

(Maths)

PIPE AND CISTERN

Type (6): When taps are opened alternatively:

Ques: Two pipes can fill the tank in 20 hours and 25 hours. If both are opened alternatively for one – one hour then in how much time the tank will be filled?

Ans: Part of the tank filled in 1 cycle = $\frac{1}{20} + \frac{1}{25}$

$$\begin{aligned} \text{(Each cycle completes in 2 hours)} &= \frac{5+4}{100} \\ &= \frac{9}{100} \end{aligned}$$

$$\text{Part of the tank filled in 11 cycles (i.e. 22 hours)} = \frac{9 \times 11}{100} = \frac{99}{100}$$

$$\text{Remaining tank} = 1 - \frac{99}{100} = \frac{1}{100} \text{ part}$$

It means tank will fill in 23rd hour.

$$\begin{aligned} \text{Time taken to fill the remaining tank} &= \frac{\frac{1}{100}}{\frac{1}{20}} \\ &= \frac{1}{100} \times \frac{20}{1} \\ &= \frac{1}{5} \text{ hours} \end{aligned}$$

$$\begin{aligned} \text{Total time taken to fill the tank} &= 22 + \frac{1}{5} \\ &= 22\frac{1}{5} \text{ hours.} \end{aligned}$$