Time & Work

01. Machine P can print one lakh books in 8 hours, machine Q can print the same number of books in 10 hours while machine R can print them in 12 hours. All the machines are started at 9 a.m. while machine P is closed at 11 a.m. and the remaining two machines complete the work. Approximately at what time will the work be finished?
02. Ameen can do a piece of work in 4 hours. Ameen and Chathy together can do it in just 2 hours, while Bashar and Cathy together need 3 hours to finish the same work. In how many hours Bashar alone can complete the work?
03. A pipe is turned on to fill water into a cistern at the rate of 4 liters per minute. The cistern has a leak which would empty it in 6 hours and the cistern is now emptied in 10 hours. Determine the capacity of the cistern.
04. Abdul alone can finish a work in 6 days and Bokul alone in 8 days. Abul and Bokul undertook to do it for Tk 3200. With the help of Chinu, they completed the work in 3 days. If the money is to be distributed among them according to the work they have done, how much is to be paid to Chinu?
05. A and B can together finish a work in 30 days. They worked together for 20 days and then B left. After another 20 days, A finished the remaining work. In how many days A alone can finish the work?
06. P can complete a work in 12 days working 8 hours a day. Q can complete the same work in 8 days working 10 hours a day. If both P and Q work together, working 8 hours a day, in how many days can they complete the work?
07. A, B and C do a job alone in 20, 30 and 60 days respectively. In how many days can A do the job if he is assisted by B and C?
08. A can do a piece of work in 80 days. He alone works for 20 days and then B alone finishes the remaining work in 36 days. In how many days A and B together can complete the work?
09. *A* & *B* can do a work in 45 & 40 days respectively. They began to do the work together but *A* leaves after some days and then *B* completed the remaining work in 23 days. The number of days after which *A* left the work was:
10. *A* and *B* can do a piece of work in 5 days; *B* and *C* can do it in 7 days; *A* and *C* can do it in 4 days. Who among these will take the least time if put to do it alone?
11. *A* does half as much work as *B* and *C* does half as much work as *A* and *B* together. If *C* alone can finish the work in 40 days, then together all will finish the work in:
12. A and B can separately do a piece of work in 20 and 15 days respectively. They worked together for 6 days, after which B was replaced by C. If the work was finished in next 4 days, then the number of days in which C alone could do the work will be:
13. 2 pipes A & B can fill a cistern in 12 minutes & 15 minutes respectively but a 3rd pipe C can empty the full tank in 6 minutes. A & B are kept open for 5 minutes in the beginning & then C is also opened. In what time is the cistern emptied?
13. A do 1 work in 16 days, B do in 32 days, C in 48 days. They start together, C left after 4 day and B left before 2 day finishing the work. Total day needed to finish the work?
14. Twenty-four men can complete a work in sixteen days. Thirty-two women can complete the same work in twenty-four days. Sixteen men and sixteen women started working for twelve days. How many more men are to be added to complete the work remaining work in 2 days?
15. A and B can do a piece of work in 18 days. B and C can do it in 24 days. A and C can finish it in 36 days. In how many days can A, B and C finish it together and separately?

16. Mr. X asked to construct a road of 1920 meters in 120 days. He appointed 160 workers and find that in 24 days only 1/8 portion of work has been finished. How much additional number of workers would be needed in order to completing the whole work in time
17. If 9 engines consume 24 metric tons of coal, when each is working 8 hours day, how much coal will be required for 8 engines, each running 13 hours a day, it being given that 3 engines of former type consume as much as 4 engines of latter type?
18. A, B and C of them working alone can complete a job in 6, 8, 12 days respectively. If all three of them work together to complete a job and earn tk 2340 what will be C's share
19. It takes 120 metric tone water to sink a ship. Through a hole in the full of the ship, water is entering the ship at a rate of 2 metric tone per minute. At the same time, water is being pumped out at the rate 1.5 metric ton per minute using one pump. After 1 hour and 20 minutes another pump of same capacity was started. How much more time will it take to pump all the water out of the ship?
20. A contractor undertakes to do a piece of work in 40 days. He engages 100 men at the beginning and 100 men after 35 days and completes the work in stipulated time. If he had not engaged the additional men, how many days behind schedule would it be finished?
21. A can do a work in 80 days. A work for 10 days . After working 10 days, B completed the task within 42 days. If A & B work together, how many days it would need to complete the task12.
22. A do 1 work in 16 days, B do in 32 days, C in 48 days. They start together, C left after 4 day and B left before 2 day finishing the work. Total day needed to finish the work?
23. A, B and C started a job together which they can complete in 2 days. B alone can do the job in 5 days and C alone can do it in 4 days. After working for 1 day, both B and C left. How long would it take for A to complete the rest of the job?
24. 20 workers can finish a work in 30 days. After how many days should 5 workers leave the job so the work is completed in 35 days?

Solution

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

$\therefore$ (P + Q + R)'s 2 hour work $\left(\frac{37}{120}\times 2\right) = \frac{37}{60}$

$\therefore$ 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 $\frac{11}{60}$ part of work is done by Q and R in 1 hour

$\therefore$ $\frac{23}{60}$ part of work is done by Q and R in $\frac{23\times 60}{60\times 11}$ or $\frac{23}{11}$ hours $\approx$ 2 hours

So, the work will be finished approximately (11.am + 2 hours) = 1.pm; **(Answer).**

Alternative Method:

Suppose, Machine Q and R have to work for x house in addition to their work of 2 hours with machine P to complete the whole work.

So, according to question:

$$\frac{2}{8}+\frac{2+x}{10}+\frac{2+x}{12}=1$$

$$\Rightarrow \frac{30+24+12x+20+10x}{120}=1 \quad \Rightarrow 74+22x=120 \qquad \Rightarrow 22x=120-74=46 \qquad \Rightarrow x=\frac{46}{22}=2\frac{2}{22}\text{ hours.}$$

So, 11 am + 2 hours 5 minutes = 1:05 pm

So, the work will be finished at 1:05 pm (approximately)

02. Acording to the question,

In 1 hour, Ameen can do $\frac{1}{4}$ of the work

Ameen and Cathy in 1 hour can do = $\frac{1}{2}$ of the work

$\therefore$ Cathy in 1 hour = $\frac{1}{2}-\frac{1}{4}=\frac{2-1}{4}=\frac{1}{4}$ of the work. Bashar and Cathy, in 1 hour can = $\frac{1}{3}$ of the work

$\therefore$ Bashar 1 hour can do = $\frac{1}{3}-\frac{1}{4}=\frac{4-3}{12}=\frac{1}{12}$ of the work.

$\therefore$ Bashar can do $\frac{1}{12}$ of the work in 1 hour

$\therefore$ Bashar can do 1 of the work in 12 hour **Answer: Bashar alone can do the work in 12 hours**

03. Let, the capacity of the cistern be x ltrs.

In 1 minute, the pipe can fill 4 ltrs.

$\therefore$ in 60 minutes (or in 1 hour) the pipe can fill (4 × 60) ltrs or 240 ltrs.

$\therefore$ Time required to fill the whole (1) cistern is $\frac{x}{240}$ hrs.

In $\frac{x}{240}$ hrs, the pipe can fill 1 (or whole) cistern

$\therefore$ In 1 hr, the pipe can fill = $\frac{1\times 240}{x}=\frac{240}{x}$ part of the cistern

Again, In 1 hr, the leak can empty $\frac{1}{6}$ cistern

If the cistern is full with water, and if we open the pipe and the leak at a time, then in 1 hr, $(\frac{1}{6}-\frac{240}{x})$ part of the cistern will be emptied.

Now, in 1 hr, they (the pipe and the leak) can empty $\frac{1}{10}$ part of the cistern.

$\therefore$ We can get the following equation $\frac{1}{10}=\frac{1}{6}-\frac{240}{x} \Rightarrow \frac{1}{10}=\frac{x-1440}{6x} \Rightarrow 10x-6x=14400 \ \therefore x=3{,}600$

$\therefore$ **The capacity of the cistern is 3,600 ltrs. (Answer)**

04. In 6 days Abdul can finish the whole work

In 1 day Abdul can finish = $\frac{1}{6}$ part of the work

In 8 days Bokul can finish the whole work

In 1 day Bokul can finish = $\frac{1}{8}$ part the work

So, in 1 day together both Abul and Bokul can finish $(\frac{1}{6} + \frac{1}{8}) = \frac{7}{24}$ parts of the work

again in 3 days Abul, Bokul and Chinu can finish the whole work

$\therefore$ again in 1 day Abul, Bokul and Chinu can finish = $\frac{1}{3}$ part of the work

Therefore in 1 day only Chinu can finish $(\frac{1}{3} - \frac{7}{24})$ or $\frac{1}{24}$ part of the work

So, the ratio of 1 day's work done by Abul, Bokul and Chinu respectively is = $\frac{1}{6} : \frac{1}{8} : \frac{1}{24} = 4 : 3 : 1$

$\therefore$ Chinu is to be paid = Tk. $(3{,}200 \times \frac{1}{4+3+1})$ or Tk. 400 (Answer)

05. (A + B) can do the work in 30 days.

$\therefore$ (A × B) can do $\frac{1}{30}$th of the work in 1 day.

(A + B)'s 20 days' work = $\left(\frac{1}{30} \times 20\right) = \frac{2}{3}$.

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

Now, $\frac{1}{3}$ work is done by A in 20 days.

Therefore, the whole work will be done by A in (20 × 3) = 60 days. **(Answer).**

06. P can complete the work in (12 × 8) hrs. = 96 hrs.

Q can complete the work in (8 × 10) hrs. = 80 hrs.

$\therefore$ P's1 hour's work = $\frac{1}{96}$ and Q's 1 hour's work = $\frac{1}{80}$.

(P + Q)'s 1 hour's work = $\left(\frac{1}{96} + \frac{1}{80}\right) = \frac{11}{480}$.

$\therefore$ (P + Q)'s 8 hour work = $\frac{11}{480} \times 8 = \frac{11}{60}$

$\therefore \frac{11}{60}$ work can be done in 1 day $\therefore$ 1 (Full) work can be done in $\frac{60}{11}$ day = 5 $\frac{5}{11}$ days **(Answer).**

07. In 20 days A can do the whole work.

So, In 1 day A can do $\frac{1}{20}$ in of the work.

Thus, B can do, in 1 day, $\frac{1}{30}$ work & C can do, in 1 day, $\frac{1}{60}$ work.

A's 1 day's work with help of B & C = $\frac{1}{20}+\frac{1}{30}+\frac{1}{60}=\frac{3+2+1}{60}=\frac{6}{60}=\frac{1}{10}$

$\therefore$ They do $\frac{1}{10}$ part work in 1 day.

$\therefore$ They do the whole work in 10 days. **(Answer).**

08. In 80 days, A can do 1 work

In 20 days A can do = $\frac{1\times 20}{80}=\frac{1}{4}$ part of work

The rest of the work = $1-\frac{1}{4}=\frac{4-1}{4}=\frac{3}{4}$ work;

B completes $\frac{3}{4}$ of work in 36 days

B completes 1 of work in $\frac{4\times 36}{3}$ = 48 days.

A & B together can complete = $\frac{1}{80}+\frac{1}{48}=\frac{8}{240}=\frac{1}{30}$ of work in 1 day.

A & B complete $\frac{1}{30}$ of work in 1 day

$\therefore$ A & B complete 1 (Full) of work in $\frac{1\times 30}{1}$ = 30 days **(Answer)**

Alternative Method:

In 20 days, A finishes $\frac{20}{80}=\frac{1}{4}$ th of the work.

So, $\frac{3}{4}$ th of the work remains, which B takes 36 days to finish.

So, B will need $(36\times\frac{4}{3})$ = 48 days to finish the whole work.

And A and B, together, wile finish = $\frac{1}{80}+\frac{1}{48}\Rightarrow\frac{6+10}{480}=\frac{16}{480}=\frac{1}{30}$ th of the work in 1 day.

Therefore, they will need 30 days to finish the whole work. **(Answer).**

09. $(A+B)$'s 1 day's work = $\left(\frac{1}{45}+\frac{1}{40}\right)=\frac{17}{360}$.

Work done by B in 23 days = $\left(\frac{1}{40}\times 23\right)=\frac{23}{40}$.

Remaining work = $\left(1-\frac{23}{40}\right)=\frac{17}{40}$.

Alternative:

Say, A left the work after x days.

So, according to the question, $\frac{x}{45}+\frac{x+23}{40}=1$

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

$\Rightarrow 17x=360-207;$

$\therefore x=\frac{153}{17}=9$ days **(Answer)**

Written Math (Practice Sheet-5)

Now, $\frac{17}{360}$ work was done by $(A + B)$ in 1 day

$\frac{17}{40}$ was done by $(A + B)$ in $\left(1 \times \frac{360}{17} \times \frac{17}{40}\right) = 9$ days.

So, A left after 9 days. (Answer).

10. $(A + B)$'s 1 day's work $= \frac{1}{5}$

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

and $(A + C)$'s 1 day's work $= \frac{1}{4}$.

$2(A + B + C)$'s 1 day's work $= \left(\frac{1}{5} + \frac{1}{7} + \frac{1}{4}\right) = \frac{83}{140}$.

$(A + B + C)$'s 1 day's work $= \frac{83}{280}$.

C's 1 day's work $= \left(\frac{83}{280} - \frac{1}{5}\right) = \frac{27}{280}$.

A's 1 day's work $= \left(\frac{83}{280} - \frac{1}{7}\right) = \frac{43}{280}$.

B's 1 day's work $= \left(\frac{83}{280} - \frac{1}{4}\right) = \frac{13}{280}$.

Thus time taken by A, B, C is $\frac{280}{43}$ days, $\frac{280}{13}$ days, $\frac{280}{27}$ days respectively.

Clearly, the time taken by A is least. **(Answer).**

11. C alone can finish the work in 40 days.

$\therefore$ $(A + B)$ can do it in 20 days. So, $(A + B)$'s 1 day's work $= \frac{1}{20}$.

A's 1 day's work : B's 1 day's work $= \frac{1}{2} : 1 = 1 : 2$.

A's 1 day's work $= \left(\frac{1}{20} \times \frac{1}{3}\right) = \frac{1}{60}$. $\left[\text{Divide } \frac{1}{20} \text{ in the ratio } 1 : 2\right]$

B's 1 day's work $= \left(\frac{1}{20} \times \frac{2}{3}\right) = \frac{1}{30}$.

$(A + B + C)$'s 1 day's work $= \left(\frac{1}{60} + \frac{1}{30} + \frac{1}{40}\right) = \frac{9}{120} = \frac{3}{40}$.

$\therefore$ All the 3 together will finish it in $\frac{40}{3} = 13\frac{1}{3}$ days. **(Answer).**

Alternative Method:

Given that C alone can do the work in 40 days

So, A + B, together, can do the work in 20 days. [as C does half of (A + B)]

Now, A, B, C all together, in 1 day, can do $\frac{1}{20}+\frac{1}{40}=\frac{3}{40}$ th of the work.

So, they will need = $\frac{40}{3}=13\ \frac{1}{3}$ days to do the whole work. **(Answer).**

12. $(A + B)$'s 6 day's work $= 6\left(\frac{1}{20}+\frac{1}{15}\right)=\frac{7}{10}$

$(A + C)$'s 4 day's work $= 1 - \frac{7}{10} = \frac{3}{10}$

$(A + C)$'s 1 day's work $= \frac{3}{40}$

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

$\therefore$ C's 1 day's work $= \left(\frac{3}{40}-\frac{1}{20}\right)=\frac{1}{40}$ Hence, C alone can finish the work in 40 days. **(Answer).**

13. Part filled in 5 min. $= 5\left(\frac{1}{12}+\frac{1}{15}\right)=\left(5\times\frac{9}{60}\right)=\frac{3}{4}$.

Part emptied in 1 min., when all the pipes are opened $= \frac{1}{6}-\left(\frac{1}{12}+\frac{1}{15}\right)=\left(\frac{1}{6}-\frac{3}{20}\right)=\frac{1}{60}$.

Now, $\frac{1}{60}$ part is emptied in 1 min.

$\therefore$ $\frac{3}{4}$ part will be emptied on $\left(60\times\frac{3}{4}\right)$ = 45 min. **(Answer).**

14. 20 men can do in 30 days so 1 man can do $30 \times 20 = 600$ days
Let, after X days 5 men left 20 men can do in X days
1 men can do in 20x days
Again, $20 - 5 = 15$men can do in $35 - X$ days
1 men can do in $15 (35 - x)$ days
ATQ, $20x + 15(35 - x) = 600$ X – 15 **(Ans.)**

15. (A + B)'s 1 day's work = 1/18, (B + C)'s 1 day's work = 1/24 and (A + C)'s 1 day's work = 1/36
Now, 2(A + B + C)'s 1 day's work =1/18 + 1/24 + 1/36=9/72 =1/8
So, (A +B + C)'s 1 day's work =1/16
Thus, A, B and C together can finish the work in 16 days.
Now, A's 1 day's work = (A + B + C)'s 1 day's work - (B + C)'s 1 days work=1/16 – 1/24= 1/48
A alone can finish the work in 48 days.
Similarly, B's 1 day's work = 1/16 – 1/36 = 5/144
B alone can finish the work in 144/5 = 28.8 days
And C's 1 day work=1/16 – 1/18 = 1/144
Hence C alone can finish the work in 144 days.
Ans: Together = 16 days, A = 48 days, B = 28.8 days and C = 144 days.

16. Days remaining = 120 – 24 = 96 days. Work remaining =1 – 1/8 = 7/8 part
Now, 1/8 work in 24 days can do = 160 workers
1 (Full) work in 1 day can do = $160 \times 24 \times 8$ workers

7/8 part of work in 96 days can do =160 × 24 × 8 × 7/8 × 96 = 280 workers
So, additional worker need = 280 – 160 = 120 workers **(Ans.)**

17. According to the question, 3 engines of former type = 4 engines of latter type
So 9 engines of former type = 4 × 9/3 = 12 engines of latter type
Now, In 8 hours 12 engines consume 24 metric tons
In 13 hours 8 engines consume 24 × 13 × 8/8 × 12 metric tons = 26 metric tons **(Ans.)**

18. In 1 day, A, B and C alone can do 1/6, 1/8 and 1/12 part of the work respectively
A : B : C = 1/6 : 1/8 : 1/12 = 4 : 3 : 2 (Multiple by 24)
Sum of ratio = 4 + 3 + 2 = 9. So, C's share = 2340 × 2/9 = 520 Tk. **(Ans.)**

19. Here, Water enter ship per minute =2 metric tone
Water pumped out per minute =1.5 metric tone
Water remains in tank per minute =(2 –1.5) = 0.5 metric tone
After 1 hr & 20 minutes or 80 minutes water remains in tank = (80 × .5) = 40 MT
After 80 minutes another same capacity pumped out pump started
So two pump pumped out water per minute = (1.5 + 1.5) = 3 MT
Per minutes amount of extra water pumped out = (3 – 2) = 1 MT
Now, 1MT water pumped out in 1 minute 40 MT water pumped out in (40 × 1)/1 = 40 minutes **(Ans.)**

20. Remaining no. of days = 40 – 35 = 5 days Total worker = 100 + 100 = 200
200 men can complete the work in 5 days; 100 men can complete the work in 200*5/100=10 days
If he had not engaged the additional men,
then he needed (10 – 5) = 5 days more to finish the whole work in stipulated time. (Ans.) 5 days (Ans)

21. A 80 days done = 1 portion. A 10 days done = (10/80) = 1/8 portion
Remaining work = (1 – 1/8) = 7/8 portion. B 7/8 portion done = 42 days
B 1 (whole) portion done = (42 × 8/7) = 48 days; Both A & B 1 day done = (1/80 + 1/48) = 1/30 portion
A & B 1/30 portion done =1 days; 1 (whole) portion done = (1 × 30)/1 = 30 days **(Ans.)**

22. A, B, and C can do the job in 2 days.
So, in 1 day, they can do = 1/2 portion of the job.
B can do in 1 day = 1/5 of the job; C can do in 1 day = 1/4 of the job;
B & C can do 1 day =(1/5 + 1/4) = 9/20 portion of the job
So, A can do in 1 day = 1/2 – 9/20 = 1/20 portion of the job
Remaining work =(1 – 1/2) = 1/2 portion; A 1/20 portion job done = 1 day
A 1/2 portion job done = (20/2) = 10 days **(Ans.)**

23. In 4 days they all together do = (1/16 + 1/32 + 1/48) × 4 = 11/24 portion
Remaining part = 1 – 11/24 = 13/24 portion
Now suppose that A & B needs altogether x days to complete the work As per question
A works = x days & B works = (x – 2) days; ATQ, x/16 + (x – 2)/32 = 13/24; Or, x = 6.11 Or, approximately 6 days
Therefore total days needed to finish the work = (6 + 4) = 10 days **(Ans.)**

24. 32 women = 24 men 16 women = 24 × 16/32 = 12 men
Total men = 16 + 12 = 28 men; 24 men do in 16 days = 1 part of work
28 men do in 12days = 28 × 12/16 × 24 = 7/8 part; Remaining part of work = 1 – 7/8 = 1/8 part
1/16 part work do in 1day = 24 men; 1 (whole) part work do in 1 day = 24 × 16 men
1/8 part work do in 2 days = 24 × 16/8 × 2 = 24 men
So, more men needed =24 **(Ans.)**

Probability

01. A bag contains 4 white, 5 red and 6 blue balls. Three balls are drawn at random from the bag. The probability that all of them are red, is:

A) 2/91 B) 1/22 C) 3/22 D) 2/77

Explanation:

Let S be the sample space.

Then, n(S) = number of ways of drawing 3 balls out of 15 = $15C_3 = \frac{15 \times 14 \times 13}{3 \times 2 \times 1} = 455$.

Let E = event of getting all the 3 red balls.

$n(E) = 5C_3 = 5C_2 = \frac{15 \times 14 \times 13}{3 \times 2 \times 1} \frac{5 \times 4}{2 \times 1} = 10$.

$\therefore P(E) = n(E)/n(S) = 10/455 = 2/91$. **Answer: A) 2/91**

02. In a class, there are 15 boys and 10 girls. Three students are selected at random. The probability that 1 girl and 2 boys are selected, is:

A) 21/46 B) 1/5 C) 3/25 D) 1/50

Explanation:

Let , S - sample space E - event of selecting 1 girl and 2 boys.

Then, n(S) = Number ways of selecting 3 students out of 25

$= 25C_3 = 2300$. $n(E) = 10C_1 \times 15C_2 = 1050$.

$\therefore P(E) = n(E)/n(s) = 1050/2300 = 21/46$ **Answer: A) 21/46**

03. A problem is given to three students whose chances of solving it are 1/2, 1/3 and 1/4 respectively. What is the probability that the problem will be solved?

A) 1/4 B) 1/2 C) 3/4 D) 7/12

Explanation:

Let A, B, C be the respective events of solving the problem and $\bar{A}, \bar{B}, \bar{C}$ be the respective events of not solving the problem. Then A, B, C are independent events

$\therefore \bar{A}, \bar{B}, \bar{C}$ are independent events

Now, P(A) = 1/2 , P(B) = 1/3 and P(C) = 1/4

$P(\bar{A}) = \frac{1}{2}, P(\bar{B}) = \frac{2}{3}$ and $P(\bar{C}) = \frac{3}{4}$

$\therefore$ P(none solves the problem) = P(not A) and (not B) and (not C)

$P(\bar{A}) = \frac{1}{2}, P(\bar{B}) = \frac{2}{3}$ and $P(\bar{C}) = \frac{3}{4}$

$= P(\bar{A} \cap \bar{B} \cap \bar{C})$

$= P(\bar{A})P(\bar{B})P(\bar{C})$ $(\because \bar{A}, \bar{B}$ and $\bar{C}$ are independent $) = \frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} = \frac{1}{4}$

Hence, P(the problem will be solved) = 1 – P(none solves the problem)

$= 1 - \frac{1}{4} = \frac{3}{4}$ **Answer: C) 3/4**

04. In a class, 30% of the students offered English, 20% offered Hindi and 10% offered both. If a student is selected at random, what is the probability that he. Has offered English or Hindi?

A) 1/2 B) 3/4 C) 4/5 D) 2/5

Explanation:

$P(E) = \frac{30}{100} = \frac{3}{10}$, $P(H) = \frac{20}{100} = \frac{1}{5}$ and $P(E \cap H) = \frac{10}{100} = \frac{1}{10}$

$P(E \text{ or } H) = P(E \cup H) = P(E) + P(H) - P(E \cap H) = (\frac{3}{10} + \frac{1}{5} - \frac{1}{5}) = \frac{4}{10} = \frac{2}{5}$ **Answer: D) 2/5**

05. A basket contains 10 apples and 20 oranges out of which 3 apples and 5 oranges are defective. If we choose two fruits at random, what is the probability that either both are oranges or both are non defective?

A) 136/345 B) 17/87 C) 316/435 D) 158/435

Explanation:

$n(S) = {}^{30}C_2$

Let A be the event of getting two oranges and

B be the event of getting two non-defective fruits.

and $(A \cap B)$ be the event of getting two non-defective oranges

$\therefore P(A \cup B) = P(A) + P(B) - P(A \cap B)$

06. A bag contains 50 tickets numbered 1, 2, 3, 4 ..... 50 of which five are drawn at random and arranged in ascending order of magnitude. Find the probability that third drawn ticket is equal to 30.

A) 551/15134 B) 1/2 C) 552/15379 D) 1/9

Explanation:

Total number of elementary events = $50C_5$

Given, third ticket = 30

=> first and second should come from tickets numbered 1 to 29 = $29C_2$ ways and remaining two in $20C_2$ ways.

Therefore, favourable number of events = $29C_2 \times 20C_2$

Hence, required probability = $(29C_2 \times 20C_2)/50C_5 = 551/15134$ **Answer: A)** 551/15134

07. A bag contains 2 red, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?

A) 10/21 B) 11/21 C) 1/2 D) 2/7

Explanation:

Total number of balls = (2 + 3 + 2) = 7.

Let S be the sample space.

Then, n(S) = Number of ways of drawing 2 balls out of 7 = $7C_2 = 21$

Let E = Event of drawing 2 balls, none of which is blue.

n(E) = Number of ways of drawing 2 balls out of (2 + 3) balls = $5C_2 = 10$

Therefore, P(E) = n(E)/n(S) = 10/ 21. **Answer: A) 10/21**

08. A box contains 100 balls, numbered from 1 to 100. If three balls are selected at random and with replacement from the box, what is the probability that the sum of the three numbers on the balls selected from the box will be odd?

A) 1/6 B) 1/3 C) 1/2 D) ¼

Explanation:

$P(\text{odd}) = P(\text{even}) = \frac{1}{2}$ (because there are 50 odd and 50 even numbers)

Sum or the three numbers can be odd only under the following 4 scenarios:

$\text{Odd} + \text{Odd} + \text{Odd} = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

$\text{Odd} + \text{Even} + \text{Even} = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

$\text{Even} + \text{Odd} + \text{Even} = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

$\text{Even} + \text{Even} + \text{Odd} = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

Other combinations of odd and even will give even numbers.
Adding up the 4 scenarios above:

$= \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{4}{8} = \frac{1}{2}$

Answer: C) ½

09. A bag contains 7 green and 5 black balls. Three balls are drawn one after the other. The probability of all three balls being green, if the balls drawn are not replaced will be:

A) 123/897 B) 23/67 C) 7/44 D) 12/45

Explanation:

Here, $n(E) = {}^7C_1 \times {}^5C_1 \times {}^5C_1$

And, $n(S) = {}^{12}C_1 \times {}^{11}C_1 \times {}^{10}C_1$

$P(S) = \frac{7 \times 6 \times 5}{12 \times 11 \times 10} = \frac{7}{44}$

Answer: C) 7/44

10. What is the probability of getting at least one six in a single throw of three unbiased dice?

A) 1/36 B) 91/256 C) 13/256 D) 43/256

Explanation:

Find the number of cases in which none of the digits show a '6'.
i.e. all three dice show a number other than '6', $5 \times 5 \times 5 = 125$ cases.
Total possible outcomes when three dice are thrown = 216.
The number of outcomes in which at least one die shows a '6' = Total possible outcomes when three dice are thrown - Number of outcomes in which none of them show '6'.
$= 216 - 125 = 91$
The required probability = 91/256

Answer: B) 91/256

11. What is the probability of getting at least one six in a single throw of three unbiased dice?

A) 1/36 B) 91/256 C) 13/256 D) 43/256

Explanation:

Find the number of cases in which none of the digits show a '6'.
i.e. all three dice show a number other than '6', $5 \times 5 \times 5 = 125$ cases.
Total possible outcomes when three dice are thrown = 216.
The number of outcomes in which at least one die shows a '6' = Total possible outcomes when three dice are thrown - Number of outcomes in which none of them show '6'.
$= 216 - 125 = 91$
The required probability = 91/256

Answer: B) 91/256

12. The probability of success of three students X, Y and Z in the one examination are 1/5, 1/4 and 1/3 respectively. Find the probability of success of at least two.

A) 1/4 B) 1/2 C) 1/6 D) 1/3

Explanation:

$P(X) = \frac{1}{5}, P(Y) = \frac{1}{4}, P(Z) = \frac{1}{3}$

Required probability:

$= [\, P(A)P(B)\{1 - P(C)\}\,] + [\, \{1 - P(A)\}P(B)P(C)\,] + [\, P(A)P(C)\{1 - P(B)\}\,] + P(A)P(B)P(C)$

$= \frac{4}{60} + \frac{3}{60} + \frac{2}{60} + \frac{1}{60} = \frac{10}{60} = \frac{1}{6}$ **Answer: C) 1/6**

13. The letters of the word CASTIGATION is arranged in different ways randomly. What is the chance that vowels occupy the even places?

A) 0.04 B) 0.043 C) 0.047 D) 0.05

Explanation:

Vowels are A I A I O,

C A S T I G A T I O N

(O) (E) (O) (E) (O) (E) (O) (E) (O) (E) (O)

So there are 5 even places in which five vowels can be arranged and in rest of 6 places 6 constants can be arranged as follows :

$n(S) = \frac{11!}{2! \times 2! \times 2! \text{ (A, I, T are 2 times)}} = 4989600$

Required Probability $= \frac{21600}{4989600} = 0.043$ **Answer: B) 0.043**

বিগত বছরের প্রশ্নাবলী ও বিশদ সমাধান	২০১৯ সালে ৩০ জুন পর্যন্ত অনুষ্ঠিত সকল সরকারী ও বেসরকারী ব্যাংকের প্রশ্নাবলী ও সমাধান

01. Two pipes A and B can fill a tank in 20 hours and 30 hours respectively .Both the pipes are opened to fill the tank but when the tank is $\frac{1}{3}$ full a leak develops in the tank through which $\frac{1}{3}$ water supplied by both the pipes goes out. How much time will the tank take to be full?

[6 Govt. Banks & 2 FI (SO)- 19,]

Solution: Let, to fill $\frac{1}{3}$ part it needs x hr

According to problem, $\frac{x}{20} + \frac{x}{30} = \frac{1}{3} \Rightarrow \frac{5x}{60} = \frac{1}{3} \quad \Rightarrow x = 4$

Due to leakage $\frac{1}{3}$ rate is reduced i.e, every tank needs more time.

So, 1st pipe needs $= \frac{20}{1-\frac{1}{3}} = \frac{20}{\frac{2}{3}} = 30$ hr. and 2nd pipe needs $= \frac{30}{1-\frac{1}{3}} = \frac{30}{\frac{2}{3}} = 45$ hr.

Let, It needs '**a**' hrs more to fill rest $\frac{2}{3}$ part.

According to problem, $\frac{a}{30} + \frac{a}{45} = \frac{2}{3} \quad \Rightarrow \frac{3a + 2a}{90} = \frac{2}{3} \quad \Rightarrow \frac{5a}{90} = \frac{2}{3} \therefore a = \frac{2}{3} \times \frac{90}{8} = 12$

$\therefore$ Total time = (4 + 12) hr. = 16 hr.

Ans : 16 Hrs

02. An engineer undertake a project to build a road 15 km long in 300 days and employs 45 men for the purpose. After 100 days, he finds 2.5 km of the road has been completed. Find the number of extra men he must employ to finish the work in time. *[6 Govt. Banks & 2 FI (SO)- 19,]*

Solution: Let, Extra people needs to join is x

Here, work done, $W_1 = 2.5$ km
Time already passed, $T_1 = 100$ days,
Initial people, $M_1 = 45$.

$\therefore$ work remain, $W_2 = 15 - 2.5 = 12.5$ km.
Time remain, $T_2 = (300 - 100) = 200$ days.
People needed $= 45 + x$.

$\therefore$ According to Input-Output method,

$$\frac{w_1}{M_1 \times T_1} = \frac{W_2}{M_2 \times T_2}$$

$$\Rightarrow \frac{2.5}{45 \times 100} = \frac{12.5}{(15+x) \times 200} \qquad \Rightarrow 45 + x = \frac{12.5 \times 45 \times 100}{2.5 \times 200} = 112.5 \therefore x = 67.5 \approx 68 \text{ (approx)}$$

Ans: 68

03. Machine A, working alone at its constant rate, produces x pounds of peanut butter in 12 minutes. Machine B, working alone at its constant rate, produces x pounds of peanut butter in 18 minutes. How many minutes will it take machines A and B, working simultaneously at their respective constant rates, to produce x pounds of peanut butter? Sonali Bank Ltd. Officer (Cash-19)

Solution:

A can produce in 12 minutes x pound of peanut butter

$\therefore$ A can produce in 1 minute pound of peanut butter

Again, B can produce in 18 minutes x pound of peanut butter

$\therefore$ B can produce in 1 minute $\frac{x}{18}$ g pound of peanut butter

So, $(3x + 5x)$ So, in 1 minute (A + B) can produce $= \left(\frac{x}{12} + \frac{x}{18}\right) = \left(\frac{3x + 2x}{36}\right) = \frac{5x}{36}$ pounds.

Now, $\frac{5x}{36}$ pounds can be produced by (A+B) in = 1 miute

$\therefore$ x pounds can be produced by (A+B) in $= \frac{36 \times x}{5x} = 7.2$ minutes = 7 minutes 12 seconds. (Ans.)

04. A team of 2 men and 5 women completed one-fourth of a job in 3 days. After 3 days another man joined the team and they took 2 days to complete another one-fourth of the job. How many men can complete the whole job in 4 days? **NRB Bank Ltd., Management Trainee Officer-19**

Solution:

2 men and 5 women require 3 days to complete $\frac{1}{4}$ job

$\therefore$ They complete $\frac{1}{4 \times 3} = \frac{1}{12}$ join in 1 day.

3 men + 5 women require 2 days to complete $\frac{1}{4}$ job;

$\therefore$ They compete $\frac{1}{4 \times 3} = \frac{1}{12}$ job in 1 day.

3 me + 5 women $= \frac{1}{8}$

2 men + 5 women $= \frac{1}{12}$

(–) 1 man $= \frac{1}{24}$

$\frac{1}{24}$ job is done in 1 day by 1 men

$\therefore$ 1 job is done in 1 day by 24 men

$\therefore$ 1 job is done in 4 day by $\frac{24}{4}$ = 6 men. (Ans.)

05. 12 men can complete a piece of work in 36 days. 18 women can complete the same piece of work in 60 days. 8 men and 20 women work together for 20 days. If only women were to complete the remaining piece of work in 4 days, how many women would be required?

Sonali Bank, Officer (Cash-19) [Written]

Solution:

12 men take 36 days to complete = 1 work

$\therefore$ 1 men take 1 days to complete = $\frac{1}{12 \times 26}$ part of work

$\therefore$ 8 men take 20 days to complete = $\frac{8 \times 20}{12 \times 36} = \frac{10}{27}$ part of work

So, 8 men and 20 women have done in 20 days = $\left(\frac{10}{27} + \frac{10}{27}\right) = 2 \times \frac{10}{27} = \frac{20}{27}$ parts of work

$\therefore$ Remaining = $\left(1 - \frac{20}{27}\right) = \frac{27 \times 20}{27} = \frac{7}{27}$ parts of work

Now, in 1 day $\frac{1}{18 \times 60}$ part of work is completed by = 1 women

$\therefore$ In 4 day $\frac{7}{27}$ part of work is complete by = $\frac{18 \times 60 \times 7}{4 \times 27}$ = 70 women

06. A certain number of men can finish a piece of work in 100 days. If there were 10 men less, it would take 10 days more for the work to be finished. How many men were there originally?

[Sadharab Bima Corporation Asst. Manager19, Written]

Solution:

Let,

the original number of men = x

$\therefore$ x men can do in 100 days = 1 portion

$\therefore$ x men can do in 1 days = $\frac{1}{100}$ portion

$\therefore$ 1 men can do in 1 days = $\frac{1}{100x}$ portion

$\therefore$ (x–10) men can do in 1 " = $\frac{x-10}{100x}$ "

$\therefore$ (x–10) men can do in 110 days = $\frac{(x-10) \times 110}{100x}$ " = $\frac{110x - 1100}{100x}$

ATP, $\frac{110x - 1100}{100x} = 1$ [as, Total work = 1 portion]

$\Rightarrow 110x - 1100 = 100x \Rightarrow 110x - 100x = 1100 \Rightarrow 10x = 1100 \therefore x = 110$

Ans: x = 110

07. An article manufactured by a company consists of two parts A and B. In the process of manufacture of part A, 9 out of 100 are likely to be defective. Similarly, 5 out of 100 are likely to be defective in the process of manufacture of part B. What will be the probability that the assembled part will not be defective?

[5 Govt. Banks Officer (Cash) 19, Written]

Solution:

Probability of only A is defective = $\frac{9}{100} \times \frac{(100-5)}{100} = \frac{9}{100} \times \frac{95}{100}$

$\therefore$ Probability of only B is defective $= \frac{100-9}{100} \times \frac{5}{100}$

$\therefore$ Probability of both are defective $= \frac{9}{100} \times \frac{5}{100}$

$\therefore$ Probability of at least one defective $= \left(\frac{9}{100} \times \frac{95}{100}\right) + \left(\frac{91}{100} \times \frac{5}{100}\right) + \left(\frac{9}{100} \times \frac{5}{100}\right) = \frac{855+455+45}{10000} = \frac{1355}{10000}$

$\therefore$ Probability of not defective parts $= \left(1 - \frac{1355}{10000}\right) = \frac{8645}{10000} = 0.8645$

Ans: 0.8645

08. 60 men could complete a piece of work in 250 days. They worked together for 200 days. After that the work had to be stopped for 10 day due to bad weather. How many more men should be engaged to complete the work in time? *[5 Govt. Banks Officer (Cash) 19, Written]*

Solution:

60 men can do in 250 days = 1 portion

$\therefore$ 60 men can do in 1 day $= \frac{1}{250}$ portion

$\therefore$ 60 men can do in 200 days $= \frac{200}{250}$ portion $= \frac{4}{5}$ portion

$\therefore$ Remaining work $= \left(1 - \frac{4}{5}\right) = \frac{1}{5}$ portion

Now, In 250 days 1 portion can done by = 60 men

$\therefore$ In 1 day 1 portion can done by = (250×60) men

$\therefore$ In 1 day $\frac{1}{5}$ portion can done by = $= \frac{250 \times 60 \times 1}{5}$ men

$\therefore$ In 40 day $\frac{1}{5}$ portion can done by = $= \frac{250 \times 60 \times 1}{5 \times 40}$ men $= 75$ men

$\therefore$ Number of additional men should be engaged $= (75 - 60)$ men $= 15$ men

Ans: 15 men.

09. An engineer undertake a project to build a road 15 km long in 300 days and employs 45 men for the purpose. After 100 days, he finds 2.5 km of the road has been completed. Find the number of extra men he must employ to finish the work in time. *[6 Govt. Banks & 2 FI (SO)- 19, cancelled]*

Solution:

Remaining days $= (300 - 100) = 200$

Remaining work $= (15 - 2.5)$ km $= 12.5$ km

$\therefore$ In 100 days 2.5 km can build by 45 men

$\therefore$ In 1 days 2.5 km can build by (45×100) men

$\therefore$ In 1 days 1 km can build by $\frac{45 \times 100}{2.5}$ men

$\therefore$ In 200 days 1 km can build by $\frac{45 \times 100}{2.5 \times 200}$ men

$\therefore$ In 200 days 1 km can build by $\frac{45 \times 100 \times 12.5}{2.5 \times 200}$ men $= 112.5 = 113$ men

[Since, the number of men cannot be a fraction]

$\therefore$ Additional men needed $= (113 - 45) = 68$ (Ans)

10. Two pipes A and B can fill a tank in 20 hours and 30 hours respectively. Both the pipes are opened to fill the tank but when the tank is 1/3 full, a leak develops in the tank through which 1/3 water supplied by both the pipes the goes out. How much time will the tank take to be full? *[6 Govt. Banks & 2 FI (SO)- 19, cancelled]*

Solution:

A can fill in 1 hour $= \frac{1}{20}$ portion

B can fill in 1 hour $= \frac{1}{30}$ portion

$\therefore$ In 1 hour two tanks filled $= \left(\frac{1}{20}+\frac{1}{30}\right)$ portion $= \left(\frac{3+2}{60}\right)$ portion $= \frac{1}{12}$ portion

To fill the full tank the pipes have to fill $\frac{1}{3}$ portion more to overcome leakage.

Now,

To fill the full tank time needed = (1 × 12) hours = 12 hours.

Again,

To fill $\frac{1}{3}$ portion more, time needed $= \left(12 \times \frac{1}{3}\right)$ hours = 4 hours.

$\therefore$ Total time needed = (12 + 4) hours. = 16 hours

Ans: 16 hours

11. 6 men can complete a piece of work in 12 days. 8 women can complete the same piece of work in 18 days whereas 18 children can complete the piece of work in 10 days. 4 men, 12 women and 20 children work together for 2 days. If only men were to complete the remaining work in 1 day how many men would be required totally? *[4 Govt. Banks Officer (General) 19, Written]*

Solution:

6 men can do in 1 day $= \frac{1}{12}$ portion

$\therefore$ 1 man can do in 1 " $= \frac{1}{12\times6}$ portion

$\therefore$ 4 men can do in 2 days $= \frac{4\times2}{12\times6}$ or, $\frac{1}{9}$ portion.

Again,

8 women can do in 1 day $= \frac{1}{18}$ portion

$\therefore$ 1 woman can do in 1 day $= \frac{1}{8\times18}$ portion

$\therefore$ 12 women can do in 2 days $= \frac{12\times2}{8\times18}$ Or, $\frac{1}{6}$ portion.

Now, 18 children can do in 1 day $= \frac{1}{10}$ portion

$\therefore$ 1 children can do 1 day $= \frac{1}{10\times18}$ portion

$\therefore$ 20 children can do 2 day $= \frac{20\times2}{10\times18}$ Or, $\frac{2}{9}$ Portion

$\therefore$ Total work in 2 days $= \left(\frac{1}{9}+\frac{1}{6}+\frac{2}{9}\right)$ portion $= \frac{2+3+4}{18}$ portion $= \frac{1}{2}$ portion

$\therefore$ Remaining work $= \left(1-\frac{1}{2}\right)$ Or, $\frac{1}{2}$ Portion

$\therefore \frac{1}{12}$ portion can do in 1 day by 6 men

$\therefore$ 1 portion can do in 1 day by (6×12)men

$\therefore$ $\frac{1}{2}$ portion can do in 1 day by $\frac{6\times12}{2}$ men $= 36$men

$\therefore$ 36 men required to finish the remaining work in 1 day.

Ans: 36 men required

12. **First bag contains 4 red and 3 black balls. Second bag contains 2 red and 4 black balls. One bag is selected at random. From the selected bag, one ball is drawn. Find the probability that the ball drawn is red.** *[4 Govt. Banks Officer (General) 19, Written]*

Solution:

Total balls in first bag $= (4 + 3) = 7$

$\therefore$ Total balls in second bag $= (2 + 4) = 6$

$\therefore$ The probability of choosing the first bag $= \frac{1}{2}$

The probability of choosing a red ball from first bag $= \frac{1}{2} \times \left(\frac{4}{7}\right) = \frac{2}{7}$

Now,

The probability of choosing the second bag $= \frac{1}{2}$

$\therefore$ The probability of choosing a red ball from second bag $= \frac{1}{2} \times \left(\frac{2}{6}\right) = \frac{1}{6}$

$\therefore$ Total probability $= \left(\frac{2}{7} + \frac{1}{6}\right) = \frac{12+7}{42} = \frac{19}{42}$

Ans: $\frac{19}{42}$

13. **A pipe can fill a tank in 0.9 hours and another pipe can empty in 0.7 hours. If tank is completely filled and both pipes are opened simultaneously then 450 liters of water is removed from the tank in 2.5 hours. What is the capacity of the tank?** *[6 Govt. Banks & 2 Financial Institutions SO (General) 19, Written]*

Solution:

A pipe in 0.9 hour can fill 1 portion

$\therefore$ A pipe in 1 hour can fill $\frac{1}{0.9}$ or $\frac{10}{9}$ portion

Another pipe in 0.7 hour can empty 1 portion

$\therefore$ Another pipe in 1 hour can empty $\frac{1}{0.7}$ or $\frac{10}{7}$ portion

$\therefore$ Both together in 1 hour can empty $= \left(\frac{10}{7} - \frac{10}{9}\right)$ portion $= \left(\frac{90-70}{63}\right)$ portion $= \frac{20}{63}$ portion

$\therefore$ Both together in 2.5 hours can empty $= \frac{20\times2.5}{63}$ portion $= \frac{50}{63}$ portion

Now, $\frac{50}{63}$ portion $= 450$ liters

$\therefore$ 1 portion $= \frac{450\times63}{50}$ " $= 567$ liters

Ans: 567 liters

14. **A sum of Tk. 3240 was fixed to complete a work. 54 workers completed the work in 8 days and the sum was divided equally among the workers. If the work was to be completed in 3 days then how much less money each worker would receive compared to when the work was completed in 8 days?** *[6 Govt. Banks & 2 Financial Institutions SO (General) 19, Written]*

Solution:

In the first case, each worker receives = $\frac{3240}{54}$ Tk. = 60 Tk.

Now,

In 8 days 1 portion can be done by 54 workers

$\therefore$ In 1 day 1 portion can be done by (8×54) workers

$\therefore$ In 3 days 1 portion can be done by = $\left(\frac{8 \times 54}{3}\right)$ workers = 144 workers

$\therefore$ Each worker receives = $\frac{3240}{144}$ Tk = 22.5 Tk

$\therefore$ Now, each worker receives less money = (60 – 22.5) Tk. = 37.5 Tk

Ans: 37.5 Tk.

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15. Working together pipe P, R and T can fill a tank in 5 hours. Working together P and R can fill it in 7 hours. Find in how many hours T can fill it? *[Basic Bank Ltd. (Cashier)-18]*

Solution:

(P+R+T) take 5 hours to fill up 1 tank

$\therefore$ (P+R+T) take 1 hour to fill up $\frac{1}{5}$ part of tank

Again, (P+R) take 7 hours to fill up 1 tank

$\therefore$ (P+R) take 1 hour to fill up $\frac{1}{7}$ part of tank

$\therefore$ In 1 hour, T can fill up = $\left(\frac{1}{5} - \frac{1}{7}\right) = \frac{7-5}{35} = \frac{2}{35}$ part of tank.

Now, $\frac{2}{35}$ part of tank is filled by T in 1 hour

$\therefore$ 1 or complete part of tank is filled by T in = $\frac{35 \times 1}{2} = 17\frac{1}{2}$ hours.

Ans. T can fill up t he tank in $17\frac{1}{2}$ hours.

16. A box contains 5 green, 4 yellow and 3 white balls. Three balls are drawn at random. What is the probability that they are not of same colour? *[Basic Bank Ltd. (Cashier)-18]*

Solution:

Given that, number of green ball = 5 $\therefore$ Number of yellow ball = 4 and $\therefore$ Number of white ball = 3

$\therefore$ Total ball = 5 + 4 + 3 = 12

$\therefore$ Probability that the balls are same colour is P(3 balls are same colours)

$= P(3 \text{ green}) + P(3 \text{ yellow}) + P(3 \text{ white}) = \frac{5c_3}{12c_3} + \frac{4c_3}{12c_3} + \frac{3c_3}{12c_3} = \frac{10}{220} + \frac{4}{220} + \frac{1}{220} = \frac{10+4+1}{220} = \frac{15}{220}$

$= \frac{3}{44}$

$\therefore$ P (3 balls are same NOT colours) = $1 - \frac{3}{44} = \frac{44-3}{44} = \frac{41}{44}$

Ans. The probability of not being 3 same colour is $\frac{41}{44}$

17. Jaya can make 40 pancakes in a minute. Sally can make pancakes at half of Jaya's rate. What time will it need (in minute) to make 150 cakes, if Sally's have already made a start of 30 pancakes alone?

[NCC Bank Ltd. (MTO)-18]

Solution:

Sally takes 1 minute to make $\frac{40}{2}$ = 20 pancakes.

Sally makes 20 pancakes in 1 minute.

$\therefore$ Sally makes 30 pancakes in = $\frac{30 \times 1}{20}$ = 1.5 minute.

$\therefore$ Remaining (150 – 30) = 120 pancakes are made by both of them.
Now, Jaya and Sally takes 1 minute to make= 40 + 20 = 60 pancakes.

That means, 1 pancake is made by them in = $\frac{1}{60}$ minutes

$\therefore$ 120 pancake is made by them in = $\frac{1 \times 120}{60}$ = 2 minutes

$\therefore$ Total time taken by them to make 150 pancakes is = 2 min + 1.5 min = 3.5 minutes.

Ans: 3.5 munities

18. A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 2 days B had to leave and A alone complete the remaining work. How many days did it took to complete the whole work?

[Sonali Bank Ltd. (Officer)-18]

Solution:

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

$\therefore$ (A+B)'s 2 day's work = $\frac{2}{6}=\frac{1}{3}$ part

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

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

$\therefore \frac{2}{3}$ part of work is done by A in = $\frac{15 \times 2}{3 \times 1}$ = 10 days

$\therefore$ Time taken to complete the work = 10 + 2 = 12 days

Ans. 12 days.

19. A box contains 75 rods; 35 are blue and 25 of these blue rods are twisted at the bottom. The rest of them are red and 30 of the red ones are twisted. The rods that are not twisted are clear. What is the probability of drawing?

[Solani & Janata Bank Ltd. (SO) IT/ICT-18]

a) A blue rod of from the box? b) A clear rod from the box?

c) A blue, twisted rod? d) A red, clear rod? e) A twisted rod?

Solution:

Given, total rods = 75

Color	Total	Twisted	Clear
Blue	35	25	10
Red	40	30	10

Now, we will find the probability.

A) Probability of a blue rod from the box = $\frac{\text{Total blue rods}}{\text{Total rods}}=\frac{35}{75}=\frac{7}{15}$

B) Probability of a clear rod from the box $= \frac{\text{Total clear rods}}{\text{Total rods}} = \frac{10+10}{75} = \frac{20}{75} = \frac{4}{15}$

C) Probability of a blue twisted rod $= \frac{\text{Total blue twisted rods}}{\text{Total rods}} = \frac{25}{75} = \frac{1}{3}$

D) Probability of a clear red rod $= \frac{\text{Total clear red rods}}{\text{Total rods}} = \frac{10}{75} = \frac{2}{15}$

E) Probability of a twisted rod $= \frac{\text{Total twisted rods}}{\text{Total rods}} = \frac{25+30}{75} = \frac{55}{75} = \frac{11}{15}$

20. The sum of race times of two runners is 170 seconds. One of the runners took ten seconds less than twice the other to complete the race. What is the race time of each runner? *[Solani & Janata Bank Ltd. (SO) IT/ICT-18]*

Solution:

Let, A took x seconds

$\therefore$ B took (170–x) seconds.

According to question, $2(170 - x) - 10 + (170 - x) = 170$

$\Rightarrow 340 - 2x - 10 + 170 - x = 170 \quad \Rightarrow 330 = 3x \quad \Rightarrow 3x = 330 \quad \therefore x = \frac{330}{3} = 110 \quad \therefore A = 110$

$\therefore$ A took 110 seconds and B took (170–100) = 60 seconds.

21. Two men and five women completed only one fourth portion of a job in 3 days. After 3 days, another man was included in the team and two days they completed another one fourth portion of the job. How many men can complete the whole job in 4 days? *[One Bank Ltd. (SCO)-18]*

Solution:

2 men + 3 women, in 3 days complete $= \frac{1}{4}$ part

$\therefore$ 2 men + 3 women, in 1 day complete $= \frac{1}{4\times3} = \frac{1}{12}$ part

3 men + 3 women, in 2 days complete $= \frac{1}{4}$ part

$\therefore$ 3 men + 3 women, in 1 day complete $= \frac{1}{4\times2} = \frac{1}{8}$ part

3 men + 3 women, in 1 day complete $= \frac{1}{8}$ part

2 men + 3 women, in 1 day complete $= \frac{1}{12}$ part

(-)

$\therefore$ 1 man complete in 1 day $= \frac{1}{24}$ part

So, 1 part completed in 1 day by $= 24\times1$ men

$\therefore$ 1 part completed in 4 day by $\frac{24\times1}{4} = 6$ men

Ans: 6 men

22. 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? *[NRBC Bank Ltd. (MTO)-18]*

Solution:

Let, total work has been completed in x days.

A works = x days

$\therefore$ B works = (x–2) days & C works = 4 days

According to the question,

$\frac{x}{16}+\frac{x-2}{32}+\frac{4}{48}=1 \Rightarrow \frac{6x+3(x-2)+8}{96}=1$

$\Rightarrow 6x+3x-6+8=96 \Rightarrow 9x+2=96 \Rightarrow 9x=96-2=94$

$\Rightarrow x=\frac{94}{9}=10.44 \therefore x=10.44$

So, the work will be completed in 10.44 days i.e 11 days (Approx.)

Ans:11days (Approx.)

23. 50 daily workers can complete a dam project in 40 days. If 30 of them work daily and the rest work in every alternative day, how many more days will be required to complete the project? *[Bangladesh Bank (AD)-18]*

Solution:

50 workers took 40 days to complete = 1 work

$\therefore$ 1 worker took 40 day to complete = $\frac{1}{50}$ part of the work

$\therefore$ 1 worker took 1 day to complete = $\frac{1}{40\times 50}=\frac{1}{2000}$ part of the work

$\therefore$ 30 workers can do in 1 day $\frac{30}{2000}$ part = $\frac{3}{200}$ part of the work

As rest (50 – 30) = 20 workers work in alternative days.

So, every second day all workers work together.

Here, 50 workers can do in 1 day $\frac{1}{40}$ part of the work.

And 30 workers can do in 1 day $\frac{3}{200}$ part of the work.

So, in 2 days they complete = $\left(\frac{1}{40}+\frac{3}{200}\right)=\frac{5+3}{200}=\frac{8}{200}=\frac{1}{25}$ part of the work.

$\therefore$ In 1 day they complete = $\frac{1}{25\times 2}=\frac{1}{50}$ part of the work.

Now, $\frac{1}{50}$ part of the work is done in 1 day

$\therefore$ 1 (whole) part of the work is done in = $\frac{1\times 50}{1}=50$ days

$\therefore$ They need (50–40) = 10 days more to complete project.

Ans: 10 days

24. 3 coins are tossed at random. construct the sample space and find the probability of getting:

a) One head two tails b)One tail c) One tail and two heads. *[Bangladesh Bank (AD)-18]*

Solution:

To toss 3 coins sample space be = {HHH, HHT, HTH, THH, HTT, THT, TTH, TTT}.

From sample space :

a) P(One head two tails)= $\frac{3}{8}$

b)P(One tail)= $\frac{3}{8}$

c) P(One tail and two heads) = $\frac{3}{8}$

Ans:

25. A can do a piece of work in 120 days and B can do it in 150 days. They work together for 20 days . Then B leaves and A continues the work alone. 12 days after C joins A and the work is completed in 48days more. In how many days can C do it if he works alone? *[Joint Recruitment Test for 5 Banks (Officer)-18]*

Solution:

A & B can do in 1 day $= \left(\frac{1}{120}+\frac{1}{150}\right) = \left(\frac{5+}{600}\right) = \frac{9}{600} = \frac{3}{200}$ Part of the work

$\therefore$ A & B can do in 20 days $= \left(\frac{3}{200}\times 20\right) = \frac{3}{10}$ Part of the work

Remaining work $= 1 - \frac{3}{10} = \frac{10-3}{10} = \frac{7}{10}$ Part of the work

In 12 days, A can complete $= \frac{12}{120} \times 12 = \frac{1}{10}$ Part of the work

$\therefore$ Remaining work $= \left(\frac{7}{10}-\frac{1}{10}\right) = \frac{7-1}{10} = \frac{6}{10} = \frac{3}{5}$ Part of the work

Let, C can do the work is x days

So, A & C can do in 1 day $= \left(\frac{1}{120}+\frac{1}{x}\right) = \frac{x+120}{120x}$ Part of the work

$\therefore$ A & C can do in 48 days $= \frac{48(x+120)}{120x}$ Part of the work

According to question, $\frac{48(x+120)}{120x} = \frac{3}{5} \Rightarrow 5 \times 48\ (x + 120) = 360x$

$\Rightarrow 240x + 28{,}800 = 360x \quad \Rightarrow 360x - 240x = 28{,}800 \quad \Rightarrow 120x = 28{,}800 \quad \therefore x = \frac{28800}{120} = 240$

$\therefore$ C can do the work 240 days.

Alternative solution:

Let, C alone can do the work in x days

According to the problem,

A+B+C = 1

$\Rightarrow \left(\frac{20+12+48}{120}+\frac{20}{150}+\frac{48}{x}\right) = 1 \Rightarrow \frac{48}{120}+\frac{20}{150}+\frac{48}{x} = 1 \quad \Rightarrow \frac{400x+80x+48\times 600}{600x} = 1$

$\Rightarrow 600x - 480x = 48\times 600 \quad \Rightarrow 120x = 48\times 600 \quad \Rightarrow x = \frac{48\times 600}{120} \quad \therefore x = 240$

$\therefore$ C alone can do the work in 240 days

Answer: 240 days

26. A manufacturing company uses two machines A and B with different production capacities. When working alone, machine A can produce a production lot 5 hours and machine B can produce the same lot in x hours. When the tow machines operate simultaneously to produce the same production lot, it takes them 2hours to complete the job. How many hours will the machine B take to produce the production lot alone? *[Joint Recruitment Test for 5 Banks (Officer)-18]*

Solution:

Machine A take 5 hours to produce = 1 lot

Machine A takes 1 hours to produce $= \frac{1}{5}$ lot

And machine B takes x hour to produce = 1 lot

Machine B takes x hours to produce $= \frac{1}{x}$ lot

$\therefore$ Together they take 1 hour to produce $= \left(\frac{1}{5}+\frac{1}{x}\right) = \frac{x+x}{5x}$ Portion of lot

Again, they take 2 hours to complete the job

$\therefore$ They take 1 hour to complete $\frac{1}{2}$ job

$\therefore$ We can write $= \frac{x+5}{5x} = \frac{1}{2} \Rightarrow 2x + 10 = 5x \Rightarrow 3x = 10 \Rightarrow x = \frac{10}{3} \therefore x = 3\frac{1}{3}$ hours.

Ans: $x = 3\frac{1}{3}$ hours

Alternative solution:

Given, Machine A & B alone can Produce a lot in 5 hours and x hours respectively.
According to problem,

$A+B = 1 \Rightarrow \frac{2}{5}+\frac{2}{x} = 1 \Rightarrow \frac{2x+10}{5x} = 1 \Rightarrow 2x + 10 = 5x \Rightarrow 3x = 10 \Rightarrow x = \frac{10}{3} \therefore x = 3\frac{1}{3}$

So, Machine B alone can Produce a lot in $3\frac{1}{3}$ hours

Answer: $3\frac{1}{3}$ hours

27. Pipe A can fill a tank in 18 hours, Pipe B can empty a tank in 12 hours, Pipe C can fill tank in 6 hours. The tank is already filled up to $\frac{1}{6}$ of its capacity. Now Pipe A is opened in the first hour alone, Pipe B is opened in the second hour alone and Pipe C is opened in the third hour alone. This cycle is repeated until the tank gets filled. Then in how many hours does the rest of tank get filled?

[Joint Recruitment Test for 8 Banks (SO)-18]

Solution:

As the tank is filled $\frac{1}{6}$ part of it's capacity

$\therefore$ The remaining $= \left(1-\frac{1}{6}\right) = \frac{5}{6}$ parts needed to be filled.

Now, Pipe A takes 18 hours to fill = 1 tank

$\therefore$ Pipe A takes 1 hour to fill $= \frac{1}{18}$ parts needed to be filled.

Similarly, Pipe C takes 1 hour to fill $\frac{1}{6}$ part of the tank.

And Pipe B takes 1 hour to empty $\frac{1}{12}$ part of the tank.

So, three pipes can fill the tank separately in 3 hours $= \left(\frac{1}{18}+\frac{1}{6}-\frac{1}{12}\right) = \frac{2+6-3}{36} = \frac{5}{36}$ Part of the tank

$\therefore \frac{5}{36}$ Part of the tank is filled in $= \frac{3 \times 36 \times 5}{5 \times 6} = 18$ hours.

Ans: 18 hours.

Alternative solution:

As the tank is filled $\frac{1}{6}$ part of it's capacity

$\therefore$ The remaining part $= \left(1-\frac{1}{6}\right) = \frac{5}{6}$ part needed to be filled.

$\therefore$ Pipe A,B & C fill the tank in 3 hours $= \frac{1}{18} - \frac{1}{12} + \frac{1}{6} = \frac{5}{36}$ part

$\therefore$ Required time taken to fill the rest of the part of the tank = $(3 \times \frac{36}{5} \times \frac{5}{6})$ hours = 18 hours

Answer: 18 hours

28. A bag contains some white and black balls. The probability of picking two white balls one after other without replacement form that bag is $\frac{14}{33}$. What will be the probability of picking two black balls from that bag if bag can hold maximum 15 balls only? *[Joint Recruitment Test for 8 Banks (SO)-18]*

Solution:

Let, the number of white balls = x and the number of black balls = y

According to problem,

$$\frac{{}^{x}c_2}{{}^{(x+y)}c_2} = \frac{14}{33} \Rightarrow \frac{x \times (x-1)}{(x+y) \times (x+y-1)} = \frac{7 \times 2}{11 \times 3}$$

Now, multiplying both the numerator and denominator by 4 we get,

$$\Rightarrow \frac{x \times (x-1)}{(x+y) \times (x+y-1)} = \frac{7 \times 2 \times 4}{11 \times 3 \times 4} \Rightarrow \frac{x \times (x-1)}{(x+y) \times (x+y-1)} = \frac{8 \times 7}{12 \times 11}$$

So, White balls x= 8 and total balls (x+y) = 12 . So, black balls= (12–8)=4

$\therefore$ Probability of picking two black balls without replacement $= \frac{{}^{4}c_2}{{}^{12}c_2} = \frac{4 \times 3}{12 \times 11} = \frac{1}{11}$

Ans: $\frac{1}{11}$

29. A and B can do a piece of work in 30 days, while B and C can do the same work in 24 days and C and A in 20 days. They all work together for 10 days when B and C leave. How many days more will A take to finish the work? *[Joint Recruitment Test for 3 Banks (Officer-Cash)-18*

Solution:

(A + B) + (B+C) + (C+A)'s 1 day's work $= \left(\frac{1}{30} + \frac{1}{24} + \frac{1}{20}\right)$ Part

$\Rightarrow$ 2(A + B + C)'s 1 day's work $= \frac{12}{120}$ Part

$\therefore$ (A + B + C)'s 1 day's work $= \frac{15}{120 \times 2} = \frac{1}{16}$ Part

$\therefore$ (A + B + C)'s 10 day's work $= 10 \times \frac{1}{16} = \frac{5}{8}$ Part

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

Now, A does in 1 day $= \left(\frac{1}{16} - \frac{1}{24}\right) = \frac{1}{48}$ Part

That means $\frac{1}{48}$ Part of the work is done by A in 1 day

$\therefore \frac{3}{8}$ Part of the work is done by A in $\left(\frac{48 \times 3}{8}\right)$ = 18 days

Ans: 18 days

30. A tank is filled by three pipes with uniform flow. The first two pipes operating simultaneously fill the tank in the same time during which the tank is filled by the third pipe alone. The second pipe fills the tank 5

hours faster than the first pipe and 4 hours slower than the third pipe. Find the time required by the first pipe to fill the tank? *[Joint Recruitment Test for 3 Banks (Officer-Cash)-18*

Solution:

Let, the first pipe can alone fill the tank in x hour

$\therefore$ 2nd and 3rd pipe will take (x–5) and (x–9) hours to fill the tank

According to the problem,

$\frac{1}{x}+\frac{1}{x-5}=\frac{1}{x-9} \Rightarrow \frac{(x-5)+x}{x(x-5)}=\frac{1}{x-9} \Rightarrow (2x-5)(x-9)=x(x-5)$

$\Rightarrow 2x^2-18x-5x+45=x^2-5x \Rightarrow x^2-18x+45=0$

$\Rightarrow x^2-15x-3x+45=0 \Rightarrow x(x-15)-3(x-15)=0$

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

Either, $x-15=0 \therefore x=15$ or, $x-3=0 \therefore x=3$ [x = 3 is not acceptable]

The first pipe will take 15 minutes to fill the tank.

Ans: 15 minutes

31. Anik visited his cousin Rowhan during the summer vacation. In the mornings, they both would go for swimming. In the evenings, they would play tennis. They would engages in at most one activity per day, i.e. either they went swimming or played tennis each day. There were days when they took rest and stayed home all day long. There were 32 mornings when they did nothing, 18 evenings when they stayed at home, and a total of 28 days when they swam or played tennis. What duration of the summer vacation did Anik stay with Rowhan? *[Uttara Banks Ltd. (AO-Cash)-18]*

Solution:

Let, Anik stayed x days with Rowhan

As they were free on 32 mornings

$\therefore$ They were busy in (x–32) mornings

As, they were did nothing on 18 evenings

$\therefore$ They were busy in (x–18) evenings

According to question,

$(x-32)+(x-18)=28 \Rightarrow 2x-50=28 \Rightarrow 2x=50+28=78 \therefore x=\frac{78}{2}=39$

$\therefore$ Anik stayed 39 days with Rowhan.

Ans: 39 days

32. A machine P can print one lakh books in 8 hours; machine Q can print the same number of books in 10 hours while machine R can print them in 12 hours. All the machines are started at 9 am. While machine P is closed at 11 am. and the remaining two machines complete work. Approximate at what time will the work be done? *[Joint Recruitment Test for 2 Banks (Officer)-18]*

Solution:

Work done by P,Q & R together in 1 hr $=\left(\frac{1}{8}+\frac{1}{10}+\frac{1}{12}\right)=\frac{37}{120}$ part

As they start working together at 9 am & P stops working at 11 am

So, they work together in 2 hours $=\frac{37}{120}\times 2=\frac{37}{60}$

$\therefore$ Remaining work$=(1-\frac{37}{60})=\frac{23}{60}$ part

$\therefore$ Work done by (Q + R) in 1 hr $=\left(\frac{1}{10}+\frac{1}{12}\right)=\frac{11}{60}$ part

$\frac{11}{60}$ part work done in 1 hr

$\therefore \frac{23}{60}$ part work done in $\frac{60 \times 23}{11 \times 60} = \frac{23}{11} = 2\frac{1}{11}$ hr

So, they will finish the work in 11am+$2\frac{1}{11}$ = 1 pm

Ans: 1 pm

33. Three pipes A, B and C can fill a tank in 6 hours. After working at it together for 2 hours, C is closed and A and B can fill the remaining part in 7 hours. How many hours will take C alone to fill the tank?

[Joint Recruitment Test for 2 Banks (Officer)-18]

Solution:

A, B, C together do in 1 hour = $\frac{1}{6}$ Parts

$\therefore$ A, B, C together do in 2 hour = $\frac{1 \times 2}{6} = \frac{1}{3}$ parts

$\therefore$ Remaining part = $1 - \frac{1}{3} = \frac{2}{3}$ parts which is fulfilled by (A+B) in 7 hours.

In 7 hours (A+B) together fulfill = $\frac{2}{3}$ parts

$\therefore$ (A+B) together fulfill in 1 hours = $\frac{2}{3 \times 7} = \frac{2}{21}$ parts

So, C alone fulfills in 1 hour = $\left(\frac{1}{6} - \frac{2}{21}\right) = \frac{1}{14}$ parts

C alone fulfills $\frac{1}{14}$ parts in 1 hour

$\therefore$ C fulfills completes part in = $1 \times \frac{14}{1}$ = 14 hours

Ans: 14 hrs

34. A alone can reap a certain field in 15 days and B in 12 days. If A begins alone and after a certain interval B joins him, the field is reaped in 7.5 days. How long did A and B work together.

[Probashi Kallyan Bank Ltd. (SEO)-18]

Solution:

Let, B works for x days

In 1 day A can do = $\frac{1}{15}$ part

In 7.5 days A can do = $\frac{7.5}{15} = \frac{1}{2}$ part

In 1 day B can do = $\frac{1}{12}$ part

In x day B can do = $\frac{x}{12}$ part

According to the question, $\frac{1}{2} + \frac{x}{12} = 1 \Rightarrow \frac{6 + x}{12} = 1 \Rightarrow 6 + x = 12$

$\therefore$ x = 12 – 6 = 6 days

Thus, A and B work 6 days together.

Ans: 6 days

35. A tank can be filled by a tap in 20 minutes and by another tap in 60 minutes. Both the taps are kept open for 10 minutes and then the first tap is shut off. After this, the tank will be completely filled in what time?

[Probashi Kallyan Bank Ltd. (SEO)-18]

Solution:

দুটি পাইপ দ্বারা 10 মিনিটে পূর্ণ হয় = $10\left(\frac{1}{20}+\frac{1}{60}\right) = \frac{1}{2}+\frac{1}{6} = \left(\frac{3+1}{6}\right) = \frac{4}{6} = \frac{2}{3}$ অংশ

let, after x minutes 2nd pipe will fill the tank

According to problem,

$A+B=1 \quad \Rightarrow \frac{10}{20}+\frac{10+x}{60}=1 \quad \Rightarrow \frac{10+x}{60}=1-\frac{1}{2} \quad \Rightarrow \frac{10+x}{60}=\frac{1}{2} \quad \Rightarrow \frac{10+x}{30}=1 \quad \therefore x=20$

So, after 20 minutes 2nd pipe will fill the tank

Ans: 20 minutes

36. Working together pipe P, R and T can fill a tank in 5 hours. Working together P and R can fill it in 7 hours. Find in how many hours T can fill it? *[Basic Bank Ltd. (AM)-18]*

Solution:

(P + R + T) takes 5 hours to fill up = 1 tank

$\therefore$ (P + R + T) take 1 hour to fill up = $\frac{1}{5}$ part of tank

Again, (P + R) take 7 hours to fill up = 1 tank

$\therefore$ (P + R) take 1 hour to fill up = $\frac{1}{7}$ part of tank

$\therefore$ In 1 hour, T can fill up = $\left(\frac{1}{5}-\frac{1}{7}\right) = \frac{7-5}{35} = \frac{2}{35}$ part of tank

Now, $\frac{2}{35}$ part of tank is filled by T in = 1 hour

$\therefore$ 1 or completed part of tank is filled by T in = $\frac{35\times 1}{2} = 17\frac{1}{2}$ hours

Ans: T can fill up the tank in $17\frac{1}{2}$ hours.

37. A box contains 5 green, 4 yellow and 3 white balls. Three balls are drawn at random. What is the probability that they are not of same colour? *[Basic Bank Ltd. (AM)-18]*

Solution:

Given that, number of green ball = 5 $\therefore$ Number of yellow ball = 4 and $\therefore$ Number of white ball = 3

$\therefore$ Total ball = 5 + 4 + 3 = 12

$\therefore$ Probability that the balls are same colour , P(3 balls are same colours)

$= P(3 \text{ green}) + P(3 \text{ yellow}) + P(3 \text{ white}) = \frac{5c_3}{12c_3}+\frac{4c_3}{12c_3}+\frac{3c_3}{12c_3} = \frac{10}{220}+\frac{4}{220}+\frac{1}{220} = \frac{10+4+1}{220} = \frac{15}{220}$

$= \frac{3}{44}$

$\therefore$ P (3 balls are not same colours) = $1-\frac{3}{44} = \frac{44-3}{44} = \frac{41}{44}$

Ans. The probability of not being 3 same colour is $\frac{41}{44}$

38. Machine A, working alone at its constant rate, produces x pounds of peanut butter in 12 minutes. Machine B, working alone at its constant rate, produces x pounds of peanut butter in 18 minutes. How many minutes will it take machines A and B, working simultaneously at their respective constant rates, to produce x pounds of peanut butter? *[Sonali Bank Ltd. (Officer-Cash) 18]*

Solution:

A can produce in 12 minutes x pound of peanut butter

$\therefore$ A can produce in 1 minute $\frac{x}{12}$ pound of peanut butter

Again, B can produce in 18 minutes x pound of peanut butter

$\therefore$ B can produce in 1 minute $\frac{x}{18}$ pound of peanut butter

So, in 1 minute (A+B) can produce $= \left(\frac{x}{12} + \frac{x}{18}\right) = \left(\frac{3x + 2x}{36}\right) = \frac{5x}{36}$ pounds.

Now, $\frac{5x}{36}$ pounds can be produced by (A+B) in = 1 minute

$\therefore$ x pounds can be produced by (A+B) in $= \frac{36 \times x}{5x}$ = 7.2 minutes = 7 minutes 12 seconds.

Ans: 7 minutes 12 seconds.

39. Two men and five women completed only one fourth portion of a job in 3 days. After 3 days, another man was included in the team and two days they completed another one fourth portion of the job. How many men can complete the whole job in 4 days? *[Shajalal Islami Bank Ltd. (TSO) 18]*

Solution:

2 men and 5 women require 3 days to complete $\frac{1}{4}$ job

$\therefore$ They complete $\frac{1}{4\times3} = \frac{1}{12}$ job in 1 day.

3 men + 5 women require 2 days to complete $\frac{1}{4}$ job;

$\therefore$ They complete $\frac{1}{4\times2} = \frac{1}{8}$ in 1 days.

3 men + 5 women $= \frac{1}{8}$

2 men + 5 women $= \frac{1}{12}$

(–) 1 man $= \frac{1}{24}$

$\frac{1}{24}$ job is done in 1 day by 1 men

$\therefore$ 1 job is done in 1 day by 24 men

$\therefore$ 1 job is done in 4 day by $\frac{24}{4} = 6$ men.

Ans: 6 men.

40. A machine P can print one lakh books in 8 hours; machine Q can print the same number of books in 10 hours while machine R can print them in 12 hours. All the machines are started at 9 am. While machine P is closed at 11 am. and the remaining two machines complete work. Approximate at what time will the work? *[Sonali Bank Ltd. (IT/ICT) 18]*

Solution:

Work done by P,Q & R together in 1 hr $= \left(\frac{1}{8} + \frac{1}{10} + \frac{1}{12}\right) = \frac{37}{120}$ part

As they start working together at 9 am & P stops working at 11 am

So, they work together in 2 hours $= \frac{37}{120} \times 2 = \frac{37}{60}$

$\therefore$ Remaining work= $(1-\frac{37}{60})=\frac{23}{60}$ part

$\therefore$ Work done by (Q + R) in 1 hr $=\left(\frac{1}{10}+\frac{1}{12}\right)=\frac{11}{60}$ part

$\frac{11}{60}$ part work done in 1 hr

$\therefore \frac{23}{60}$ part work done in $\frac{60\times 23}{11\times 60}=\frac{23}{11}=2\frac{1}{11}$ hr

So, they will finish the work in 11am+$2\frac{1}{11}$ = 1 pm

Ans: 1 pm