \rightarrow 98 \text{ -----Total} = 308.$$

$$300 \rightarrow 8$$

? → 400  
 $300 \times 400 / 8 = 15000$

**69)** When the price of the article was increased by 10% and sale decreased by 10% .So what is the effect on his income?  
No of articles \* cost →  $10 \times 10 = 100$   
Decrease \* increase →  $9 \times 11 = 99$   
Diff = 1  
→  $1/100 \times 100 = 1\%$

**70)** When the price of the article was decreased by 10% and sale increased by 10% .So what is the effect on his income?  
No of articles \* cost →  $10 \times 10 = 100$   
increase \* decrease →  $11 \times 9 = 99$   
Diff = 1  
→  $1/100 \times 100 = 1\%$

**71)** When the price of the article was increased by 20% and sale decreased by 15% .So what is the effect on his income?  
No of articles \* cost →  $100 \times 100 = 10000$   
Decrease \* increase  $85 \times 120 = 10200$   
Diff = 200  
→  $200/10000 \times 100 = 2\%$  gain

**72)** A discount serial of 10%, 20% & 40% is equal to single discount of how much % ?  
 $0.9 \times 0.8 \times 0.6 = 0.432$   
 $100 - 43.2 = 56.8\%$

**73)** The printed price of an article is Rs 150. The shopkeeper allowed successive discount .If the second discount is 12.5 % .what was the first discount , so that the final payment of the article is Rs 105?  
 $87.5\% \Rightarrow 105$   
 $100\% \Rightarrow ?$   
→  $100 \times 105 / 87.5 = 120$   
 $150 - 120 = 30 \rightarrow 30/150 \times 100 = 20\%$

**74)** A horse & a cow were sold for Rs 12000 each .The horse was sold at a loss of 20 % & cow at a gain of 20 % .The entire transaction resulted in how much % gain or loss accrued?  
 $100/80 \times 12000 = 15000$   
 $100/120 \times 12000 = 10000$   
Total C.P = 25000  
Total S.P =  $12000 \times 2 = 24000$   
Loss = 1000  
L % =  $1000/25000 \times 100 = 4\%$  loss

**75)** A man sold two horses for Rs 4000 each , He neither loosing nor gaining in the deal .If he sold one at gain of 25 % so other at a loss of how much percentage ?  
S.P =  $4000 \times 2 = 8000$   
Total S.P = Total C.P  
 $100/125 \times 4000 = \text{Rs } 3200$   
Remaining =  $8000 - 3200 = 4800$   
 $4800 - 4000 = 800$   
 $800/4800 \times 100 = 16.66\%$

**76)** A dealer sells a radio at a gain of 10%, If he had bought it at 10% less and sold it for Rs 132 less ,he would have still gained 10% ,Find C.P  
Assumption:  
 $100 + 10 = 110$   
 $90 + 9 = 99$   
Diff = 11

$100 \rightarrow 11$   
? → 132

$132 \times 100 / 11 = \text{Rs } 1200$

Verification :  
 $1200 + 120(10\%) = 1320$   
 $1080 + 108(10\%) = 1188$   
Diff = 132

**77)** A dealer sells a radio at a loss of 10%, If he had bought it at 20% less and sold it for Rs 55 more ,he would have had a profit of 40% ,Find C.P?  
 $100 - 10 \Rightarrow 90$   
 $80 + 32 \Rightarrow 112$   
Diff = 22

$100 \rightarrow 22$   
? → 55

$55 \times 100 / 22 = 250$

**78)** At what percentage above the cost price should a shopkeeper mark his radio so he get a profit of 20 % even allowing 10 % discount on marked price?  
M.P =  $100 + P\% / 100 - D\% \times \text{C.P}$   
→  $120/90 \times 100 = 33.33\%$

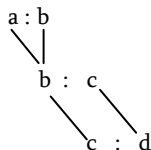
#### RATIO AND PROPORTION

**79)** If a:b=2:3, b:c=4:5 ,Find a:c, a:b:c=?  
a : b



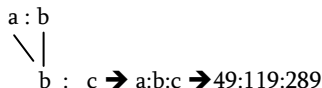
$$\rightarrow a:b:c \rightarrow 8:12:15, a:c \rightarrow 8:15$$

80) If  $a:b=2:3$ ,  $b:c=4:5$ ,  $c:d=6:7$ , Find  $a:d$  &  $a:b:c$ ?



$$\rightarrow 48:72:90:105$$

81) The ratio of money with  $a:b=7:17$ ,  $b:c=7:17$ , If  $a$  has Rs 470. Find  $C$ ?



$$\rightarrow \text{Rs } 2890$$

82) The cost of making an article is divided between materials, labour & overheads in the ratio  $3:4:1$ , If the materials cost Rs 67.5, Find the cost of article.

$$3:4:1$$

$$3 \rightarrow 67.5$$

$$8 \rightarrow ?$$

$$67.5 \times \frac{8}{3} = 180$$

83)  $A$  can do a piece of work in 10 days &  $B$  can do in 15 days. They worked together & completed. The total wages for the work is Rs 600. Find  $A$ 's Share?

Person	Total work	Per day work
A	10	3
B	15	2

$$\text{Total Per work} = 5$$

$$\frac{3}{5} \times 600 = 360$$

84)  $A$  can do a piece of work in 10 days &  $B$  can do in 15 days. They worked together and after 2 days  $A$  left, then  $B$  do the remaining total wages for work is Rs 600.

Person	Total work	Per day work
A	10	3
B	15	2

$$\text{Total Per work} = 5$$

$$\text{L.C.M} = 30$$

$$A's \ 2 \ \text{day work} = 3 \times 2 = 6$$

$$A = \frac{6 \times 600}{30} = 120$$

85) A bag contains 1 Rs, 50 P & 25 P coins in the ratio  $5:6:8$ . If the total is Rs 420. Find no of coins in each sort?

$$100:50:25$$

$$5:6:8$$

$$500:300:200 \rightarrow \text{Amount ratio} = 5:3:2$$

$$\frac{5}{10} \times 420 = 210 \times 1 = 210$$

$$\frac{3}{10} \times 420 = 126 \times 2 = 252$$

$$\frac{2}{10} \times 420 = 84 \times 4 = 336$$

86) A bag contains 25 P coins, 10p coins & 5P coins in the ratio  $1:2:3$ . If the total is Rs 30. Find no of 5p coins?

$$25:10:5$$

$$1:2:3$$

$$25:20:15 \rightarrow \text{Amount ratio} = 5:4:3$$

$$\frac{3}{12} \times 30 = 7.5 \times 20 = 150$$

87) The ratio of 1<sup>st</sup> & 2<sup>nd</sup> class fare between the 2 stations is  $4:1$  & what of no of passengers travelling by 1<sup>st</sup> & 2<sup>nd</sup> class is  $1:40$ . If Rs 1100 is collected as fare. Find the amount collected from 1<sup>st</sup> class Passenger.

$$4:1$$

$$1:40$$

$$4:40 \rightarrow \text{ratio} = 1:10$$

$$\frac{1}{11} \times 1100 = 100$$

88) The incomes of  $A$  &  $B$  are in the ratio  $3:2$  and their expenditure in the ratio  $5:3$ , If each sales Rs 1000, Find  $A$ 's income.

$$\frac{5}{3} + \frac{1000}{1000} = \frac{3}{2}$$

$$10:2000$$

$$9:3000$$

$$1:1000$$

$$\rightarrow 5000 + 1000 = \text{Rs } 6000/-$$

89) Two equal glasses are respectively  $\frac{1}{3}$  &  $\frac{1}{4}$  full of milk. They are then filled up with water & the contents mixed in a tumbler. What is the ratio of milk & water in the glass?

$$M \rightarrow \frac{1}{3} + \frac{1}{4} = \frac{7}{12}$$

$$W \rightarrow \frac{2}{3} + \frac{3}{4} = \frac{17}{12}$$

$$\text{Ratio} \rightarrow 7:17$$

90)  $A$  and  $B$  are two alloys of gold and copper prepared by mixing metals in the ratio  $7:2$  &  $7:11$ . If equal quantities of the alloys are melted to form a third alloy  $C$ , what's the ratio of gold & copper in  $C$ ?

$$7:2=9$$

$$7:11=18$$

$$\text{To make sum equal}$$



$$\frac{14:4}{7:11} \\ 21:15 \rightarrow 7:5$$

**91)** In a mixture of 20 l of milk & water contains in the ratio 5:1 .If 4l of mixture is replaced by 4 l water .so what is the ratio of milk & water in the new mixture ?  
20 litres = 15:5 =15-3:5-1  $\rightarrow$  12:4+4 lit  $\Rightarrow$  12:8  $\rightarrow$  4:3

**92)** A jar contained 800 l of milk ,200l is removed from the container & 200 l water is added to this .the same process is repeated twice .what amount of milk will be there at the end of 3 rd process?

$$800 \rightarrow 3:1 == 600(x):200(y)$$

$$\rightarrow x(x-y/x)^n$$

$$= 800(600/800 * 600/800 * 600/800) = 337.5$$

### PERCENTAGES

**93)** If 70 % of the students in a school are boys. And the no of girls be 504.Find no of boys.

$$\frac{504 * 100}{30} = 1680.$$

$$\frac{1680 * 70}{100} = 1176 \text{ boys.}$$

**94)** In an examination 65 % of students are passed and no of failures is 420.Find the total strength?

$$\frac{420 * 100}{35} = 1200$$

**95)** In an examination, a student scored 30% marks from the first paper out of 180.How much % should he score from 2nd paper out of 150 if he is to get an overall average of atleast 50 %?

$$\text{I } 180 \quad \frac{180 * 30}{100} = 54$$

$$\text{II } \frac{150}{330} \quad \frac{111 * 100}{150} = 74 \%$$

$$\frac{330}{2} = 165.$$

**96)** In an examination a student scored 30 % marks from the I paper out of 150.How much % should he score out of 120 if he is to get an overall percentage of atleast 50 %?

$$\text{I } 150 \quad \frac{30 * 150}{100} = 45$$

$$\text{II } 120 \quad 90 * 100 = 75 \%$$

$$\frac{270}{2} \quad \frac{120}{2}$$

$$\frac{270}{2} = 135$$

**97)** In an examination a student scored 30 % marks from I paper out and he is failed by 15 marks and another student who scored 40 % mark and he obtained 35 mark more than pass mark.Find pass mark?

$$\text{Maximum mark} = \frac{\text{Addition of difference in pass mark.}}{\text{Difference of scoring percentage}}$$

$$= \frac{50 * 100}{10} = 165$$

$$\frac{500 * 30}{100} = 150 + 15 = 165$$

$$\frac{500 * 40}{100} = 200 - 35 = 165$$

$$\frac{165 * 100}{500} = 33 \%$$

**98)** In an exam 42 % of students failed in Hindi.52 % failed in English.If 17 % failed in both, find % of students passed in both?

$$100 - 77 = 23 \%$$

**99)** The price of sugar was increased by 25 %.How much % the house holder reduce the consumption so their expenditures remains the same

$$\text{For increase } \frac{R}{100 + R} * 100$$

$$\text{For decrease } \frac{R}{100 - R} * 100 \quad \frac{25}{125} * 100 = 20 \%$$

**100)** If A's income is 20 % less than B's income .In how much % B's income is more than that of A?

$$\begin{array}{cc} \text{A} & \text{B} \\ 800 & 1000 \end{array}$$

$$\frac{200 * 100}{800} = 25 \%$$

**101)** In an election between 2 candidates, one gets 62 % of votes and he is elected by majority of 144 votes .Find the no of votes.

$$\frac{144 * 100}{162} \quad 62 \% - 38 \% = 24 \%$$

$$\frac{144 * 100}{24} = 600$$

**102)** In an election between 2 candidates ,one gets 30 % of the voter and id defeated by 15000 votes. Find no of votes of winning candidate?

$$\frac{15000 * 100}{40} = 3750 * 70$$

(OR)

$$40 \% \rightarrow 15000 = 26250.$$

$$70 \% \rightarrow ?$$

**103)** In an election between 2 candidates, one gets 55 % of total valid votes.20 % of votes were invalid.If the no of votes was 7500,so find the no of votes polled by defeated candidate.

$$\text{Valid} = 6000$$

$$55 \% \rightarrow 6000$$

$$45 \% \rightarrow ?$$

$$= 2700.$$

**104)** 12) 10 % of voters did not cast their votes in an election between 2 candidates.10 % of the polled were invalid and one gets 54 % of the total valid votes and he is elected by the majority of 1620 votes. Find the number of votes enrolled on voter's list?

$$8\% \rightarrow 1620$$

$$100\% \rightarrow ?$$

$$= \frac{1620 * 100}{8} = 20250.$$

$$8$$

$$\frac{20250 * 100}{90} = 22500$$

$$90$$

$$\frac{22500 * 100}{90} = 25000$$

$$90$$

**105)** The population of the town increased by 10 % in the 1st year and 20 % in the 2nd year. The population after 2 years will be ? The population is 8000?

$$8000 \rightarrow 10 \% = 800$$

$$8000 + 800 = 8800$$

$$8800 \rightarrow 20\% = 1760$$

$$8800 + 1760 = 10560$$

$$\text{Pop} \left( 1 + \frac{r}{100} \right)^n ;$$

$$\text{Future Population} * \frac{100 + R}{100} ; \text{ Past Population} * \frac{100}{100 + R}$$

**106)** The population of the town increased by 5% evy year.If the pesent population is 15435?

$$15435 * \frac{100}{105} * \frac{100}{105} = 14000$$

**107)** In a mixture of 40 litre of milk and water contains 10% water. How much water should br added to this so that water becomes 20%?

$$\begin{array}{l} \swarrow \text{M } 36 \quad \text{To add milk,} \\ 40 \quad \searrow \text{W } 4 \end{array} \quad \begin{array}{l} 36 \rightarrow 80\% \\ ? \rightarrow 20\% \end{array} \quad \begin{array}{l} \text{Total water} \\ \frac{20 * 30}{80} = 9\text{litres.} \rightarrow 9 - 4 = 5 \text{ litres.} \end{array}$$

**108)** A man sends 75 % of his income. If his income is increased by 20%,he increases his expenditure by 10 %.His savings are increases by how much %?

$$100 \rightarrow 75 = 25 \quad \frac{12.5 * 100}{25} = 50\%$$

$$120 \rightarrow 82.5 = 37.5 \quad \frac{12.5}{25}$$

**109)** A man donated 5% of his income to a trust and deposited 20% of remainder in a bank. If he now has Rs 1919.What is his income?

$$100 \rightarrow 5\% = 95$$

$$95 \rightarrow 20\% = 76$$

$$100 = 76$$

$$? = 1919$$

$$= 2525$$

## TIME & DISTANCE, TRAINS

**110)** A train 100 m long running with an avg speed of 72 km/hr .How long it will take to cross an electric pole?

$$T = 100 * 18/72 * 5 = 5 \text{ sec}$$

**111)** A train 100m long running with a avg speed of 72 kmph .How long it will take to cross a platform of 150 m?

$$T = (100+150) * 18/75 * 5 = 12.5$$

**112)** A train 200m long running with avg speed of 72 kmph .It takes 1 min to cross a platform. How long the platform?

$$72 \text{ kmph} = 20 \text{ m/s}$$

$$x + 200/20 = 60$$

$$x = 1000 \text{ m}$$

**113)** A train 100m long running with a avg speed of 30 kmph .How long it will take to cross a man who is running with an avg speed of 6 kmph in the opposite direction ?

$$T = 100 * 18/36 * 5 = 10 \text{ seconds}$$

**114)** A train 200m long running with a avg speed of 80 kmph .How long it will take to

cross a man who is running with an avg speed of 8 kmph in the same direction?

$$T = 200 \cdot 18/72 \cdot 5 = 10 \text{ seconds}$$

**115)** Two trains are 132 m & 108 m long running at 40 kmph & 32 kmph . From the moment they meet ,how long it will take to cross each other ?

$$T = 240\text{m} \cdot 18/72 \cdot 5 = 12 \text{ seconds}$$

**116)** A train 100 m long .It takes 10 seconds to pass a pole & it takes 8 seconds to pass a same length of another train running in opposite direction.what is the speed of second train ?

$$S=100/10=10 \text{ m/s} \rightarrow 36 \text{ kmph}$$

$$200/x+10=8$$

$$200=8x+80$$

$$8x=120$$

$$x=15$$

$$\rightarrow 54 \text{ kmph}$$

**117)** A train running with an avg speed of 25 kmph.It takes 18s to pass a platform & it takes 12 s to pass a man who is running with an avg speed of 5 kmph in opposite direction.what is the length of the train and platform .

$$D=25 \cdot 5/18 \cdot 18=125\text{m}$$

$$25+5=30 \cdot 5/18=25/3$$

$$D=25/3 \cdot 12=100(\text{train})$$

$$125-100=25(\text{platform})$$

**118)** A train leaves delhi at 9 A.M with an avg speed of 25 kmph .Another train starts from same place in same direction with an average speed of 35 kmph at 2 P.M .How long they both will be together ?

$$\left. \begin{array}{l} 9.00 \Rightarrow 25 \text{ kmph} \\ 2.00 \Rightarrow 35 \text{ kmph} \end{array} \right\} = \text{Diff}=10$$

$$5 \cdot 25=125$$

$$125/10=12.5 \cdot 35=437.5 \text{ km}$$

**119)** A thief steals a car at 1.30 P.M & drives with an avg speed of 45 kmph. The theft is discovered at 2P.M . And the owner sets of another one with an average speed of 50 kmph .At what time the thief will be caught ?

$$45 \cdot 50 \cdot 1/5 \cdot 2=225 \text{ km}$$

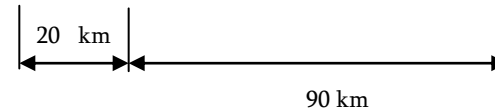
$$225/50=4 \frac{1}{2}$$

$$\rightarrow 4.30+2 = 6.30 \text{ P.M}$$

**120)** Two trains starts from delhi & hyderabad proceeding towards each other at 95 kmph & 80 kmph .when they meet , it is found that one train have travelled 180 km more than the other .So find the distance between Delhi and hyderabad .

$$180/95-85 = 12 \text{ hrs} \cdot 175(95+80) = 2100 \text{ km}$$

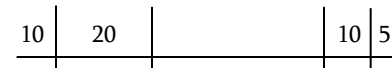
**121)** A and B are two stations between 110 km .A train starts from A towards B at 7 P.M with an average speed of 20 kmph .Another train starts from B towards A at 8 P.M at 25 kmph .At what time they will meet ?



$$\rightarrow 90/20+25=2 \text{ hrs}$$

$$8+2=10 \text{ P.M}$$

**122)** A and B are two stations between 90 km .A train starts from A at 10 kmph & another from B at 5 kmph . Both trains are increasing the speed doubled itself in each hour .How many km from A , they will meet ?



$$90 \cdot 2/3=60$$

$$90 \cdot 1/3=30$$

**123)** A boy goes to school with an avg speed of 30 kmph .he is late by 10 min. However with an avg speed of 40 km/hr. He reached his school 5 min earlier .Find the distance between school and house.

$$30-10 \text{ late}$$

$$40-5 \text{ earlier}$$

$$x/30-x/40=15/60$$

$$\text{Product of 2 speed} \cdot \text{difference of arrival/difference of 2 speed}$$

$$1200/10 \cdot 15/60=30 \text{ km}$$

**124)** A boy goes to school with an avg speed of 10 kmph. He is late by 15min. However with an avg speed of 12 km/hr. Still he is 5 min late. Find the distance between school and house.

$$120/2 \cdot 10/60 = 10 \text{ km}$$

**125)** A boy goes to school with an avg speed of 10 kmph and return back with 15 kmph. Find avg speed ?

$$2xy/x+y \rightarrow 300/25 = 12 \text{ kmph}$$

**126)** A boy goes to school with an avg speed of 3 kmph and return back with 2 kmph.If he takes 5 hrs in all , find the distance between school and house ?

$$12/5 \cdot 5 = 12 \text{ km}$$

distance =  $12/2=6$  km

Total time \* product of 2 speed /dist of 2 speed  $\rightarrow 5*6/5 = 6$  km

**127)** Without any stop, the average speed of bus is 54 kmph, with stop 45m kmph .How many min/hr does the bus stopped?

Rest Time= Difference of speed /Speed without stop

=  $9/54 = 1/6$  hrs =  $1/6 * 60$  min = 10 mins/hr

**128)** A man covered certain distance by scooter .If he had travelled 3 km speed fast , he would take 40 mins less.If he had travelled 2 km speed slow , he would take 40 min more. Find the usual speed and also distance ?

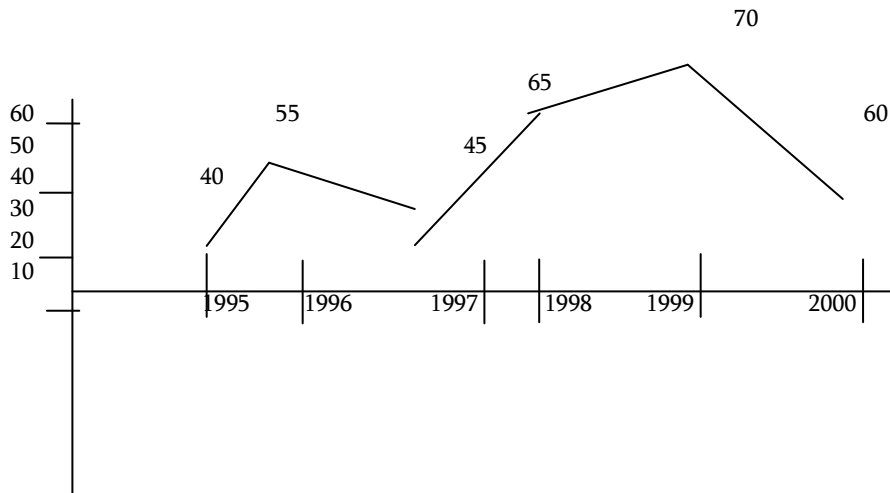
Usual speed =  $2 * \text{product of inc \& dec in speed} = 12$  kmph

$12 \rightarrow 12+3=15$

$12 \rightarrow 12-2=10$

$\Rightarrow 15*10/15-10*80/60=40$  km

### Tabulation



**129)** If the income in 1998 was Rs 264 crore, what was the expenditure in 1998?

$100 \rightarrow 165$

$? \rightarrow 264$

$264*100/165=16000$

**130)** If the income in 1995 was Rs 420 crore,what is the expenditure ?

$100 \rightarrow 140$

$? \rightarrow 420$

$420 * 100/140 = 300$

**131)** In which year the ratio of income to expenditure the minimum ?

In 1995

$100 \rightarrow 140$

$140/100=1.4$

**132)** In which year the ratio of percentage earned to the previous year is the minimum ?

$45/65 = 9/13$  ,  $60/70 = 6/7$

$\rightarrow 1997$

**133)** What is the average profit % for all the years ?

$335/6 = 55.8 \%$

**134)** If the expenditure in 2000, was 25 % , more then thye expenditure in 1997, In 1997 income was what % less than the income in 2000?

$1997 \rightarrow 2000$

$100 \rightarrow 125*60/100 = 75$

Income  $\rightarrow 145 \rightarrow 200 = \text{diff}=55$

$55*100/200 = 27.5 \%$  less

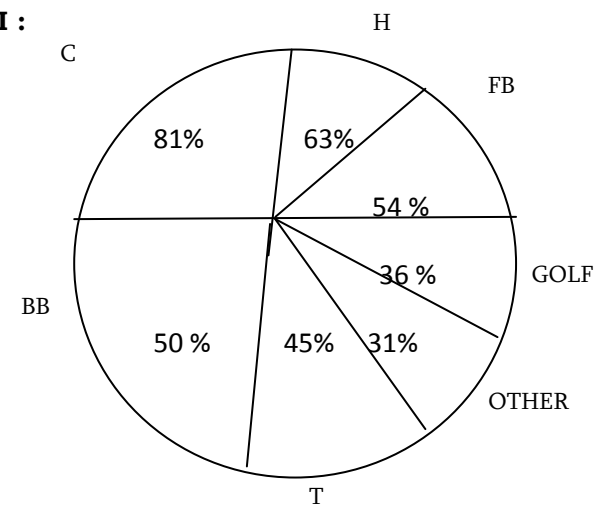
**135)** If the profit in 2000 was Rs 4 crores ,what was the profit in 199?

$600 \rightarrow 4$

$70 \rightarrow ?$

Cannot be determined

### Tabulation II :



**136)** What % of total spending is spent on tennis?

$45/360 * 100 = 12.5 \%$

**137)** How much % more is spent on hockey than that on Golf?

$$27/360 * 100 = 300/4 = 75\%$$

**138)** How much % less is spent on football than that of cricket?

$$27/81 * 100 = 33.33 \%$$

**139)** If the total expenditure for the sports during the year was 72000, How much is spent on basket ball ?

$$50/360 * 72000 = 10,000$$

## CALENDARS

Day code:

Sun -0, Mon -1, Tue -2, Wed-3, Thurs -4, Fri -5, Sat -6

Month Code:

Jan-0, Feb-3, Mar-3, Apr-6, May-1, Jun-4, Jul-6, Aug-2, Sep-5, Oct-0, Nov-3, Dec-5

Year Code:

$$1600-1699 = 6$$

$$1700 - 1799 = 4$$

$$1800-1899 = 2$$

$$1900-1999 = 0$$

$$2000-2099 = 6$$

**140)** What was the day on 16th july 1776?

$$16-7-1776$$

$$76/4=19$$

$$16+76=92 \rightarrow 92+19=111 \rightarrow 111+6(\text{month code})=117+4(\text{year code}) \rightarrow 121$$

$$121/7=2 \rightarrow \text{Tuesday}$$

**141)** What was the day on 09-09-2014?

$$14/4=3$$

$$9+14=23 \rightarrow 23+3=26 \rightarrow 26+5(\text{month code})=31+6(\text{year code})=37$$

$$37/7=2 \rightarrow \text{Tuesday}$$

**142)** What was the day on 26-01-1950?

$$50/4=12$$

$$26+50=76+12=88+0(\text{month code})=88+0(\text{year code})=88/7 = 4 \rightarrow \text{Thursday}$$

**143)** What was the day on 15-02-2012?

$$12/4=3$$

$$15+12=27 \rightarrow 27+3=30+3(\text{month code})=33+6(\text{year code})=39$$

$$39/7=4 - 1 \text{ (for leap yr dates between jan 1 to feb 29)} \rightarrow 3 \text{ (Wednesday)}$$

## CUBES

1) A cube size is  $3*3*3$ , it is painted in all 3 areas and cut in to  $1*1*1$  size small cubes. How many small cubes 3 faces painted, 2 face painted, 1 face painted and how many cubes none face painted.

$$8, 12, 6, 1$$

2) A cube is  $4*4*4$ . It is painted in all surfaces. How many small cubes 3 faces painted, 2 face painted, 1 face painted and how many cubes none face painted?

$$8, 24, 24, 8$$

3) A cube size is  $3*3*3$ . It is painted in 3 diff colours. Opposite Sides are Red, Black, Green. How many face 1 red, 1 black, 1 green. How many face 1 red 1 black? How many 1 red? none? How many atleast 1 face painted?

$$8, 4, 2, 1, 26$$

Formula:

$$3 \text{ faces} = 8$$

$$2 \text{ faces} = 12 (x-2)$$

$$1 \text{ face} = 6 (x-2)^2$$

$$\text{no face} = (x-2)^3$$

4) A cube  $6*6*6$  painted in 3 colours Opp sides are red, black, green. How many 1 faces coloured? How many 1 red, 1 black? How many 1 red? How many none?

$$1 \text{ face} = 6*16 = 96/3 = 32$$

$$2 \text{ face} = 12*4 = 48/3 = 16$$

$$\text{no face} = 64.$$

## PROBABILITY

1) A bag contains 3 red balls, 5 yellow balls & 4 green balls. Three balls are drawn from the box at random. What is the probability that they are different colours?

$$3C1 * 5C1 * 4C1 / 12C3 = 60/220 = 3/11.$$

2) A bag contains 3 red, 5 yellow & 4 green balls. Three balls are drawn at random. What is the probability that they are exactly 2 green balls?

$$4C2 * 8C1 / 220 = 12/55.$$

3) A bag contains 3 red, 5 yellow, 4 green balls. 3 balls are drawn at random. What is the probability that there are no yellow balls?

$$7C3 / 220 = 7/44.$$

4) A bag contains 3 red, 5 yellow, 4 green balls. 3 balls are drawn at random. What is the probability that they are same colour?

$$1 + 10 + 4 / 220 = 3/44.$$

5) A bag contains 3 red, 5 yellow and 4 green balls. 3 balls are drawn at random. What is the probability that they are not same colour?

$$1 - \frac{3}{44} = \frac{41}{44}.$$

6) A bag contains 7 white & 5 black balls. A ball is drawn from the box and replaced. Again a ball is drawn from the box. What is the probability that both were white, black. I white II black?

$$\frac{7C1}{12C1} \cdot \frac{7C1}{12C1} = \frac{49}{144}$$

$$\frac{5C1}{12C1} \cdot \frac{5C1}{12C1} = \frac{25}{144}$$

$$\frac{7C1}{12C1} \cdot \frac{5C1}{12C1} = \frac{35}{144}$$

### COMBINATION

1) In how many ways to form a committee consisting of 3 boys and 2 girls selected from 5 boys and 4 girls.

$${}^5C_3 \cdot {}^4C_2 = 60 \text{ ways.}$$

2) In how many ways to form a committee consisting of 5 students selected from 5 boys and 4 girls. At least 1 boy should be there. Find the probability?

$${}^5C_5 + {}^5C_4 \cdot {}^4C_1 + {}^5C_3 \cdot {}^4C_2 + {}^5C_2 \cdot {}^4C_3 + {}^5C_1 \cdot {}^4C_4$$

$$= 5 + 20 + 30 + 40 + 5$$

$$= 126.$$

### PERMUTATION

1) In how many ways to arrange seats for 3 boys?

$$3! = 6 \text{ ways.}$$

2) In how many ways to arrange seats for 4 boys and 3 girls. Boys & Girls are alternate?

$$4! \cdot 3! = 144 \text{ ways.}$$

3) In how many ways to arrange seats for 5 Boys & 4 girls, Either start with 'Boy' or 'Girl'.

$$4! \cdot 4! = 576.$$

$$576 + 576 = 1152 \text{ ways.}$$

### ALLIGATION AND MIXTURE

1)

The average marks obtained by 120 candidates in a certain examination is 35 marks. The average marks obtained by passed candidate is 39 marks. That of failed candidate is 15 marks. Find the no of students those who are passed.?

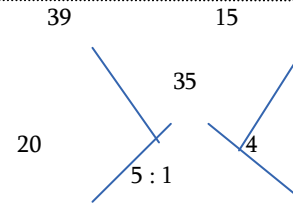
$$\frac{X}{120} = 39$$

$$\frac{Y}{120} = 15$$

$$X = 4680; Y = 1800.$$

Pass

Fail



$$= \frac{120 \cdot 5}{6} = 100.$$

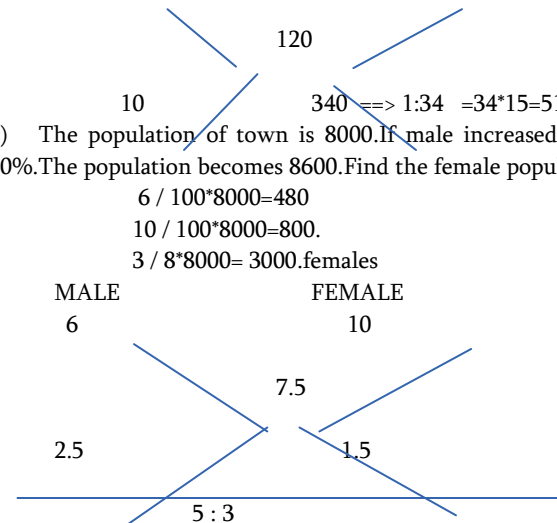
2) The average salary of entire staff in an office is 120/month. The average salary of officers is 460 and of non-officers is 110. If the no. of officers is 15. Find the no of non officers?

Officers

460

Non Officers

110



3) The population of town is 8000. If male increased by 6% and female increased by 10%. The population becomes 8600. Find the female population of the town?

$$\frac{6}{100} \cdot 8000 = 480$$

$$\frac{10}{100} \cdot 8000 = 800.$$

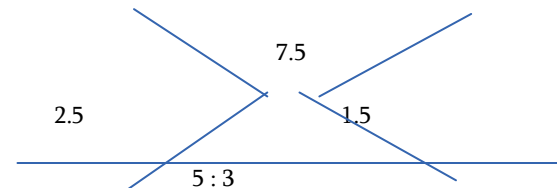
$$\frac{3}{8} \cdot 8000 = 3000 \text{ females}$$

MALE

6

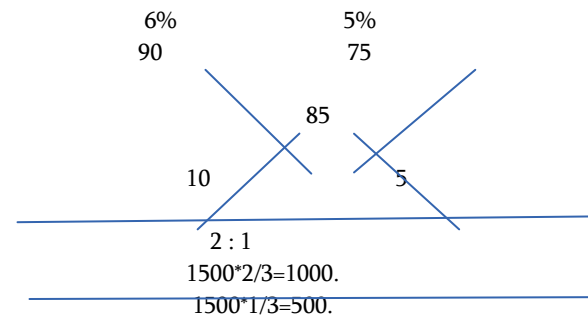
FEMALE

10

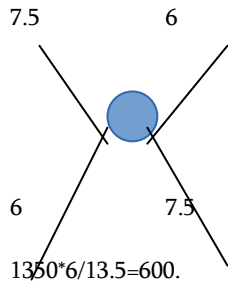


$$\text{Overall increase} = \frac{600}{8000} \cdot 100 = 7.5.$$

4) Rs 1500 is divided into two parts. One part invested 6% pa and other at 5 % pa. At the end of the year, investor received Rs 85 as interest from both investment. Find the two parts of investments?



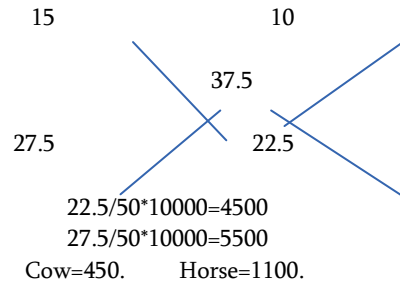
5) A man buys two houses for 1850. He sold one at a gain of 7.5 % and other at a loss of 6 %. He is neither losing nor gaining in the deal. Find the cost of each.



$$1350 \times 6 / 13.5 = 600.$$

$$1350 \times 7.5 / 13.5 = 750.$$

6) A man buys 5 horse and 10 cows for Rs 10000. He sold horse at gain of 15 % and cow at a loss of 10 %. Thus he gets Rs 375 as profit. Find the cost of each.



$$22.5 / 50 \times 10000 = 4500$$

$$27.5 / 50 \times 10000 = 5500$$

Cow = 450. Horse = 1100.

#### CLOCK

1) At what time between 3 and 4 will the hands of the clock be together?

$$15 \times 60 / 55 = 16 \frac{4}{11} \text{ min}$$

2) At what time between 4 and 5 will the hands of the clock coincide?

$$20 \times 60 / 55 = 21 \frac{9}{11} \text{ mins.}$$

3) At what time between 4 and 5 will the hands of clock will be at right angle?

$$5 \times 60 / 55 = 5 \frac{5}{11}.$$

$$35 \times 60 / 55 = 38 \frac{2}{11}.$$

4) How many right angles in a day?

Ans = 44 times.

{ 2-3 = II

3-4 = I } Same

{ 8-9 = II

9-10 = I } Same

5) At what time between 8 and 9 will the hands of clock be at staright angle?

$$10 \times 60 / 55 =$$

$$40 \times 60 / 55 =$$

6) The minute hand of a clock overtakes the hour hand at the intervals of 65 mins pf every correct time. So how many minutes a day, the watch gain or lose?

Diff\*60\*24

Given data

Correct watch overtake once in 65 5/11 mins.

$$65 \frac{5}{11} - 65 = \frac{5}{11}.$$

$$\frac{5 \times 60 \times 24}{11 \times 65} = 10 \frac{10}{143}.$$

$$11 \times 65$$

#### S.I AND C.I

S.I = PNR/100.

Amount of C.I =  $P(1 + R/100)^N$

1) Let the P = 1000, N = 3 years, R = 10 %

Find SI and CI

SI

$$1000 \times 3 \times 10 / 100 = \text{Rs } 300.$$

CI

$$\text{Amount} = 11/10 \times 11/10 \times 11/10$$

$$= 1331.$$

C.I = Amount - P = 331.

2) The SI for certain sum of money for 2 years at 5 % p.a is Rs 80. So what is the CI for the same sum, rate and period?

$$\text{SI} = 80 / 2 = 40 \text{ (for 1 year)}$$

$$= 80 + 2 = 82.$$

$$(40 + 42)$$

3) The difference between SI and CI for a certain sum of money for 2 years at 4 % p.a is Rs

1. Find P.

Assume 1000.

SI	CI
40	40
40	41.6
<hr/>	
80	1.6
1000	1.6 →
?	1 →
<hr/>	
= 1000	= 625 %
1.6	

#### REASONING

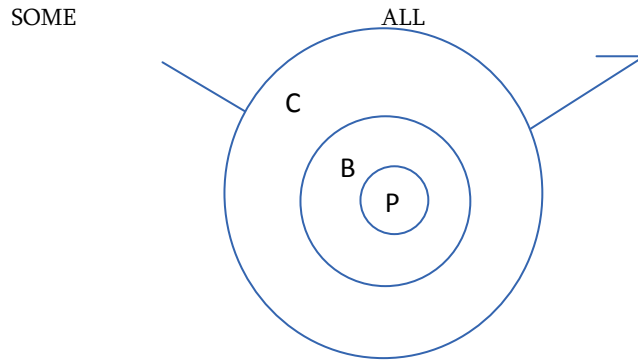
1) All papers are books.

All books are chairs.

Conclusion:

- a.All papers are chairs
- b.All chairs are papers
- c.Some papers are chairs
- d.some chairs are papers

Ans:1 and 4 only

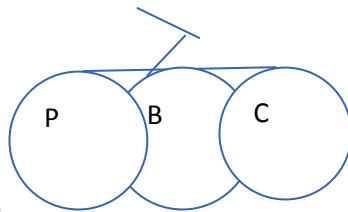


- 2) Some Papers are Books.  
Some Books are Chairs.

Conclusion:

- Some Papers are Chairs
- Some Papers are not Chairs.
- No Paper is Chair.
- Some Chairs are Books.

Ans: 4 only.

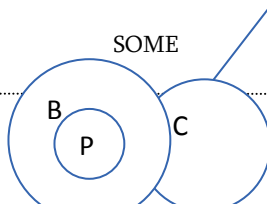


- 3) All Papers are Books.  
Some Books are Chairs.

Conclusion:

- Some Papers are chairs.
- Some Papers are not chairs.
- No Paper is chair.
- Some Books are Papers.

Ans :4 only.

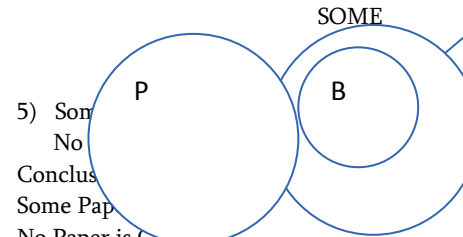


- 4) Some Papers are Books  
All Books is chairs.

Conclusion:

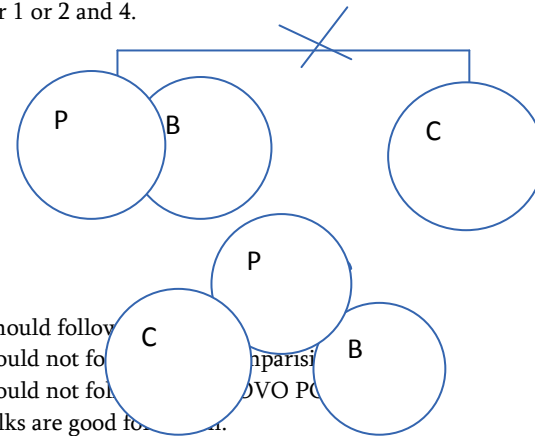
- Some Papers are chairs.
- Some Papers are not chairs.
- No Paper is Chairs.
- Some Chairs are Books.

Ans: 1,2,4 Only.



- 5) Some Papers are Books.  
No Books are Chairs.  
Conclusion:  
Some Papers are Chairs.  
Some Papers are not Chairs.  
No Paper is Chair.  
Some Chairs are Books.  
No Book is Chair.

Answer :Either 1 or 2 and 4.



Rules:

- Conclusions Should follow from the premises.
- Conclusion should not follow from the premises.
- Conclusion should not follow from the premises.

- 6)Morning walks are good for health.  
I) All healthy people go for morning walks.  
II) Evening walks are harmful.

DIRECTION TEST

- 1) A man walked 20m straight,then he turned right and walked 30m,then he turned left and walked 40m.Again he turned left walked 30m.Finally he turned right and walked 50m.How far was he from the start?

Answer 110m. 20

50

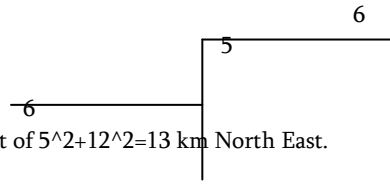


30

40

30

2) A man walked 6km towards east. Then he turned left and walked 5 km. Then he turned right and walked 6 km. So how was he from the start and in which direction?



Answer =  $\sqrt{5^2 + 12^2} = 13$  km North East.

RANKING

1) Raju's rank is 12<sup>th</sup> from top and 29<sup>th</sup> from bottom. 5 Students did not participate and 5 students failed. What is the strength?

12

29

41

1-

40

$40 + 5 + 5 = 50$ .

2) In a row of girls, Shilpa is 8<sup>th</sup> from left, Reena is 17<sup>th</sup> from right. When they interchange, Shilpa becomes 14<sup>th</sup> from left. What is the total strength?

(8) S      R (17)

R

S 14.

In between 8 and 14 = 5.

BLOOD RELATION

1) Pointing to a man on the stage, Reeta said "He is the brother of the daughter of the wife of my husband". How's he related to Reeta?

Answer: Son

2) A+B mean A is brother of B

A- B mean A is the mother of B

A \* B mean A is the father of B

A/ B mean A is the daughter of B.

M + N - O      Maternal Uncle.