Pipes and Cisterns Questions and Answers for Competitive Exams Pdf

1. Three pipes A, B and C can fill a tank from empty to full in 30 minutes, 20 minutes and 10 minutes respectively. When the tank is empty, all the three pipes are opened A, B and C discharge chemical solutions P, Q and R respectively. What is the proportion of solution R in the liquid in the tank after 3 minutes?

a. 5/11

b. 6/11

c. 7/11

d. 8/11

Ans: B

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

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

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

2. Two pipes A and B can separately fill a cistern in 60 minutes and 75 minutes respectively. There is a third pipe in the bottom of the cistern to empty. If all the three pipes are simultaneously opened, then the cistern is full in 50 minutes. In how much time, the third pipe alone can empty the cistern?

a. 90 min

b. 100 min

c. 110 min

d. 120 min

Ans: B

Work done by the third pipe in 1 min.

$$-\frac{1}{50}-\left(\frac{1}{60}+\frac{1}{75}\right)=\left(\frac{1}{50}-\frac{3}{100}\right)=-\frac{1}{100}.$$ [– ve sign means emptying]

$\therefore$ The third pipe alone can empty the cistern in 100 min.

3. Two taps A and B can fill a tank in 5 hours and 20 hours respectively. If both the taps are open then due to a leakage, it took 30 minutes more to fill the tank. If the tank is full, how long will it take for the leakage alone to empty the tank?

a. 4x1/2 hrs

b. 9 hrs

c. 18 hrs

d. 36 hrs

Ans: D

Part filled by (A + B) in 1 hour $= \left(\frac{1}{5}+\frac{1}{20}\right)=\frac{1}{4}$.

So, A and B together can fill the tank in 4 hours.

Work done by the leak in 1 hour $= \left(\frac{1}{4}-\frac{2}{9}\right)=\frac{1}{36}$.

$\therefore$ Leak will empty the tank in 36 hrs.

4. Two pipes A and B can fill a tank is 15 minutes and 20 minutes respectively. Both the pipes are opened together but after 4 minutes, pipe A is turned off. What is the total time required to fill the tank?

a. 10 min 20 sec

b. 11 min 45 sec

c. 12 min 30 sec

d. 14 min 40 sec

Ans: D

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

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

Part filled by B in 1 minute $= \frac{1}{20}$.

$\frac{1}{20} : \frac{8}{15} :: 1 : x$ or $x = \left(\frac{8}{15}\times 1\times 20\right) = 10\frac{2}{3}$ min. = 10 min. 40 sec.

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

5. Two pipes A and B together can fill a cistern in 4 hours. Had they been opened separately, then B would have taken 6 hours more than A to fill the cistern. How much time will be taken by A to fill the cistern separately?

a. 1 hr

b. 2 hrs

c. 6 hrs

d. 8 hrs

Ans: C

Let the cistern be filled by pipe A alone in x hours.

Then, pipe B will fill it in $(x + 6)$ hours.

$\therefore \quad \frac{1}{x}+\frac{1}{(x+6)} = \frac{1}{4} \quad \Leftrightarrow \quad \frac{x+6+x}{x(x+6)} = \frac{1}{4}$

$\Leftrightarrow \quad x^2 - 2x - 24 = 0 \quad \Leftrightarrow \quad (x-6)(x+4) = 0$

$\Leftrightarrow \quad x = 6.$