

Pipes and Cisterns - I

Two pipes A and B can fill a tank in 36 hours and 45 hours respectively. If both the pipes are open simultaneously.

How much time will be taken to fill the tank?

A) 15hr B) 25hr C) 20hr d) 30hr e) None.

$$\begin{aligned} &+ \frac{h}{A+B} = 36 \\ &+ A = 36 \quad \begin{matrix} \text{hrs} \\ \text{eff} \end{matrix} \quad \begin{matrix} 5 \\ 4 \end{matrix} \text{ (lt)} \\ &+ B = 45 \end{aligned}$$

$$\Rightarrow \frac{180(\text{lt})}{(A+B)\text{eff}}$$

$$\Rightarrow \frac{180}{5+4} = \frac{180}{9} = 20\text{hrs} \quad \begin{matrix} 1\text{lt} \\ \downarrow \\ 30\text{hrs} \end{matrix}$$

$$\begin{array}{r} 3 \overline{) 36, 45} \\ \underline{12, 15} \\ 4, 5 \end{array}$$

→ the work

⊕ $P_1 = 10\text{hr}$ ✓
⊖ $P_2 = 15\text{hr}$ ✓

LCM

⊕ $P_1 = 10\text{hr}$
⊖ $P_2 = 15\text{hr}$

3 eff
2
30 (cap)
1

$$\Rightarrow \frac{30}{3-2} = \frac{30}{1} = 30\text{hr}$$

⊕ $A = 10$ eff 2
⊕ $B = 20$ eff 1

20 (work)

$$\frac{20}{20+1} = \frac{20}{3} \text{ days}$$

Q2. If A and B two pipes can fill a tank in 10 hours, when A pipe can fill a tank in 6 hours alone, then in how much time will be taken to fill/empty the tank when pipe B opens alone.
 A) filled in 20 hr ✓ B) Empty in 15 hr c) Empty in 20 hr d) filled in 15 hr.

$$\begin{array}{l} \textcircled{+} A + B = 10 \checkmark \quad \begin{array}{l} \text{hr} \\ \text{eff} \end{array} \\ \textcircled{+} A = 6 \checkmark \quad \begin{array}{l} \text{hr} \\ \text{eff} \end{array} \\ B = \end{array} \quad \begin{array}{r} 3 \\ 5 \\ -2 \end{array} \quad \begin{array}{c} 30 \\ 30 \end{array}$$

$$(A + B)_{\text{eff}} = 3$$

$$A_{\text{eff}} = \underline{5}$$

$$\underline{B_{\text{eff}} = -2}$$

$$\begin{array}{r} 2 \overline{) 6, 10} \\ \underline{3, 5} \end{array} \quad \begin{array}{r} + A = 10 \text{ Lt} \\ - B = 4 \text{ Lt} \end{array}$$

$$2 \times 3 \times 5 = 30$$

6 Lt ✓ filled

$$\frac{30 \text{ Lt}}{2} = \ominus 15 \text{ hr} \rightarrow 15 \text{ hr.}$$

remove the water

$$\underline{(A + B) - A} = B_{\text{eff}}$$

$$3 - 5 = B_{\text{eff}}$$

$$\underline{B_{\text{eff}} = -2 \checkmark}$$