

Solution Booklet 5th Semester

Chapter 1- Time and Work

Q1.ANS-C

A's 1 day's work = $\frac{1}{24}$ B's 1 day's work = $\frac{1}{6}$ C's 1 day's work = $\frac{1}{12}$

(A+B+C)'s 1 day's work = $(\frac{1}{24} + \frac{1}{6} + \frac{1}{12}) = \frac{7}{24}$

∴ The work will be completed by them in i.e. $3\frac{3}{7}$ days.

Q2.ANS-C

Ghansyam's 1 day work = $\frac{1}{8} - \frac{1}{12} = \frac{1}{24}$

Q3.ANS-A

$$2(A + B + C)'s \text{ 1 day's work} = \left(\frac{1}{30} + \frac{1}{24} + \frac{1}{20} \right) = \frac{15}{120} = \frac{1}{8}.$$

$$\text{Therefore, } (A + B + C)'s \text{ 1 day's work} = \frac{1}{2 \times 8} = \frac{1}{16}.$$

$$\text{Work done by A, B, C in 10 days} = \frac{10}{16} = \frac{5}{8}.$$

$$\text{Remaining work} = \left(1 - \frac{5}{8} \right) = \frac{3}{8}.$$

$$A's \text{ 1 day's work} = \left(\frac{1}{16} - \frac{1}{24} \right) = \frac{1}{48}.$$

Now, $\frac{1}{48}$ work is done by A in 1 day.

So, $\frac{3}{8}$ work will be done by A in $\left(48 \times \frac{3}{8} \right) = 18$ days.

Q4.ANS-A

$$(A + B + C)'s \text{ 1 day's work} = \frac{1}{6};$$

$$(A + B)'s \text{ 1 day's work} = \frac{1}{8};$$

$$(B + C)'s \text{ 1 day's work} = \frac{1}{12}.$$

$$\therefore (A + C)'s \text{ 1 day's work} = \left(2 \times \frac{1}{6} \right) - \left(\frac{1}{8} + \frac{1}{12} \right)$$

$= (\frac{1}{3} - \frac{5}{24}) = \frac{3}{24} = \frac{1}{8}$. So, A and C together will do the work in 8 days.

Q5.ANS-C

$$(A + B)'s \text{ 1 day's work} = \left(\frac{1}{15} + \frac{1}{10} \right) = \frac{1}{6}.$$

$$\text{Work done by A and B in 2 days} = \left(\frac{1}{6} \times 2 \right) = \frac{1}{3}.$$

$$\text{Remaining work} = \left(1 - \frac{1}{3} \right) = \frac{2}{3}.$$

3 3

Now, $\frac{1}{15}$ work is done by A in 1 day.

$\therefore \frac{2}{3}$ work will be done by a in $\left(15 \times \frac{2}{3}\right) = 10$ days.

Hence, the total time taken = $(10 + 2) = 12$ days.

Q6.ANS-C

(B + C)'s 1 day's work = $\left(\frac{1}{9} + \frac{1}{12}\right) = \frac{7}{36}$.

Work done by B and C in 3 days = $\left(\frac{7}{36} \times 3\right) = \frac{7}{12}$.

Remaining work = $\left(1 - \frac{7}{12}\right) = \frac{5}{12}$.

Now, $\frac{1}{24}$ work is done by A in 1 day.

So, $\frac{5}{12}$ work is done by A = $24 \times \frac{5}{12} = 10$ days.

Q7.ANS-D

(P + Q + R)'s 1 hour's work = $\left(\frac{1}{8} + \frac{1}{10} + \frac{1}{12}\right) = \frac{37}{120}$.

Work done by P, Q and R in 2 hours = $\left(\frac{37}{120} \times 2\right) = \frac{37}{60}$.

Remaining work = $\left(1 - \frac{37}{60}\right) = \frac{23}{60}$.

(Q + R)'s 1 hour's work = $\left(\frac{1}{10} + \frac{1}{12}\right) = \frac{11}{60}$.

Now, $\frac{11}{60}$ work is done by Q and R in 1 hour.

So, $\frac{23}{60}$ work will be done by Q and R in $\left(\frac{60}{11} \times \frac{23}{60}\right) = \frac{23}{11}$ hours ≈ 2 hours.

So, the work will be finished approximately 2 hours after 11 A.M., i.e., around 1 P.M.

Q8.ANS-A

$$\frac{1}{60} \times X + \frac{1}{90} \times (X - 15) = 1$$

So, $x = 42$ days

Q9.ANS-A

2 days work = $\frac{1}{12} + \frac{1}{18} = \frac{5}{36}$

In 14 days work done = $\frac{35}{36}$

Remaining work = $\frac{1}{36}$

Next turn is of A. A will take = $12 \times \frac{1}{36} = \frac{1}{3}$ day

So, total number of days = $14 \frac{1}{3}$ days.

Q10.ANS-C

3 days work = $\frac{1}{18} + \frac{1}{24} + \frac{1}{36} = \frac{1}{8}$
 So, in 24 days the whole work completed.

Q11.ANS-B

Wages is inversely proportional to days.
 Ratio of wages = $\frac{1}{12} : \frac{1}{16} : \frac{1}{24} = 4:3:2$
 Wages of B = $\frac{3}{9} \times 2700 = \text{Rs. } 900$

Q12.ANS-B

\therefore In 5 days, (4 men + 6 women) get ₹ 1600.
 \therefore In 1 day, (4 men + 6 women) get ₹ $\frac{1600}{5} = ₹ 320$ (i)
 In 1 day number of person to get ₹ 1 = $\frac{320}{4 \text{ men} + 6 \text{ women}}$ (ii)
 Similarly, in second condition,
 In 1 day, number of person to get ₹ 1 = $\frac{1740}{6} \times (3 \text{ men} + 7 \text{ women})$
 = $\frac{290}{(3 \text{ men} + 7 \text{ women})}$ (iii)
 From Eqs. (ii) and (iii), we get
 $\frac{320}{(4 \text{ men} + 6 \text{ women})} = \frac{290}{(3 \text{ men} + 7 \text{ women})}$
 $96 \text{ men} + 224 \text{ women} = 116 \text{ men} + 174 \text{ women}$
 $\Rightarrow 20 \text{ men} = 50 \text{ women}$
 $\Rightarrow \text{Man} / \text{Women} = \frac{5}{2}$
 $\therefore 1 \text{ women} = \frac{2}{5} \text{ man}$
 From Eq. (i), 1 day,
 $(4 \text{ men} + 6 \text{ women}) = (4 \text{ men} + 6 \times \frac{2}{5} \text{ men}) = \frac{32}{5} \text{ men}$ get ₹ 320
 \therefore In 1 day, 1 man get = $\frac{320 \times 5}{32} = ₹ 50$
 \therefore In 1 day, 1 woman get = $50 \times \frac{2}{5} = ₹ 20$
 \therefore In 1 day, (7 men + 6 women) get
 $7 \times 50 + 6 \times 20 = ₹ 470$
 \therefore Required number of days = $\frac{3760}{470} = 8 \text{ days}$

Q13.ANS-D

1 man's 1 day's work = $\frac{1}{8} \times \frac{1}{12} = \frac{1}{96}$
 10 men's 1 day's work = $1 \times \frac{10}{96} = \frac{5}{48}$
 1 woman's 1 day's work = $\frac{1}{192}$
 4 women's 1 day's work = $\frac{1}{192} \times 4 = \frac{1}{48}$
 1 child's 1 day's work = $\frac{1}{240}$
 10 children's 1 day's work = $\frac{1}{24}$
 Therefore, (10 men + 4 women + 10 children)'s 1 day's work = $\frac{5}{48} + \frac{1}{48} + \frac{1}{24} = \frac{8}{48} = \frac{1}{6}$
 The required No. of days = 6 days

Q14.ANS-D

1 work done = $9 \times 7 \times 15$
 $9 \times 7 \times 15 = 6 \times 9 \times X \text{ days}$
 $X = \frac{9 \times 7 \times 15}{6 \times 9} = \frac{35}{2} = 17 \frac{1}{2} \text{ days.}$

Q15.ANS-A

$M_1 \times D_1 \times T_1 / W_1 = M_2 \times D_2 \times T_2 / W_2$

$$\Rightarrow (16 \times 18 \times 20) / (36 \times 4 \times 24) = (X \times 12 \times 16) / (64 \times 6 \times 18) \Rightarrow X = 60.$$

Q16.ANS-B

Since, 50 men can do a job in 50 days.

So, work done by 1 man in a day = $1/(50 \times 50)$

Also, 80 women can do the job in 50 days.

So, work done by 1 women in 1 day = $1/(50 \times 80)$

Now, work done by 40 men and 48 women in first 10 days

$$= (40 \times 10) / (50 \times 50) + (48 \times 10) / (50 \times 80) = 4/25 + 3/25 = 7/25$$

Now, 5 men and 8 women are removed after 10 days,

So work done by 35 men and 40 women in 10 days = $(35 \times 10) / (50 \times 50) + (40 \times 10) / (50 \times 80)$

$$= 7/50 + 1/10 = (7 + 5)/50 = 6/25$$

Again, 5 men and 8 women are removed after 10 days,

So work done by 30 men and 32 women in 10 days =

$$(30 \times 10) / (50 \times 50) + (32 \times 10) / (50 \times 80) = 5/25$$

Now, after every 10 days as the number of men and women decrease, work done also decreased by $1/25$ th part.

So, work done after every 10 days upto 50 days = $7/25 + 6/25 + 5/25 + 4/25 + 3/25 = 25/25 = 1$

So, it will take 50 days for them to complete the work.

Q17.ANS-C

1 man do $1/88$ job per day

2 woman do $1/88$ job per day

3 children do $1/88$ job per day

So, 1 man, 1 woman, 1 child..

$1/88 + 1/176 + 1/264$ job per day

so, $11/528 = 1/t$ where t is the time taken..

$$\text{now } 264/11 = 48 = t$$

Q18.ANS-C

1 woman's 1 day's work = $1/70$

1 Child's 1 day's work = $1/140$

5 Women and 10 children 1 day work =

$$(5/70 + 10/140) = 17/140$$

So, 5 women and 10 children will finish the work in 7 days.

Q19.ANS-B

$$(20 \times 20) / (1/3) = X \times 25 / (2/3)$$

$\Rightarrow X = 32$. So, we need 12 more men.

Q20.ANS-D

$$1000 \times 20 = 2000 \times x \Rightarrow x = 10 \text{ days}$$

Q21.ANS-A

In this type of questions we first get the filling in 1 minute for both pipes then we will add them to get the result, as

Part filled by A in 1 min = $1/20$

Part filled by B in 1 min = $1/30$

Part filled by (A+B) in 1 min = $\frac{1}{20} + \frac{1}{30} = \frac{1}{12}$

So, both pipes can fill the tank in 12 mins.

Q22.ANS-C

Net part filled in 1 hour $\left(\frac{1}{5} + \frac{1}{6} - \frac{1}{12} \right) = \frac{17}{60}$.

∴ The tank will be full in $\frac{60}{17}$ hours i.e., $3\frac{9}{17}$ hours.

Q23.ANS-C

$\frac{1}{8} - \frac{1}{5} = -\frac{3}{40}$

$\frac{3}{40}$ part emptied in 1 hr.

So, it will emptied in $\frac{40}{3}$ hr.

$\frac{1}{2}$ emptied in $\frac{40}{3} \times \frac{1}{2} = \frac{20}{3}$ hr = 6 hr and 40 minutes.

Q24.ANS-B

Let the capacity is 12 units.

A filled 3 units, B filled 4 units and C emptied 12 units in one hour.

3pm to 5pm A filled 6 and B filled 4. Till 5pm total unit filled is 11.

If all of them working together 5 unit is emptied. Till 6pm we have = $11 - 5 = 6$ unit

Again in next hour 5 unit emptied. Till 7 pm we are left with 1 unit filled.

So, 1 unit is emptied in next 12 minutes. So, time is 7:12 pm.

Q25.ANS-D

$\frac{1}{60}$ part filled by B in = 1min

$\frac{1}{3}$ part will be filled in = $(\frac{1}{3}) / (\frac{1}{60}) = 60/3 = 20$.

Q26.ANS-D

Part filled in 4 minutes = $4(\frac{1}{15} + \frac{1}{20}) = \frac{7}{15}$

Remaining part = $(1 - \frac{7}{15}) = \frac{8}{15}$

Part filled by B in 1 minute = $\frac{1}{20} : \frac{8}{15} :: 1 : x$

$x = (\frac{8}{15} \times 1 \times 20) = 10\frac{2}{3} \text{ min} = 10 \text{ min } 40 \text{ sec}$

The tank will be full in (4 min. + 10 min. + 40 sec.) = 14 min. 40 sec

Q27.ANS-C

Let the slower pipe alone fill the tank in x min.

Then, faster pipe will fill it in $\frac{x}{3}$ min.

$\Rightarrow \frac{1}{x} + \frac{3}{x} = \frac{1}{36} \Rightarrow \frac{4}{x} = \frac{1}{36} \Rightarrow x = 144 \text{ min.}$

Q28.ANS-B

Part filled by (A + B + C) in 3 minutes = $3 \left(\frac{1}{30} + \frac{1}{20} + \frac{1}{10} \right) = \left(3 \times \frac{11}{60} \right) = \frac{11}{20}$.

Part filled by C in 3 minutes = $\frac{3}{10}$.

∴ Required ratio = $\left(\frac{3}{10} \times \frac{20}{11} \right) = \frac{6}{11}$.

Q29.ANS-C

Work done by the waste pipe in 1 minute = $\frac{1}{12} - \left(\frac{1}{20} + \frac{1}{30} \right)$

$$= \left(\frac{1}{15} - \frac{11}{120} \right)$$

$$= -\frac{1}{40}. \quad [-\text{ve sign means emptying}]$$

\therefore Volume of $\frac{1}{40}$ part = 3 gallons.

Volume of whole = (3 x 40) gallons = 120 gallons.

Q30.ANS-D

Same as Q29.

Q31.ANS-C

Half filled in 25 mins. So one fourth fill in 20 mins.

Q32.ANS-C

If diameter is doubled area becomes four times. So, it is filled in 10 mins.

Q33.ANS-B

Pipe A alone can fill the cistern in $37.5 = 75/2$ minutes. Since it was open for 30 minutes, part of the cistern filled by pipe A = $(2/75) \times 30 = 4/5$

So the remaining $15/15$ part is filled by pipe B.

Pipe B can fill the cistern in 45 minutes. So, time required to fill $1/5$ part = $45/5 = 9$ minutes.
i.e., pipe B is turned off after 9 minutes.

Q34.ANS-C

Suppose, first pipe alone takes x hours to fill the tank.

Then, second and third pipes will take $(x - 5)$ and $(x - 9)$ hours respectively to fill the tank.

$$\therefore \frac{1}{x} + \frac{1}{(x-5)} = \frac{1}{(x-9)}$$

$$\Rightarrow \frac{x-5+x}{x(x-5)} = \frac{1}{(x-9)}$$

$$\Rightarrow (2x-5)(x-9) = x(x-5)$$

$$\Rightarrow x^2 - 18x + 45 = 0$$

$$(x-15)(x-3) = 0$$

$$\Rightarrow x = 15. \quad [\text{neglecting } x = 3]$$

Q35.ANS-C

Suppose pipe A alone takes x hours to fill the tank.

Then, pipes B and C will take $\frac{x}{2}$ and $\frac{x}{4}$ hours respectively to fill the tank.

$$\therefore \frac{1}{x} + \frac{2}{x} + \frac{4}{x} = \frac{1}{5}$$

$$\Rightarrow \frac{7}{x} = \frac{1}{5}$$

$$\Rightarrow x = 35 \text{ hrs.}$$

Q36.ANS-D

$$\text{Part filled by (A + B) in 1 minute} = \left(\frac{1}{60} + \frac{1}{40} \right) = \frac{1}{24}.$$

Suppose the tank is filled in x minutes.

$$\text{Then, } \frac{x}{2} \left(\frac{1}{24} + \frac{1}{40} \right) = 1$$

$$\Rightarrow \frac{x}{2} \times \frac{1}{15} = 1$$

$$\Rightarrow x = 30 \text{ min.}$$

Q37.ANS-B

Time taken by one tap to fill half of the tank = 3 hrs.

$$\text{Part filled by the four taps in 1 hour} = \left(4 \times \frac{1}{6} \right) = \frac{2}{3}.$$

$$\text{Remaining part} = \left(1 - \frac{1}{2} \right) = \frac{1}{2}.$$

$$\therefore \frac{2}{3} : \frac{1}{2} :: 1 : x$$

$$\Rightarrow x = \left(\frac{1}{2} \times 1 \times \frac{3}{2} \right) = \frac{3}{4} \text{ hours i.e., 45 mins.}$$

So, total time taken = 3 hrs. 45 mins.

Q38.ANS-D

Time taken to records broadcast both side = 30 min. = 1/2 hr

For 16 full record Time need = 15 * 1/2 = 15/2 hr

=> 15/2 hour for 15 full record

To translate 15 full record = 15/2 * 3 = 45/2 = 22.5 hr

Q39.ANS-A

Last month ratio C1 : C2 : C3 = 400 : 330 : 260 = 40 : 33 : 26

This month total calls = 1200

$$40X + 33X + 26X = 1200$$

$$x = 1200/99 = 400/33$$

C1 ratio = 40 * 400/33 = 484.84 => 485 approximately

C2 ratio = 33 * 400/33 = 400

C3 ratio = 26 * 400/33 = 315.15

Calls first CSR II take more than last month = 485 - 400 = 85

Q40.ANS-A

In 9 minutes first printer prints = 684 pages

We can use relative speed formula.

Time taken = 684 / (88 - 76) = 57 minutes

So, from 10:32 + 57 mins = 11:29 AM.

Q41.ANS-A

For solving this Q, lets see how many helper-hour are required..

$$20/2 + 700/35 = 10 + 20 = 30$$

so 30 helper-hour in 3 hours, so # of helpers = $30/3 = 10$

Q42.ANS-C

10 men can complete a piece of work in 15 days

$$\Rightarrow \text{Work done by 10 men in 1 day} = 1/15$$

15 women can complete a piece of work in 12 days

$$\Rightarrow \text{Work done by 15 women in 1 day} = 1/12$$

$$\text{Work done by 10 men and 15 women in 1 day} = 1/15 + 1/12 = 9/60 = 3/20$$

10 men and 15 women can complete the work in $20/3 = 6 \frac{2}{3}$ days

Q43.ANS-B

$$A+B = 1/14, B+C = 1/8 \text{ AND } C+A = 1/7$$

$$2(A+B+C) = 1/14 + 1/8 + 1/7 = (4+7+8)/56 = 19/56$$

$$A+B+C = 19/112$$

$$A = 19/112 - 1/8 = 5/112 \Rightarrow 112/5 \text{ DAYS}$$

$$B = 19/112 - 1/7 = 3/112 \Rightarrow 112/3 \text{ DAYS}$$

$$C = 19/112 - 1/14 = 11/112 \Rightarrow 112/11 \text{ DAYS.}$$

B is the least efficient.

Q44.ANS-C

two identical tap fill $2/5$ of a tank in 20 mins, which means,

one tap fill $1/5$ of a tank in 20 mins

and there is still $3/5$ of a tank waiting to be filled,

So, it takes three times 20 mins to fill the remaining tank.

Q45.ANS-B

$$A's \text{ 5 days work} = 50\% \quad B's \text{ 5 days work} = 33.33\% \quad C's \text{ 2 days work} = 16.66\% \quad [100 - (50 + 33.33)]$$

$$\text{Ratio of contribution of work of A, B and C} = 50 : 33.33 : 16.66 = 3 : 2 : 1$$

$$A's \text{ total share} = \text{Rs. } 1500 \quad B's \text{ total share} = \text{Rs. } 1000 \quad C's \text{ total share} = \text{Rs. } 500$$

$$A's \text{ one day's earning} = \text{Rs. } 300 \quad B's \text{ one day's earning} = \text{Rs. } 200 \quad C's \text{ one day's earning} = \text{Rs. } 250$$

Q46.ANS-C

$$\text{Efficiency - } A:B = 2:1$$

$$\text{Days - } A:B = 1:2$$

$$\text{So, } 2x - x = 30 \Rightarrow x = 30$$

A takes 30 days and B takes 60 days.

$$\text{Working together} = 1/30 + 1/60 = 3/60 = 1/20$$

So, work is done in 20 days.

Q47.ANS-B

Let he initially employed x workers which works for D days and he estimated 100 days for the whole work and then he doubled the worker for $(100-D)$ days.

$$D * x + (100 - D) * 2x = 175x \Rightarrow D = 25 \text{ days.}$$

Now , the work done in 25 days = $25x$ Total work = $175x$. Therefore, work done before increasing the no of workers = $(25x/175x) \times 100\% = 14 \frac{2}{7}\%$

Q48.ANS-B

$$\frac{3}{4} \times (x-2)x = (x+7)(x-10)$$

$$\Rightarrow x^2 - 6x - 280 = 0$$

$$\Rightarrow x = 20 \text{ and } x = -14$$

so, the acceptable values is $x = 20$

Therefore, Total work = $(x-2)x = 18 \times 20 = 360$ unit

$$\text{Now, } 360 = 30 \times k \Rightarrow k = 12 \text{ days}$$

Q49.ANS-B

Case 1- Both A and B can fill the tank in 1 hr = $\frac{1}{4} + \frac{1}{6} = \frac{5}{12}$

It means in $\frac{12}{5}$ hr tank is filled. So, $\frac{1}{2}$ part filled in $\frac{6}{5}$ hr = 1 hr 12 mins.

Now all three pipes open together, in 1 hr they fill = $\frac{1}{4} + \frac{1}{6} - \frac{1}{4} = \frac{1}{6}$.

In 6 hr they filled the tank. So, half tank is filled in 3 hrs.

Total time taken is 4 hrs 12 mins.

Case 2- $\frac{3}{4}$ th part is filled by A and B in $= (\frac{3}{4}) \times \frac{12}{5} = \frac{9}{5}$ hr

$\frac{1}{4}$ tank filled by A, B and C in $= (\frac{1}{4}) \times 6 = \frac{3}{2}$ hr

Total time taken is $\frac{9}{5} + \frac{3}{2} = 3$ hrs 18 mins.

So, the time difference is = 4 hr 12 mins - 3 hr 18 mins = 54 mins.

Q50.ANS-D

Let the number of workers be x .

Now, Using work equivalence method,

$$X + (X-1) + (X-2) + \dots + 1 = X \times 55\% \text{ of } X$$

$$\Rightarrow [X \times (X+1)] / 2 = X \times (55X/100) \quad [\text{Series is in AP. Sum of AP} = \{\text{No. of terms (first term + last term)} / 2\}]$$

Therefore, $X = 10$

Q51.ANS-A

Combined efficiency of all the three boats = 60 passenger/trip

Now, consider option(a)

15 trips and 150 passengers means efficiency of B1 = 10 passenger/trip

which means in carrying 50 passengers B1 must have taken 5 trips. So the rest trips equal to 5 ($10 - 5 = 5$)

in which B2 and B3 together carried remaining 250 ($300 - 50 = 250$) Passengers.

Therefore the efficiency of B2 and B3 = $250/5 = 50$ passenger/trip Since, the combined efficiency of B1,

B2 and B3 is 60. Which is same as given in the first statement hence option(a) is correct.

Q52.ANS-B

Let x liter be the per day filling and v liter be the capacity of the reservoir, then

$$90x + v = 40000 \times 90 \quad \text{-----(1)}$$

$$60x + v = 32000 \times 60 \quad \text{-----(2)}$$

solving eq.(1) and (2), we get $x = 56000$

Hence, 56000 liters per day can be used without the failure of supply.

Q53.ANS-C

Machine I: Number of nuts produced in one minute = 100

To produce 1000 nuts time required = 10 min

Cleaning time for nuts = 5 min

Over all time to produce 1000 nuts = 15 min.
 Over all time to produce 9000 = 138 min – 5 min = 133 min ----- (1)
 Machine II: To produce 75 bolts time required = 1 min
 To produce 1500 bolts time required = 20 min
 Cleaning time for bolts = 10 min.
 Effective time to produce 1500 bolts = 30 min
 Effective time to produce 9000 bolts = $30 \times 6 - 10 = 170$ min ----- (2)
 From (1) and (2)
 Minimum time = 170 minutes

Q54.ANS-B

Quarter of Kg means 250 gm
 Less weight, less price (Direct Proportion)
 So, $250:200::60:x \Rightarrow x = 200 \times 60 / 250 \Rightarrow x = 48$
 So, 200 gm will cost 48 paise.

Q55.ANS-C

Total volume of water displaced = $(4 \times 50) \text{ m}^3 = 200 \text{ m}^3$.
 \therefore Rise in water level = $\left(\frac{200}{40 \times 20} \right) \text{ m} = 0.25 \text{ m} = 25 \text{ cm}$.

Q56.ANS-C

Let's assume the speed of one copier = x
 Speed of other copier = 125% of x = $125x/100$
 So, Ratio of speed = $x:125x/100 = 4:5$
 Copies made on faster copier = $5/9 \times 1800 = 1000$

CHAPTER 2 – NUMBER SYSTEM

Q1. Answer: D

Explanation: If n is even, the whole number $n(n+1)(2n+1)$ is divisible by even number. [Even * Even = Even].
 If $n=1 \Rightarrow 1 \times 2 \times 3 = 6$. So, it is divisible by 3 and 6. [Even * Odd * Odd = Even]
 If $n=3 \Rightarrow 3 \times 4 \times 7$ is divisible by 12.

Q2. Answer: A

Explanation: Let, the first digit be xy, then the second digit would be yx.
 $xy = 10x + y$ and $yx = 10y + x$.
 $\Rightarrow \text{sum} = 11(x+y)$
 So, the sum has to be multiple of 11. A is not possible.

Q3. Answer: C

Explanation: We know that, $(x-x)$ is 0. So, the product is 0.

Q4. Answer: A

Explanation: We know that, from 1 to 99, 4 comes 20 times. And from 100 to 200 it comes 20 times.
 Also, from 201 to 252 it comes 15 times. So, in total 4 comes 55 times from 1 to 252.

Q5. Answer: A

Explanation: Numbers are n , $n+1$ and $n+2$.

$$\Rightarrow (n+1)^2 - 12n = 2(n+2) - 3$$

$\Rightarrow n=0, 12$. Hence, largest number is 14.

Q6. Answer: C

Explanation: $36=1 \times 36=2 \times 18=3 \times 12=4 \times 9=6 \times 6$.

So, $6+6=12$ is the minimum.

Q7. Answer: A

Explanation: 1, 2, 3 and 5. So, 5 is the largest.

Q8. Answer: B

Explanation: If we think, then the numbers like 100, 200 300 are 9 in total then the zeroes in them are $9 \times 2=18$. Now, if we see numbers like 101, 102, 103, 201 are 9 in each set of 100 numbers. Then in 9 sets the total zeroes are $9 \times 9=81$, then we come to numbers like 110 120 920 etc. So, these numbers are 9 in each set of hundred then we have total zeroes are $9 \times 9=81$, then in total number of zeroes are $81+81+18=180$.

Now, to count 5. If we conclude a number in ones place, are 105, 205, 125 etc. 10 per set so total are $9 \times 10=90$. 5's in tens place like 150, 151, 159, ... are 10 in each set. So, $10 \times 9=90$.

Now 5 in hundred place are from 500-599= 100, so the total is $100+90+90=280$.

From this the equation will be $(2 \times 280)-180=380$.

Q9. Answer: D

Explanation: The smallest possible 4 consecutive even numbers are: 2, 4, 6 and 8

The product of these four numbers is $2 \times 4 \times 6 \times 8 = 384$.

So, any other 4 consecutive numbers will also be divisible by 384.

Q10. Answer: D

Explanation: 1, 2, 3, 4, 5 average is 3 and 1, 2, 3, 4 average is 2.5

$$\Rightarrow \text{drop\%} = (3 - 2.5)/3 \times 100 = 16.6 \%$$

Q11. Answer: D

Explanation: Sets for XYZW

9 at all four places: 9999. That is 4 times.

9 at three places: 999W, 99Z9, 9Y99 and X999. That is $3 \times 9 \times 4=108$

9 at two places: 99ZW, 9Y9W, 9YZ9, X99W, X9Z9 and XY99. That is $2 \times 6 \times 9^2=1272$

9 at one place: 9YZW, X9ZW, XY9W and XYZ9. That is $4 \times 729=2916$

Total is 4200.

Q12. Answer: B

Explanation: 1-9: 9 digits. 10-99: There are 90, 2-digit numbers= $(90)(2) = 180$ digits.

100-999: There are 900 3-digit numbers= $(900)(3) = 2700$ digits.

1000: 4 digits. Total= $9 + 180 + 2700 + 4 = 2893$.

Q13. Answer: A

Explanation: A, B, C, D and E are five consecutive numbers. It means difference between A and E is 4 units. Let check option (a) 24. Divide it into 12 and 12, which not possible case. If we make it 10 and 14 then our equation will satisfy. So, the sum $A+E=24$ correct.

$$A^2+B^2+C^2=D^2+E^2 \Rightarrow 10^2+11^2+12^2=13^2+14^2.$$

Q14. Answer: D

Explanation: We have, $3^2=9$. So, it is 5^9 .

Q15. Answer: A

Explanation: The answer would be simple selection C (100,10) or $^{100}C_{10}$.

Q16. Answer: C

Explanation: For example, 164. If I remove 4 it becomes 16. And if I remove 1 it becomes 64. Let's find out some more, try it yourself.

Q17. Answer: C

Explanation: Use $(a-b)^2=(a+b)^2-4ab$

$$\Rightarrow (a-b)^2=12^2-4*11=144-44=100 \Rightarrow a-b=10.$$

Q18. Answer: C

Explanation: First bounce is $=2/3$. So, in four bounce fraction is $=(2/3)^4=16/81$.

Q19. Answer: D

Explanation: If we consider second last digit which is 2. Then face value is 2 and place value is 20. The difference is $(20-2)=18$.

Q20. Answer: D

Explanation: Place value of 3 is 3000.

Q21. Answer: C

Explanation: Given, $4+5+1+*+6+0+3=(19+*)/9 >$ next number after 19 is 27. So, * will have 8.

Q22. Answer: D

Explanation: Divisibility by 8 is last three digits must be divisible by 8.

$$\Rightarrow 6*2/8. \text{ Check the option only 3 satisfy the condition. } \Rightarrow 632/8=R(0).$$

Q23. Answer: A

Explanation: Use the divisibility of 11.

$$\Rightarrow (2+6+5+1)-(5+x+6)=0 \Rightarrow 14-11-x=0 \Rightarrow x=3.$$

Q24. Answer: C

Explanation: Last two digits either 0 or divisible by 4.

C have -0,2,4,6,8 (5 choices)

A have 9 choices (1 to 9, zero cannot be the first digit)

B have 10 choices (0 to 9)

So, the total numbers are $9 \times 10 \times 5 = 450$.

Q25. Answer: B

Explanation: Given, 968A96B is divisible by $72(8 \times 9)$

It is divisible by 8 when last three digits are divisible by 8.

$\Rightarrow 96B/8$ when B is either 0 or 8.

Also check divisibility by 9.

If $B=0 \Rightarrow 9+6+8+A+9+6+0=38+A \Rightarrow$ for $A=7$ it is divisible by 9

If $B=8 \Rightarrow 46+A \Rightarrow$ for $A=8$ it is divisible by 9.

For $A=7$ and $B=0$ it is divisible by 72.

Q26. Answer: C

Explanation: For $n=1$, $6n^2+6n=6+6=12$. So it is always divisible by 12.

Q27. Answer: D

Explanation: Let $2^{32} = x$. Then, $(2^{32} + 1) = (x + 1)$.

Let $(x + 1)$ be completely divisible by the natural number N. Then,

$(2^{96} + 1) = [(2^{32})^3 + 1] = (x^3 + 1) = (x + 1)(x^2 - x + 1)$, which is completely divisible by N, since $(x + 1)$ is divisible by N.

Q28. Answer: C

Explanation: Number is divisible by 8, if the number formed by the last three digits is divisible by 8.

i.e., $58N$ is divisible by 8 $\Rightarrow N=4$

Again a number is divisible by 11, if the difference between the sum of digits at even places and sum of digits at the odd places is either 0 or divisible by 11.

i.e., $(M+9+4+4+8)-(3+0+8+5+N)=M-N+9=M+5$

It cannot be zero hence, $M+5=11 \Rightarrow M=6$.

Q29. Answer: B

Explanation: Let the original number be 'a'

Let the divisor be 'd' and the quotient of the division of a by d be 'x'.

Therefore, we can write the relation as $a=dx+24$.

When twice the original number is divided by d, $2a$ is divided by d.

We know that $a=dx+24$. Therefore, $2a=2dx+48$

The problem states that $(2dx+48)/d$ leaves a remainder of 11.

$2dx$ is perfectly divisible by d and will therefore, not leave a remainder.

The remainder of 11 was obtained by dividing 48 by d.

When 48 is divided by 37, the remainder that one will obtain is 11.

Hence, the divisor is 37.

Q30. Answer: B

Explanation: The correct answer should be B, 10,000. $\Rightarrow 101 \times 101 = 10201$.

if we raise this to 10 we get the hundreds position as zero.

last four digits of $(101)^{10} = 1001$

If we see the trend, the last two digits remain the same --01

the digits from third onward are equal to the power, if it is 2 it will be 2 and if we make it 10 the third and fourth become 10.

So if we take this to 100, $(101)^{100}$ we get the last 5 digits as 10001

subtract 1 from this we get our answer 10,000.

Q31. Answer: B

Explanation: Given, $1200 \times (1 - 1/2) \times (1 - 1/3) \times (1 - 1/5) = 320$.

Q32. Answer: C

Explanation: First number is 18 and last is 99. Total numbers are $[(99-18)/9] + 1 = 10$.

Q33. Answer: A

Explanation: Given, $[(77-33)/11] + 1 = 5$.

Q34. Answer: B

Explanation: Last two digits must be divisible by 4. So, x can take 0.

Q35. Answer: D

Explanation: Use divisibility of 11.

Q36. Answer: D

Explanation: Use divisibility of 10 and 4.

Q37. Answer: A

Explanation: Divisible by 3 are 133, divisible by 5 are 80 and divisible by both are 25.

Divisible by either 3 or 5 are $= 133 + 80 - 25 = 188$.

So, numbers not divisible by 3 or 5 $= 400 - 188 = 212$.

Q38. Answer: A

Explanation: First no. is 110 and the last is 891.

No. of terms $= [(891-110)/11] + 1 = 72$.

Q39. Answer: B

Explanation: Given, $(6+4+3+a)/3 = (13+a)/3$.

'a' will satisfy the value 2, 5 and 8. So, a is 5.

Q40. Answer: C

Explanation: Use the divisibility of 8 and 11.

N is 4 as explained in the previous post.

Now since the number is divisible by 11.

$[M + 9 + 4 + 4 + 8] - [3 + 0 + 8 + 5 + N] = 11K$ (K IS AN INTEGER)

$\Rightarrow M + 25 - 16 - N = 11K \Rightarrow M - N + 9 = 11K \Rightarrow M + 5 = 11$

Since M IS less than 10, $k = 1$. Only $M = 6$ satisfies.

Q41. Answer: D

Explanation: Use the divisibility of 5 and 8 both.

Q42. Answer: C

Explanation: Divisible by 4 $= [(96-12)/4] + 1 = 22$.

Divisible by 9 $= [(99-18)/9 + 1] = 10$.

Divisible by 4 and 9 are 2 (36, 72).

So, divisible by 4 or 9 are $= 22 + 10 - 2 = 30$.

Q43. Answer: A

Explanation: If the number is divisible by 5 and 11 it must be divisible by 55.

The numbers are less than 660.

Hence, dividing 659 by 55 gives the numbers of multiple of 55 are 11. (Ignoring fraction part)

The 11 multiples of 55 which are less than 560, but of these 11 multiples some can be multiples of 3.

The numbers of such, multiples is the quotient of 11 by 3.

Quotient of $11/3=3$.

Out of 11 multiples of 55, 3 are multiples of 3.

Hence, numbers less than 660 and divisible by 5 and 11 but not by 3= $11-3=8$.

Q44. Answer: C

Explanation: We need to find the number of values in the set of numbers from 0 to 999 which are not divisible by 5 or 7. The largest multiple of 5 just smaller than 999 is $995 = 199*5$ and the largest multiple of 7 just smaller than 999 is $994 = 142*7$. So we have 199 numbers divisible by 5 and 142 numbers divisible by 7. But here we have counted the numbers divisible by...5 and 7 both are 28.

Divisible by 5 or 7 = $199+142-28=313$.

Numbers not divisible by 5 or 7 = $999-313=686$

Q45. Answer: B

Explanation: LCM of 5, 8, 12 and 20 is 120. It is not a multiple of 9.

Q46. Answer: C

Explanation: LCM of 1.05 and 2.1 = LCM of 105 and 210 = 210

So, the LCM of 1.05 and 2.10 is $2.10=2.1$

Q47. Answer: B

Explanation: LCM of 4, 5 and 6 is 60. So, the numbers are multiple of 60.

First is 240 and last 540.

$\Rightarrow N = [(540-240)/60] + 1 = 6$.

Q48. Answer: C

Explanation: Given, $6^6 = (2^6)*(3^6)$ and $8^8 = 2^{24}$

Now we know that the least common multiple of the above two numbers and k is:

$12^{12} = (2^6*3^6)^2 = (2^{12})*(3^{12})$

Thus, k will also be in the form of : $(2^a)*(3^b)$

Now, b has to be equal to 12 since in order for $(2^{24})*(3^{12})$ to be a common multiple, at least one of the numbers must have the terms 2^{24} and 3^{12} as its factors. (not necessarily the same number).

We can see that 8^8 already takes care of the 2^{24} part.

Thus, k has to take care of the 3^{12} part of the LCM.

This means that the value k is $(2^a)*(3^{12})$ where a can be any value from 0 to 24 (both inclusive) without changing the value of the LCM. Thus K can have 25 values.

Q49. Answer: A

Explanation: L.C.M (9, 12 and 15) = 180 min or 3 hours.

\therefore After 3 hours they toll together.

Q50. Answer: A

Explanation: H.C.F. of 403,465,496 is = 31. Therefore, largest capacity of bottles must be 31 ltr

Now, No. of bottles required to put 403 ltr of petrol, i.e. $403/31 = 13$
 In the same way, No. of bottles required to put 465 ltr of diesel= $465/31=15$
 No. of bottles required to put 496 litre of mobile oil= $496/31 = 16$
 Therefore, least no. of bottle required of 31 litre size= $13+15+16=44$

Q51. Answer: C

Explanation: The bells will toll together after time in seconds equal to the LCM of 9, 6, 4, 10 and 8.
 LCM of 9, 6, 4, 10 and 8 is = 360 seconds.
 In one hour, the rings will toll together $3600/360$ times = 10 times.

Q52. Answer: D

Explanation: LCM (3, 4, 5, 6 and 8) = $120 = 2 \times 2 \times 2 \times 3 \times 5$.
 As 2, 3 and 5 are not in pair in LCM's factor so we need to multiply 120 by 5 and 3,2 to make it a perfect square.
 $\Rightarrow 120 \times 2 \times 5 \times 3 = 3,600$.
 $\therefore 3600$ is the least perfect square divisible by 3, 4, 5, 6 and 8.

Q53. Answer: C

Explanation: LCM of 42, 56 and 63=504 sec.

Q54. Answer: A

Explanation: The first light flashes thrice every minute. That means it takes $(60/3)=20$ seconds for the light to flash once. Similarly it takes 24 seconds for the other light to flash once.
 The LCM of 24 (4×6) and 20 (4×5) is 120 ($4 \times 5 \times 6$). Thus the lights will flash together the first time at 120s. An hour has 3600 seconds. So there are $(3600/120)=30$ intervals of 120 seconds in an hour. And thus, the lights will flash together 30 times every hour.

Q55. Answer: A

Explanation: LCM of (12,15,18)=180
 $\Rightarrow 9999/180=R(99)$. So, the number is $(9999-99)=9900$.

Q56. Answer: D

Explanation: L.C.M. of 2, 4, 6, 8, 10 and 12 is 120.
 So, the bells will toll together after every 120 seconds (2 minutes).
 In 30 minutes, they will toll together $(30/2)+1=16$ times .

Q57. Answer: D

Explanation: Given, $16-x^2=(4-x)(4+x)$ and $x^2+x-6=(x-2)(x+3)$
 So, LCM is $=(x-2)(x+3)(16-x^2)$.

Q58. Answer: B

Explanation: Factorize $399=3 \times 7 \times 19$.
 The possible pairs are [(57, 7), (21, 19), (399, 1), (133, 3)]
 The least possible sum is given when $a=21$ and $b=19$ and the sum is $2+1=3$.

Q59. Answer: C

Explanation: LCM of 36 and 48=12.

Q60. Answer: C

Explanation: All the students from each have to be accommodated in a certain number of rooms. There should be no person left over (remainder) from any places who can be clubbed together with the persons left over from other places. To have the minimum number of rooms, the capacity of each room is HCF of all the numbers. $\text{HCF}(42, 60, 210, 90 \text{ and } 84) = 6$.
Thus, Min number of rooms $= (42+60+210+90+84)/6 = 81$.

Q61. Answer: D

Explanation: The 2 numbers are $A = 36x$ and $B = 36y$, where x and y have no common factors.

$$A * B = 36^2 * y = 12960$$

$$\Rightarrow x y = 12960 / 36^2 = 10$$

$(x = 1, y = 10); (x = 2, y = 5)$. There only 2 such pairs.

Q62. Answer: C

Explanation: $\text{HCF of fraction} = (\text{HCF of numerators}) / (\text{LCM of denominators}) = 2/81$.

Q63. Answer: C

Explanation: Let the required numbers be $15x$ and $11x$. Then, their H.C.F. is x . So, $x = 13$. The numbers are $(15 \times 13 \text{ and } 11 \times 13)$ i.e., 195 and 143.

Q64. Answer: A

Explanation: Use the given formula, First no. * Second no. $= (\text{HCF} * \text{LCM})$ of these two numbers
 $\Rightarrow \text{Second no.} = 2310 * 30 / 210 = 330$.

Q65. Answer: C

Explanation: Given, $12\text{HCF} = \text{LCM}$ and $\text{LCM} + \text{HCF} = 403$

$$\Rightarrow 12\text{HCF} + \text{HCF} = 403. \text{ By solving, } \text{HCF} = 31, \text{ LCM} = 372$$

Let k be the other number.

$$\text{LCM} \times \text{HCF} = 93 \times k \Rightarrow k = (372 \times 31) / 93 = 124$$

Q66. Answer: D

Explanation: Let HCF be x . According to the question, $\text{LCM} = 20x$.

$$\Rightarrow \text{LCM} + \text{HCF} = 2520 \Rightarrow 21x = 2520 \Rightarrow x = 120.$$

$$\text{So, } \text{LCM} = 20 * 120 = 2400.$$

$$\text{Now, } \text{No.1} * \text{No.2} = 2400 * 120 \Rightarrow \text{no.2} = 2400 * 120 / 480 = 600.$$

$$\text{Required answer} = 3 * 600 = 1800.$$

Q67. Answer: D

Explanation: Let the numbers are $3x, 4x$ and $5x$.

$$\text{LCM} = 60x = 1200 \Rightarrow x = 20.$$

Q68. Answer: D

Explanation: We have, $(1/m) + (1/n) = (m+n)/mn = 72/(6*210) = 2/35$. Hence, option 4.

Q69. Answer: C

Explanation: Clearly, the numbers are (23×13) and (23×14) .

$$\therefore \text{Larger number} = (23 \times 14) = 322.$$

Q70. Answer: C

Explanation: We have, $3240 = 2^3 \cdot 5 \cdot 3^4$ and $3600 = 2^4 \cdot 5^2 \cdot 3^2$

$\text{HCF}(3240, 3600) = 2^2 \cdot 5 \cdot 3^2$ and $\text{LCM}(3240, 3600) = 2^4 \cdot 5^2 \cdot 3^4$

$\text{HCF}(3240, 3600, x) = \text{HCF}(\text{HCF}(3240, 3600), x) = \text{HCF}(2^2 \cdot 5 \cdot 3^2, x) = 36$

$\text{LCM}(3240, 3600, x) = \text{LCM}(\text{LCM}(3240, 3600), x) = \text{LCM}(2^4 \cdot 5^2 \cdot 3^4, x) = 2^4 \cdot 3^5 \cdot 5^2 \cdot 7^2$

From the HCF line, we know that x is divisible by $2^2 \cdot 3^2 = 36$. We know that the factor for 2 of x is 2^2 , because the other term has a 2^3 . The factor for 3 is at least 3^2 , because that is all the other term has. x has no factor of 5, because the other term does.

From the LCM line we know that x has a factor of 3^5 and 7^2 , because the other term only has a factor of 3^4 and has no factor of 7.

Therefore, $x = 2^2 \cdot 3^5 \cdot 7^2$.

Q71. Answer: B

Explanation: HCF must be a factor of LCM. Therefore, 35 cannot be their HCF.

Q72. Answer: A

Explanation: LCM of 7, 12 and 16 = 336

$\Rightarrow 1856/336 = R(176)$. We have to remove this remainder to make it divisible by 336.

Q73. Answer: C

Explanation: LCM of 10, 15 and 18 = 90. To make it perfect square, we multiply it with $2 \times 5 = 10$

Therefore required number of soldiers = $90 \times 10 = 900$

Q74. Answer: D

Explanation: HCF of 2002 and 1820 is 182.

Q75. Answer: C

Explanation: HCF of 250 cm and 150 cm is 50 cm.

Therefore Number of slabs = Area of floor / Area of slab

$= (250 \times 150) / (50 \times 50) = 15$.

Q76. Answer: A

Explanation: we have, $\text{HCF}(\text{each stack}) = \text{HCF}(336, 240, 96) = 48$

No. of stacks of English book = 7; No. of stacks of Maths book = 5

No. of stacks of Science book = 2. So, total stacks = 14.

Q77. Answer: B

Explanation: LCM of (6, 9, 12 and 17) = 612

So, the number is in form = $612K + 1$. The largest is 9999.

$\Rightarrow 9999/612 = R(207) \Rightarrow \text{Multiple of 612 is } (9999 - 207) = 9792$

Hence, the number is $9792 + 1 = 9793$.

Q78. Answer: A

Explanation: Required number = H.C.F of $(1356 - 12)$, $(1868 - 12)$ and $(2764 - 12)$

= H.C.F of 1344, 1856 and 2752 = 64.

Q79. Answer: A

Explanation: $\text{HCF}(780, 840, 960) = 60$

Thus total number of pieces $\Rightarrow [760/60] + [840/60] + [960/60] = 43$

Total number of person required $=43 \times 2 = 86$.

Q80. Answer: B

Explanation: The alarm tolls together twelve times a day. Therefore, they toll together once every 2 hours (or 120 minutes). Since no two alarms toll at equal intervals of time, the total number of distinct factors of 120, including 1 and 120 itself $= 2^3 \times 3 \times 5$

The number of factors $= (3+1) \times 2 \times 2 = 16$.

The maximum value of X is 16.

Q81. Answer: D

Explanation: Required number = H.C.F. of $(1657 - 6)$ and $(2037 - 5)$
 $=$ H.C.F. of 1651 and 2032 $= 127$.

Q82. Answer: C

Explanation: L.C.M. of 5, 6, 7, 8 $= 840$.

∴ Required number is of the form $840k + 3$

Least value of k for which $(840k + 3)$ is divisible by 9 is $k = 2$.

∴ Required number $= (840 \times 2 + 3) = 1683$.

Q83. Answer: A

Explanation: Required number = H.C.F. of $(91 - 43)$, $(183 - 91)$ and $(183 - 43)$
 $=$ H.C.F. of 48, 92 and 140 $= 4$.

Q84. Answer: C

Explanation: LCM of (40, 72 and 108) $= 1080$ sec $= 18$ minutes. So, at 5:38.

Q85. Answer: D

Explanation: Required number of toys $= \text{LCM}(20, 25, 28, 38 \text{ and } 40) - 5$
 $\Rightarrow 3,800 - 5 = 3,795$.

Q86. Answer: A

Explanation: We have, $84 = 2^2 \times 3^1 \times 7^1$

Total factors $= 3 \times 2 \times 2 = 12$.

Odd $= 2 \times 2 = 4$. And Even $= \text{total} - \text{odd} = 12 - 4 = 8$.

Q87. Answer: A

Explanation: We have, $1200 = 2^4 \times 3^1 \times 5^2$

Odd factors $= 2 \times 3 = 6$.

Q88. Answer: A

Explanation: Add only powers $= 11 + 5 + 1 = 17$.

Q89. Answer: C

Explanation: Given, $18 = 2 \times 3^2$.

Sum of factors $= (2^0 + 2^1) \times (3^0 + 3^1 + 3^2) = (1 + 2) \times (1 + 3 + 9) = 3 \times 13 = 39$.

Q90. Answer: B

Explanation: We have, $6! = 1 \times 2 \times 3 \times 4 \times 5 \times 6 = 2^4 \times 3^2 \times 5$. Total factors $= 5 \times 3 \times 2 = 30$.

Q91. Answer: B

Explanation: We have $(23/5) + (23/25) = 4 + 0 = 4$.

Q92. Answer: C

Explanation: We have, $(1000/5) + (1000/25) + (1000/125) + (1000/625) = 200 + 40 + 8 + 1 = 249$.

Q93. Answer: D

Explanation: Given, $1 \times 2 \times 3 \times 4 = 4!$ And $1 \times 2 \times 3 \times \dots \times 125 = 125!$

$\Rightarrow (125/5) + (125/25) + (125/125) = 25 + 5 + 1 = 31$.

Q94. Answer: D

Explanation: We have, $24 = 2^3 \times 3$.

Highest power of 2 is $= [150/2] = 75$.

Highest power of 3 is $= [150/3] = 50$.

Highest power of 2^3 is $= [75/3] = 25$.

So, the lowest value out of these powers is the highest power of 24. The answer is 25.

Q95. Answer: C

Explanation: We have, $30 = 2 \times 3 \times 5$.

Highest power of 2 is $= (40/2) = 20$.

Highest power of 3 is $= (40/3) = 13$.

Highest power of 5 is $= (40/5) = 8$.

So, the highest power of 30 is 8.

Q96. Answer: D

Explanation: We have, $100p + 10q + r = p! + q! + r!$

Now, $6! = 720$ and $7! = 5040$.

If 7 is one of digits, then the sum of the factorials becomes four digits number or more.

Hence the numbers 7, 8, 9 can be neglected.

Consider $6! = 720$. But 7 cannot be there in hundred's place.

Hence, we can neglect 6 also. Now, $5! = 120$, $4! = 24$, $3! = 6$, $2! = 2$ and $1! = 1$.

To get a three digit number, 5 has to be present in the number.

But 5 cannot be in hundreds place as then the number greater than 500 which cannot be obtained as the sum of factorial. Also, maximum possible number is $5! + 4! + 3! = 150$

Also 'p' cannot be zero as it is a three digit number.

Hence $p = 1$. Then different possible cases are 154, 153, 152, 125, 135, 145

From this, only 145 satisfies the condition. Thus, $(4+5) = 9$.

Q97. Answer: A

Explanation: Formula: $(\text{Divisor} \times \text{Quotient}) + \text{Remainder} = \text{Dividend}$.

$(54 \times Q) + 31 = D$ -----(1)

$D \% 27 = R$ -----(2)

From equation (2), we have

$\Rightarrow [(54 \times Q) + 29] \% 27 = R$.

Assume $Q = 1$.

$\Rightarrow (54 + 31) \% 27 = R \quad \Rightarrow 85 \% 27 = R \quad \Rightarrow 4 = R$.

Short Cut— $31/27 = R(4)$ [27 is multiple of 54].

Q98. Answer: A

Explanation: We have, $2^{93} / 7 \Rightarrow (2^3)^{21} / 7 = 8^{21} / 7$ gives 1 remainder.

Q99. Answer: C

Explanation: We have, $24^5 / 5 \Rightarrow 24/5 = R(4)$. So, $4^5 / 5 \Rightarrow 1024/5 = R(4)$.

Q100. Answer: C

Explanation: we have, $(15^{23} + 23^{23}) / 19 = (15 + 23) / 19 = R(0)$. [use $(a^n + b^n) / (a + b)$ for n is odd]

Q101. Answer: D

Explanation: We have, $4/6$ has 4 as a remainder and $4 \times 4/6$ has 4 as a remainder.

$4 \times 4 \times 4/6$ has 4 as a remainder and $4 \times 4 \times 4 \times 4/6$ has 4 as a remainder.

So, the remainder is 4.

Q102. Answer: A

Explanation: we have, $7^{4n} - 6^{4n} \Rightarrow$ here $n > 0$ and n is integer, i.e., $n = 1, 2, 3, \dots$

$(a^n - b^n)$ is always divisible by $(a - b)$. When n is even it is also divisible by $(a + b)$.

So, it is divisible by $(7 + 6) = 13$.

Q103. Answer: A

Explanation: We have, $(1821 \times 1823 \times 1827) / 12$

Find the individual remainders of each one. We have,

$\Rightarrow 9 \times 11 \times 3 = 297 / 12 = R(9)$.

Q104. Answer: D

Explanation: Any number when divided by 5 leaves remainder 3 will be of type: $5k + 3$

Square of Number = $(5k + 3)^2 = 25k^2 + 30k + 9$

When this square is divided by 5, remainder will be same as the remainder when 9 is divided by 5.

Hence, 4 is the remainder.

Q105. Answer: D

Explanation: We know that, Dividend = (Divisor * Quotient) + Remainder

Divisor = $(6 * 3) + 2 = 20$

$5 * \text{Quotient} = 20$, Quotient = 4.

Dividend = (Divisor * Quotient) + Remainder

Dividend = $(20 * 4) + 6 = 86$.

Q106. Answer: D

Explanation: Divisor = $(5 \times 46) = 230$

$\therefore 10 \times \text{Quotient} = 230 \Rightarrow \frac{230}{10} = 23$

Dividend = (Divisor x Quotient) + Remainder = $(230 \times 23) + 46 = 5290 + 46 = 5336$.

Q107. Answer: B

Explanation: 98 is the largest two digit number divisible by 7. Check the option- $94/7 = R(3)$.

Q108. Answer: C

Explanation: We have, $(10x+y)+(10y+x)=11(x+y)$ is always divisible by 11. So, the remainder is 0.

Q109. Answer: A

Explanation: Using the identity $a^2-b^2=(a-b)(a+b)$,
 $(2^{28}-1)=[(2^{14})^2-1^2]=(2^{14}+1)(2^{14}-1)=[(2^7)^2-1^2](2^{14}+1)=(2^{14}+1)(2^7-1)(2^7+1)$
Now, $(2^7+1)=129$ and $(2^7-1)=127$
So, $(2^{28}-1)$ is divisible by 127 and 129. Their sum is 256.

Q110. Answer: C

Explanation: We have, $(91+92+\dots+98)/6=(1+2+3+4+5+0+1+2)/6=18/6=R(0)$.

Q111. Answer: B

Explanation: We have, $47/19=R(8)$. [342 is multiple of 19].

Q112. Answer: C

Explanation: We have, $(13 \times 14 \times 16)/6=1 \times 2 \times 4/6=8/6=R(2)$.

Q113. Answer: C

Explanation: We have, $3^7/8=(3^2)^3 \times 3^1/8=9^3 \times 3/8=1 \times 3/8=3/8=R(3)$.

Q114. Answer: A

Explanation: The dividend is in the form $a \times b^y$. We need to change it into the form $a^n + b^n$.
 $3^{444} + 4^{333} = (3^4)^{111} + (4^3)^{111}$.
Now $(3^4)^{111} + (4^3)^{111}$ will be divisible by $3^4 + 4^3 = 81 + 64 = 145$.
Since the number is divisible by 145 it will certainly be divisible by 5.
Hence, the remainder is 0.

Q115. Answer: C

Explanation: The remainders when 5555 and 2222 are divided by 7 are 4 and 3 respectively.
Hence, the problem reduces to finding the remainder when $(4)^{2222} + (3)^{5555}$ is divided by 7.
Now $(4)^{2222} + (3)^{5555} = (4^2)^{1111} + (3^5)^{1111} = (16)^{1111} + (243)^{1111}$.
Now $(16)^{1111} + (243)^{1111}$ is divisible by $16 + 243$ or it is divisible by 259, which is a multiple of 7.
Hence the remainder when $(5555)^{2222} + (2222)^{5555}$ is divided by 7 is zero.

Q116. Answer: D

Explanation: We have, $7^{52}/2402=(7^4)^{13}/2402=2401^{13}/2402=R(2401)$.

Q117. Answer: B

Explanation: Use factor and remainder theorem of functions. Put $x=-1$ in given function.
 $F(-1)=(-1)^3+2(-1)^2+5(-1)+3=-1$.

Q118. Answer: D

Explanation: Use factor and remainder theorem of functions.
Put $x=1$ in given function and equate it 0, i.e. $F(1)=0$.
 $\Rightarrow 2(1)^3-3(1)^2+4(1)+c=0 \quad \Rightarrow 2-3+4+c=0 \quad \Rightarrow c=-3$.

Q119. Answer: A

Explanation: Fermat's theorem-- $a^{(p-1)}/p=R(1)$. P is prime number and a & p are co-prime.

Q120. Answer: A

Explanation: Use factor and remainder theorem of functions. Put $x=-3$ in given function.

$$F(-3)=(-3)^3+4(-3)^2-7(-3)+12=42.$$

Here, remainder is 42. If we remove it, then divisible by $(x+3)$.

Q121. Answer: C

Explanation: Wilson theorem— $(p-1)!/p = R(p-1)$. Where, p is prime number.

$$\Rightarrow (41-1)!/41 = R(40).$$

Q122. Answer: D

Explanation: Consider only the last digits: $9*5*3=135$. Now $135*n$ must finish with a 5 (and n can be 0,1,...,9).

$135*0$ will not end with a 5

$135*1$ will end with a 5 ($5*1=5$)

$135*2$ will not end with a 5 ($5*2=10$)

Only the ODD value of n maintain 5 as the last digit, so n can be any odd value : 1,3,5,7,9.

So, we have five possible values.

Q123. Answer: A

Explanation: Given, $(30)^{2720}$, we can write it as $[(30)^4]^{680}$ Or $[(10*3)^4]^{680}$

The right most non-zero digit depends on the unit digit of $[(3)^4]^{680}$.

Unit digit of $[(3)^4]^{680}$ or $(81)^{680}$.

The unit digit of 81 is 1 so any power of 81 will always give its unit digit as 1.

Thus, required unit digit is 1.

Q124. Answer: C

Explanation: Cyclicity of 2 is 4, after 4th power it is repeated. $2^9=2^1=2$

Q125. Answer: A

Explanation: Since the exponents are even, we can apply the property that, if ' n ' is even (a^n-b^n) is always divisible by $(a+b)$.

$6^{256}-4^{256}$ will always be divisible by $(6+4)=10$. Now any number multiplied by 10 gives the last digit as 'zero'.

Alternative: The last digit of both the numbers are same as '6'

Thus, after subtracting the unit's digit be '0'.

Q126. Answer: D

Explanation: Multiply last digit of each number.

$$\Rightarrow 3 \times 7 \times 7 \times 3 = 21 \times 21 = 1 \text{ is the last digit.}$$

Q127. Answer: B

Explanation: Cyclicity of 7 is four. $7^7=7^3=343$. So, last digit is 3. Similarly for 17^7 .

Q128. Answer: A

Explanation: Required unit's digit = unit's digit in $(4)^{102} + (4)^{103}$.

Now, 4^2 gives unit digit 6.

$\therefore (4)^{102}$ gives unit digit 6.

$\therefore (4)^{103}$ gives unit digit of the product (6×4) i.e., 4.

Hence, unit's digit in $(264)^{102} + (264)^{103}$ = unit's digit in $(6 + 4) = 0$.

Q129. Answer: A

Explanation: Since the given number is divisible by 5, so 0 or 5 must come in place of #.

But, a number ending with 5 is never divisible by 8.

So, 0 will replace #.

Now, the number formed by the last three digits is 4@0, which becomes divisible by 8, if @ is replaced by 4. Hence, digits in place of @ and # are **4 and 0** respectively.

Q130. Answer: C

Explanation: Given, $3^{153} = 3^1 = 3$ unit digit is 3.

$\Rightarrow 7^{162} = 7^2 = 49$...unit digit is 9. So, $3 \times 9 = 27$...7 is the answer.

Q131. Answer: D

Explanation: Given, $5 \times 8 = 40$...0 in the last.

Q132. Answer: D

Explanation: Given, $25!$ is always a multiple of 4. After $3!$, all the factorials are divisible by 4.

$(23)^{25!} = 3^4 = 81$...1 is the unit digit.

Q133. Answer: B

Explanation: Number 7 has 4 cycle in its repeating powers:

$7^1 = 7$... $7^2 = ..9$

$7^3 = ...3$ $7^4 =1$

from this point the unit digit of 7^5 is 7 so it is repeating so keep in mind that we have 4 cycles that are repeating. So, here let's apply this to the problem, first look at the initial term without considering the power 47 : (137^{13}) , here ONLY unit digit matters so we have : (7^{13}) by applying above cycle pattern, we see that 13 is $3 \times 4 + 1$, so we should cover 4 FULL cycle and the 13th term is our answer. by viewing to the cycle we see that after 4 full cycle the 13th number is conform to the first number in 7 power so 13th's unit digit is 7...

Now let's apply the power 47 ... we have a number something like this : $(.....7)^{47}$, once again we must apply our pattern : $47 = 11 \times 4 + 3$, so the third term is equal to 47th term

and we see here the third term is 3 so our answer is 3, so we can say that the unit digit of $(137^{13})^{47}$ is 3.

Q134. Answer: B

Explanation: We have, $35^{87} = 5$ is the last digit

$93^{46} = 3^2 = 9$ is the last digit.

So, $9 + 5 = 14$. Last digit is 4.

Q135. Answer: A

Explanation: We have, $44^{91} = 4^3 = 64$. Last digit is 4.

$73^{37} = 3^1 = 3$ is the last digit.

So, $3 \times 4 = 12$. Last digit is 2.

Q136. Answer: C

Explanation: We have, $12^{34}=2^2=4$ is the last digit. And $5^9=5$ is the last digit.
So, $4-5=9$ is the last digit.

Q137. Answer: B

Explanation: We have, $2^{34}=2^2=4$.
 $14^{832}=4^4=256$. Last digit is 6. And $17^{21}=7^1=7$.
So, last digit of $4 \times 6 \times 7=168$ is 8.

Q138. Answer: C

Explanation: n^{th} term of A.P. is, $n=[(72-8)/4] + 1=17$.

Q139. Answer: A

Explanation: Given, $(a+2d)+(a+8d)=8 \Rightarrow 2a+10d=8$.
Sum of 11 terms $= (11/2) * [2a+10d] = (11/2) * 8 = 44$.

Q140. Answer: B

Explanation: Sum $= (20/2) * [2 \times 4 + 19 \times 3] = 10 * 65 = 650$.

Q141. Answer: A

Explanation: 5^{th} term of G.P. $= 5 \times 3^4 = 405$.

Q142. Answer: D

Explanation: $B = 1 * [(2^{65} - 1)/(2 - 1)] = 2^{65} - 1 = A - 1$. So, $A = B + 1$.

Q143. Answer: B

Explanation: If a, b and c are in A.P. then $b - a = c - b$.
 $\Rightarrow \log(2^x - 1) - \log 2 = \log(2^x + 3) - \log(2^x - 1) \Rightarrow (2^x - 1)/2 = (2^x + 3)/(2^x - 1)$
On simplifying this you will get $x = \log_2 5$.

Q144. Answer: A

Explanation: Here, $a_n = a + (n - 1) d = 78$
 $a = 3, d = 8 - 3 = 5$
Therefore, $3 + (n - 1) (5) = 78$
 $\Rightarrow (n - 1) * 5 = 78 - 3 = 75 \Rightarrow n = 16$.
Hence, a_{16} is 78.

Q145. Answer: B

Explanation: Here, $a = 11, d = 8 - 11 = -3$. Let $a_n = -150$
Therefore, $a + (n - 1) d = -150 \Rightarrow 11 + (n - 1) (-3) = -150$
 $\Rightarrow (n - 1) = + 161/3 = 53 \frac{2}{3}$, which is not an integral number.
Since number of terms can never be a fraction. Hence, -150 is not a term of the given series.

Q146. Answer: C

Explanation: Let a be the 1st term and d the common difference.

Here, $a_{11} = a + 10d = 38$ (1)

$\Rightarrow a_{16} = a + 15d = 73$ (2)

Subtracting (2) from (1), we get

$$\Rightarrow a + 10d - a - 15d = 38 - 73 \quad \Rightarrow d = 7$$

Putting $d = 7$ in (1), we get

$$\Rightarrow a + 10 * 7 = 38 \quad \Rightarrow a = 38 - 70 = -32$$

So, $a_{31} = a + 30d = -32 + 30 * 7 = -32 + 210 = 178$

Hence, 31st term is 178.

Q147. Answer: D

Explanation: Given series is 3, 15, 27, 39...

Here, $a = 3$, $d = 15 - 3 = 12$. Since, $a_n = a_k + (n - k)d$

$$\Rightarrow a_n - a_{54} = (n - 54) * 12 \quad \Rightarrow 132 = 12n - 54 * 12 \text{ (since } a_n - a_{54} = 132 \text{ given)}$$

$$\Rightarrow 12n = 132 + 54 * 12 = 12(11 + 54) \quad \Rightarrow n = 11 + 54 = 65.$$

Q148. Answer: A

Explanation: Given that, $a_1 = 1$; $a_2 = 3$; $a_3 = 9$; $n = 8$

Common ratio, $r = a_2/a_1 = 3/1 = 3$. $\Rightarrow a_8 = a_1 * r^{8-1} = 1 * 3^7 = 2187$.

Q149. Answer: B

Explanation: Given, $a_1 = 6$; $a_2 = 12$; $a_3 = 24$; $a_n = 1536$.

Common ratio, $r = a_2/a_1 = 12/6 = 2$.

$$\text{Now, } 1536 = 6 * (2)^{n-1} \quad \Rightarrow n = 9.$$

Hence, 1536 is the 9th term.

Q150. Answer: C

Explanation: Given, $S_n = 3n^2 + n$, put $n = 1, 2$

$$S_1 = 3.1^2 + 1 = 4 \text{ and } T_1 = 4.$$

$$S_2 = 3.2^2 + 2 = 14 \text{ and } T_2 = S_2 - S_1 = 14 - 4 = 10.$$

$$\Rightarrow d = T_2 - T_1 = 10 - 4 = 6$$

$$\text{Hence, } T_n = a + (n - 1)d = 4 + (n - 1)6 = 6n - 2.$$

Q151. Answer: A

Explanation: The given series is $3 + 7 + 11 + 15 + \dots$ to 30 terms.

Given, $a = 3$, $d = 4$ and $n = 30$

$$\text{We know that, } S_n = (n/2) * [2a + (n - 1)d]$$

$$S_{30} = (30/2) * [2 * 3 + (30 - 1) * 4] = 15 * [6 + 116] = 1830.$$

Q152. Answer: B

Explanation: It is an A.P. series with $a = 2$, $d = 3$. Let 62 be the n th term. $\Rightarrow T_n = 62$.

But we know that, $T_n = a + (n - 1)d$

$$\Rightarrow 62 = 2 + (n - 1) * 3 \quad \Rightarrow 62 = 2 + 3n - 3$$

$$\Rightarrow 3n = 63 \quad \Rightarrow n = 21$$

So, 62 is the 21st term.

Q153. Answer: D

Explanation: Savings on successive days are 1, 2, 3, 4..... Paise, which form an A.P. with $a = 1$, $d = 1$.

$$\text{Total savings in 365 days} = S_{365} = (365/2) * [2 * 1 + (365 - 1) * 1]$$

$$= 66795 \text{ paise} = \text{Rs. } 667.95.$$

Q154. Answer: B

Explanation: Check the options one by one. We get,

(a) Since $\log_a a = 1$, so $\log_{10} 10 = 1$.

(b) $\log(2 + 3) = \log 5$ and $\log(2 \times 3) = \log 6 = \log 2 + \log 3$

$$\therefore \log(2 + 3) \neq \log(2 \times 3)$$

(c) Since $\log_a 1 = 0$, so $\log_{10} 1 = 0$.

(d) $\log(1 + 2 + 3) = \log 6 = \log(1 \times 2 \times 3) = \log 1 + \log 2 + \log 3$.

So, (b) is incorrect.

Q155. Answer: C

Explanation: We have, $\log_5 512 = \log 512 / \log 5 = \log 2^9 / \log(10/2)$
 $= 9 \log 2 / (\log 10 - \log 2) = (9 \times 0.3010) / (1 - 0.3010) = 3.876$.

Q156. Answer: C

Explanation: We have, $\log 27 = 1.431$

$$\Rightarrow \log(3^3) = 1.431 \quad \Rightarrow 3 \log 3 = 1.431 \quad \Rightarrow \log 3 = 0.477$$

$$\therefore \log 9 = \log(3^2) = 2 \log 3 = (2 \times 0.477) = 0.954.$$

Q157. Answer: B

Explanation: We have, $\log_2 10 = 1/(\log_{10} 2) = 1/(0.3010) = (1000/301)$.

Q158. Answer: B

Explanation: We have, $\log_{10} 80 = \log_{10}(8 \times 10)$

$$= \log_{10} 8 + \log_{10} 10 = \log_{10}(2^3) + 1 = 3 \log_{10} 2 + 1 = (3 \times 0.3010) + 1 = 1.9030.$$

Q159. Answer: B

Explanation: We have, $\log_{10} 5 + \log_{10}(5x + 1) = \log_{10}(x + 5) + 1$

$$\Rightarrow \log_{10} 5 + \log_{10}(5x + 1) = \log_{10}(x + 5) + \log_{10} 10$$

$$\Rightarrow \log_{10}[5(5x + 1)] = \log_{10}[10(x + 5)]$$

$$\Rightarrow 5(5x + 1) = 10(x + 5) \quad \Rightarrow 5x + 1 = 2x + 10$$

$$\Rightarrow 3x = 9 \quad \Rightarrow x = 3.$$

Q160. Answer: B

Explanation: We have, $\log_{60} 3 + \log_{60} 4 + \log_{60} 5 = \log_{60}(3 \times 4 \times 5) = \log_{60} 60 = 1$.

Q161. Answer: C

Explanation: We have, $\log(2^{64}) = 64 \times \log 2 = (64 \times 0.30103) = 19.26592$

Its characteristic is 19. Hence, then number of digits in 2^{64} is 20.

Q162. Answer: C

Explanation: We have, $\log_2 x = 10 \quad \Rightarrow x = 2^{10}$.

$$\therefore \log_x y = 100 \quad \Rightarrow y = x^{100}$$

$$\Rightarrow y = (2^{10})^{100} \quad [\text{put value of } x] \quad \Rightarrow y = 2^{1000}.$$

Q163. Answer: B

Explanation: Let, $\log_2 16 = n$. Then, $2^n = 16 = 2^4 \Rightarrow n = 4$.

$$\therefore \log_2 16 = 4.$$

CHAPTER 3- TIME, SPEED & DISTANCE

Q1. Answer: B

Explanation: Bus travels 160 km in 4 hours, Speed of bus = $160/4 = 40$ km/hr.

Train travels 320 km in 5 hours, Speed of train = $320/5 = 64$ km/hr.

In one hour, bus travels 40 km and train travels 64 km.

$$\text{Ratio} = 40 : 64 = 5 : 8.$$

Q2. Answer: B

Explanation: Let t be the time taken to reach the factory on time.

At 5 km/h it will take $(t + 3)$ minutes and at 6 km/h it will take $(t - 7)$ minutes.

$$\text{Now, } 5(t + 3)/60 = 6(t - 7)/60$$

$$\Rightarrow 5t + 15 = 6t - 42, \text{ i.e. } t = 57 \text{ minutes}$$

So, at 5 km/h it will take 60 minutes and at 6 km/h it will take 50 minutes

$$\Rightarrow \text{distance} = 5 \times 60/60 = 5 \text{ km or } 6 \times 50/60 = 5 \text{ km.}$$

Q3. Answer: C

Explanation: If the distance = x km., Time taken @ 40 kmph = $x/40$ and @ 50 kmph = $x/50$

Difference between these two time is $(11-5)=6$ min. = $1/10$ hour

$$\text{So } [(x/40)] - [(x/50)] = 1/6, x = 20$$

Time taken @ 40 kmph = $x/40 = 20/40 = 1/2$ hours = 30 minutes, which is 11 minutes late.

So, correct time = $30 - 11 = 19$ min.

Q4. Answer: B

Explanation: Given that,



Both A and B will reach the point R after the same time.

When the time is same, we have $S_1/S_2 = D_1/D_2$.

$$\Rightarrow 3/4 = x/(21+21-x) \Rightarrow x = 18 \text{ km.}$$

Q5. Answer: A

Explanation: When speed of the man = 10 km/hr = d/t

When speed of the man = 15 km/hr = $d/(t-2)$

Equating the value of d , we have $\Rightarrow 10 \times t = 15 \times (t - 2) \Rightarrow t = 6$ hours.

$$\text{Desired speed} = d/(t-1) = 10t/(t-1) = 12 \text{ km/hr.}$$

Q6. Answer: B

Explanation: Speed = $600/(5 \times 60)$ m/sec = 2 m/sec = $2 \times (18/5)$ = 7.2 km/hr.

Q7. Answer: A

Explanation: Speed = 3 m/s = $3 \times 18/5$ km/hr = $54/5$ km/hr

Time = 1 hr 40 min = $(1 + 2/3)$ hr = $5/3$ hr

Distance Covered = $S \times T = (54/5) \times (5/3) = 18$ km.

Q8. Answer: A

Explanation: When distance is constant, we can use: $S_1 \times T_1 = S_2 \times T_2$

$\Rightarrow ST = 3/4 S(T + 5/2) \quad \Rightarrow T = 7.5$ hr.

Q9. Answer: B

Explanation: We are having time and speed given, so first we will calculate the distance. Then we can get new speed for given time and distance.

Time = $50/60$ hr = $5/6$ hr and Speed = 48 mph

Distance = $S \times T = 48 \times 5/6 = 40$ km

New time will be 40 minutes. So, time = $40/60$ hr = $2/3$ hr

Now we know, Speed = Distance/Time

New speed = $40 \times 3/2 = 60$ km/hr.

Q10. Answer: A

Explanation: Let distance = x km and usual rate = y km/hr.

Then, $(x/y) - x/(y+3) = 40/60 \quad \Rightarrow 2y(y+3) = 9x \quad \dots\dots\dots(1)$

And, $x/(y-2) - (x/y) = 40/60 \quad \Rightarrow y(y-2) = 3x \quad \dots\dots\dots(2)$

On dividing (1) and (2), we get $x = 40$ km.

Q11. Answer: C

Explanation: Let the speeds of two trains be $7X$ and $8X$ km/hr.

Given, $8X = 400/4 \Rightarrow X = 12.5$ km/hr.

So, speed of first train is $12.5 \times 7 = 87.5$ km/hr.

Q12. Answer: C

Explanation: Let the speed of the train be x km/hr and that of the car be y km/hr.

Then, $(120/x) + (480/y) = 8 \quad \Rightarrow (1/x) + (4/y) = 1/15 \quad \dots\dots\dots(1)$

And, $(200/x) + (400/y) = 25/3 \quad \Rightarrow (1/x) + (2/y) = 1/24 \quad \dots\dots\dots(2)$

On solving (1) and (2), we get $x = 60$ and $y = 80$.

Ratio of speeds = $60:80 = 3:4$.

Q13. Answer: A

Explanation: Let, Abhay's speed be x km/hr.

Then, $(30/x) - (30/2x) = 3 \quad \Rightarrow 6x = 30 \quad \Rightarrow x = 5$ km/hr.

Q14. Answer: A

Explanation: Let, the total distance be 3 km.

Average speed = $3 / [(1/10) + (1/20) + (1/60)] = 18$ km/hr.

Q15. Answer: C

Explanation: Speed from X to Y is 40 km/hr. So, speed from Y to X (return journey) = 60 km/hr.

Let, the distance be D . We have,

=> Average speed = $(D+D)/[(D/40)+(D/60)] = 48 \text{ km/hr.}$

Short Cut:- Average Speed = $2xy/(x+y) = 2*60*40/(60+40) = 48 \text{ km/hr.}$

Q16. Answer: C

Explanation: Let, the original speed be 'N'.

Now, $63/N + 72/(N+6) = 3 \Rightarrow N=42.$

Q17. Answer: A

Explanation: Let the duration of the flight be x hours.

Then, $(600/x) - [600/(x+1/2)] = 200 \Rightarrow (600/x) - [1200/(2x+1)] = 200.$

$\Rightarrow x(2x+1) = 3 \Rightarrow 2x^2 + x - 3 = 0$

$\Rightarrow (2x+3)(x-1) = 0 \Rightarrow x = 1 \text{ hr.}$ [neglecting the -ve value of x]

Q18. Answer: C

Explanation: Average speed when distance equal = $2XY/(X+Y) = 2*40*50/90 = 400/9.$

Q19. Answer: B

Explanation: Average Speed = (Total distance travelled/Total time taken)

$\Rightarrow (3+3+3+3)/[(3/10) + (3/20) + (3/30) + (3/60)] = 20 \text{ km/hr.}$

Q20. Answer: B

Explanation: Average speed $\frac{\frac{3}{4}D + \frac{1}{4}D}{\frac{3}{4B} + \frac{1}{4S}} = 4BS/(3S+B).$

Q21. Answer: D

Explanation: The gap between them is decreasing at the relative speed of $(150-30)=120 \text{ km/hr.}$

Distance = $120*(7.5/60) = 15 \text{ km.}$

Q22. Answer: B

Explanation: In 2 hours from 14:30 to 16:30, Paschim express has covered = $2*60=120 \text{ km.}$

Time taken by two trains to meet = $120/(80-60)=6 \text{ hours.}$

They will meet = $6*80=480 \text{ km from Delhi.}$

Q23. Answer: B

Explanation: Given, A to B distance AB = 700 km. In 1 hr both the cars will move 60 km each. So, the remaining distance between them is $(700-120)=580.$

From 10 to 11 car y will continue to run for 60 km. Now, remaining distance = $580-60=520.$

Now, the two cars will meet after = $520/120 = 4 \frac{1}{3} \text{ hrs or } 4 \text{ hr } 20 \text{ minutes.}$

So, they will meet at 3:20 PM. [11+4 hr 20 minutes]

Q24. Answer: C

Explanation: If the man is stationary then busses will meet him after 10 minutes. As they are meeting in 8 minutes, means the distance any bus is travelling in 10 minutes, the same should be travelled by man and bus together in 8 minutes. Let, speed of man = s.

$\Rightarrow 10*20 = 8*(s+20) \Rightarrow s = 5 \text{ km/hr.}$

Q25. Answer: A

Explanation: A distance of 100m is covered in 4 minutes at the relative speed.

$\Rightarrow S_c - S_m = d/t \Rightarrow S_c - 3 = (100/1000) / (4/60)$

$\Rightarrow S_c = 4.5 \text{ km/hr.}$

Q26. Answer: D

Explanation: Time required = $100 / [(10-8) * (5/18)] = 180 \text{ sec} = 3 \text{ minutes}$.

Q27. Answer: A

Explanation: Train starting from A takes 5 hr to reach the point B whereas the train starting from B takes 7 hr to reach the point A. Now to find the speed of two trains, the distance AB has to be divided by 5 and 7 for two trains. So, let us assume the distance to be 35 (LCM of 5 and 7). We have,

Speed of train starting from A = $35/5 = 7 \text{ km/hr}$.

Speed of train starting from B = $35/7 = 5 \text{ km/hr}$.



Train starting from A will travel for 2 hr and then both trains will proceed towards each other. In the first 2 hr the train from A will move 7×2 i.e. 14 km. Then, the remaining distance between the two trains will be $35 - 14 = 21 \text{ km}$.



Now, they will meet each other after $= 21 / (7+5) = 1 \frac{3}{4} = 1 \text{ hour } 45 \text{ minutes}$.

So, the two trains will cross each other at 10:45 AM.

Q28. Answer: A

Explanation: Time = (distance between them / relative speed) $\Rightarrow \text{Time} = 8.5 / 0.5 = 17 \text{ hr}$.

Q29. Answer: B

Explanation: In 30 min thief covers 30 km. Now, the distance between police and thief at 3 pm is 30 km.

So, Time = $30 / 15 = 2 \text{ hr}$. Police caught the thief at 5 pm.

Q30. Answer: B

Explanation: Required Time = $\frac{150+600}{50 \times \frac{5}{18}} = 54 \text{ sec}$.

Q31. Answer: C

Explanation: Relative speed = $60 + 6 = 66 \text{ km/hr}$ (Since both the train and the man are moving in opposite direction) = $(66 * 5/18) \text{ m/sec} = 55/3 \text{ m/s}$.

Time taken to pass the man = $(100 * 3/55) = 6 \text{ sec}$.

Q32. Answer: C

Explanation: Speed of train = $\frac{(100+500)}{2 \times 60} \times \frac{18}{5} = 45 \frac{\text{km}}{\text{hr}}$.

Q33. Answer: C

Explanation: Let, the length of train be 'x'. We have

$\Rightarrow x/15 = (x+100)/30 \Rightarrow x = 100$.

Q34. Answer: A

Explanation: Let, speed of goods train = s

$$\Rightarrow (s + 50) = \frac{187.5}{9} \times \frac{18}{5}$$

$$\Rightarrow s + 50 = 75 \quad \Rightarrow s = 25 \text{ km/hr.}$$

Q35. Answer: B

Explanation: Required Time = $(460 - 160) / [(25 + 35) * (5/18)] = 18 \text{ sec.}$

Q36. Answer: C

Explanation: Given, $(130 + 110) / (S_A - S_B) = 60 \quad \dots\dots\dots(1)$

$$\Rightarrow (130 + 110) / (S_A - S_B) = 60 \quad \dots\dots\dots(2)$$

On solving equations (1) and (2), we get $S_A = 42 \text{ m/s}$ and $S_B = 38 \text{ m/s}$.

Q37. Answer: C

Explanation: Let the length of the train be ' x ' meters. The speed of the train is same in both cases.

$$\text{So, } (x + 96) / 12 = (x + 141) / 15 \quad \Rightarrow x = 84 \text{ meters.}$$

Now, we put x in the above equation to get the speed.

$$\text{Speed} = (84 + 96) / 12 = 15 \text{ m/s} = 15 * 5/18 = 54 \text{ km/hr.}$$

Q38. Answer: B

Explanation: Let the speeds of the two trains be $x \text{ m/sec}$ and $y \text{ m/sec}$ respectively.

Then, length of the first train = $27x$ metres and length of the second train = $17y$ metres.

$$\Rightarrow (27x + 17y) / (x + y) = 23 \quad \Rightarrow 27x + 17y = 23x + 23y$$

$$\Rightarrow 4x = 6y \quad \Rightarrow x : y = 3 : 2.$$

Q39. Answer: B

Explanation: Length of train = time * speed = $20 * 54 * 5/18 = 300 \text{ m.}$

Now, length of platform is l .

$$\Rightarrow 36 = (l + 300) / (54 * 5/18) \quad \Rightarrow l + 300 = 36 * 15 = 540 \quad \Rightarrow l = 240 \text{ m.}$$

Q40. Answer: C

Explanation: Speed of train relative to jogger = $(45 - 9) \text{ km/hr} = 36 \text{ km/hr} = 10 \text{ m/s}$

Distance to be covered = $(240 + 120) \text{ m} = 360 \text{ m.}$

$$\text{Time taken} = 360 / 10 = 36 \text{ sec.}$$

Q41. Answer: D

Explanation: Let the speed of the slower train be $x \text{ m/sec}$. Then, speed of the faster train = $2x \text{ m/sec}$.

Relative speed = $(x + 2x) \text{ m/sec} = 3x \text{ m/sec.}$

$$\Rightarrow 3x = (100 + 100) / 8 \quad \Rightarrow x = 25/3.$$

$$\text{So, speed of the faster train} = 50/3 \text{ m/s} = (50/3) * (18/5) = 60 \text{ km/hr.}$$

Q42. Answer: C

Explanation: Let, the speed of boat in still water be ' x ' km/hr and the speed of stream be ' y ' km/hr.

Speed in Downstream = $(x + y)$ and Upstream = $(x - y)$.

$$\Rightarrow 10 / (x - y) = 30 / 60 \quad \dots\dots\dots(1) \quad \text{and} \quad 10 / (x + y) = 25 / 60 \quad \dots\dots\dots(2)$$

By dividing the equations, we get

$$\Rightarrow (x + y) / (x - y) = 6/5 \quad \Rightarrow 5x + 5y = 6x - 6y \quad \Rightarrow x = 11y.$$

Putting in (1), we get $y = 2 \text{ km/hr.}$

Q43. Answer: D

Explanation: Let, speed of boat in still water be 'x'.

Speed in Downstream=(x+2) and Upstream=(x-2).

Let the distance between the two ports be 'd'. We have,

$$\Rightarrow d/(x+2) = 4 \text{ and } d/(x-2) = 5.$$

By dividing the two equations, we get $x=18 \text{ km/hr}$.

Now, we put the value of x in the above equation. We get $d=80$.

Q44. Answer: C

Explanation: Relative speed= $5+10=15 \text{ km/hr} = (1/4) \text{ km/min}$.

Hence, they will be $1/4 \text{ km}$ away a minute before.

Q45. Answer: D

Explanation: Given, $[12/(x-y)] - [12/(x+y)] = 6$ (1)

$$\Rightarrow [12/(2x-y)] - [12/(2x+y)] = 1 \text{(2)}$$

By solving these equation, we get $y=8/3$.

Q46. Answer: A

Explanation: Downstream speed= $(x+y)=11$

$$\Rightarrow x+1.5=11 \Rightarrow x=9.5$$

Upstream speed= $x-y=9.5-1.5=8 \text{ km/hr}$.

Q47. Answer: A

Explanation: Distance is constant use the ratio of speed and time. We have

$$\Rightarrow (5+2)/(5-2) = (T+2)/T \Rightarrow 7/3 = (T+2)/T$$

$$\Rightarrow 3T+6=7T \Rightarrow T=6/4=3/2=1.5 \text{ hr.}$$

$$\Rightarrow D=ST=(5+2)*1.5= 10.5 \text{ km.}$$

Q48. Answer: D

Explanation: Let rate upstream = x km/hr & rate downstream = y km/hr.

Then, $30/x + 44/y = 10$ and $40/x + 55/y = 13$

By solving these two equations you will get the answer.

Q49. Answer: B

Explanation: On solving we get $x = 5$ and $y = 11$

So, rate of upstream = 5 km/hr and rate of downstream = 11 km/hr

Rate of current = $1/2(11-5) \text{ km/hr} = 3 \text{ km/hr}$

Rate in still water = $1/2(11+5) \text{ km/hr} = 8 \text{ km/hr}$

Let man's speed upstream x kmph. So, downstream is 2x kmph.

Rate in still water= $(\text{upstream}+\text{downstream})/2=(x+2x)/2=3x/2$

$$\Rightarrow 3x/2=15 \Rightarrow x=10 \text{ kmph}$$

Rate upstream =10 kmph and downstream =20 kmph

Hence, rate of stream= $(20-10)/2= 5 \text{ kmph}$.

Q50. Answer: D

Explanation: $x=6$ and $y=4$, we have

$$\Rightarrow d/(x+y) + d/(x-y)= t \Rightarrow d/10 + d/2 = 3/2$$

$$\Rightarrow d= 3 \text{ km.}$$

Q51. Answer: A

Explanation: Let, the speed of the stream be x km/hr.

Then, $(91/10-x) + (91/10+x) = 20 \Rightarrow x = 3$ km/hr.

Q52. Answer: B

Explanation: We have, $x*(15/60) + 2x*(20/60) + x*(10/60) = 39$

$\Rightarrow 3x+8x+2x=468 \Rightarrow x=36$.

Q53. Answer: A

Explanation: Speed downstream = $(14 + 1.2) = 15.2$ km/hr.

Speed upstream = $(14 - 1.2) = 12.8$ km/hr.

Total time taken = $4864/15.2 + 4864/12.8 = 320 + 380 = 700$ hours.

Q54. Answer: D

Explanation: Time for first meeting = $1000/(15-10)=200$ sec.

Q55. Answer: B

Explanation: Time for first meeting = $1000/(15+10)=40$ sec.

Q56. Answer: D

Explanation: Let the length of the circular track be x km.

Speed of A = $x/1 = x$ km/hr and Speed of B = $6x/1 = 6$ km/hr.

Time after which they will cross each other = $x/(6x-x) = 1/5$ hr = 12 minutes.

So, they will cross each other at 7:42 AM.

Q57. Answer: D

Explanation: Time for first meeting of A & B = $1000/(15-10)=200$ sec.

Time for first meeting of A & C = $1000/(20-10)=100$ sec.

LCM of (200,100)=200 sec. So, all of them will meet after 200 seconds.

Q58. Answer: C

Explanation: Time = length of track/relative speed = $600/[(5-2)*5/18] = 720$ sec.

Q59. Answer: B

Explanation: For first time, we have to fix one person and find the respective times.

Fix Mohit, so time taken by Mohit to meet Divya = $0.5/(8-5) = 1/6$ hr = 10 minutes.

Time taken by Mohit to meet Rajat = $0.5/(8-3) = 1/10$ hr = 6 minutes.

Time taken for all to meet first time = LCM of (Mohit-Divya, Mohit-Rajat) = LCM(10,6) = 30 minutes.

Q60. Answer: B

Explanation: Time to meet at starting point = LCM of their times = LCM $(0.5/8, 0.5/5, 0.5/3) = 0.5 = 30$ min.

Q61. Answer: A

Explanation: For two hands to coincide, one will 360 degree over the other.

$\Rightarrow N = 360/(11/2) = 720/11 = 65 \frac{5}{11}$ minutes.

Q62. Answer: C

Explanation: In an accurate clock the minute hand moves with a speed of 6 degree per minute.

So, in 2 hrs 20 min i.e. 140 minutes it moves $140 \times 6 = 840^\circ$.

Q63. Answer: D

Explanation: In one hour they are two times in straight line (coincide and opposite) two times.
In 12hr 22 times. In 24 hr 44 times.

Q64. Answer: C

Explanation: Since, every hours the two hands makes 90° twice, except for the time between 2 to 4 O'clock and 8 to 10 O'clock, where they make 90° angle in 2 hours only thrice.
Hence, in 24 hours both hands will be right angle 44 times.

Q65. Answer: A

Explanation: Speed of the hour hand $= (1/2)^\circ$ per min.
Time required by hour hand to travel $135^\circ = 135 / (1/2) = 270$ min = 4 hr 30 minutes.
So, time on the clock is 7:30.

Q66. Answer: C

Explanation: Angle between hour and minute hand, $\theta = \left| 30H - \frac{11}{2}M \right|$
Where, H is time in hours and M is time in minutes.
At 3:25, Angle $= (30 \times 3) - (11/2) \times 25 = 47.5^\circ$.

Q67. Answer: C

Explanation: At 9:00 the hour hand is at 9. After 14 minutes it must have travelled 7 degree.
So, after the interchange the minute hand is 7 degree ahead of 9. At 9:00 the minute hand is at 12. After 14 minutes it will be 6 degree before 3. So, after interchange the hour hand is 6 degree away from 3.
Now, to strike 3 minutes hand has to travel $90 - 7 = 83$ degree.
Time required $= 83/6 = 14$ minutes. Hence, time is 14 minute past three.

Q68. Answer: B

Explanation: Angle $= [30 \times 3 - 11/2 \times 40] = 130^\circ$.

Q69. Answer: A

Explanation: Between 10 and 11, the minute hand and hour hand are at an angle of 30° to each at 10 O'clock. They are 50 min apart. It has to cover 45 min to have different of 5 min.
So, time is $= 45 \times 12/11$. Therefore they makes 30 degree in between 10 and 11 once.
The next time they will be at angle of 30° to each other will be at 11.

Q70. Answer: A

Explanation: At 2 O'clock angle between them is 60 degree.
Time $= 60 / (11/2) = 120/11 = 10 \frac{10}{11}$. So, the time is 2 : 10 $\frac{10}{11}$ PM.

Q71. Answer: A

Explanation: Given, A=200 m and S=180 m $\Rightarrow A : S = 10 : 9$.
Also, A=200 m and N=160 m $\Rightarrow A : N = 10 : 8$.
So, $(S/A) \times (A/N) = (9/10) \times (10/8) \Rightarrow S : N = 9 : 8$.
If S runs 100 m, then N will run $(100 \times 8/9) = 88.88$ m.

Hence, S will defeat N by 11.11 m.

Q72. Answer: D

Explanation: Given, A : B = 1000 : 900 = 10 : 9 and B : C = 1000 : 850 = 20 : 17.

So, A : B : C = 200 : 180 : 153. When A runs 200, C will run 153.

So, when A runs 1000, C will run $(1000/200) \times 153 = 765$ m.

A defeat C by $(1000 - 765) = 235$ m.

Q73. Answer: A

Explanation: Karan covered = 1000 m and Varun covered = $1000 - 40 - 10 = 950$ m.

=> Karan : Varun = 1000 : 950 = 20 : 19.

Karan travels 20 m and Varun in the same time travels 19 m. Now, Karan has a 40 m start, hence he needs to cover only 960 m. So, distance covered by Varun in same time = $(960/20) \times 19 = 912$ m.

Hence, Karan defeats Varun by $(1000 - 912) = 88$ m.

Q74. Answer: C

Explanation: Given, A : B = 1200 : 1100 = 12 : 11 and B : C = 1600 : 1400 = 8 : 7. => A : B : C = 96 : 88 : 77.

So, A runs 96 m and C runs 77 m in same time. When, A runs 9600 m, C will run $(9600/96) \times 77 = 7700$ m.

A will beat C by $(9600 - 7700) = 1900$ m.

Q75. Answer: C

Explanation: A can run 500 in 30 sec and 1000m in 60 sec.

So, we need to know how much can B in 60 sec. = $(500/35) \times 60 = 6000/7$ m.

Hence, A can be a start of $(1000 - 6000/7) = 1000/7 = 142 \frac{6}{7}$ m for dead heat.

Q76. Answer: D

Explanation: Clearly, A beats B by 4 seconds. Now, find out how much B will run in these 4 seconds.

Speed of B = Distance/Time taken by B = $224/32 = 7$ m/s.

Distance covered by B in 4 seconds = Speed \times time = $7 \times 4 = 28$ metre, i.e., A beat B by 28 metre.

Q77. Answer: C

Explanation: A's speed = $5 \times 5/18 = 25/18$ m/s.

Time taken by A to cover 100 m = $100 \times 18/25 = 72$ sec.

Time taken by B to cover 92 m = $(72 + 8) = 80$ sec.

B's speed = $(92/80) \times (18/5) = 4.14$ km/hr.

Q78. Answer: D

Explanation: In a km race A can beat B by 100 m

=> While A run 1000 m, B run $(1000 - 100) = 900$ m

In a km race B can beat C by 60 m

=> While B runs 1000 m, C runs $(1000 - 60) = 940$ m

=> While B run 1 m, C run $940/1000$ m => While B runs 900 m, C runs $(940/1000) \times 900 = 94 \times 9 = 846$ m

i.e., while A run 1000 m, C run 846 m. Hence, A can beat C by $(1000 - 846) = 154$ m.

Q79. Answer: C

Explanation: Let us say speed of escalator = s steps/sec.

So, $30 + 18s = 34 + 6s$ => $s = 1/3$ steps/sec.

Total steps = $30 + (18 \times 1/3) = 36$ steps.

Q80. Answer: B

Explanation: Ratio of speeds of Shyam and Vyom = 3:2 and the ratio of distance = 25:20.

Hence, ratio of times = $25/3 : 20/2 = 5 : 6$.

Let, escalator has n steps.

So, $(n-25)/(n-20) = 5/6 \Rightarrow n=50$.

Q81. Answer: B

Explanation: $W + C = 5 \frac{3}{4} = 23/4$.

$\Rightarrow C + C = 23/4 - 2 \Rightarrow 2C = 15/4 \Rightarrow C = 15/8$.

So, $W = 23/4 - 15/8 = 31/8 \Rightarrow 2W = 31/4 = 7 \text{ hours } 45 \text{ minutes}$.

Q82. Answer: B

Explanation: Stopping time = (difference between speed/speed without stoppage) = $9/54 = 1/6 \text{ hr} = 10 \text{ min}$.

Q83. Answer: C

Explanation: Train which start from B at 10AM will definitely cross the train starting from A at 10AM.

Also 5 trains starting from B before 10AM and 5 trains starting from B after 10AM will also cross.

So, total = $5+5+1=11$.

Q84. Answer: A

Explanation: Given that,



Everyday Sunil reaches S at 5 PM. On Sunday, he saves 30 minutes. So, he must have met the children at point P, 15 minutes early i.e. at 4:45 PM, to save 30 minutes (15 minutes going from P to S and 15 minutes of returning from S to P).

Hence, the children were walking from 4 PM to 4:45 PM i.e. for 45 minutes.

Q85. Answer: A

Explanation: Speed of A = $1 \text{ km in } 18 \text{ min} = 1000/18 = 55.55 \text{ m/min}$.

When A travels 3.5 km. B already has been traveled $(4.5+1) = 5.5 \text{ km}$.

A will take time to travel 3.5 km = $3500/55.55 = 63 \text{ min}$.

So, B will take 66 min to travel 5.5 km (As B has started 3 min before of A).

Thus, speed of B = $5500/66 = 83.33 \text{ m/min} = 5 \text{ km/hr}$.

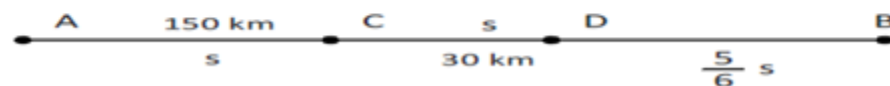
Q86. Answer: C

Explanation: Given that,

Case I:



Case II:



The difference of $(15-7)=8$ minutes has come up due to distance CD & AC. DB have same distances and same speed.

$$\text{So, } \frac{30}{\frac{5S}{6}} - \frac{30}{S} = 8 \times \frac{1}{60} \Rightarrow S = 45 \text{ km/hr.}$$

Q87. Answer: C

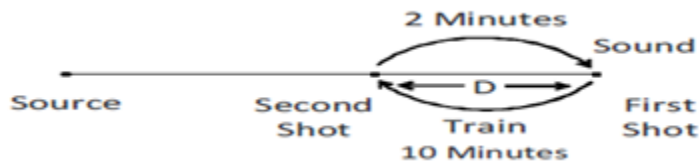
Explanation: Let, the speed of second lady be x km/hr. So, the speed of first lady be $(x+2)$ km/hr.

Time taken by first lady = $24/(x+2)$ and Time taken by second lady = $24/x$.

$$\text{Given, } (24/x) - [24/(x+2)] = 1 \Rightarrow x = 6 \text{ km/hr.}$$

Q88. Answer: A

Explanation: The distance D covered by the sound in 2 minutes and is covered by the person in 10 minutes is equal. We have,



$$\Rightarrow S_1/S_2 = T_1/T_2$$

$$\Rightarrow S_1 \cdot T_1 = S_2 \cdot T_2$$

$$\Rightarrow S_s \cdot T_s = S_m \cdot T_m$$

$$\Rightarrow 300 \cdot 2 = S_m \cdot 10$$

$$\Rightarrow S_m = 66 \text{ m/s.}$$

Q89. Answer: B

Explanation: Let the train be at a distance y from A. Let the length of the tunnel AB be $8x$. Therefore, the cat is at $3x$ from A.

Now both the conditions given in the questions assume same time scenario. Therefore, the ratio of the speeds of the cat and the train will be equal to the ratio of the distances traveled by them.

$$\text{Required ratio, } = y/3x = (y + 8x)/5x \Rightarrow y = 12.$$

$$\text{Therefore, ratio of the speed} = y/3x = 12x/3x = 4 : 1.$$

Q90. Answer: D

Explanation: Let they meet at a distance of Y from start, after time t of Rahul's start.

$$\text{According to the question, we have } \Rightarrow 40 \times (5+t) = 50t$$

$$\Rightarrow 200 + 40t = 50t \Rightarrow T = 200/10 = 20 \text{ minutes}$$

$$\Rightarrow Y = 50 \times t = 50 \times 20 = 1000 \text{ m.}$$

1000 m from the options it is evident that all options expect 1200 m are smaller than 1000 m and dog in any case has to move more than 1000 m.

Q91. Answer: D

Explanation: Total distance covered by dog is 1200 m. Dog must cover 1000 m in forward direction to reach the destination. We are left with 200 m extra distance covered by dog. So, dog covered half of them in forward direction and half in backward direction. It means 100 m more in forward direction. Hence, the total distance covered by dog in forward direction is 1100 m (1000+100).

Q92. Answer: B

Explanation: Speed of father = 125 m/min and speed of son = $(250/3)$ m/min.

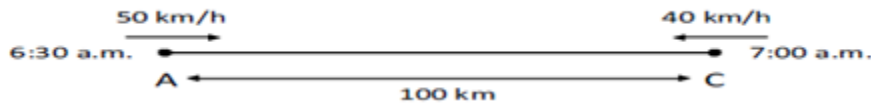
$$\text{Relative speed} = 125 - (250/3) = (125/2) \text{ m/min.}$$

$$\text{Time taken by father to overtake the son} = 1000 / (125/3) = 24 \text{ minutes.}$$

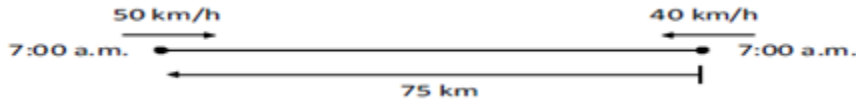
$$\text{So, son must have travelled} = 24 \times 250/3 = 2000 \text{ m.}$$

Q93. Answer: D

Explanation: From 6:30 to 7:00 i.e. for half hour, the train from Ahmadabad will move for half an hour and will cover a distance of $50 \times \frac{1}{2}$ i.e. 25 km.



Now, past 7:00 AM both the trains will move.



Now, both the trains are moving in the opposite direction. So, they will collide after $= 75 / (50 + 40) = 75 / 90 = 5/6$ hr = 50 minutes.

Q94. Answer: C

Explanation: In 45 minutes, train from A travels $= (3/4) \times 48 = 36$ km.

Distance remaining $= 232 - 36 = 196$ km.

Time for meeting $= 196 / (48 + 50) = 12$ hours.

So, train from A will travel $48 \times 2 = 96$ km more. Hence, they will meet $(96 + 36) = 132$ km from A.

Q95. Answer: D

Explanation: We have, $(d/3) + [(d-2)/6] = 13/6$

$$\Rightarrow 3d - 2 = 13 \quad \Rightarrow d = 5 \text{ km.}$$

Q96. Answer: C

Explanation: Let x km/minute be the velocity of flow and speed of boat in still water $= y$ km/minute

Let, after time $= t$ minutes it passes the raft

The travel time of raft is $(60 + t)$ minutes and the distance traveled is $(60 + t) \times x = 6$

$$\Rightarrow t = 6/x - 60$$

From the question, we have

$$\Rightarrow 60(x + y) - t(y - x) = 6$$

$$\Rightarrow 60x + 60y - (6/x - 60)(y - x) = 6$$

$$\Rightarrow 120y - 6y/x = 0 \quad \Rightarrow 20y = y/x$$

$$\Rightarrow x = 1/20 = (1/20) \text{ km/min} = 3 \text{ km/hr.}$$

CHAPTER 4 – DATA INTERPRETATION

Q1. Answer: D

Explanation: Average amount on interest= $(23.4+32.5+41.6+36.4+49.4)/5=36.66$ lakh.

Q2. Answer: C

Explanation: Total Bonus= $(3+2.52+3.84+3.68+3.96)=17$

Total amount of Salary= $(288+342+324+336+420)=1710$

Required %= $(17/1710)*100=0.99=1\%$ approx.

Q3. Answer: C

Explanation: Total expenditure in 1998= $(288+98+3+23.4+83)=495.4$

Total expenditure in 2002= $(420+142+3.96+49.4+98)=713.36$

Required %= $(495.4/713.36)*100=69\%$ approx.

Q4. Answer: A

Explanation: Total Expenditure in 2000= $(324+101+3.84+41.6+74)=544.44$ lakh.

Q5. Answer: B

Explanation: Total amount on Taxes= $(83+108+74+88+98)=451$

Total amount on Fuel and Transport= $(98+112+101+133+142)=586$

Required ratio= $451/586=0.76=10/13$ approx.

Q6. Answer: B

Explanation: Runs scored by Dheeru= $(72*3x)/100=2.16x$

Runs scored by Farhan= $(66*4x)/100=2.64x$

Required %= $[(2.64x-2.16x)/2.16x]*100 = 22\frac{2}{9}\%$.

Q7. Answer: C

Explanation: Total runs scored by Eeshan= $28*55=1540$

If last 3 matches are not considered, then his total runs= $25*46=1150$

Maximum possible run in 28th match= $1540-1150-126-127=137$.

Q8. Answer: D

Explanation: Let total runs scored is x. Total balls faced= $x-74$.

So, $129.6=[x/(x-74)]*100 \Rightarrow x=324$

Required average runs scored= $324/8=40.5$.

Q9. Answer: B

Explanation: Total runs scored by Cheeru= $(114*400)/100=456$

Total matches played= $456/38=12$

Runs scored by Farhan= $(66*400)/100=264$

So, total balls faced by Dheeru= $(264*24/72)*100=400$

Required difference= $400-288=112$.

Q10. Answer: C

Explanation: Number of matches played by Dheeru & Farhan together = $19 \times 6 - (8 + 20 + 12 + 28) = 46$

Maximum possible runs of Farhan = $(66 \times 150) / 100 = 99$

Matches played by him = $99 / 3 = 33$

So, required minimum number of matches played by Dheeru = $46 - 33 = 13$.

Q11. Answer: D

Explanation: Income in the year of 2008 by R = $(100/9) \times 18.9 \times (109/100) = \text{Rs. } 228.9 \text{ lakhs.}$

Q12. Answer: A

Explanation: Increase % = $[(14 - 10) / 10] \times 100 = 40 \%$.

Q13. Answer: A

Explanation: Total income of P in 2007 = $(100/7) \times 2.1 \times (107/100) = 32.1 \text{ lakhs.}$

So, Expenditure = $32.1 - 2.1 = 30 \text{ lakhs.}$

Q14. Answer: C

Explanation: Average % profit of company S = $1/6 \times [7 + 8 + 13 + 14 + 15 + 15] = 12\%$.

Q15. Answer: B

Explanation: Average % profit earned by all companies except Q in the year 2005

= $(1/5) \times [9 + 5 + 8 + 12 + 6] = 8\%$. So, Required difference = $10 - 8 = 2\%$.

Q16. Answer: C

Explanation: $(15000 \times 9) / (25000 \times 10) = x / 12500 \Rightarrow x = \$ 6750 \text{ mn}$

Required profit = $6750 + 8000 + 12500 = \$ 27250 \text{ mn.}$

Q17. Answer: B

Explanation: Given, $7000/8000 = P_{\text{Infosys}}/14000 \Rightarrow P_{\text{Infosys}} = \$ 12250 \text{ mn.}$

$P_{\text{TCS}} = 32375 - 12250 - 14000 = \$ 6125 \text{ mn}$

Let, investment of TCS in UK = x. We have, $\Rightarrow x/7000 = 6125/12250 \Rightarrow x = \$ 3500 \text{ mn.}$

Required Ratio = $3500 : 8000 = 7 : 16$.

Q18. Answer: A

Explanation:

TCS	:	Infosys	:	Accenture
-----	---	---------	---	-----------

Profit ->	(4000*5)	:	(5000*8)	:	(4500*6)
	20	:	40	:	27

$P_{\text{TCS}} = (20/87) \times 8700 = \$ 2000 \text{ mn.}$

$P_{\text{Infosys}} = (40/87) \times 8700 = \$ 4000 \text{ mn.}$

$P_{\text{Accenture}} = (27/87) \times 8700 = \$ 2700 \text{ mn.}$

Required % = $(2700/6000) \times 100 = 45\%$.

Short Cut-> Required value = $[27 / (40 + 20)] \times 100 = 45\%$.

Q19. Answer: C

Explanation: We have, $(x \times 4) / [(85000 - x) \times 6] = 20000 / 30000 \Rightarrow x = \$ 42500 \text{ mn.}$

$I_{\text{TCS}} = \$ 42500 \text{ mn}$ and $I_{\text{Infosys}} = \$ 42500 \text{ mn.}$

Let, required years are y.

$(42500 \times 6) / (17000 \times y) = 30000 / 40000 \Rightarrow y = 20 \text{ years.}$

Q20. Answer: D**Explanation:** $I_{\text{accenture}} = 30000 - 9000 - 10000 = \$ 11000 \text{ mn}$ $P_{\text{accenture}} = 18000 - 4500 - 6000 = \$ 7500 \text{ mn}.$ Required % = $[(11000 - 7500) / 11000] * 100 = 31.9/11\%$.**Q21. Answer: C****Explanation:** Average = $(2640 + 3720 + 2520 + 3360 + 3120 + 4320 + 5040 + 3120) / 8 = 3480$

Required ratio = 3 : 5.

Q22. Answer: D**Explanation:** Required value = $5040 / 3360 = 1.5$ times.**Q23. Answer: D****Explanation:** In 1998-99 and 1993-94 foreign exchange reserve decrease.In 1994-95, % increase = $[(3360 - 2520) / 2520] * 100 = 33.33\%$ In 1992-93, % increase = $[(3720 - 2640) / 2640] * 100 = 40.9\%$.**Q24. Answer: D****Explanation:** Required % = $(4320 / 3480) * 100 = 125\%$ approx.**Q25. Answer: C****Explanation:** % increase = $[(5040 - 2520) / 2520] * 100 = 100\%$.**Directions (Q26 to Q30):**Let, total discount in January is x. Then, total discount in April = $1.331x$. According to question, we have $\Rightarrow (30x/100) - (10/100) * 1.331x = 33.8 \Rightarrow 3x - 1.331x = 3338$ $x = 2000(\text{total discount in January}).$

Total discount in [February = 2200, March = 2420, April = 2662 and May = 2928.2].

Q26. Answer: A**Explanation:** According to new condition, we have $\Rightarrow (30x/100) - (10/100) * 1.728x = 333.8$. New, $x = 2624$ (approx).Required difference = $[(30/100) * 2624] - [(15/100) * (120/100) * 2624] = 787.2 - 472.32 = 315$ approx.**Q27. Answer: A****Explanation:** Marked price of S in May = 2928Selling price of S in May = $2928 - [(20/100) * 2928] = 2343$ Cost price of S in May = $2343 - 343 = 2000$ Cost price of T in February = $(2000/5) * 6 = 2400$.**Q28. Answer: C****Explanation:** Cost price of Q in April = $2662 - (25/100) * 2662 - 80 = 1716$ Profit of R in January = $(120/100) * (20/100) * 2420 = 580$ Cost price of R in January = $2000 - (30/100) * 2000 - 580 = 820$ Required percentage = $(896/820) * 100 = 109\%$ approx.**Q29. Answer: D****Explanation:** Profit percent of R in March = $[100\% + (25/4)\%]$ of $16\% = 17\%$

Let, cost price of R in March= x .

Then, $(117/100)x = 2420 - (16/100) \times 2420 \Rightarrow x = 1737$.

Required value $= 82 \times 295 = 24200$ approx.

Q30. Answer: A

Explanation: Cost price of Q in February $= [2200 - (25/100) \times 2200] \times [1 + (5/20)] = 1400$

Total cost price of 10 products $= 14000$

Required total selling price $= (120/100) \times 14000 = 16800$

New selling price per product $= 16800/8 = 2100$.

Q31. Answer: C

Explanation: Average number of females $= (2500 + 3000 + 3500 + 2500 + 2500)/5 = 2800$.

Q32. Answer: D

Explanation: Total males from organization Vaishali and Vashundhra $= 3000 + 4000 = 7000$

Total females from organization Vaishali, Vashundhra and Model Town $= 2500 + 3000 + 3500 = 9000$

Required Percentage $= (7000/9000) \times 100 = 78\%$ (approx).

Q33. Answer: D

Explanation: Total females from organization Vaishali, Vashundhra, Model Town and Ashok Nagar $= 2500 + 3000 + 3500 + 2500 = 11500$

Total males from organization Vaishali, Vashundhra, Model Town and Ashok Nagar $= 3000 + 4000 + 3000 + 2500 = 12500$

Required difference $= 12500 - 11500 = 1000$.

Q34. Answer: A

Explanation: Required ratio $= 3000/2500 = 6:5$

Q35. Answer: C

Explanation: Number of males in Vashundhra $= 4000$

Required Percentage $= (4000/16000) \times 100 = 25\%$.

Q36. Answer: A

Explanation: Students taking loan from UCO in 2009 $= 1000$

Defaulters (UCO) $= 23\%$ of $1000 = 230$ and Person taking loan from PNB in 2010 $= 2000$.

Defaulters (PNB) $= 20\%$ of $2000 = 400$.

Total desired defaulters $= 230 + 400 = 630$.

Q37. Answer: D

Explanation: Can say because number of students taking a loan from SBI in 2007 is unknown.

Q38. Answer: B

Explanation: From the graph it is clear that in 2009, difference between no. of students taking a loan is highest as compared to previous year.

Q39. Answer: D

Explanation: Number of students taking education loan from OBC bank all over the year

$= 1000 + 1000 + 1500 + 2000 + 1500 = 7000$

Total loan amount sanctioned over the years = $7000 \times 175000 = \text{Rs. } 1225000000$.

Q40. Answer: C

Explanation: SBI = 19000 and BOB = 19500

Total students taking loans in 2010 = 13500 and in 2011 = 14000.

Desired ratio = $(19000 + 19500) / (13500 + 14000) = 7 : 5$.

Q41. Answer: D

Explanation: In 1995, Total exports = $(40 + 60 + 120) = 220$.

In 1996, Total exports = $(60 + 70 + 90) = 220$.

Q42. Answer: D

Explanation: Total exports of Company Y = $(80 + 40 + 60 + 60 + 80 + 100 + 140) = 560$

Total exports of Company Z = $(60 + 90 + 120 + 90 + 60 + 80 + 100) = 600$

Required % = $(560 / 600) \times 100 = 93.33\%$.

Q43. Answer: C

Explanation: By looking into the graph, in 1996 the difference is Minimum.

Q44. Answer: C

Explanation: In 1993, average export = $(30 + 60 + 80) / 3 = 170 / 3$

In 1998, average exports = $(50 + 80 + 100) / 3 = 230 / 3$.

Required difference = $(230 / 3) - (170 / 3) = 20$.

Q45. Answer: C

Explanation: Total exports of company Z = 600. Average exports = $600 / 7 = 85.7$ approx.

Q46. Answer: D

Explanation: Percentage increase in profit of company Y in 2008 = $[(40 - 35) / 35] \times 100 = 14\%$ (approx).

Q47. Answer: A

Explanation: % increase in profit of company Z in 2005 = $[(40 - 35) / 35] \times 100 = 14.14 = 14\%$ approx.

Q48. Answer: D

Explanation: Required profit = $265000 \times (130 / 100) \times (140 / 100) = \text{Rs. } 482300$.

Q49. Answer: A

Explanation: Average % increase in profit of Z over the years = $(1 / 6) \times (20 + 35 + 40 + 45 + 50 + 55) = 40 \frac{5}{6}\%$.

Q50. Answer: D

Explanation: % increase in company Y in 2005 = $[(30 - 25) / 25] \times 100 = 20\%$

% increase in company Z in 2007 = $[(50 - 45) / 45] \times 100 = 100 / 9\%$

Required ratio = $20 / (100 / 9) = 9 : 5$.

Q51. Answer: B

Explanation: Average profit earned by three companies in 2008 = $(1 / 3) \times (350 + 400 + 450) = 400$.

Q52. Answer: D

Explanation: From the graph, in year 2007 the difference is Minimum.

Q53. Answer: D

Explanation: From the graph, the highest total profit is earned in 2009 = 400+425+475=1300.

Q54. Answer: A

Explanation: % increase in profit earned by A from 2006 to 2007 = $\frac{(375-275)}{275} \times 100 = 36\%$ approx.

Q55. Answer: C

Explanation: Required difference = (profit earned by A in 2004) - (profit earned by C in 2009)
= 400 - 300 = 100 crores.

Q56. Answer: C

Explanation: $I_{M\ 2009-10} = E_{M\ 2010-11} = I_{M\ 2010-11} / 1.4$

$I_{M\ 2009-10} : I_{M\ 2010-11} = 10 : 14 = 5 : 7$.

Q57. Answer: D

Explanation: Suppose in the year 2006-07 expenditure of company M is Rs. a. Then the profit earned by company M in this year = Rs. (10% of a).

Hence, income of company M = Rs. (110% of a)

Again, expenditure of company N in 2009-10 = Rs. $(a \times 110 / 100)$

Hence, profit earned by company N in 2009-10 = Rs. $(a \times 110 / 100) \times (60 / 100)$.

Thus, required ratio = $(10a / 100) / [(110a / 100) \times (60 / 100)] = 5 : 33$.

Q58. Answer: D

Explanation: The given graph depicts only the percent profit earned by the two companies over the given years. Hence, these information are insufficient to answer the question.

Q59. Answer: C

Explanation: In 2010-11, profit earned by Company N was 70 %. Therefore, 170% of expenditure is Rs. 119 crores. Thus, required expenditure = $(119 / 170) \times 100 =$ Rs. 70 crores.

Q60. Answer: C

Explanation: Percent increase in % profit over that of the previous year for the given years is as follow:

2006-07: $\frac{(30-25)}{25} \times 100 = 20\%$

2007-08: $\frac{(40-30)}{30} \times 100 = 33.33\%$

2008-09: $\frac{(20-40)}{40} \times 100 = -50\%$

2009-10: $\frac{(60-20)}{20} \times 100 = 200\%$

2010-11: $\frac{(70-60)}{60} \times 100 = 16.66\%$.

Q61. Answer: C

Explanation: Printing cost is 20% of total amount = 30600. So, Total amount = 153000.

Amount on Royalty = 15% of total amount = $(15 / 100) \times 153000 =$ Rs. 22950.

Q62. Answer: C

Explanation: $100\% = 360^\circ \Rightarrow 1\% = 3.6^\circ$. So, $15\% = 15 \times 3.6 = 54^\circ$.

Q63. Answer: B

Explanation: Given, $MP=120\%$ of $CP \Rightarrow CP=180*100/120=150$.

Cost of paper used= 25% of $150=(25/100)*150=Rs. 37.50$.

Q64. Answer: A

Explanation: Transportation cost is 10% of total amount= $82500 \Rightarrow$ total amount= 825000 .

One copy cost= $825000/5500=150$.

Selling price= 120% of $CP=(120/100)*150=Rs. 187.50$.

Q65. Answer: D

Explanation: Required $\%=[(20-15)/20] * 100=25\%$.

Q66. Answer: A

Explanation: Required Ratio= $(8+9)/(15+18) = 17:33$.

Q67. Answer: D

Explanation: Here, do not find the ratio of number of qualified candidate that of the appeared. Simply check the ratio of $\%$ qualified candidates with respect to appeared is the least for which state, i.e., G.

Q68. Answer: D

Explanation: Difference is= $(21-13) \%$ of $9000=720$.

Q69. Answer: B

Explanation: Required $\% = [(16+7)\% \text{ of } 9000 / (11+8)\% \text{ of } 45000] * 100=24.21\%$.

Q70. Answer: C

Explanation: $(16+21)\% \text{ of } 9000 : 8\% \text{ of } 45000 = 37 : 40$.

Q71. Answer: A

Explanation: Required difference = $(\% \text{ of fund acquire from (NGO -internal sources) of } 500 \text{ lakh}) = (15-5)\% \text{ of } 500=Rs. 50 \text{ lakh}$.

Q72. Answer: D

Explanation: Fund from government agencies= $(500*45)/100=Rs. 225 \text{ lakh}$

Expenses in school maintenance= $(500*20)/100=Rs. 100 \text{ lakh}$

Remaining found= $225-100=Rs. 125 \text{ lakh}$.

Q73. Answer: A

Explanation: Funds from donation= $(500*35)/100=Rs. 175 \text{ lakh}$

Scholarship amount= $(15*500)/100=Rs. 75 \text{ lakh}$

Required percentage= $(75/175)*100=42.85\%=43\% \text{ approx}$.

Q74. Answer: C

Explanation: Total amount used by the school for payment= $(500*30)/100 = Rs. 150 \text{ lakh}$.

Q75. Answer: C

Explanation: Fund acquired from government agencies= $(500*45)/100=Rs. 225 \text{ lakh}$.

Q76. Answer: A

Explanation: Let total income in 2010 and 2013 is $5x$ and $7x$.

Saving of B in 2010 = $(20/100) * (5x/100) * 6 = 6x/100$

Income of E in 2013 = $(4/5) * (5x/100) * 21 = 7x/5$

Saving of E in 2013 = $(2/5) * (7x/5) = 14x/25$

Required % = $[(6x/100) / (14x/25)] * 100 = 75/7 \%$.

Q77. Answer: C

Explanation: Given, $7 - 5 \rightarrow D$. So, $1 \rightarrow D/2$.

Total income of all firm in 2010 = $5D/2$

Total income of all firm in 2013 = $7D/2$

Average of income of firm A, B and E in 2010 = $(5D * 37) / (2 * 100 * 3)$

Average of income of firm B, C and D together in 2013 = $(7D * 18) / (2 * 100 * 3)$

Required ratio = 185 : 126.

Q78. Answer: C

Explanation: Income of firm E in 2013 = $(4/7) * (5x/100) * 21 = 3x/5$

% income of E in 2013 = $[(3x/5) / 7x] * 100 = 60/7 \%$

% income of firm F and G together = $[100 - (11 + 4 + 8 + 6 + (60/7))] = 437/7 \%$

% income of firm F in 2013 = $(437/7) * (11/19) = 253/7 \%$.

Q79. Answer: A

Explanation: Income of A, B and E together in 2010 = $37 * 5x/100 = 185x/100$

Income of e in 2013 = $(3/2) * (5x/100) * 10 = 3x/4$

Income of C, D and E together in 2013 = $(7x/100) * 14 + (3x/4) = 173x/100$.

Required % = $\{[(185x/100) - (173x/100)] / (173x/100)\} * 100 = 7\% \text{ approx.}$

Q80. Answer: D

Explanation: Income of firm A and B in 2013 = $(7 * x/100) * 15 = (105 * x)/100$

Income of firm A and B in 2012 = $(106/100) * (100/120) * x = (7 * x)/8$

Income of firm A and B in 2010 = $(5 * x/100) * 14 = (7 * x)/10$

Required % = $\{[7x/8 - 7x/10] / (7x/10)\} * 100 = 25\% \text{ increase.}$

Q81. Answer: D

Explanation: Data are insufficient.

Q82. Answer: B

Explanation: Ratio of number of coconut trees and lemon trees = 5 : 1. Therefore, the number of coconut trees is 500. Since, revenue generated from coconut trees is Rs. 180000. Hence, value per tree = $180000/500 = \text{Rs. } 360$.

Q83. Answer: A

Explanation: Since, revenue of Rs. 300000 is equally divided by Gopal and Ram. Hence, amount received by Gopal in 1997 = $(1/2) * 300000 = \text{Rs. } 150000$.

Q84. Answer: A

Explanation: The value of lemon output per acre of land = $120000/5 = 0.24 \text{ lakh/acre.}$

Q85. Answer: B

Explanation: Let the amount invested by Gopal and Ram be $2x$ and $3x$ respectively. Gopal further invested Rs. 2 lakh. According to question, we have $(2x+2=3x)$ or $x=2$ lakh.

Hence, initial amount paid by Gopal and Ram to Krishna is 4 lakh and 6 lakh respectively. Total money invested by them together $= (4+6) = 10$ lakh.

The total revenue generated $= 10 \times 25\% = 2.5$ lakh.

Also, the ratio of revenue from coconut and lemon trees in the ratio 3 : 2.

Hence, revenue from coconut = Rs. 180000 and revenue from lemons = Rs. 120000.

So, total output of coconut $= 180000 / 5 = 36000$.

Directions (Q86 to Q70):

	Monday	Tuesday	Wednesday	Thursday	Friday
Tata	180	150	250	150	180
Renault	160	220	200	180	140
Maruti	200	200	300	250	200
Total	540	570	750	580	520

Q86. Answer: B

Explanation: By given data, $540/750 = 18 : 25$.

Q87. Answer: A

Explanation: Total number of car produced by Renault from Monday to Friday = 900.

Q88. Answer: D

Explanation: Required Average $= 1150/5 = 230$.

Q89. Answer: C

Explanation: Maximum number of cars produced on Wednesday = 750.

Q90. Answer: C

Explanation: Number of cars produced on Tuesday and Thursday is same, i.e. 150.

Q91. Answer: B

Explanation: Total sale of cars in West Bengal $= (58/100) \times 20 = 11600$

Total sale of Tata car in Goa $= 58 \times (9/100) = 5220$.

Required difference $= 11600 - 5220 = 6380$.

Q92. Answer: D

Explanation: Sales of Tata cars in Punjab $= (58/100) \times 14 = 8120$.

Increase in volume $= 15000 - 8120 = 6880$

% increase $= (6880/58000) \times 100 = 12\%$ approx.

Q93. Answer: C

Explanation: Total sale of Tata in 2016 $= (112/100) \times 58000 = 64960$

New total sale in Maharashtra $= (134/100) \times (10/100) \times 58000 = 7772$

New total sale in M.P. $= (122/100) \times (22/100) \times 58000 = 15567$

Total new sale in these states=23339

Previous overall sale in all stat except M.P. and Maharashtra= $(58/100)*58000=33640$

Required increase in sale in other states= $(64960-23339)-33640=7981=8000$ approx.

Q94. Answer: D

Explanation: Required %= $(101/58) * 100=175\%$ approx.

Q95. Answer: A

Explanation: Net total sale= $(120/100)*199000=238800$

New sale of Tata in West Bengal= $(110/100)*(20/100)*58000=12760$

New total sale of Tata= $(12760/20)*100=63800$

Required total sale= $238800-63800=175000$.

Q96. Answer: D

Explanation: Number of men working in Marketing department= $(7/12)*1800*(18/100)=189$.

Q97. Answer: D

Explanation: Women in IT department= $(4/9)*1800*(23/100)=184$.

Required percentage= $(184/1800)*100=10.22=10\%$ approx.

Q98. Answer: A

Explanation: No. of women working in HR department= $(3/4)*1800*(14/100)=189$.

Total employees in that department= $(14/100)*1800=252$.

Required ratio= $189/252= 3 : 4$.

Q99. Answer: C

Explanation: Required ratio= $[(2/9)*1800*(17/100)] / [(17/100)*1800] = 2 : 9$.

Q100. Answer: B

Explanation: Men working in Production department= $(11/12)*1800*(28/100)=462$

Total employees in Production department= $(28/100)*1800=504$

Required %= $(462/504)*100=91.67\%$.

Q101. Answer: C

Explanation: Total no. of mobiles sold in the month of July= $45000*(17/100)=7650$

Mobiles sold by company B in the month of July= $7650*(7/15)=3570$

Total no. of mobiles sold in the month of December= $45000*(16/100)=7200$

Mobiles sold by company B in the month of December= $7200*(9/16)=4050$

Required ratio= $3570/4050= 119 : 135$.

Q102. Answer: C

Explanation: No. of mobile phones sold in the month of November= $45000*(12/100)=5400$

No. of mobile phones sold by company A in the month of November= $5400*(7/15)=2520$

No. of mobile phones sold without discount in the month of November by

Company A= $2520*65/100=1638$.

Q103. Answer: D

Explanation: No. of mobile phones sold in the month of October= $45000*8/100=3600$

No. of mobile phones sold by company B in the month of October= $3600 \times 5/12 = 1500$
Total profit earned by company B in the month of October= $1500 \times 433 = 649500$.

Q104. Answer: D

Explanation: No. of mobile phones sold in the month of July= $45000 \times (17/100) = 7650$
No. of mobile phones sold by company A in the month of July= $7650 \times (8/15) = 4080$
No. of mobile phones sold in the month of December= $45000 \times (16/100) = 7200$
No. of mobile phones sold by company A in the month of December= $7200 \times (7/16) = 3150$
Required %= $(4080/3150) \times 100 = 130\%$ approx.

Q105. Answer: A

Explanation: No. of mobiles sold in month of August= $(22/100) \times 45000 = 9900$
No. of mobiles sold in month of September= $(25/100) \times 45000 = 11250$
No. of mobile phones sold by company B in the month of August= $9900 \times (5/9) = 5500$
No. of mobile phones sold by company B in the month of September= $11250 \times (2/5) = 4500$
Total No. of mobile phones sold by company B in the month of August and September= $5500 + 4500 = 10000$.

Q106. Answer: D

Explanation: No. of boys in school R and U together= $(2000 \times 72.5/100) + (1000 \times 82.5/100) = 2275$
Required ratio= $(2275/3000) \times 100 = 75.83\%$.

Q107. Answer: C

Explanation: Number of boys in school T= $(1250 \times 60)/100 = 750$.

Q108. Answer: A

Explanation: Total number of students in school R=2000 and in School S=2250.
Required percentage= $(2000/2250) \times 100 = 89\%$ approx.

Q109. Answer: B

Explanation: Required average= $(1/2) \times [(2500 \times 60/100) + (3000 \times 55/100)] = 1575$.

Q110. Answer: C

Explanation: Required ratio= $(2500 \times 40/100) : (3000 \times 45/100) = 100 : 135 = 20 : 27$.

CHAPTER 5 – DATA SUFFICIENCY

Q1. Answer: E	Q2. Answer: D	Q3. Answer: E
Q4. Answer: E	Q5. Answer: C	Q6. Answer: E
Q7. Answer: B	Q8. Answer: A	Q9. Answer: C
Q10. Answer: D	Q11. Answer: B	Q12. Answer: C
Q13. Answer: A	Q14. Answer: D	Q15. Answer: D
Q16. Answer: C	Q17. Answer: E	Q18. Answer: D
Q19. Answer: E	Q20. Answer: C	Q21. Answer: D
Q22. Answer: D	Q23. Answer: C	Q24. Answer: E
Q25. Answer: B		

Q26. Answer:

Explanation: Following the steps mentioned earlier, we see that statement I is not sufficient to answer the question as from statement I; we get 2 values of x as -8 and $+8$.

Statement B is sufficient as we get $x = 8$.

As this is a unique solution, so the answer is 2nd option II alone.

Q27. Answer:

Explanation: If we follow the steps of solving a Data Sufficiency question, from statement I; we get the value of x as 8 . This statement is sufficient to answer the question as we are getting a unique answer as "No". Also from statement II; we get the value of x as 4 . This statement is also sufficient to answer the question as we are getting a unique answer as "No". Since, we are getting unique answers from both statements individually, so the answer is I alone and II alone.

Q28. Answer: E

Explanation: From II, we conclude that in a class of 40, Deepak ranks 23rd from the bottom i.e. 18th from the top.

From I and II, we find that Suman is 3 ranks below 18th rank from the top i.e. she ranks 21st from the top.

From II and III, we find that Suman is 3 ranks above 23rd rank from the bottom, i.e. she ranks 20th from the bottom or 21st from the top.

Q29. Answer: D

Explanation: From I, the order is : E, B, C or C, B, E.

From II, the order is : E, B.

From III, the order is : A, D, E.

Combining the above three, we get the order as : A, D, E, B, C. Clearly, E is sitting in the middle.

Q30. Answer: D

Explanation: From II, we know that Copal's brother was born in 1982.

From III, we find that Gopal's brother was 8 years younger to him i.e. Gopal was born in 1974.

From I, we find that Sanjay is 6 years older than Gopal. Thus, Sanjay was born in 1968.

Q31. Answer: B

Explanation: From the given statement, the descending order of heights is : __, Q, __, S, __.

From II, we have the order: __, Q, R, S, __. Thus, R is in the middle.

From III, we have the order : P, Q, __, S, __. But, according to I, T is not the shortest.

So, R is the shortest. Thus, we have the order : P, Q, T, S, R. So, T is in the middle.

Q32. Answer: E

Explanation: From I and II, we conclude that Mathematics period began at 9.00 a.m., Biology period began at 8.00 a.m. and Physics period began at 11 a.m. So, the Chemistry period began at 10.00 a.m.

From I and III, we conclude that Mathematics period ended and Chemistry period began at 10.00 a.m.

Q33. Answer: E

Explanation: From III, we have: Rajan's basic salary = Rs. 1550.

From I, we have: Vasu's basic salary = Rs. $(1550 + 100)$ = Rs. 1650.

From II, we have: Rajan's other allowances = Rs. 2000 and Vasu's other allowances = Rs. 2050.

Therefore Vasu's monthly salary = Rs. $(1650 + 2050)$ = Rs. 3700.

Q34. Answer: A

Explanation:

From I, we have: $P > D$, $P > N$, $T > P$ i.e. $T > P > D > N$ or $T > P > N > D$...(i)

From II, we have: $R > Q$, $T > R$ i.e. $T > R > Q$...(ii)

From III, we have: $T > Q$, $R > Q$...(iii)

Clearly, from (i) and (ii), we conclude that T is taller than each one of P, N, D, R and Q. So, T is the tallest.

Q35. Answer: D

Explanation: From I, we conclude that the girl is either Kunal's or his brother's wife. But, according to II, Kunal has no siblings.

So, from both I and II, we conclude that the girl is Kunal's wife.

From III, we find that the girl is the only daughter-in-law of Kunal's mother i.e. she is Kunal's wife.

Q36. Answer: D

Explanation: From I, II and III, we conclude that all P, Q, R, T and U are children of X. Of these, Q and U are male while R and T are female. But the sex of P cannot be determined.

Q37. Answer: C

Explanation: We know that if distance is constant, we can use: $S_1 \cdot T_1 = S_2 \cdot T_2$.

From I- Normal speed is x m/s, then new speed is $1.2x$ m/s. Normal time is t sec and new time is $(t+20)$ sec. We can find x by using above equation. Hence, I alone is sufficient.

Similarly, from II and III alone we get the speed of Rohit.

Q38. Answer: E

Explanation: Let the number of students are x .

From I- we have 24 students.

From II- total weight of students and professor = $(x+1) \cdot 64 = 1600$.

From II- $[\text{Total weight of (professor + x)} / (x+1)] - (\text{total weight of student} / x) = 2$

By using all three we get the weight of professor.

Q39. Answer: A

Explanation: Profit percentage=25%.

From I- He sells 12 phones. So, we have only numbers from first statements.

From II- $SP=1500$, by using profit % we get CP.

From III- only discount is given.

From I and II, we get the total profit = $12 \times$ profit on selling one phone.

Q40. Answer: C

Explanation: Given that, profit=Rs. 90 and discount=20%.

From I- $MP=2CP$. We know that, $CP=SP-\text{profit}=SP-90$.

And also $SP=MP \times (100-D\%)/100 = 2CP \times 80/100 = 1.6CP$

$\Rightarrow CP=1.6CP-90 \quad \Rightarrow 0.6CP=90 \quad \Rightarrow CP=90/0.6=150$.

From II- profit=20% and discount=40%.

$SP=0.6MP$