

MBA PIONEER 2024

QUANTITATIVE APTITUDE

DPP: 13

Work Rate and Time - 2

- Q1** 9 men and 6 women can complete a work in 30 days while 6 men and 5 women can complete a work in 40 days. In how many days 4 women can complete the total work?
- Q2** 8 men and 8 women together can complete a piece of work in 8 days. In how many days (rounded off to nearest integer) can 20 men alone complete the same work if 12 women alone can complete it in 14 days?
- Q3** Mangal can complete a project work in 20 days, Shinu is 25% more efficient than Mangal. If Konda can do the work in 14 more days than Shinu, in how many days can Mangal and Konda do the whole work together?
- Q4** Two miners Akshay and Rajiv can dig a well in 20 days and 25 days respectively and a third person Bhavan can fill that well in 30 days. All of the three miners start their work and after sometime Bhavan leaves the work. If the total time taken to dig the well from the beginning is 12 days, find after how many days Bhavan left his work?
- Q5** Rajat can do a piece of work in 25 days and Rakhil can do the $\frac{1}{5}$ th of the same work in 6 days. In how many days together they can complete the $\frac{22}{25}$ th of the total work?
- (A) 10 days (B) 12 days
(C) 20 days (D) 22 days

Q6

Pipes A and C can fill a tank in 60 hours and 36 hours, respectively, while pipe B can empty it in 90 hours. In an empty tank, A and C are open for 12 hours then B and C are open for 5 hours. If 276 liters of the tank is empty, what is the total capacity (in liters) of the tank?

- (A) 960 (B) 840
(C) 480 (D) 720

Q7 Vikram and Dhanush can make a furniture in 9 days and 16 days (respectively) more than the time taken if both of them worked together. Find the time (in days) in which Vikram can make the furniture alone.

Q8 90 Men were employed to complete a project in 190 days. After 70 days it was found that only $\frac{1}{3}$ rd of the project was done. How many more men must be employed to finish the project in the stipulated time?

Q9 A cistern can be filled by two pipes in 35 min. and 40 min. respectively. Another pipe can empty the cistern in 20 min. Initially, the first two pipes are opened. After 5 min, the third is also opened. In how much time from now, the cistern is full?

- (A) 200 min (B) 205 min
(C) 210 min (D) 215 min

Q10 Indra can do a piece of work in 18 days. Meghnad can do the same work in 24 days and Karn in 36 days. Indra and Karn worked for 6 days and handed it to Meghnad. Meghnad



worked for some days and handed it again to Indra and Karn 4 days before completing the work. For how many days did Meghnad work?

- Q11** Laxman can do a piece of work in 24 days and Ram can do it in 10 days. On which date will they complete the work, if they work together on prime number dates starting 31st May?
 (A) 7th June (B) 17th June
 (C) 13th June (D) 23rd June
- Q12** Sheila, Rimi, and Jeena can complete a work in 24, 15 and 30 days respectively. They started the work together, but Sheila left the work 3 days before the end of work. Again, after 2 days, Rimi left the work. Then in how many days the total work got completed?
 (A) $8\frac{7}{17}$ days
 (B) $10\frac{7}{17}$ days
 (C) $12\frac{7}{17}$ days
 (D) $14\frac{7}{17}$ days
- Q13** Ratul can complete a project work in 20 days and Rajat can complete the same work in 30 days. Rajat starts the work alone and works for 10 days and left the work. After that remaining work completed by Ratul and Ratan together in $7\frac{7}{9}$ days. In how many days can Ratan complete the whole work alone?
- Q14** Ajay works twice as good as Manu. Ajay is able to finish a job in 80 days less than Manu. If they work together on this job, how many days will it take?
 (A) $23\frac{1}{3}$
 (B) $33\frac{1}{3}$
 (C) $43\frac{1}{3}$
 (D) $53\frac{1}{3}$
- Q15** Pipe A can fill a tank in 50 minutes, while pipe B alone can fill it in 75 minutes and pipe C can

empty the full tank in 1 hour. If all the pipes are opened together and pipe B is closed 12 minutes before the tank is filled, then how much time will be needed to make the tank full?

- (A) 68 minutes (B) 69.6 minutes
 (C) 72 minutes (D) 78 minutes
- Q16** A swimming pool can be filled by an inlet pipe in 8 hours, but due to the faulty drainage system, out of total water filled per hour, 20% is drained off at the end of every hour till the pool is completely filled, then find the number of hours in which pool will be filled completely.
 (A) 9 hr 12 min (B) 9 hr 24 min
 (C) 9 hr 36 min (D) 9 hr 48 min
- Q17** 28 men can do a work in 90 days while working 3 hours a day. 36 men can do the same work in $(3X+6)$ days while working 5 hours a day. In how many days will X men complete the whole work while working 4 hours a day?
 (A) 143.5 days (B) 161.5 days
 (C) 157.5 days (D) 139.5 days
- Q18** The work done by a woman in 6 hours is equal to the work done by a man in 4 hours and by a boy in 9 hours. If working 7 hours per day, 8 men can complete a work in 7 days, then in how many days 12 women, 10 men and 18 boys together finish the same work working 10 hours per day?
 (A) $1\frac{1}{2}$ days
 (B) $1\frac{5}{31}$ days
 (C) $1\frac{33}{65}$ days
 (D) 2 days
- Q19** A tank can be filled by 3 pipes in 12, 15, and 18 hours respectively. All the 3 pipes are opened at the same time and it gets noticed that for a leakage in the bottom of the tank, it takes 69



minutes extra for the tank to be filled up. Now, if the tank is full, in how much time approximately will the leak alone empty it?

- (A) 29 hrs (B) 27 hrs.
(C) 25.7 hrs (D) 23.8 hrs

Q20 The time taken by 4 men to finish a project work is double the time taken by 6 children to finish the same work. Each man is thrice as fast as a woman. How much time (in days) it takes to finish the work by 12 men, 14 children, and 12 women while a child can finish the work in 26 days?

Q21 Ajay, Maria, and Neeraj can complete a work in 36, 54 and 18 days respectively. In how many days can Maria complete the work if she is helped by Ajay and Neeraj on every fourth day?

- (A) 24
(B) 27
(C) $31\frac{8}{15}$
(D) $28\frac{5}{7}$

Q22 X can do as much work in 2 days as Y can do in 3 days and Y can do as much in 4 days as Z in 5 days. If X, Y, and Z all work together, a specific work takes 20 days to accomplish. How long would Y take to do that specific work by himself?

- (A) 46 days (B) 56 days
(C) 66 days (D) 76 days

Q23 There are three pipes A, B, and C that can fill a tank in 7, 8, and 9 hours respectively. The tank has a hole that can empty it in 12 hours. At the beginning, the tank is empty. Pipes A and B are turned on together and turned off after 30 minutes. Then, pipe C is turned on and left on for the next hour. Determine the approximate total time needed to fill the tank if all three pipes are turned on at the same time, but after

1.5 hours of running the three pipes (as given). Assume that the hole in the tank was effective during the complete time period.

- (A) 4.11 hours (B) 3.64 hours
(C) 3.11 hours (D) 4.48 hours

Q24 A can do $\frac{4}{5}$ th of work in 20 days. Efficiency of B is 30% more than that of A. Both A and B started working together and left the work after ten days. C completed the remaining work in 4 days. Efficiency of C is what percent more/less than that of A?

- (A) 25% less (B) 50% more
(C) 25% more (D) 50% less

Q25 There are 4 machines that make accelerators for a car factory. The fastest machine can make one accelerator in 2 hours. The slowest machine makes one accelerator in 3 hours. Which of the following cannot be the value of the average time taken by the 4 machines to make an accelerator each?

- (A) 2.2 (B) 2.3
(C) 2.6 (D) 2.68

Q26 Bikram takes 25% more days than Virat to complete the work, when they work alone. To complete $\frac{1}{4}$ th of work, Bikram alone works. Bikram and Virat work together to complete $\frac{1}{2}$ th of the work. Remaining work gets completed by Virat in 4 days. In how many days the total work gets completed?

- (A) 36 days
(B) $13\frac{4}{9}$ days
(C) 24 days
(D) $17\frac{3}{10}$ days

Q27 Two pipes A and B are attached to cistern which has 4800 cubic meter capacity and pipe A is inlet and pipe B is outlet. The rate of flow of



water in pipe B is 25 cubic meter/ min more than that of pipe A and time taken by pipe B to empty the cistern is 16 minutes less than the time taken by pipe A to fill it, then what is the rate of flow of water in pipe A?

- (A) $72 \text{ m}^3/\text{min}$ (B) $84 \text{ m}^3/\text{min}$
(C) $75 \text{ m}^3/\text{min}$ (D) $70 \text{ m}^3/\text{min}$

Q28 Pipe P, Q & R can fill water in a tank in 20 min, 30 min and 60 min respectively. Pipe A, B & C can empty the tank in 30 min, 40 min and 120 min respectively. The inlet pipes and the outlet pipes are put in "On" and "Off" mode in every alternate minute. In the first minute pipes P, Q & R are opened and in the second minute A, B & C are opened when pipes P, Q & R are closed. Again, in the 3rd minute P, Q, R are opened and A, B & C are closed. This went on till the tank is filled with water completely. When (in minutes) the tank will be filled? [Write the closest integer if the answer is in fraction]

- (A) 50 (B) 55
(C) 60 (D) 65

Q29 Sigmund takes 4 days more than the time taken by Freud and himself together to complete a piece of work. Freud takes 16 days more than the time taken by Sigmund and himself together to complete a piece of work. If they had started working together and had worked for 5 days before Sigmund leaves, find the time taken by Freud to complete all the work alone.

- (A) 18 days (B) 36 days
(C) 28 days (D) 24 days

Q30 Bunny is thrice as efficient as Sunny, and Munny is 75% more efficient than Bunny. Bunny, Sunny and Munny together can complete the work in $126/74$ days. Find the difference between times taken to complete the work by Bunny and

Munny together and Sunny and Munny together?

- (A) $\frac{72}{255}$ days
(B) $\frac{81}{275}$ days
(C) $\frac{168}{275}$ days
(D) $\frac{94}{275}$ days



Answer Key

Q1 90
Q2 5
Q3 12
Q4 2.4
Q5 (B)
Q6 (D)
Q7 21
Q8 15
Q9 (B)
Q10 4
Q11 (B)
Q12 (A)
Q13 28
Q14 (D)
Q15 (B)

Q16 (D)
Q17 (C)
Q18 (C)
Q19 (C)
Q20 1
Q21 (B)
Q22 (C)
Q23 (D)
Q24 (D)
Q25 (A)
Q26 (B)
Q27 (C)
Q28 (B)
Q29 (D)
Q30 (C)



Hints & Solutions

Q1 Text Solution:

Topic - Time and Work

According to question,

Total work done by 9 men and 6 women in 30 days = (9 men + 6 women) × 30

Similarly, total work done by 6 men and 5 women in 40 days = (6 men + 5 women) × 40

Work done is same, so,

$$(9 \text{ men} + 6 \text{ women}) \times 30 = (6 \text{ men} + 5 \text{ women}) \times 40$$

$$\Rightarrow 270 \text{ men} + 180 \text{ women} = 240 \text{ men} + 200 \text{ women}$$

$$30 \text{ men} = 20 \text{ women}$$

$$\Rightarrow \text{Efficiency of 1 man} = \frac{2}{3} \times \text{Efficiency of 1 woman}$$

As 9 men and 6 women can complete a work in 30 days

$$9 \text{ men and 6 women} = 6 \text{ women} + 6 \text{ women} = 12 \text{ women}$$

Time taken by 12 women to do the work = 30 days

$$\text{Time taken by 1 woman} = (30 \times 12) \text{ days} = 360 \text{ days}$$

$$\text{Thus, Time taken by 4 women} = \frac{360}{4} \text{ days} = 90 \text{ days}$$

Q2 Text Solution:

Topic - Time and Work

12 women can complete the work in 14 days.

$$\therefore 8 \text{ women can complete the work in } \frac{14 \times 12}{8} = 21 \text{ days}$$

8 women in 21 days complete 1 unit.

8 women in 1 day complete $\frac{1}{21}$ part

8 women in 8 days complete $\frac{8}{21}$ part

Therefore, the remaining part = $(1 - \frac{8}{21}) = \frac{13}{21}$ part of the work will be completed by 8 men in 8 days.

$$\text{So, 8 men's work in 1 day} = \frac{13}{(21 \times 8)} = \frac{13}{168} \text{ th part}$$

Thus, 8 men can complete the work in $\frac{168}{13}$ days.

$$20 \text{ men can complete the work in } \frac{8 \times \frac{168}{13}}{20} = 5 \text{ days (approx.)}$$

Q3 Text Solution:

Topic - Time and Work

Ratio of the efficiency of Mangal and Shinu = 100 : 125 = 4:5

Ratio between the time taken by Mangal and Shinu = $\frac{1}{4} : \frac{1}{5} = 5:4$

If Mangal can do the work in 20 days, then Shinu can do the same work in $\frac{20}{5} \times 4 = 16$ days

Konda can do the same work in 16 + 14 = 30 days

Mangal and Konda together can do the same work in

$$= \frac{1}{\frac{1}{20} + \frac{1}{30}}$$

$$= \frac{1}{\frac{1}{12}}$$

$$= 12 \text{ days}$$

Q4 Text Solution:

Topic - Time and Work

Let total work is LCM of 20, 25 and 30 days = 300 units

1 day work of Akshya, Rajiv and Bhavan is $\frac{300}{20} = 15$ units, $\frac{300}{25} = 12$ units and $\frac{300}{30} = 10$ units. But the nature of work of Bhavan is opposite to that of Akshay and Rajiv.

Let Bhavan work for 'x' days and remaining days in which only Akshay and Rajiv work is (12 - x) days.

According to question,

$$\Rightarrow x \times (15 + 12 - 10) + (12 - x) \times (15 + 12) = 300$$

$$\Rightarrow 17x + 27(12 - x) = 300$$

$$\Rightarrow 17x + 324 - 27x = 300$$



$$\Rightarrow 10x = 24$$

$$\Rightarrow x = 2.4 \text{ days}$$

Hence, Bhavan left the work after 2.4 days.

Q5 Text Solution:

Topic - Time and Work

Rajat can do the work in 25 days.

In one day, Rajat can do $\frac{1}{25}$ th of the work.

Rakhil can do the $\frac{1}{5}$ th of the work in 6 days, so he can complete the whole work in $= 5 \times 6 = 30$ days.

In one day, Rakhil can do $\frac{1}{30}$ th of the work.

In one day, Rajat and Rakhil together can do the $(\frac{1}{25} + \frac{1}{30})$ th work

$$= \frac{1}{25} + \frac{1}{30}$$

$$= \frac{6+5}{150}$$

$$= \frac{11}{150} \text{th work.}$$

$\frac{11}{150}$ th work is done in 1 day

$\frac{22}{25}$ work is done in $\frac{150}{11} \times \frac{22}{25} = 12$ days.

Option (B) is correct.

Q6 Text Solution:

Topic - Time and Work

Let the tank capacity be 180p

Dividing the capacity of the tank by the time taken, we have,

Efficiency of A = 3p

Similarly Efficiency of B = -2p (negative work)

Similarly Efficiency of C = 5p

Tank filled = $(A + C) \times 12 + (B + C) \times 5 = (3p + 5p) \times$

$$12 + (5p - 2p) \times 5 = 111p$$

Remaining tank capacity = $180p - 111p = 69p$

$$69p = 276$$

$$p = 4$$

Total tank capacity = $180p = 180 \times 4 = 720$ liters

Hence, option d is the correct answer.

Q7 Text Solution:

Topic - Time and Work

Let the time both together take to make the furniture be x days.

Time taken by Vikram alone = $x + 9$ days

Time taken by Dhanush alone = $x + 16$ days

One day's work when they both work together =

Sum of their individual per day work.

$$\frac{1}{x} = \frac{1}{x+16} + \frac{1}{x+9}$$

$$(x+9)(x+16) = x(x+9) + x(x+16)$$

$$\Rightarrow x^2 + 25x + 144 = 2x^2 + 25x$$

$$\Rightarrow x^2 = 144$$

$$x = 12, -12$$

But x cannot be negative, so $x = 12$.

Time taken by Vikram to make furniture alone = $12 + 9 = 21$ days

Q8 Text Solution:

Topic - Time and Work

Let total 'a' men finish the project in stipulated time.

By product constancy,

$$\frac{M_1 \times D_1}{W_1} = \frac{M_2 \times D_2}{W_2}$$

$$\frac{90 \times 70}{\frac{1}{3}} = \frac{a \times (190-70)}{1 - \frac{1}{3}}$$

$$\frac{90 \times 70}{\frac{1}{3}} = \frac{a \times 120}{\frac{2}{3}}$$

$$\frac{90 \times 70}{1} = \frac{a \times 120}{2}$$

$$\Rightarrow a = 105$$

Total 105 men can finish the project.

Thus, extra men required = $105 - 90 = 15$

Q9 Text Solution:

Topic - Time and Work

Part filled in 5 min. = $5 \times (\frac{1}{35} + \frac{1}{40}) = \frac{15}{56}$.

Remaining part = $1 - \frac{15}{56} = \frac{41}{56}$.

Net part filled in 1 min, when the three pipes are opened

$$= \frac{1}{35} + \frac{1}{40} - \frac{1}{20} = \frac{1}{280}$$

Now, $\frac{1}{280}$ part is filled in one minute.

$\frac{41}{56}$ part is filled in $280 \times \frac{41}{56} = 205$ minutes.

Option (B) is correct.

Q10 Text Solution:

Topic - Time and Work



Combined work done by Indra and Karn in (6 + 4) = 10 days (6 initial days and last 4 days)

$$= \frac{10}{18} + \frac{10}{36}$$

$$= \frac{5}{6}$$

Remaining work = $1 - \frac{5}{6}$

$$= \frac{1}{6}$$

Meghnad works for $(\frac{1}{6} \times 24) = 4$ days.

Q11 Text Solution:

Topic - Time and Work

Total work = {LCM of 24, 10} = 120 units.

Laxman's work /day = $\frac{120}{24} = 5$ units; Ram's

work /day = $\frac{120}{10} = 12$ units; Work done together /day = (12 + 5) = 17 units.

If they worked together, number of days, it takes = $\frac{120}{17} \approx 7.06$ days

8th prime number date starting from 31st May.

31st May, 2nd June, 3rd June, 5th June, 7th June, 11th June, 13th June, 17th June.

Hence, option (B) is correct.

Q12 Text Solution:

Topic - Time and Work

Let the work be completed in x days.

Sheila's 1 days' work = $\frac{1}{24}$ units

Sheila's (x-3) day's work = $\frac{x-3}{24}$ units

Rimi's 1 day's work = $\frac{1}{15}$ units

Rimi's (x-1) day's work = $\frac{x-1}{15}$ units

Jeena's 1 day's work = $\frac{1}{30}$ units

Jeena's x day's work = $\frac{x}{30}$ units

Therefore,

$$\frac{x-3}{24} + \frac{x-1}{15} + \frac{x}{30} = 1$$

$$5(x-3) + 8(x-1) + 4x = 120$$

$$17x - 23 = 120$$

$$x = \frac{143}{17}$$

$$= 8\frac{7}{17} \text{ days}$$

Option (A) is correct.

Q13 Text Solution:

Topic - Time and Work

Ratul's 1 day's work = $\frac{1}{20}$

Rajat's 1 day's work = $\frac{1}{30}$

Rajat's 10 day's work = $\frac{10}{30} = \frac{1}{3}$

Remaining work = $1 - \frac{1}{3} = \frac{2}{3}$

Let Ratan can do the work in 'm' days.

Ratan's 1 day work = $\frac{1}{m}$

According to the question,

$$(\frac{1}{20} + \frac{1}{m}) \times \frac{70}{9} = \frac{2}{3}$$

$$\frac{1}{20} + \frac{1}{m} = \frac{3}{35}$$

$$m = 28 \text{ days}$$

Ratan can do the whole work in 28 days.

Q14 Text Solution:

Topic - Time and Work

Ratio of times taken by Ajay and Manu = 1:2.

The time difference is (2-1) = 1 day, if Manu takes 2 days then Ajay takes 1 day.

If difference of time is 80 days, Manu takes $(\frac{2}{1} \times 80) = 160$ days.

So, Ajay takes 80 days to do the work.

Ajay's 1 day's work = $\frac{1}{80}$

Manu's 1 day's work = $\frac{1}{160}$

(Ajay + Manu)'s 1 day's work = $(\frac{1}{80} + \frac{1}{160}) = \frac{3}{160}$

Thus, Ajay and Manu together can do the work in = $\frac{160}{3} = 53\frac{1}{3}$ days.

Q15 Text Solution:

Topic - Time and Work

Suppose the tank is filled in T minutes.

According to the question, pipes A and C are open for T minutes and pipe B for (T - 12) minutes.

$$\frac{T}{50} + \frac{T-12}{75} - \frac{T}{60} = 1$$

$$\Rightarrow \frac{(6T+4T-48-5T)}{300} = 1$$

$$\Rightarrow \frac{(5T-48)}{300} = 1$$

$$\Rightarrow 5T = 348$$

$$\Rightarrow T = 69.6 \text{ minutes}$$

Hence, the tank is filled in 69.6 minutes.

Q16 Text Solution:



Topic - Time and Work

Let total work be 80 units

Hence, inlet pipe does $\frac{80}{8} = 10$ unit of work in 1 hour

But due to leakage only $(10 - 20\%) = 8$ units of work is done

Therefore, in 9 hours it will do $9 \times 8 = 72$ units work, and rest 8 unit will be done at the rate of 10 units/hr because it's the final installment so there will be no effect of drainage system (given in question.)

Therefore, total time = $9 + \frac{8}{10} = 9$ hr 48 min.

Option (D) is correct.

Q17 Text Solution:**Topic - Time and Work**

Here, one hour work done by one man = $\frac{1}{(28 \times 90 \times 3)}$

Also, one hour work done by one man = $\frac{1}{\{36 \times (3X+6) \times 5\}}$

Then, by the condition,

$$\frac{1}{(28 \times 90 \times 3)} = \frac{1}{(36 \times (3X+6) \times 5)}$$

$$\Rightarrow \frac{1}{7560} = \frac{1}{540X+1080}$$

$$\Rightarrow 540X = 6480$$

$$\Rightarrow X = 12$$

Therefore, time taken by ($X = 12$) men to complete the whole work while working 4 hours a day

$$= \frac{(28 \times 90 \times 3)}{(12 \times 4)}$$

$$= 157.5 \text{ days}$$

Q18 Text Solution:**Topic - Time and Work**

Let the efficiencies of a woman, man and boy are W, M and B respectively.

Then, by the condition,

$$6W = 4M = 9B$$

$$W = \frac{4}{6}M = \frac{2}{3}M$$

$$B = \frac{4}{9}M$$

Now, the work done by 12 women, 10 men and 18 boys together

$$= 12W + 10M + 18B$$

$$= 12 \times \frac{2}{3}M + 10M + 18 \times \frac{4}{9}M$$

$$= 8M + 10M + 8M$$

$$= 26M$$

By the given data, 8 men can complete the work working 1 hour per day in $= 7 \times 7 = 49$ hours.

26 men working 10 hours per day can complete the work in

$$\frac{(7 \times 7 \times 8)}{(26 \times 10)} = \frac{98}{65} \text{ days}$$

$$= 1 \frac{33}{65} \text{ days}$$

Option (C) is correct.

Q19 Text Solution:**Topic - Time and Work**

Work done by three pipes in 1 hour, $\frac{1}{12} + \frac{1}{15} + \frac{1}{18}$
 $= \frac{37}{180}$

Time taken by these pipes to fill the tank = $\frac{180}{37}$ hours = 4 hours 51 minutes (approx.).

Due to leakage, time taken = (4 hrs 51 min) + 69 min = 6 hours.

Work done by (three pipes + leak) in 1 hour = $\frac{1}{6}$

Work done by the leak in 1 hour = $\frac{37}{180} - \frac{1}{6} = \frac{7}{180}$

Leak will empty the full cistern in $\frac{180}{7} \approx 25.7$ hours.

Q20 Text Solution:**Topic - Time and Work**

1 child can finish the job in = 26 days

6 children can finish the job in = $\frac{26}{6} = \frac{13}{3}$ days

14 children can finish the job in = $\frac{26}{14} = \frac{13}{7}$ days

4 men can finish the job in = $\frac{13}{3} \times 2 = \frac{26}{3}$ days

1 man can finish the job in = $4 \times \frac{26}{3} = \frac{104}{3}$ days

12 men can finish the job in = $\frac{104}{12 \times 3} = \frac{26}{9}$ days

4 women can finish the job in = $\frac{26}{3} \times 3 = 26$ days

12 women can finish the job in = $\frac{26 \times 4}{12} = \frac{26}{3}$ days



12 men, 12 women and 14 children complete the whole work in

$$= \frac{1}{\frac{9}{26} + \frac{3}{26} + \frac{7}{13}}$$

$$= 1 \text{ day}$$

Q21 Text Solution:

Topic - Time and Work

Given that,

Ajay takes 36 days to complete the work alone.

Maria takes 54 days to complete the work alone.

Neeraj takes 18 days to complete the work alone.

Ajay and Neeraj assisted on every fourth day.

$$\text{So, Maria's 3 day's work} = \frac{1}{54} \times 3 = \frac{1}{18}$$

$$\text{Now, (Ajay + Maria + Neeraj)'s 1 day's work} = \frac{1}{36} + \frac{1}{54} + \frac{1}{18} = \frac{11}{108}$$

Work done in 4 days = Maria's 3 day's work + (Ajay + Maria + Neeraj)'s 1 day's work

$$= \frac{1}{18} + \frac{11}{108} = \frac{17}{108}$$

In this way, $\frac{17}{108}$ part of the work is completed in 4 days.

So, in 24 days work done = $\frac{102}{108}$ and in next 3 days work done by Maria = $\frac{1}{18}$

$$\text{Now total work} = \frac{1}{18} + \frac{102}{108} = 1$$

So total time taken = 27 days

Hence, option (B) is correct.

Q22 Text Solution:

Topic - Time and Work

Ratio of Time taken by X and Y for doing certain units of work = 2 : 3

So the ratio of the efficiency of X and Y = 3 : 2

Ratio of time taken by Y and Z for doing certain units of work = 4 : 5

So the ratio of the efficiency of Y and Z = 5 : 4

The ratio of the efficiency of X, Y and Z = 15 : 10 : 8

Let the efficiency of X, Y and Z be 15 units, 10 units and 8 units.

1 day work of X, Y and Z = 15 + 10 + 8 = 33 units.

Work done in 20 days = 33 × 20 = 660 units.

Time taken by Y to complete 660 units of work = $\frac{660}{10} = 66$ days.

Option (c) is correct.

Q23 Text Solution:

Topic - Time and Work

Let the amount of work to be done to either fill an empty tank or empty a full tank be LCM(7, 8, 9, 12) = 504 units

Work done by pipe A in one hour = $\frac{504}{7} = 72$ units

Work done by pipe B in one hour = $\frac{504}{8} = 63$ units

Work done by pipe C in one hour = $\frac{504}{9} = 56$ units

Work done by the hole in one hour = $\frac{504}{12} = 42$ units

Work done in the first one and a half hours

$$= 36 + 31.5 + 56 - \frac{3}{2} \times 42$$

$$= 123.5 - 63$$

$$= 60.5 \text{ units}$$

Work remaining = 504 - 60.5 = 443.5 units

Work done by all the pipes together in 1 hour when they are opened simultaneously

$$= 72 + 63 + 56 - 42$$

$$= 149 \text{ units}$$

So, time required to fill the remaining tank = $\frac{443.5}{149}$ hours = 2.98 hours (approx.)

So, total time required to fill the empty tank = 1.5 + 2.98 = 4.48 hours.

Q24 Text Solution:

Topic - Time and Work

A does $\frac{4}{5}$ th of work in 20 days.

Time Taken by A to complete the work

$$= \frac{5}{4} \times 20 = 25 \text{ days}$$

Efficiency of B is 30% more than that of A.



If Work done by A in one day = 10, then work done by B in one day = 13

Ratio of time taken by A and B = 13 : 10

Time taken by B to complete the work

$$= \frac{10}{13} \times 25$$

$$= \frac{250}{13} \text{ days}$$

A and B worked for ten days.

Total work Completed by A and B in 10 days

$$= 10\left(\frac{1}{25} + \frac{13}{250}\right)$$

$$= \frac{23}{25}$$

Work left = $1 - \frac{23}{25} = \frac{2}{25}$ which is done by C in 4 days.

Time taken by C to complete the whole work = $\frac{25}{2} \times 4$

C = 50 days

Ratio of Efficiency of A and C = $\frac{50}{25}$

Efficiency of C is 50 % less than that of A.

Q25 Text Solution:

Topic - Time and Work

The fastest machine takes 2 hours. The slowest machine takes 3 hours.

Let all the other machines take as much time as the fastest machine.

Average time = $\frac{(2+2+2+3)}{4} = 2.25$ hours.

This means that the average time taken will be somewhat greater than 2.25 hours

Similarly, let all the other machines take as much time as the slowest one = $\frac{(2+3+3+3)}{4} = 2.75$ hours.

This meanst that the average time taken will be somewhat lesser than 2.75 hours

The only value that does not lie between the above range is 2.2 hours.

Option (A) is correct.

Q26 Text Solution:

Topic - Time and Work

Remaining work completed by Virat = $1 - \frac{1}{4} - \frac{1}{2}$

$$= \frac{1}{4}$$

So, $\frac{1}{4}$ of the work is completed by Virat in 4 days.

Therefore, the number of days in which Virat alone can complete the work

$$= 4 \times 4 = 16$$

Bikram alone can complete the work in = $16 \times \frac{125}{100} = 20$ days

\Rightarrow Bikram's 1 day's work = $\frac{1}{20}$

\Rightarrow Virat's 1 day's work = $\frac{1}{16}$

= (Bikram + Virat)'s 1 days work = $\frac{1}{20} + \frac{1}{16} = \frac{9}{80}$

So, the whole work can be completed by both together in $\frac{80}{9}$ days.

$\frac{1}{4}$ of the work gets completed by Bikram in = $\frac{1}{4} \times 20 = 5$ days

$\frac{1}{2}$ of the work completed by Bikram and Virat in = $\frac{1}{2} \times \frac{80}{9} = \frac{40}{9}$ days

Therefore, total time in which work gets completed

$$= 5 + \frac{40}{9} + 4$$

$$= \frac{121}{9}$$

$$= 13\frac{4}{9} \text{ days}$$

Option (B) is correct.

Q27 Text Solution:

Topic - Time and Work

Let the rate of flow of pipe A be $x \text{ m}^3/\text{min}$.

Then, rate of flow of pipe B = $(x + 25) \text{ m}^3/\text{min}$.

$$\Rightarrow \frac{4800}{x} - \frac{4800}{x+25} = 16$$

$$\Rightarrow \frac{4800(x+25) - 4800x}{x(x+25)} = 16$$

$$\Rightarrow \frac{120000}{x^2+25x} = 16$$

$$\Rightarrow \frac{7500}{x^2+25x} = 1$$

$$\Rightarrow x^2 + 25x - 7500 = 0$$

$$\Rightarrow x = 75 \text{ or } -100$$

$\Rightarrow x = 75 \text{ m}^3/\text{min}$ (As 'x' cannot be negative)

Hence, the rate of flow of water in pipe A is $75 \text{ m}^3/\text{min}$.

Q28 Text Solution:

Topic - Time and Work



Let us assume that the capacity of the tank is 120 units.

P can fill at $\frac{120 \text{ unit}}{20 \text{ min}} = 6 \text{ unit/min}$

Q can fill at a rate of $\frac{120 \text{ unit}}{30 \text{ min}} = 4 \text{ unit/min}$

R can fill at a rate of $\frac{120 \text{ unit}}{60 \text{ min}} = 2 \text{ unit/min}$

Total amount of water filled in the first minute is $(6 + 4 + 2) \text{ units}$

$= 12 \text{ units.}$

A can empty at $\frac{120 \text{ unit}}{30 \text{ min}} = 4 \text{ unit/min}$

B can empty at $\frac{120 \text{ unit}}{40 \text{ min}} = 3 \text{ unit/min}$

C can empty at $\frac{120 \text{ unit}}{120 \text{ min}} = 1 \text{ unit/min rate}$

Total water emptied in a minute is $(4 + 3 + 1) \text{ unit}$
 $= 8 \text{ units.}$

Hence, total volume filled in 2 minutes $= (12 \text{ unit} - 8 \text{ unit}) = 4 \text{ unit.}$

Total time needed to fill 108 unit is $= (108 \times \frac{2}{4}) = 54 \text{ minutes.}$

In the 55th minute the volume filled will be 108 units + 12 units

$= 120 \text{ units.}$

Thus, in 55 minutes the tank will be filled.

Q29 Text Solution:

Topic - Time and Work

This question is very difficult to solve if we solve it from scratch.

So, to solve it quickly, we can use the following concept.

If A & B together take 'X' days to finish a piece of work, and time taken by A alone is 'a' day more than 'x' while time taken by B alone is 'b' days more than 'x', then we can say:

$$x^2 = a \times b$$

In this question, Sigmund takes 4 days more than the time taken by Freud and himself

together to complete a piece of work and Freud takes 16 days more than the time taken by Sigmund and himself together to complete a piece of work.

Thus, time taken for them to complete the work working together t can be found as:

$$t^2 = 4 \times 16$$

$$t = 8 \text{ days.}$$

Thus, time taken by Freud alone $= 8 + 16 = 24$ days (D)

Hence, option D is the correct answer.

Q30 Text Solution:

Topic - Time and Work

According to question,

Ratio of efficiency of Bunny and Sunny = 3:1

Ratio of efficiency of Bunny and Munny = 4:7

So, ratio of efficiency of Bunny, Sunny and Munny = 12:4:21

Total work $= (12 + 4 + 21) = 37 \times \frac{126}{74} = 63 \text{ units}$

Time taken by (Bunny and Munny) together to complete the work $= \frac{63}{12+21} = \frac{21}{11} \text{ days}$

Time taken by (Munny and Sunny) together to complete the work $= \frac{63}{25} \text{ days}$

Required days $= \frac{63}{25} - \frac{21}{11} = \frac{168}{275} \text{ days}$

