Class Test on Lecture Sheet 7

1. The speed of three cars are in the ratio 2: 3: 4. The ratio of the times taken by these cars to travel the same distance is-

A. 2: 3: 4 B. 4: 3: 2 C. 6: 4: 3 D. 3: 4: 6 E. None of these

A. B. C. D. E.

সমাধান: We know, Distance = Velocity × Time

So, the time taken for each car is inversely proportional with their corresponding velocities.

So, the ratio of time taken = $\frac{1}{2}:\frac{1}{3}:\frac{1}{4} = \frac{1}{2}\times 12:\frac{1}{3}\times 12:\frac{1}{4}\times 12 = 6:4:3$

উত্তর: C. 6: 4: 3

2. A car is driving at the speed of 100 km/hr and stops for 10 minutes at the end of every 150 km. To cover a distance of 1000 km, it will take-

A. 12 hour B. 10 hour C. 11 hour D. 9 hour E. None of these

সমাধান: Here, 100 km journey takes 60 min.

So, 150 km journey takes 90 min.

Including break of 10 minuites, total time = 100 min

So, (150×6) or, 900 km journey will take = 600 min = 10 hrs

Again, car cover 100 km in an hour.

So, total time to cover a distance of 1000 km = 10 hrs + 1 hr = 11 hrs

Answer: C. 11 hrs

3. 10 minutes after a plane leaves the airport, it is reported to be 40 miles away. What is the average speed in miles per hour of the plane? [Govt. Bank (Cash Officer) ('20)-2023]

A. 560 B. 400 C. 240 D. 220

সমাধান: We know, $s = vt \Rightarrow v = \frac{s}{t} = \frac{40}{\frac{10}{60}} = \frac{40\times 60}{10}$ = 240 miles

Answer: C. 240

4. A train 125m long passes a man, running at 5 km/hr in the same direction in which the train is going, in 10 seconds. The speed of the train is-

A. 45 km/hr B. 50 km/hr C. 54 km/hr D. 55 km/hr E. 40 km/hr

সমাধান: We know, Distance = Velocity × Time

$\Rightarrow S = (V_1 - V_2) \times t$

$\Rightarrow 125 = (V_1 - 5) \times \frac{5}{18} \times 10$

$\Rightarrow V_1 - 5 = 45$

$\Rightarrow V_1 = 50$ km/hr

Answer: B. 50 km/hr

5. A train 220 m long is moving at 45 km/h. The train taken by the train to cross a tunnel 260 m long is- [প্রতিরক্ষা মন্ত্রণালয় (সহ: পরি.)-২২]

A. 25 sec. B. 35 sec. C. 38 sec. D. 40 sec.

সমাধান: We know, $s = vt \Rightarrow t = \frac{s}{v} = \frac{220+260}{45\times\frac{5}{18}} = \frac{480\times 18}{45\times 5} = 38.4$ sec.

Answer: C. 38 sec.

9. In a 100 m race, Asif covers the distance in 36 seconds and Raihan in 45 seconds. In this race, Asif beats Raihan by-

A. 22 m B. 25 m C. 20 m D. 22.5 m

সমাধান: 100 meter race এ; Asif covers the distance in 9 seconds less than Raihan $(36 - 45)$

Now, the distance covered by Raihan in this 9 seconds,

S = vt $\Rightarrow$ S = $\frac{100}{45} \times 9 = 20$ m

Answer: C. 20 m

10. A train travels at an average speed of 90 km/hr without any stoppage. However, its average speed decrease to 60 km/hr on account of stoppage. On an average, how minute per hour does the train stop?
A. 12 minute B. 18 minute C. 20 minute D. 24 minute E. 30 minute
সমাধান: In 60 minutes the train is supposed to travel 90 km without stoppages
Actually, in 60 minutes the train travels 60 km with stoppages i.e. 30 km less
With average speed 90 km/hr, the time taken by train to travel 30 km = $\frac{30}{90} = \frac{1}{3}$ hours = 20 minutes
∴ Train stops for 20 minutes every hour. (Answer)

Practice Math

1. 10 cats caught 10 rats in 10 seconds. How many cats are required to catch 100 rats in 100 seconds?
[প্রাথমিক সহকারী শিক্ষক-১২, কর্ণফুলী গ্যাস ডিস্ট্রিবিউশন কোম্পানী লি. (সহকারী ব্যবস্থাপক) ২০২১]
A. 10 B. 20 C. 50 D. 100
সমাধান: 10টি ইঁদুরকে 10 সেকেন্ডে ধরে 10টি বিড়াল
10টি ইঁদুরকে 1 সেকেন্ডে ধরে 10×10টি বিড়াল
1টি ইঁদুরকে 1 সেকেন্ডে ধরে $\frac{10\times10}{10}$টি বিড়াল
100টি ইঁদুরকে 1 সেকেন্ডে ধরে $\frac{10\times10\times100}{10}$টি বিড়াল
100টি ইঁদুরকে 100 সেকেন্ডে ধরে = $\frac{10\times10\times100}{10\times100} = 10$ টি বিড়াল

2. For making a cupboard, it requires human labor three times the labor required to make a bench. Six carpentars can make 36 benches and 5 cupboards in 12 days. How many days will 10 carpenters to make 61 benches and 8 cupboards? [Combined Officer-08, RAKUB SO 11]
A. 23 days B. 32 daye C. 21 days D. 12 days E. None of these
Solution: Here,
1 cupboard = 3 benches
So, 5 cupboards = $5 \times 3 = 15$ benches
and 8 cupboards = $8 \times 3 = 24$ benches
36 benches and 5 cupboard = $(36 + 15)$ or 51 benches
61 benches and 8 cupboards = $(61 + 24) = 85$ benches
6 carpenter can make 51 benches in 12 days
1 carpenter can make 1 bench in $\frac{12\times6}{51}$ days
10 carpenter can make 85 benches in $\frac{12\times6\times85}{51\times10}$ = 12 days (Answer: D. 12 days)

3. A teacher has 3 hours to grade all the papers submitted by the 35 students in her class. She gets through the first 5 papers in 30 minutes. How much faster does she have to work to grade the remaining papers in the allotted time? [IBA BBA 15-16]
A. 10% B. 15% C. 20% D. 25% E. None of these
সমাধান: Total allotted time = 3 hours = 180 minutes
Time spent for first 5 papers = 30 minutes
Total papers to be graded = 35
So, remaining 30 papers need to be graded in 150 minutes
So, time (average) allotted for per paper = 5
Previously, time spent (average) for per paper = 6
So, as per the given condition, let teachers needs to be P% faster.
Then $5 + 5 \times \frac{P}{100} = 6$
$\Rightarrow 5 + \frac{P}{20} = 6$
$\Rightarrow \frac{P}{20} = 1$
$\Rightarrow P = 20$
উত্তর: C. 20%

4. Courier charges for packages to a certain destination are tk. 65 for the first 250 grams and tk. 10 for each additional 100 grams or part there. What could be the weight in grams of a package for which the charge is tk. 155?

A. 1155 B. 1145 C. 1040 D. 1050 E. None of these

সমাধান: Here, total courier charge = 155 tk.
Charge for first 250 grams = 65 tk.
So, charge for the rest weight = 90 tk.
Now, tk 10 is needed for each additional max 100 gms/part there
So, tk 90 is needed for each additional max 100 gms/part there
So, total weight of the package = $250 + 900$ (max) = 1150 gms (max)
From the options we can take 1145 as a answer.
উত্তর: B. 1145

5. A contractor employed 30 men to do a piece of work in 38 days. After 25 days, he employed 5 men more and the work as finished one day earlier. How many days he would have been behind, if he had not employed additional men?

A. 1 B. $1\frac{1}{2}$ C. $1\frac{3}{4}$ D. $2\frac{1}{2}$ E. None of these

সমাধান: Here, after 25 days till the completion of the work, total 35 men worked for 12 days.
Now, 35 man required 12 days
So, 1 man would have required (35×12) days
So, 30 man would have required $\left(\frac{35\times12}{30}\right) = 14$ days
In that case, total time would have been = 25 + 14 = 39 days
So, Contractor would have been behind for $(39 - 38)$ or 1 day
উত্তর: A. 1

6. A takes twice as much time as B or thrice as much time as C to finish a piece of work. Working together, they can finish the work in 2 days. B can do the work alone in:

A. 6 days B. 4 days C. 8 days D. 12 days E. None of these

সমাধান: Let, B takes 'x' days to finish a piece of work.
So, A takes 2x days and C takes $\frac{2x}{3}$ days to finish a piece of work.
Then, while working together as they can finish the work in 2 days.
So, $\frac{1}{2x} + \frac{1}{x} + \frac{3}{2x} = \frac{1}{2}$
$\Rightarrow \frac{1+2+3}{2x} = \frac{1}{2}$
$\Rightarrow 2x = 12$
$\therefore x = 6$
উত্তর: A. 6 days

7. A is twice as good a work man as B and is therefore able to finish a job in 18s days less than B. In how many days they can finish the job working together? [IBA MBA Dec' 2017]

A. 8 B. 12 C. 15 D. 18 E. None of these

সমাধান: Let, A takes 'x' days to finish a job
So, B takes '2x' days to finish a job
Again, A takes 18 days less than B to finish a job
So, x = $2x - 18 \Rightarrow x = 18$
Now, while working together, in 1 day, they can finish = $\frac{1}{x} + \frac{1}{2x} = \frac{3}{2x} = \frac{3}{36} = \frac{1}{12}$ part of the job
So, complete or 1 part of the work will need = 12 days
উত্তর: B. 12

8. Working 11 hours/ day, 24 men and 33 women can complete the construction of a road in 78 days. The working capacity of 3 women equals to that of 1 man. Now, the authority decides that the road is to be constructed in 55 days by working 13 hours/day. If there are only 27 women present how many men will be needed? [IBA MBA June 2018]

A. 33 B. 45 C. 87 D. 99 E. None of these

সমাধান: Here, working capacity of 3 women = 1 man

So, working capacity of 33 womans = 11 man

Now, 24 men + 33 women = $24 + 11 = 35$ man

Completion of the work in 78 days requires 11 hours work of 35 men

So, completion of the work in 1 days requires 1 hours work of $(35 \times 78 \times 11)$ men

So, Completion of the work in 55 days requires 13 hours work of $\left(\frac{35\times78\times11}{55\times3}\right) = 42$ men

Now, women present = 27

So, equivalent men present = 9 (3W = 1M)

So, men needed = $42 - 9 = 33$

উত্তর: A. 33

9. 6 men and 5 women can do a work in 6 days and 4 men and 5 women can do the same work in 8 days. How many days will be required to complete the work by 8 men and 20 women? [NSI (Field Off.) 2021]

A. 2 B. 3 C. 4 D. 5

সমাধান: মনে করি 1 জন পুরুষ 1 দিনে করে x অংশ

1 জন মহিলা 1 দিনে করে y অংশ

$\therefore$ প্রশ্নমতে, $6x + 5y = \frac{1}{6}$ ……(i)

ও $4x + 5y = \frac{1}{8}$ ……(ii)

$(i) - (ii)$

$2x = \frac{1}{6} - \frac{1}{8} = \frac{4-3}{24} = \frac{1}{24}$

$x = \frac{1}{48}$

$\therefore (i)$ নং থেকে,

$\frac{6}{48} + 5y = \frac{1}{6}$

$\frac{1}{8} + 5y = \frac{1}{6}$

$5y = \frac{1}{6} - \frac{1}{8} = \frac{4-3}{24} = \frac{1}{24}$

$\therefore y = \frac{1}{5\times24} = \frac{1}{120}$

$\therefore$ 8 জন পুরুষ ও 20 জন মহিলা 1 দিনে শেষ করতে পারে

$8x + 20y$

$\Rightarrow 8 \times \frac{1}{48} + 20 \times \frac{1}{120}$

$\Rightarrow \frac{1}{6} + \frac{1}{6}$

$\Rightarrow \frac{1+1}{6}$

$\Rightarrow \frac{2}{6}$

$\Rightarrow \frac{1}{3}$

$\therefore$ 3 দিনে শেষ করতে পারবে।

উত্তর: B. 3

10. Three workers can do a job in 12 days. Two of the workers work twice as fast as the third. How long would it take one of the faster workers to do the job himself? [BB (AD) 2001]

A. 24 B. 30 C. 32 D. None

সমাধান: ধরি, তৃতীয় জন কাজটি করতে 2x দিন সময় নেয়। তাহলে, প্রথম দু'জন কাজটি করতে সময় নেয় x দিন।

প্রশ্নমতে, $\frac{1}{x} + \frac{1}{x} + \frac{1}{2x} = \frac{1}{12}$

$\Rightarrow \frac{2+2+1}{2x} = \frac{1}{12}$

$\Rightarrow 2x = 60$

$\Rightarrow x = 30$

উত্তর: খ

11. If machine A polishes x units in 12 minutes and machine B polishes 5x units in 40 minutes, in how many minutes will A and B, working together, polish 50x units? [BB AD 2018]

A. 240 B. 300 C. 350 D. 120

সমাধান: Here, machine A polishes x units in 12 minutes & machine B polishes 5x units in 40 minutes

So, working together in 1 min they polish = $\frac{x}{12} + \frac{5x}{40} = \frac{20x}{96}$ units

Now, $\frac{20x}{96}$ units require 1 min

$\therefore$ 50x units require $\left(\frac{96}{20x} \times 50x\right)$ = 240 min

উত্তর: A. 240

12. Company PQR has 3 machines. Machine A take 5 minutes to produce the item, machine B takes 12 minutes to produce 2 items and machine C takes 10 minutes to produce 1 item. If they run simultaneously how many hours will it take to produce 294 of the said item? [IBA MBA Dec' 2019)]

A. 10 B. 10.5 C. 11 D. 630 E. None of these

সমাধান: (D) Machine A-এর Rate of work $R_A = \frac{1}{8}$ items per min

" B " " " " $R_B = \frac{2}{12} = \frac{1}{6}$ items per min

" C " " " " $R_C = \frac{1}{10}$ items per min

3টি machine simultaneously চালু থাকলে 1 min-এ Produce করবে

$\frac{1}{5} + \frac{1}{6} + \frac{1}{10} = \frac{7}{15}$টি item.

$\frac{7}{15}$ টি item produce করবে 1 min-এ

1 " " " " $\frac{15}{7}$ " "

294" " " " $\frac{15}{7} \times 294 = 630$ min-এ

13. A can do a job in 15 hours and B in 10 hours. A started at 10 am, after some hours B joined with A. The work was completed in 9 hours. At what time B started the work? [IBA MBA, Dec' 2018]

A. 3 pm B. 6 pm C. 1 pm D. 2 pm E. Cannot be determined

সমাধান: Let, A worked individually for 'x' hours, So A & B both worked for $(9 - x)$ hours

As per the given condition,

$x \times \frac{1}{15} + (9 - x)\left(\frac{1}{15} - \frac{1}{10}\right) = 1$

$\Rightarrow \frac{x}{15} + \frac{(9-x)}{6} = 1$

$\Rightarrow \frac{6x+135-15x}{90} = 1$

$\Rightarrow -9x = 90 - 135 = -45$

$\therefore x = 5$

So, B joined after 5 hours of A's start

Exact time = 10 am + 5 hrs = 3 pm

উত্তর: A. 3 pm

14. A man can do a piece of work in 5 days, but with the help of his son, he can do it in 3 days. In what time can the son do it alone?

A. 4 days B. 6 days C. 7 days D. 8 days E. None of these

সমাধান: Working together with his son,

In 1 day, a man can compelet $\frac{1}{3}$ part of the work

Let, son can do it alone it 'x' days

So, $\frac{1}{5} + \frac{1}{x} = \frac{1}{3}$

$\Rightarrow \frac{1}{x} = \frac{1}{3} - \frac{1}{5}$

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

$\therefore$ x = $\frac{15}{2} = 7.5$ days

উত্তর: E. None of these

15. A female worker can do a job in 12 hours and a male worker can do the same job in 6 hours. If equal numbers of male and female members were deployed to do that job and the team completed the job in 2 hour, how many male worker were employed? [IBA MBA Dec' 2015]

A. 1 B. 2 C. 3 D. 4 E. None of these

সমাধান: Let, 'x' male worker were employed

As working together, the team completed the job in 2 hours

So, $x\left(\frac{1}{12}+\frac{1}{6}\right)=\frac{1}{2}$

$\Rightarrow x\times\frac{3}{12}=\frac{1}{2}$

$\Rightarrow 6x=12$

$\therefore x=2$

উত্তর: B. 2

16. A can complete a project in 20 days and B can complete the same project in 30 days. A & B start working on the project together and A quits 10 days before the project is expected to be completed. How many days in total will the project take to complete?

A. 16 B. 18 C. 23 D. 27 E. 24

সমাধান: Let, the project will take 'x' days to complete.

Then, A & B together worked for $(x-10)$ days.

So, as per the given condition,

$(x-10)\left(\frac{1}{20}+\frac{1}{30}\right)+\frac{10}{30}=1$

$\Rightarrow (x-10)\left(\frac{1}{12}\right)+\frac{1}{3}=1$

$\Rightarrow \frac{x-10}{12}=\frac{2}{3}$

$\Rightarrow 3x-30=24$

$\Rightarrow 3x=54$

$\Rightarrow x=18$

উত্তর: B. 18

17. A man can build a hut in 9 days; a woman can build the same hut in 12 days and a boy can build that hut in 18 days. After working together for 2 days the man left and the woman and the boy continued the work for 2 days. After that the woman left too and the boy finished the rest of the work. If the total wage for this work is BDT 7910, how much the boy should receive based on the number of days worked? [IBA MBA June 2018]

A. BDT 2260 B. BDT 3390 C. BDT 4520 D. BDT 5085 E. None of these

সমাধান: Man + Woman + Boy: Here, in 2 days the portion of the work completed = $2\left(\frac{1}{9}+\frac{1}{12}+\frac{1}{18}\right)=\frac{1}{2}$

Woman + Boy: In the next, 2 days, the portion of the work completed = $2\left(\frac{1}{12}++\frac{1}{18}\right)=\frac{5}{18}$

So, in 4 days, work done = $\frac{1}{2}+\frac{5}{18}=\frac{14}{18}=\frac{7}{9}$

$\therefore$ Remaining work = $1-\frac{7}{9}=\frac{2}{9}$

Now, 1 or complete part of the work can be done by the boy in 18 days

So, $\frac{2}{9}$ complete part of the work can be done by the boy in $\left(18\times\frac{2}{9}\right)=4$ days

So, man worked for 2 days, woman worked for 4 days & boy worked for 8 days.

So, the ratio, $M:W:B=2:4:8$

As the total wage for this work is BDT 7910,

so, the boy should receive = $7910\times\frac{8}{2+4+8}=7910\times\frac{8}{14}=4520$

Answer: C. BDT 4520

18. Three workers A, B, C working individually can completed a task in 30 days, 15 days and 10 days respectively. If A starts the task alone and B and C help A in every 2nd and 3rd day respectively, on which day will the task be completed? [IBA MBA June 2018]

A. 10 B. 12 C. 14 D. 15 E. None of these

সমাধান: Here, work done in first 6 days $= \frac{1}{30} + \left(\frac{1}{30} + \frac{1}{15}\right) + \left(\frac{1}{30} + \frac{1}{10}\right) + \left(\frac{1}{30} + \frac{1}{15}\right) + \frac{1}{30} + \left(\frac{1}{30} + \frac{1}{15} + \frac{1}{10}\right)$

$= \frac{1}{30} + \frac{3}{30} + \frac{4}{30} + \frac{3}{30} + \frac{1}{30} + \frac{6}{30}$

$= \frac{18}{30}$

$= \frac{3}{5}$

So, remaining work $= \frac{2}{5}$

Again, work done on 7th day $= \frac{1}{30}$

So, remaining work $= \frac{2}{5} - \frac{1}{30} = \frac{11}{30}$

work done on 8th day $= \frac{3}{30}$ (from above calculation)

So, remaining work $= \frac{11}{30} - \frac{3}{30} = \frac{8}{30}$

Work done on 9th day $= \frac{4}{30}$

So, remaining work $= \frac{8}{30} - \frac{4}{30} = \frac{4}{30}$

Work done on 10th day $= \frac{3}{30}$

So, remaining work $= \frac{4}{30} - \frac{3}{30} = \frac{1}{30}$

Work done on 11th day $= \frac{1}{30}$

So, on 11th day, the task will be completed.

উত্তর: E. None of these

19. Rony and Jony are working on an assignment. Rony takes 6 hours to type 32 page on a computer, while Jony takes 5 hours to type 40 pages. How much time will they take, working together on two different computers to type an assignment of 110 pages? [Karnafully Gas Ditribution Company Ltd. (AM) 2021]

A. 8 hour 25 minutes B. 8 hour 15 minutes C. 8 hour 13 minutes D. 7 hour 15 minutes

সমাধান: Rony,

In 6 hours type 32 page

In 1 hours type $\frac{32}{6}$ page

$= \frac{16}{3}$ page

Again Jony,

In 5 hours type 40 page

In 1 hours type $\frac{40}{5}$ page

= 8 page

they together type in 1 hour $= \frac{16}{3} + 8 = \frac{16+24}{3} = \frac{40}{3}$ page

Together,

they type $\frac{40}{3}$ page in 1 hour

they type 1 page in $\frac{1}{\frac{40}{3}} = \frac{3}{40}$ hour

they type 110 page in $\frac{3\times110}{40}$ hour

$= 8\frac{1}{4}$ hour

= 8 hour 15 minutes

20. Bill and Ben can clean the garage together in 6 hours. If it takes Bill 10 hours working alone, how long will it take Ben working alone? [BB AD '21]

A. 11 hours B. 4 hours C. 16 hours D. 15 hours

সমাধান: একত্রে 1 ঘণ্টায় করে $\frac{1}{6}$

Bill 1 ঘণ্টায় করে $\frac{1}{10}$

∴ Ben করে 1 ঘণ্টায় করে $\frac{1}{6} - \frac{1}{10} = \frac{5-3}{30} = \frac{2}{30} = \frac{1}{15}$

অর্থাৎ Ben করে 15 ঘণ্টায়।

21. A can do a work in 15 days and B in 20 days. If they worked on it for 4 days, then what fraction of the work is left? [Jamuna Bank (Officer) 14]

A. $\frac{1}{4}$ B. $\frac{1}{10}$ C. $\frac{7}{15}$ D. $\frac{8}{15}$

সমাধান: working together, A & B can complete in 4 days = $4\left(\frac{1}{15} + \frac{1}{20}\right) = 4 \times \frac{35}{300} = \frac{7}{15}$ part of the work

So, work left = $\left(1 - \frac{7}{15}\right)$ part = $\frac{8}{15}$ part

উত্তর: D. $\frac{8}{15}$

22. Rashid can do a piece of work in 8 days, which Tapu can finish in 12 days. If they work at it on alternate days with Rashid beginning, in how many days, the work will be finished?

A. $\frac{28}{3}$ B. $\frac{19}{2}$ C. $\frac{217}{24}$ D. $\frac{31}{3}$

সমাধান: In 2 days, Rashid & Tapu finished = $\left(\frac{1}{8} + \frac{1}{12}\right) = \frac{20}{96} = \frac{5}{24}$ part of the work

So, in 8 days , Rashid & Tapu will finish = $\frac{20}{24}$ part of the work

Part of the work remains = $1 - \frac{5}{6} = \frac{1}{6}$

In 9^{th} day, Rashid will complete $\frac{1}{8}$ part of the work

So, after 9^{th} day, part of the work remains = $\frac{1}{6} - \frac{1}{6} = \frac{2}{48} = \frac{1}{24}$

Now, Tapu can complete whole work in 12 days

So, Tapu can complete $\frac{1}{24}$ work in $12 \times \frac{1}{24} = \frac{1}{2}$ days

So, total time requires = $9 + \frac{1}{2} = \frac{19}{2}$ days

উত্তর: B. $\frac{19}{2}$

23. When A and B work together, they receive their wages in the ratio 3: 5. If A alone can do the work in 20 days, in how much time will B do the work alone?

A. 12 days B. 15 days C. 24 days D. 30 days

সমাধান: Wage ratio of A & B, $A_w : B_w = 3: 5$

So, the required time ratio of A & B, $A_t : B_t = 5: 3$

So, when A needs 5 days, B needs 3 days

∴ When A needs 1 day, B needs $\frac{3}{5}$ day

∴ When A needs 20 days, B needs $\left(\frac{3}{5} \times 20\right)$ = 12 days

উত্তর: A. 12 days

24. Sadib can do a job in 2 hours. Tazul can do the same job in 3 hours. If they work together, how many hours will it take to do the job? [BB (Cash Officer) 2011]

A. $\frac{5}{3}$ B. 4 C. 6 D. $1\frac{1}{5}$

সমাধান: In 2 hours Sakib can do 1 part of the work

∴ In 1 hour Sadib can do $\frac{1}{2}$ part of the work

Similarly, in 1 hour Tazul can do $\frac{1}{3}$ part of the work

So, working together in 1 hour

They can do = $\left(\frac{1}{2} + \frac{1}{3}\right) = \frac{5}{6}$ part of the work

So, 1/complete work is done in $\frac{6}{5}$ days or, $1\frac{1}{5}$ days

উত্তর: D. $1\frac{1}{5}$

25. A can do a piece of work in 4 hour, B and C together can do it in 3 hours, while A and C together can do it in 2 hours. How long will B alone take to do it? [Jamuna Bank (PO) 2012]
A. 8 hours B. 10 hours C. 12 hours D. 24 hours
সমাধান: Here, A can do the work in 4 hours
So, in 1 hr, A can do $\frac{1}{4}$ of the work
Let, A = $\frac{1}{4}$
Similarly, B + C = $\frac{1}{3}$ & A + C = $\frac{1}{2}$
Now, C = $\frac{1}{2} - A = \frac{1}{2} - \frac{1}{4} = \frac{1}{4}$
Again, B + C = $\frac{1}{3} \Rightarrow$ B = $\frac{1}{3} - \frac{1}{4} = \frac{1}{12}$
So, B alone takes 12 hours.
উত্তর: C. 12 hours

26. A, B, C together can do a piece of work in 10 days. All the three started working at it together and after 4 days, A left. Then, B and C together completed the work in 10 more days. In how many days can complete a work alone?
A. 25 B. 24 C. 23 D. 21
Solution: (A+B+C) do 1 work in 10 days
So, (A+B+C)'s 1 day work = $\frac{1}{10}$ and as they work together for 4 days so workdone by them in 4 days = $\frac{4}{10} = \frac{2}{5}$
Remaining work = $1 - \frac{2}{5} = \frac{3}{5}$
(B+C) take 10 more days to complete $\frac{3}{5}$ work. So (B+C)'s 1 day work = $\frac{3}{50}$
Now A's 1 day work = (A+B+C)'s 1 day work − (B+C)'s 1 day work = $\frac{1}{10} - \frac{3}{50} = \frac{1}{25}$
A does $\frac{1}{25}$ work in 1 day
Therefore 1 work in 25 days.
Answer: A. 25

27. A can do a job in 24 day, B in 9 days and C in 12 days. B and C together start the work but leave after 3 days. How much time was taken by A to complete the remaining work?
A. 7 days B. 9 days C. 10 days D. 12 days
সমাধান: In 3 days B & C together complete = $3\left(\frac{1}{9} + \frac{1}{12}\right) = \frac{7}{12}$ part of the work
Now, remaining work = $1 - \frac{7}{12} = \frac{5}{11}$
Again, A can do the whole/ 1 part of the work in 24 days
So, A can do $\frac{5}{12}$ part of the work = $24 \times \frac{5}{12}$ = 10 days
উত্তর: C. 10 days

28. A can finish a work in 18 days and B can do the same work in 15 days. B worked for 10 days and left the job. In how many days, A alone can finish qthe remaining work?
A. 5 B. 6 C. 7 D. 8
সমাধান: In 10 days, B finishes = $\frac{10}{15} = \frac{2}{3}$ part of the work
So, remaining work = $1 - \frac{2}{3} = \frac{1}{3}$ part
Now, A can complete whole/ 1 part of the work in 18 days
So, A can complete, $\frac{1}{3}$ part of the work in $\left(18 \times \frac{1}{3}\right)$ or, 6 days
উত্তর: B. 6

29. If machine A polishes x units in 12 minutes and machine B polishes 5x units in 40 minutes, in how many minutes will A and B, working together, polish 50x units? [BB AD 2021]

A. 240 B. 300 C. 350 D. 120

সমাধান: মেশিন A 1 মিনিটে পলিশ করে $\frac{x}{12}$টি

মেশিন B 1 মিনিট পলিশ করে $\frac{5x}{40} = \frac{x}{8}$টি

একত্রে পলিশ করে $\left(\frac{x}{12} + \frac{x}{8}\right) = \frac{10x+15x}{120} = \frac{25x}{120} = \frac{5x}{24}$

একত্রে $\frac{5x}{24}$টি করে 1 মিনিটে

একত্রে 1টি করে $\frac{1}{\frac{5x}{24}} = \frac{24}{5x}$ মিনিট

একত্রে 50xটি করে $\frac{24}{5x} \times 50x = 240$ মিনিটে (উত্তর)

30. A computer takes 50 nanoseconds to do an addition. How many additions can it do in 1 second?

A. 2 billion B. 25 million C. 20 billion D. 35 million

সমাধান: 50 ন্যানোসেকেন্ড = 50×10^{-9} সেকেন্ড

ধরি, 1 সেকেন্ড যোগ করতে পারবে xটি

প্রশ্নমতে,

$50 \times 10^{-9} : 1 = 1 : x$

$\therefore \frac{50\times10^{-9}}{1} = \frac{1}{x}$

$\Rightarrow x = \frac{1}{50\times10^{-9}} = \frac{10^9}{50} = \frac{100\times10^7}{50} = 2 \times 10^7 = 2 \times 10 \times 10^6 = 20 \times 10^6 = 20$ মিলিয়ন

[মনে রাখতে হবে, 10^6 গুণ অবস্থায় থাকলে মিলিয়ন, একইভাবে 10^9 থাকলে বিলিয়ন ও 10^{12} থাকলে ট্রিলিয়ন হবে]

[ঐকিক নিয়মের অংক সহজে অনুপাত ধরে করা যাবে। সেক্ষেত্রে সমানুপাতিক রাশি হলে অনুপাতের একই পাশে একই জাতীয় রাশি বসাতে হবে।]

31. 20 people can do a work in 12 days. If 10 people left the work after 8 days, how many days will the rest of the people take to complete the work?

A. 6 B. 8 C. 12 D. 10 E. None of these

সমাধান: 20 জন কাজটি শেষ করতে পারে 12 দিনে

$\therefore$ দিন বাকি থাকে $(12 - 8) = 4$ দিনে

লোক বাকি থাকে $(20 - 10) = 10$ জন

$\therefore$ 20 জন শ্রমিক শেষ করতে পারে 4 দিনে

1 জন শ্রমিক শেষ করতে পারে 4×20 দিনে

10 জন শ্রমিক শেষ করতে পারে $\left(\frac{4\times20}{10}\right)$ দিনে

= 8 দিনে

বিকল্প সমাধান: 20 জন 8 দিনে শেষ করে $\frac{8}{12}$ বা $\frac{2}{3}$ অংশ

$\therefore$ কাজ বাকি থাকে = $\frac{1}{3}$ অংশ

20 জন $\frac{2}{3}$ অংশ করে 8 দিনে

1 জন $\frac{2}{3}$ অংশ করে 8×20 দিনে

1 জন 1 অংশ করে $\frac{8\times20}{\frac{2}{3}}$ বা $\frac{8\times20\times3}{2}$ দিনে

10 জন $\frac{1}{3}$ অংশ করে $\frac{8\times20\times3}{10\times2} \times \frac{1}{3}$ দিনে

= 8 দিনে

বিকল্প সমাধান: $\frac{M_1D_1H_1}{W_1} = \frac{M_2D_2H_2}{W_2}$

ধরি, অসম্পূর্ণ কাজ x দিনে শেষ হবে।

$\therefore \frac{20\times12}{1} = \frac{(20\times8)+(10\times x)}{1}$

$\Rightarrow 20 \times 12 = 20 \times 8 + 10 \times x$

$\Rightarrow 4 \times 20 = 10 \times x$

$\therefore x = 8$

32. A hunting lodge has enough fuel to keep 20 rooms heated for fourteen days. If the lodge decides to save fuel by turning off the heat in 5 unoccupied rooms, and each room requires the same amount of fuel to heat it, how many extra FULL days will the fuel supply last? [IBA MBA Dec' 2020]

A. 3 B. 4 C. 5 D. 18 E. 19

সমাধান: (B). Current Fuel Capacity= 20 rooms × 14days

=20 ×rooms-days

5টি রুম turn off করে দিলে Room সংখ্যা 15.

ধরি, এই 15টি x দিন চালানো যাবে; তাহলে, Fuel capacity=15x Rooms-Days

$20 \times 14 = 15x \Rightarrow x = 18\frac{2}{3}\ days$; Extra days= $18\frac{2}{3} - 14 = 4\frac{2}{3} \approx$ 4দিন

33. A short distance athlete has been 60 seconds to cover 100 meters. If he makes 30 steps in 9 seconds how many steps has he taken in that time?

A. 130 B. 170 C. 173 D. 188 E. None of these

Solution: অ্যাথলিটটি 9 সেকেন্ডে যায় = 30 স্টেপস

$\therefore$ অ্যাথলিটটি 1 সেকেন্ডে যায় = $\frac{30}{9}$ স্টেপস

$\therefore$ অ্যাথলিটটি 60 সেকেন্ডে যায় = $\frac{30\times60}{9}$ বা, 200 স্টেপস

Answer: E. None of these

34. A man's regular pay is taka 30 per hour up to 40 hours. Overtime is twice the payment for regular time. If he was paid tk. 1680, how many hours overtime did he work?

A. 8 B. 16 C. 6 D. 20 E. 28

Solution: লোকটির 1 ঘণ্টার regular pay = 30 টাকা

$\therefore$ লোকটির 40 ঘণ্টার regular pay = $(30 \times 40) = 1200$ টাকা

$\therefore$ Overtime করে উপার্জন = $(1680 - 1200) = 480$ টাকা

বলা হয়েছে, Overtime এর আয় regular pay এর দ্বিগুণ, অর্থাৎ Overtime এ 1 ঘণ্টার আয় = $(30 \times 2) = 60$ টাকা

$\therefore$ 480 টাকা উপার্জন করতে সময় লাগে = $\frac{480}{60} = 8$ ঘণ্টা

Answer: A. 8

35. The rent of a guest house was tk. 50 per day for first three days, tk. 100 per day for next 5 days and tk. 300 per day for other days. The registration fee in the beginning is tk. 50. If one has to pay tk. 1300, for how many days he availed of this facility?

A. 8 B. 10 C. 12 D. 15 E. 18

Solution: গেস্ট হাউজের রেজিস্ট্রেশন ফি = 50 টাকা

50 টাকা হারে প্রথম 3 দিনের ভাড়া = $(50 \times 3) = 150$ টাকা

100 টাকা হারে পরবর্তী 5 দিনের ভাড়া = $(100 \times 5) = 500$ টাকা

300 টাকা হারে পরবর্তী x দিনের ভাড়া = $300 \times x = 300x$ টাকা

শর্তমতে, $50 + 150 + 500 + 300x = 1300$

$\Rightarrow 700 + 300x = 1300$

$\Rightarrow 300x = 1300 - 700$

$\Rightarrow 300x = 600$

$\Rightarrow x = \frac{600}{300}$

$\Rightarrow x = 2$ দিন

$\therefore$ লোকটি 1300 টাকায় মোট $3 + 5 + 2 = 10$ দিন থাকতে পারবে।

Answer: B. 10

36. A company employs 15 persons working 44 hours a week. If 4 persons are ill, how many hours a week would the rest have to work to make up the work force lost?

A. 40 B. 50 C. 55 D. 60 E. 65

Solution: 4 জন শ্রমিক চলে যাওয়াতে শ্রমিকের সংখ্যা = $(15 - 4) = 11$ জন

15 জন লোকে কাজটি করে = 44 ঘণ্টায়

∴ 1 জন লোকে কাজটি করে = (44×15) ঘণ্টায়

∴ 11 জন লোকে কাজটি করে = $\frac{44\times15}{11} = 60$ ঘণ্টায়

Answer: D. 60

37. A group of workers promise to complete a piece of work in 10 days, but five of them do not report for work. If it took the remaining workers 12 days to complete the work, then the number of workers originally hired was-

A. 15 B. 20 C. 25 D. 30 E. 35

Solution: ধরি, মোট শ্রমিকের সংখ্যা x

5 জন না আসায় শ্রমিকের সংখ্যা দাঁড়ায় $(x - 5)$

শর্তমতে, $x \times 10 = (x - 5) \times 12$

$\Rightarrow 10x = 12x - 60$

$\Rightarrow 10x - 12x = -60$

$\Rightarrow -2x = -60$

$\Rightarrow x = \frac{-60}{-2}$

$\Rightarrow x = 30$

Answer: D. 30

38. Siam needs m minutes to do a task. After he works for k minutes, what part of the task remain incomplete?

A. $\frac{k}{m}$ B. $\frac{m}{k}$ C. $\frac{m-k}{m}$ D. $\frac{m}{m-k}$ E. None of these

Solution: দেওয়া আছে, কাজটি করতে সময় লাগে = m মিনিট

k মিনিট কাজ করার পরে কাজটি শেষ করতে সময় লাগবে = $m - k$

যেহেতু m মিনিটে শেষ হয় কাজটির পুরো বা 1 অংশ

∴ 1 মিনিটে শেষ হয় = $\frac{1}{m}$ অংশ

∴ $m - k$ মিনিটে শেষ হয় = $\frac{m-k}{m}$ অংশ

Answer: C. $\frac{m-k}{m}$

39. A conveyor belt delivers baggage at the rate of 3 tons in 5 minutes and a second conveyor belt delivers baggage at the rate of 1 ton in 2 minutes. How much time will it take to get 33 tons of baggage delivered using both the conveyor belts together?

A. 30 mins B. 25 min C. 45 min D. 35 min E. 21 min

Solution: প্রথম বেল্টের মাধ্যমে 1 মিনিটে ব্যাগ ডেলিভারি হয় = $\frac{3}{5}$ টন

এবং দ্বিতীয় বেল্টের মাধ্যমে 1 মিনিটে ব্যাগ ডেলিভারি হয় = $\frac{1}{2}$ টন

∴ দু'টি বেল্ট একত্রে 1 মিনিটে ব্যাগ ডেলিভারি করে = $\frac{3}{5} + \frac{1}{2} = \frac{6+5}{10} = \frac{11}{10}$ টন

অতএব, $\frac{11}{10}$ টন ব্যাগ ডেলিভারি হয় = 1 মিনিটে

∴ 1 টন ব্যাগ ডেলিভারি হয় = $\frac{1}{\frac{11}{10}}$ মিনিটে

∴ 33 টন ব্যাগ ডেলিভারি হয় = $\left(\frac{10}{10} \times 33\right) = 30$ মিনিটে

Answer: A. 30 mins

40. A hostel has a food reserve for 500 people of 20 days. If 200 people left the hostel after 5 days, how many days will the food last? [আরডিএ বগুড়া (সহকারী পরিচালক) ২০২১]

A. 20 days B. 22 days C. 25 days D. 30 days

সমাধান: লোক সংখ্যা = $500 - 200 = 300$ জন।
সময় = $20 - 5 = 15$ দিন
500 জনের চলে 5 দিন
∴ 1 জনের চলে = 15×500 দিন
∴ 300 জনের চলে = $\frac{15\times500}{300} = 25$ দিন (উত্তর)

41. If 3 men or 6 boys can do a piece of work in 10 days, working 7 hours a day; how many day will it take to complete a piece of work twice as large with 6 men and 2 boys working together for 8 hours a day?
A. 6 B. 6.5 C. 7 D. 7.5 E. None of these
Solution: দেওয়া আছে, 3 Men = 6 Boys
∴ 1 Men = $\frac{6}{3} = 2$ Boys ... ... (i)
ধরি, কাজটি x দিনে শেষ হয়।
যেহেতু, 3 Men 7 ঘণ্টা ধরে কাজ করে কাজটি 10 দিনে শেষ করে, সুতরাং মোট কাজ = $3M \times 10 \times 7$ ... ... (ii)
আবার, 6 Men এবং 2 Boys একত্রে 8 ঘণ্টা কাজ করে ঐ কাজের দ্বিগুণ অর্থাৎ 2x দিনে কাজটি শেষ করে।
∴ মোট কাজ = $(6M + 2B) \times 8 \times 2x = (6M + 1M) \times 8 \times 2x$ [i নং থেকে]
(i) ও (ii) নং হতে পাই, $7M \times 8 \times 2x$ ... ... (iii)
(i) ও (ii) নং হতে পাই,
$3M \times 10 \times 7 = 7M \times 8 \times 2x$
$\Rightarrow 7M \times 8 \times 2x = 3M \times 10 \times 7$
$\Rightarrow 2x = \frac{3M\times10\times7}{7M\times8}$
$\Rightarrow x = \frac{15}{4} \times 2$
$\Rightarrow x = 7.5$
∴ 6 Men এবং 2 Boys একত্রে কাজটি 7.5 দিনে শেষ করতে পারে।
Answer: D. 7.5

42. 4 men and 6 women can complete a work in 8 days, while 3 men and 7 women can complete it in 10 days. In how many days will 10 women complete it?
A. 40 days B. 36 days C. 32 days D. 34 days E. None of these
Solution: 4 Men এবং 6 Women একত্রে 8 দিনে কাজটি করতে পারে।
∴ মোট কাজ = $(4M + 6W) \times 8$ ... ... (i)
আবার, 3 Men এবং 7 Women একত্রে 10 দিনে কাজটি করতে পারে।
∴ মোট কাজ = $(3M + 7W) \times 10$ ... ... (ii)
শর্তমতে, $(4M + 6W) \times 8 = (3M + 7W) \times 10$ [(i) ও (ii) নং হতে]
$\Rightarrow$ 32M + 48W = 30M + 70W
$\Rightarrow 32M - 30M = 70W - 48W$
$\Rightarrow 2M = 22W$
$\Rightarrow M = 11W$
অর্থাৎ 1 জন পুরুষ 11 জন মহিলার সমান কাজ করে।
M = 11W, (i) নং সমীকরণে বসালে মোট কাজ পাওয়া যাবে, অর্থাৎ = $(4 \times 11 + 6) \times 8$ ইউনিট = 400 ইউনিট
∴ 400 ইউনিট কাজ করতে 10 জন Women এর সময় লাগবে = $\frac{400}{10}$ দিন = 40 দিন (Answer: A. 40 days)

43. A contract to be completed in 46 days and 117 men were set to work, each working 8 hours a day. After 33 days, $\frac{4}{7}$ of the work is completed. How many additional men may be employed so that the work may be completed in time, each man now working 9 hours a day?
A. 80 B. 71 C. 61 D. 81 E. None of these
Solution: কাজ অবশিষ্ট রইল = $1 - \frac{4}{7} = \frac{7-4}{7} = \frac{3}{7}$
সময় রইল = $46 - 33 = 13$ দিন
ধরি, মোট শ্রমিক সংখ্যা = x জন
এখানে, কাজের পরিমাণ = $\frac{4}{7} : \frac{3}{7}$

সময় $= 13:33 :: 117:x$

ঘণ্টা $= 9:8$

সুতরাং, $\frac{4}{7} \times 13 \times 9 \times x = \frac{3}{7} \times 33 \times 8 \times 117$ [MDH পদ্ধতিতে]

$\Rightarrow x = \frac{3\times33\times8\times117}{4\times13\times9}$

$\Rightarrow x = 198$

$\therefore$ মোট শ্রমিক $= 198$ জন

$\therefore$ অতিরিক্ত নিয়োগ করতে হবে $= (198 - 117) = 81$ জন

Answer: D. 81

44. If 30 men renovate $\frac{1}{2}$ of room space in 120 days, how many days would 80 men require to renovate $\frac{1}{3}$ of the remaining room space. Assuming each person works at the same rate? [IBA MBA June 2018]

A. 15 B. 30 C. 60 D. 120 E. None of these

Solution: ধরি, কক্ষটি সম্পূর্ণ সংস্কার করতে x দিন লাগবে।

যেহেতু 30 জন মানুষ 120 দিন কাজ করে কক্ষটির $\frac{1}{2}$ অংশ সংস্কার করে, তাহলে

$30 \times 120 = \frac{1}{2}x$

$\Rightarrow 3600 = \frac{x}{2}$

$\Rightarrow 7200 = x$

$\therefore x = 7200$

আবার, অবশিষ্ট কাজ অর্থাৎ $\left(1 - \frac{1}{2}\right)$ বা $\frac{1}{2}$ এর $\frac{1}{3}$ অংশ $= \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$ অংশ করতে 1 জন শ্রমিকের সময় লাগবে $=$ x এর $\frac{1}{6} = 7200 \times \frac{1}{6}$ $= 1200$ দিন

$\therefore$ 1 জন কাজটি করতে পারে $= 1200$ দিনে

$\therefore$ 80 জন কাজটি করতে পারে $= \frac{1200}{80}$ দিনে বা 15 দিনে

Answer: A. 15

বিকল্প সমাধান: 30 জন $\frac{1}{2}$ রুম মেরামত করে 120 দিনে

30 জন সম্পূর্ণ রুম মেরামত করে (120×2) দিনে

1 জন সম্পূর্ণ রুম মেরামত করে (240×30) দিনে

80 জন সম্পূর্ণ রুম মেরামত করে $\left(\frac{240\times30}{80}\right)$ দিনে

বাকি অংশের $\frac{1}{3}$ অংশ $= \frac{1}{3}\left(\frac{1}{2}\right) = \frac{1}{6}$ অংশ

80 জন $\frac{1}{6}$ অংশ মেরামত করে $= \frac{240\times30}{80\times6} = 15$ দিন

উত্তর: A.15

45. Babu can paint a house three times faster than Ali can paint. If working together, it takes Ali and Babu 24 hours to paint the house, then how many hours will it take Babu to paint the house alone?

A. 24 B. 38 C. 30 D. 32 E. None of these

Solution: ধরি, ঘরটি রং করতে বাবুর সময় লাগে = x দিন

$\therefore$ ঘরটি রং করতে আলীর সময় লাগে = 3x দিন

বাবু 1 ঘণ্টায় করতে পারে কাজটির $\frac{1}{x}$ অংশ

আলী 1 ঘণ্টায় করতে পারে কাজটির $\frac{1}{3x}$ অংশ

এবং তারা একত্রে 1 ঘণ্টায় করতে পারে কাজটির $\frac{1}{24}$ অংশ

শর্তমতে, $\frac{1}{x} + \frac{1}{3x} = \frac{1}{24}$

$\Rightarrow \frac{3+1}{3x} = \frac{1}{24}$

$\Rightarrow \frac{4}{3x} = \frac{1}{24}$

$\Rightarrow 3x = 24 \times 4$

$\Rightarrow x = \frac{24\times4}{3}$

$\therefore x = 32$
অতএব, বাবু একা 32 ঘণ্টায় রং করতে পারে।

Shortcut: $\frac{3x \times x}{3x+x} = 24$
$\Rightarrow \frac{3x^2}{4x} = 24$
$\Rightarrow 3x = 4 \times 24$
$\Rightarrow x = 32$
Answer: D. 32

46. Working independently, X takes 12 hours to finish a certain work. He finishes $\frac{2}{3}$ of the work. The rest is finished by Y whose rate is $\frac{1}{10}^{\text{th}}$ of x. In how many hours does y finish the work? [IBA MBA Dec'15]

A. 40 B. 50 C. 60 D. 70 E. None of these

সমাধান: x কাজটি শেষ করতে পারে = 12 ঘণ্টায়
$\therefore$ x 1 ঘণ্টায় করে কাজটির = $\frac{1}{12}$ অংশ
আবার, বলা আছে y এর কাজ করার হার x এর $\frac{1}{10}$ অংশ।
$\therefore$ y 1 ঘণ্টায় করে কাজটির = $\frac{1}{12} \times \frac{1}{10} = \frac{1}{120}$ অংশ।
x কাজটির $\frac{2}{3}$ করার পর বাকি থাকে $=1 - \frac{2}{3} = \frac{1}{3}$ অংশ।
এখন, কাজটির $\frac{1}{120}$ অংশ করতে y সময় নেয় = 1 ঘণ্টা
$\therefore$ কাজটির 1 অংশ করতে y সময় নেয় = $\frac{1}{\frac{1}{120}}$ ঘণ্টা।
$\therefore$ কাজটির $\frac{1}{3}$ অংশ করতে y সময় নেয় = $120 \times \frac{1}{3} = 40$ ঘণ্টা।
উত্তর ঃ A

47. A and B working together can finish a job in x days. If A works alone and completes the job, he will take $x + 4$ days. If B woks alone and completes the same job, he will take $x + 16$ days. What is x? [IBA MBA June 2016]

A. 4 B. 6 C. 8 D. 10 E. None of these

Solution: A একা 1 দিনে করে কাজটির $\frac{1}{x+4}$ অংশ
এবং B একা 1 দিনে করে কাজটির $\frac{1}{x+16}$ অংশ
যেহেতু, A এবং B একত্রে x দিনে কাজটি শেষ করে, সুতরাং A এবং B একত্রে 1 দিনে করে কাজটির $\frac{1}{x}$ অংশ।
শর্তমতে, $\frac{1}{x+4} + \frac{1}{x+16} = \frac{1}{x}$
$\Rightarrow \frac{1}{x+4} = \frac{1}{x} - \frac{1}{x+16}$
$\Rightarrow \frac{1}{x+4} = \frac{x+16-x}{x(x+16)}$
$\Rightarrow \frac{1}{x+4} = \frac{16}{x^2+16x}$
$\Rightarrow x^2 + 16x = 16(x + 4)$
$\Rightarrow x^2 + 16x = 16x + 64$
$\Rightarrow x^2 = 64$
$\Rightarrow x = 8$ [ধনাত্মক মান নিয়ে]

বিকল্প সমাধান-১: A ও B একত্রে কাজটি শেষ করতে পারে = x দিনে।
$\therefore$ A ও B একত্রে 1 দিনে করে কাজটির = $\frac{1}{x}$ অংশ।
A কাজটি শেষ করতে পারে = $x + 4$ দিনে।
$\therefore$ A 1 দিনে করে কাজটির = $\frac{1}{x+4}$ অংশ।
আবার, B কাজটি শেষ করতে পারে = $x + 16$ দিনে।
$\therefore$ B 1 দিনে করে কাজটির $\frac{1}{x+16}$ অংশ।

প্রশ্নমতে, $\frac{1}{x} = \frac{1}{x+4} + \frac{1}{x+16} \Rightarrow \frac{1}{x} = \frac{x+16+x+4}{(x+4)(x+16)} \Rightarrow \frac{1}{x} = \frac{2x+20}{x^2+20x+64}$

$\Rightarrow 2x^2 + 20x = x^2 + 20x + 64 \Rightarrow x^2 = 64 \therefore x = 8$

উত্তর ঃ C

বিকল্প সমাধান-২: এই ধরণের অংকে; যেখানে $A + B = x$, $A = x +$ something এবং B = $x +$ something দেয়া থাকে; সেখান থেকে x এর মান বের করার সূত্র হলো, $x = \sqrt{AB} \Rightarrow x = \sqrt{4 \times 16} \Rightarrow x = 8$

48. 50 persons can do a work in 12 day's by working 8 hours a day. Working how many hours per day can 60 persons finish the work in 16 days? [BEPZA (Asst. Manager)-21]

A. 8 hours B. 6 hours C. 5 hours D. 4 hours

সমাধান: 50 জন 12 দিনে শেষ করে 8 ঘণ্টা কাজ করে

1 জন 1 দিনে শেষ করে $(8 \times 50 \times 12)$ ঘন্টা কাজ করে

60 জন 16 দিনে শেষ করে $\frac{8\times50\times12}{60\times16}$ ঘণ্টা কাজ করে

$= 5$ ঘণ্টা

[লোক ও দিন কমলে সময় বেড়ে যায়। তাই এরা ব্যস্তানুপাতিক। প্রথম ক্ষেত্রে গুণ হয় ও দ্বিতীয় ক্ষেত্রে ভাগ হয়]

49. Three workers can do a job in 20 days. Two of the workers work twice as fast as the third. How long would it take one of the faster workers to do the job himself? [One Bank (PO) 2008]

A. 10 days B. 15 C. 20 D. 50

সমাধান: 1 faster person = 2 slower person

So, 2 faster + 1 slower = 5 slower person

5 slower person can do the work in 20 days

1 slower person can do the work in $5 \times 20 = 100$ days

As, 2 slower person = 1 faster then,

1 faster person can do the work in $\frac{100}{2} = 50$ days (Answer)

50. A company makes a certain product for 30 hours using three machines A, B and C. A makes 36 units per 6 hours, B makes 6 Units per 12 hours, C make 33 units per 12 hours. The company uses Machines B and C for the first 12 hours, then uses A and B for he next 6 hours and for the remaining of the time it uses A and C to make the product. What is the total amount of product made by this schedule? [IBA MBA Dec' 2020]

A. 181 B. 183 C. 168 D. 175 E. None of these

সমাধান: (E) ধরি, Rate of work of Machine A, B, C যথাক্রমে

R_A, R_B, R_C

$R_A = \frac{36}{6} = 6$ units/hr

$R_B = \frac{6}{12} = \frac{1}{2}$ units/hr

$R_C = \frac{33}{12} = \frac{11}{6}$ units/hr

প্রথম 12 ঘণ্টায় Machine C ও B করে = $12\frac{1}{2} + 12\frac{11}{6} = 28$ units

Next 6 ঘণ্টায় Machine A ও B produce করে $= 6 \times 6 + \frac{1}{2} \times 6 = 39\ units$

Remaining 12 ঘণ্টায় A ও C produce করে = $12 \times 6 + 12 \times \frac{11}{6} = 94\ units$

Total produce units $= 28 + 39 + 94 = 161\ units$

51. Rakib can complete a task in 30 minutes and together with his brother Momin, he can complete the task in 20 minutes. How long would it take for Momin working alone to complete the task?

A. 30 minutes B. 40 minutes C. 50 minutes D. 60 minutes E. None of these

Solution: ধরি, পুরো কাজ = 1 অংশ

রাকিব একা 1 মিনিটে করতে পারে $\frac{1}{30}$ অংশ কাজ

এবং রাকিব ও মোমিন একত্রে 1 মিনিটে করতে পারে $\frac{1}{20}$ অংশ কাজ

∴ মোমিন একা 1 মিনিটে করতে পারে = $\left(\frac{1}{20}-\frac{1}{30}\right)$ অংশ কাজ = $\frac{3-2}{60}$ অংশ কাজ = $\frac{1}{60}$ অংশ কাজ

মোমিন $\frac{1}{60}$ অংশ কাজ করে = 1 মিনিটে

মোমিন 1 অংশ কাজ করে = $(1 \times 60) = 60$ মিনিটে

Answer: D. 60 minutes

52. Asif can do a job in 15 hours, and Rassel can do the same job in 9 hours. If they start doing the job together at 6 am and Rassel stops working at 9 am, at what time will Asif finish the job?

A. 2 pm B. 4 pm C. 5 pm D. 6 pm E. None of these

Solution: আসিফ 1 ঘণ্টায় করে কাজটির $\frac{1}{15}$ অংশ

এবং রাসেল 1 ঘণ্টায় করে কাজটির $\frac{1}{9}$ অংশ

তাহলে, আসিফ এবং রাসেল একত্রে 1 ঘণ্টায় করে কাজটির = $\left(\frac{1}{15}+\frac{1}{9}\right)$ অংশ = $\frac{3+5}{45}$ অংশ = $\frac{8}{45}$ অংশ

∴ আসিফ এবং রাসেল (6am to 9am) বা 3 ঘণ্টায় করে কাজটির = $\frac{8}{45} \times 3 = \frac{8}{15}$ অংশ

∴ অবশিষ্ট কাজ = $\left(1-\frac{8}{15}\right) = \frac{15-8}{15} = \frac{7}{15}$ অংশ

এখন, আসিফ $\frac{1}{15}$ অংশ কাজ করে = 1 ঘণ্টায়

∴ আসিফ 1 অংশ কাজ করে = (1×15) ঘণ্টায়

∴ আসিফ $\frac{7}{15}$ অংশ কাজ করে = $\frac{15 \times 7}{15}$ ঘণ্টায় বা 7 ঘণ্টায়

∴ আসিফ অবশিষ্ট কাজ শেষ করে $(9am + 7hour)$ অর্থাৎ 4 pm এ।

Answer: B. 4 pm

53. Mukit can do a work in 8 days while his collegues Asad takes 12 days and Mithun takes 16 days to complete the same. Mukit and Asad started the work and after few days Asad left the work keeping it incomplete. Rest of the work was completed by Mukit and Mithun in 2 days. How long it took to complete the whole work?

A. 4 days B. 5 days C. 6 days D. 8 days E. 5.5 days

Solution: ধরি, মোট কাজ = 48 একক [8, 12, 16 এর ল.সা.গু]

যেখানে, মুকিতের কর্মদক্ষতা = $\frac{48}{8}$ একক = 6 একক

আসাদের কর্মদক্ষতা = $\frac{48}{12}$ একক = 4 একক

মিথুনের কর্মদক্ষতা = $\frac{48}{16}$ একক = 3 একক

আবার, ধরি, সম্পূর্ণ কাজটি করতে P দিন সময় লাগে

শর্তমতে, $(x-2)(6+4)+2(6+3) = 48$

$\Rightarrow 10(x-2)+2 \times 9 = 48$

$\Rightarrow 10x-20+18 = 48$

$\Rightarrow 10x-2 = 48$

$\Rightarrow 10x = 50$

$\Rightarrow x = \frac{50}{10}$

$\therefore x = 5$

∴ সম্পূর্ণ কাজটি করতে 5 দিন সময় লেগেছে।

Answer: B. 5 days

54. Faruk can complete a job in 12 hours, and Jamal can complete the same job in 8 hours. Faruk starts the job at 9 am and stops working at 3 pm. If Jamal starts working at 4 pm to complete the job, at what time is the job finished? [IBA MBA June 2012]

A. 6 pm B. 7 pm C. 8 pm D. 10 pm E. 12 pm

সমাধান: ফারুক কাজ 9am এ শুরু করে ও 3pm এ শেষ করে অর্থাৎ মোট 6 ঘণ্টা কাজ করে।

ফারুক, 12 ঘণ্টায় শেষ করতে পারে কাজের = 1 অংশ

∴ 1 ঘণ্টায় শেষ করতে পারে কাজের = $\frac{1}{12}$ অংশ

∴ 6 ঘণ্টায় শেষ করতে পারে কাজের = $\frac{6}{12} = \frac{1}{2}$ অংশ

বাকি কাজ $= \left(1 - \frac{1}{2}\right) = \frac{1}{2}$ অংশ জামাল শেষ করে

জামাল সম্পূর্ণ বা 1 অংশ কাজ শেষ করে $= 8$ ঘণ্টায়

$\therefore \frac{1}{2}$ অংশ কাজ শেষ করে $= 8 \times \frac{1}{2} = 4$ ঘন্টায়

অর্থাৎ জামাল বাকি কাজটুকু 4pm এ শুরু করে 4 ঘণ্টা পর 8pm এ শেষ করে।

উত্তর ঃ C

55. Kobita and Bobita can do a piece of work in 24 days. If Sunita works alone for the last 6 days, it is completed in 26 days. How long would Bobita take to do the work alone?

A. 20 days B. 36 days C. 72 days D. 24 days E. None of these

Solution: ধরি, মোট কাজ = 1 একক

কবিতা এবং ববিতা একত্রে 1 দিনে করে কাজটির $\frac{1}{24}$ অংশ

$\therefore$ তারা একত্রে $(26 - 6) = 20$ দিনে করে কাজটির $\left(\frac{1}{24} \times 20\right) = \frac{5}{6}$ অংশ

অতএব, অবশিষ্ট কাজ $= 1 - \frac{5}{6} = \frac{6-5}{6} = \frac{1}{6}$ অংশ, যা কবিতা 6 দিনে করে

কবিতা 6 দিনে করে কাজটির $\frac{1}{6}$ অংশ

$\therefore$ কবিতা 1 দিনে করে কাজটির $\frac{\frac{1}{6}}{6} = \frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$ অংশ

আবার, ববিতা 1 দিনে করে কাজটির $\left(\frac{1}{24} - \frac{1}{36}\right) = \frac{3-2}{72} = \frac{1}{72}$ অংশ

$\therefore$ ববিতা $\frac{1}{72}$ অংশ কাজ করে $= 1$ দিনে

ববিতা 1 অংশ কাজ করে $= (1 \times 72) = 72$ দিনে

Answer: C. 72 days

56. A, B and C can do a work in 5 days, 10 days and 15 days respectively. They started together to do the work but after 2 days A and B left. C did the remaining work in how many days? [Islamic Bank (PO) 10]

A. 1 B. 3 C. 4 D. 5

সমাধান: A 5 দিনে করে কাজের 1 অংশ

$\therefore$ A 1 দিনে করে $= \frac{1}{5}$ অংশ

B 10 দিনে করে কাজের 1 অংশ

$\therefore$ B 1 দিনে করে কাজের $\frac{1}{10}$ অংশ

C 15 দিনে করে কাজের 1 অংশ

$\therefore$ C 1 দিনে করে কাজের $\frac{1}{15}$ অংশ

এখন, A, B, C একত্রে 1 দিনে করে কাজের $= \frac{1}{5} + \frac{1}{10} + \frac{1}{15}$ অংশ

$= \frac{6+3+2}{30}$ অংশ

$= \frac{11}{30}$ অংশ

$\therefore$ A, B, C একত্রে 2 দিনে করে কাজের $= \frac{11}{30} \times 2 = \frac{22}{30}$ অংশ

$\therefore$ অবশিষ্ট কাজ থাকে (যা C-কে একা সম্পন্ন করতে হবে) $= \left(1 - \frac{22}{30}\right) = \frac{30-22}{30} = \frac{8}{30} = \frac{4}{15}$ অংশ

$\therefore$ অবশিষ্ট কাজ শেষ করতে C এর সময় লাগে $= \frac{\frac{4}{15}}{\frac{1}{15}} = \frac{4}{15} \times \frac{15}{1} = 4$ দিন। (উত্তর)

57. A can do a piece of work in 10 days, while B alone can do it in 15 days. They worked for 5 days and the rest work is done by C in 2 days. If they get tk. 4500 for the whole work, how much money will C get?

A. 2250 B. 1500 C. 750 D. 500

সমাধান: A, 1 দিনে করে কাজটির $= \frac{1}{10}$ অংশ

$\therefore$ A, 5 দিনে করে কাজটির $= \frac{5}{10} = \frac{1}{2}$ অংশ

আবার, B, 1 দিনে করে কাজটির $= \frac{1}{15}$ অংশ

$\therefore$ B, 5 দিনে করে কাজটির $= \frac{5}{15} = \frac{1}{3}$ অংশ

সুতরাং, A ও B একত্রে 5 দিনে করে কাজটির $= \frac{1}{2} + \frac{1}{3} = \frac{3+2}{6} = \frac{5}{6}$ অংশ

$\therefore$ অবশিষ্ট কাজ রইল $= 1 - \frac{5}{6} = \frac{6-5}{6} = \frac{1}{6}$ অংশ, যা C এর কাজ।

অতএব, A, B ও C এর কাজের অনুপাত $= \frac{1}{2} : \frac{1}{3} : \frac{1}{6} = \left(\frac{1}{2} \times 6\right) : \left(\frac{1}{3} \times 6\right) : \left(\frac{1}{6} \times 6\right) = 3 : 2 : 1$

$\therefore$ C এর প্রাপ্ত টাকা $= \left(4500O \times \frac{1}{6}\right) = 750$ টাকা

উত্তর: (গ) 750

58. A and B can do a piece of work in 45 and 40 days respectively. They began the work together but A leaves after some days and B finished the remaining work in 23 days. After how many days did A leave?

A. $7\frac{5}{9}$ days B. 8 days C. 9 days D. $14\frac{2}{5}$ days

সমাধান: A, 1 দিনে করে কাজটির $\frac{1}{45}$ অংশ

ধরি, কাজ শুরু হওয়ার x দিন পরে A চলে গিয়েছিল

তাহলে, A, x দিনে করে কাজটির $\frac{x}{45}$ অংশ

B, $(x + 23)$ দিনে করে কাজটির $\frac{(x+23)}{40}$ অংশ

প্রশ্নমতে,

$\frac{x}{45} + \frac{x+23}{40} = 1$ [পুরো কাজকে 1 একক ধরে]

$\Rightarrow \frac{8x+9(x+23)}{360} = 1$

$\Rightarrow \frac{8x+9x+207}{360} = 1$

$\Rightarrow 17x + 207 = 360$

$\Rightarrow x = \frac{360-207}{17}$

$\Rightarrow x = \frac{153}{17}$

$\Rightarrow x = 9$

$\therefore$ কাজ শুরু হওয়ার 9 দিন পর A চলে গিয়েছিল।

উত্তর: C. 9 days

Written Math

1. A manufacturing company uses two machines A and B with different production capacities. Where working alone machine A can produce a production lot in 5 hours and machine B can produce the same lot in x hours. When the two machine operate simultaneously to fill the same production lot, it takes them 2 hours to complete the job. How many hours will the machine B take to produce the production lot alone? [BCB (Officer) '06, Janata Bank (IT Officer) '16, BSC Combined Exam (SO-3 Banks) '18]

Solution: In 5 hours machine A can produce = 1 part

$\therefore$ In 1 hours machine A can produce $= \frac{1}{5}$ part

In x hours machine B can produce = 1 part

$\therefore$ In 1 hours machine B can produce $= \frac{1}{x}$ part

Again, In, 2 hours machine A and B together can produce = 1 part

$\therefore$ In, 1 hours machine A and B together can produce $= \frac{1}{2}$ part

ATQ, $\frac{1}{5} + \frac{1}{x} = \frac{1}{2}$ [A এবং B এর 1 ঘণ্টায় করা মোট উৎপাদনের পরিমাণের যোগফল = মোট উৎপাদনের $\frac{1}{2}$ অংশ]

$\Rightarrow \frac{1}{x} = \frac{1}{2} - \frac{1}{5}$

$\Rightarrow \frac{1}{x} = \frac{3}{10}$

$\Rightarrow 3x = 30$

$\therefore x = \frac{10}{3}$ So, B alone takes $= \frac{10}{3}$ hrs or 3.33 hrs or $3\frac{1}{3}$ hr or 3 hrs 20 mins (Answer)

2. Abir can do a piece of work in 80 days. He works for 10 days then Bashir alone finishes the rest of the work in 42 days. How much time would if take for the two of them together to complete the whole work? [BB (AD) 2006, 2017, Modhumoti Bank (PO) 2016, Bank Asia (MTO) 2017]

Solution: In 80 days Abir can do = 1 part

$\therefore$ In 1 day Abir can do = $\frac{1}{80}$ part

$\therefore$ In 10 days Abir can do = $\frac{10}{80} = \frac{1}{8}$ part

Rest of the work = $1 - \frac{1}{8} = \frac{8-1}{8} = \frac{7}{8}$ part

Bashir can do $\frac{7}{8}$ part of the work in 42 days

$\therefore$ Bashir can do 1 part of the work in $42 \times \frac{8}{7} = 48$ days

So, In 1 day Bashir can do = $\frac{1}{48}$ part

Now, In 1 day Abri and Bashir together can do = $\frac{1}{80} + \frac{1}{48} = \frac{3+5}{240} = \frac{8}{240} = \frac{1}{30}$ part

$\frac{1}{30}$ part is done by them in = 1 day

So, 1 part is done by them in = 30 days (Answer)

3. Working alone at their respective constant rates, A can complete a task in 'a' days and B in 'b' days. They take turns in doing the task with each working 2 days at a time. If A starts, they finish the task in exactly 10 days. If B starts, they take half a day more. How long does it take to complete the task if they both work together? [BSEC (AD) 2021]

Solution: Let, working alone at a constant rate if A takes 'a' days to complete a task, A will complete $\frac{1}{a}$ of the task in a day. Working alone at a constant rate if B takes 'b' days to complete a task, B will complete $\frac{1}{b}$ of the task in a day.

If A starts, they finish the task in exactly 10 days

Therefore, A will work on day 1, day 2, day 5, day 6, day 9, and day 10. i.e., for 6 days.

And B will work on day 3, day 4, day 7, and day 8. i.e., for 4 days.

In 6 days, A will complete $\frac{6}{a}$ of the task.

In 4 days, B will complete $\frac{4}{b}$ of the task.

With A working 6 days and B working 4 days, the task is completed.

$\frac{6}{a} + \frac{4}{b} = 1 \ldots\ldots\ldots\ldots\ldots (i)$

Again, If B starts, they finish the task in exactly 10.5 days.

Therefore, B will work on day 1, day 2, day 5, day 6, day 9, and day 10 i.e., for 6 days.

And A will work on day 3, day 4, day 7, day 8 and half a day on day 11 i.e., for 4.5 days.

In 6 days, B will complete $\frac{6}{b}$ of the task.

In 4 days A will complete $\frac{4.5}{a}$ of the task.

With B working 6 days and A working 4.5 days, the task is completed.

$\frac{4.5}{a} + \frac{6}{b} = 1 \ldots\ldots\ldots\ldots\ldots (ii)$

Subtract $(ii) \times 4$ from $(i) \times 6$

$\frac{36}{a} + \frac{24}{b} - \frac{18}{a} - \frac{24}{b} = 6 - 4$

$\Rightarrow \frac{36}{a} - \frac{18}{a} = 2$

$\Rightarrow \frac{36-18}{a} = 2$

$\Rightarrow 2a = 18$

$\Rightarrow a = \frac{18}{2}$

$\therefore a = 9$

Put the value of $a = 9$ in equation (i)

$\frac{6}{9} + \frac{4}{b} = 1$

$\Rightarrow \frac{4}{b} = 1 - \frac{2}{3}$

$\Rightarrow \frac{4}{b} = \frac{3-2}{3}$

$\Rightarrow \frac{4}{b} = \frac{1}{3}$

$\Rightarrow b = 12$

Working together A and B will complete $\frac{1}{9} + \frac{1}{12} = \frac{4+3}{36} = \frac{7}{36}^{\text{th}}$ of the task in a day.

Hence, they will complete the task in $\frac{36}{7}$ days or $5\frac{1}{7}$ days. (Answer)

4. P and Q can complete a work in 15 days and 10 days respectively. They started the work together and then Q left after 2 days. P alone completed the remaining work. How many days in total it took to finish the work?

Solution: Work done by P in 1 day = $\frac{1}{15}$ & Work done by Q in 1 day = $\frac{1}{10}$

Work done by P and Q in 1 day = $\frac{1}{15} + \frac{1}{10} = \frac{3+2}{30} = \frac{5}{30} = \frac{1}{6}$

Work done by P and Q in 2 days = $2 \times \frac{1}{6} = \frac{1}{3}$

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

Time taken by P to complete the remaining work = $\frac{2}{3} \div \frac{1}{15} = \frac{2}{3} \times \frac{15}{1} = 10$ days

Total time taken = $2 + 10 = 12$ days

Alternate approach: Let, to complete the whole work in x days

P can complete a work 1 days = $\frac{1}{15}$ days

Q can complete a work 1 days = $\frac{1}{10}$ days

According to the question,

$x \times \frac{1}{15} + 2 \times \frac{1}{10} = 1$

$\Rightarrow \frac{x}{15} + \frac{1}{5} = 1$

$\Rightarrow \frac{x+3}{15} = 1$

$\Rightarrow x + 3 = 15$

$\Rightarrow x = 15 - 3$

$\therefore x = 12$ days (Answer)

5. A, B, and C can complete a piece of work in 16, 32, and 48 days, respectively. They started working together but C left after working 4 days and B left 2 days before the completion of the work. How many days it took in total to complete the work?

সমাধান: Let the work be finished in x days

A works for = x days

B works for = $x - 2$ days

C works for = 4 days

Work done by A in 1 day = $\frac{1}{16}$

$\therefore$ Work done by A in x day = $\frac{x}{16}$

Again, Work done by B in 1 day = $\frac{1}{32}$

$\therefore$ Work done by B in $(x-2)$ day = $\frac{x-2}{32}$

Again, Work done by C in 1 day = $\frac{1}{48}$

$\therefore$ Work done by C in 4 day = $\frac{4}{48} = \frac{1}{12}$

According to the question,

$\frac{x}{16} + \frac{x-2}{32} + \frac{1}{12} = 1$

$\Rightarrow x = 10\frac{4}{9}$ days (Answer)

6. A, B and C started a job which they can complete in 2 days. B can do the job in 5 days and C can do it in 4 days. After working for 1 day, both B and C left. How long would it take A to complete the rest of the job? [Madhumoti Bank (PO) 2017]

সমাধান: Let time required by A to complete the remaining work is = x days & total time by A = y

In first 1 day $(A + B + C)$ have done $\frac{1}{2}$

So, work left after 1 day = $1 - \frac{1}{2} = \frac{1}{2}$ part; $\frac{x}{y} = \frac{1}{2}$ or, $y = 2x$ ... ... (i)

Again, $\frac{x+1}{y} + \frac{1}{5} + \frac{1}{4} = 1$ [B+C মোট 1 দিন করে কাজ করলেও A করেছে $1 + x$ দিন, সব কাজ = 1 অংশ]

$\Rightarrow \frac{20x+20+4y+5y}{20y} = 1$

$\Rightarrow 20x + 9y + 20 = 20y$

$\Rightarrow 20x - 11y = -20$

$\Rightarrow 20x - 22x = -20$ [from (i) y = 2x]

$\Rightarrow -2x = -20$

$\therefore x = 10$

Alternate approach: (by fraction)

$A + B + C$ can do in 1 day = $\frac{1}{2}$ part

$\therefore$ Work left = $1 - \frac{1}{2} = \frac{1}{2}$ part

Again, B and C have done in 1 day = $\frac{1}{5} + \frac{1}{4} = \frac{4+5}{20} = \frac{9}{20}$ part

$\frac{1}{20}$ part of work complete by A in = 1 day

$\therefore$ 1 part of work complete by A in = 1×20 day

$\therefore \frac{1}{2}$ part of work complete by A in = $20 \times \frac{1}{2} = 10$ days (Answer)

7. A, B and C can do a piece of work in 24 days, 30 days & 40 days respectively. They began the work together but C left 4 days before the completion of the work. In how many days was the work completed?

সমাধান: One day's work of A, B and C = $\left(\frac{1}{24} + \frac{1}{30} + \frac{1}{40}\right) = \frac{1}{10}$

C leaves 4 days before completion of the work, which means only A and B during the last 4 days.

Work done by A and B together in the last 4 days = $4\left(\frac{1}{24} + \frac{1}{30}\right) = \frac{3}{10}$

Remaining work = $\frac{7}{10}$, which was done by A, B, C in the initial number of days.

Number of days required for this initial work = 7 days.

Thus, the total numbers of days required = $4 + 7 = 11$ days. (Answer)

8. A and B can do a piece of work in 15 days and 10 days respectively. Both work together for 3 days and then A leaves off. In how many days the work be completed?

সমাধান: Here, A can do 1 day = $\frac{1}{15}$ part of work,

and B can do in 1 day = $\frac{1}{10}$ part of work

both A and B can do in 1 day = $\frac{1}{15} + \frac{1}{10} = \frac{1}{6}$ part of work

both A and B can do in 3 days = $\frac{1}{6} \times 3 = \frac{1}{2}$ part

$\therefore$ remaining work = $1 - \frac{1}{2} = \frac{1}{2}$

B can do 1 part in = 10 days

$\therefore$ B can do $\frac{1}{2}$ part of work in = $10 \times \frac{1}{2} = 5$ days

$\therefore$ Total time = [3 (together) + 5 (alone)] = 8 days (Answer)

9. Arif and Babu worked together to paint a house. Arif worked for 1 hour 45 minutes and Babu worked for 45 minues. Babu's hourly rate is double the rate of Asif's. If they together earned tk. 71.50, what is hourly rate of Arif in taka?

Solution: ধরি, আরিফের 1 মিনিটের পারিশ্রমিক = x টাকা

∴ আরিফের 1 ঘণ্টা 45 মিনিট বা 105 মিনিটের পারিশ্রমিক = 105x টাকা

আবার, বাবুর ১ মিনিটের পারিশ্রমিক = 2x টাকা

∴ বাবুর 45 মিনিটের পারিশ্রমিক = $(2x \times 45) = 90x$ টাকা

শর্তমতে, $105x + 90x = 71.50$

$\Rightarrow 195x = 71.50$

$\Rightarrow x = \frac{71.50}{195}$

$\Rightarrow x = 0.367$

আরিফের 1 মিনিটের উপার্জন = 0.367

∴ আরিফের 60 মিনিটের উপার্জন = $60 \times 0.367 = 22$ টাকা

Answer: 22 taka

10. If Arif works alone he will take 20 more hours to complete a task than if he works with Babu to complete the task. If Babu work alone, he will take 5 more hours to complete the task than if he works with Arif to complete the task. What is the ratio of the time taken by Arif to time taken by Babu if each of them works alone to complete the task?

Solution: ধরি, আরিফ ও বাবু একত্রে x ঘণ্টায় কাজটি করতে পারে।

∴ আরিফ একা কাজটি করতে পারে = $x + 20$ ঘণ্টায়

এবং বাবু একা কাজটি করতে পারে = $x + 5$ ঘণ্টায়

শর্তমতে, $\frac{1}{x+20} + \frac{1}{x+5} = \frac{1}{x}$

$\Rightarrow \frac{1}{x+20} = \frac{1}{x} - \frac{1}{x+5}$

$\Rightarrow \frac{1}{x+20} = \frac{x+5-x}{x(x+5)}$

$\Rightarrow \frac{1}{x+20} = \frac{5}{x^2+5x}$

$\Rightarrow x^2 + 5x = 5x + 100$

$\Rightarrow x^2 = 100$

$\Rightarrow x = 10$ [ধনাত্মক মান ধরে]

∴ আরিফ একা কাজটি করতে পারে = $(10 + 20)$ ঘণ্টায় = 30 ঘণ্টায়

এবং বাবু একা কাজটি করতে পারে = $(10 + 5)$ ঘণ্টায় = 15 ঘণ্টায়

∴ তাদের কাজ করার সময়ের অনুপাত = $30: 15 = 2: 1$

Answer: 2:1