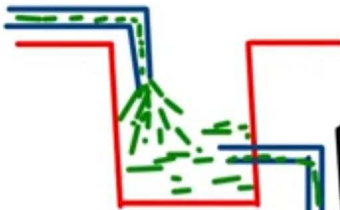


Pipes & Cisterns

(+ve)
Inlet pipe



Outlet
pipe
(-ve)

eg

$P_1 \rightarrow 10 \text{ hr}$
 $P_2 \rightarrow 40 \text{ hr}$
 $P_1 + P_2 \rightarrow ?$

$P_1 + P_2 \rightarrow (4 - 1) \text{ unit/hr}$
 $= 3 \text{ unit/hr}$

$T = \frac{40}{3} \text{ hr}$

USE CODE

AVILIVE

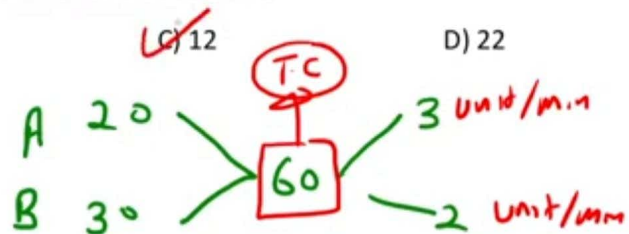
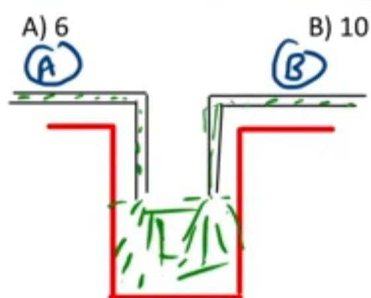
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✓ 1) Two pipes A and B can fill a tank in 20 minutes and 30 minutes respectively. If both pipes are opened together, the time taken to fill the tank is



$$A + B = 3 + 2 = 5 \text{ unit/min}$$

$$T = \frac{60}{5} \text{ min} = 12 \text{ min}$$



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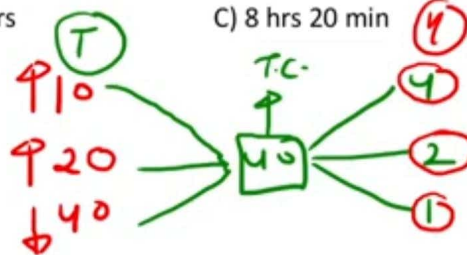
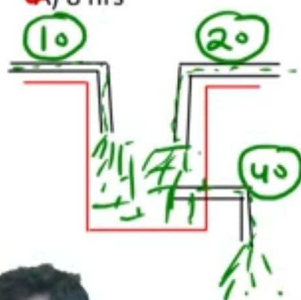
✓ 2) Two pipes can fill a tank in 10 hours and 20 hours respectively while a third pipe empty the full tank in 40 hours. If all the three pipes operate simultaneously, in how much time will the tank be filled?

✓ A) 8 hrs

B) 7 hrs

C) 8 hrs 20 min

D) 7 hrs 20 min



$$4 + 2 - 1 = 5 \text{ unit/hr}$$

$$T = \frac{40}{5} = 8 \text{ hrs}$$



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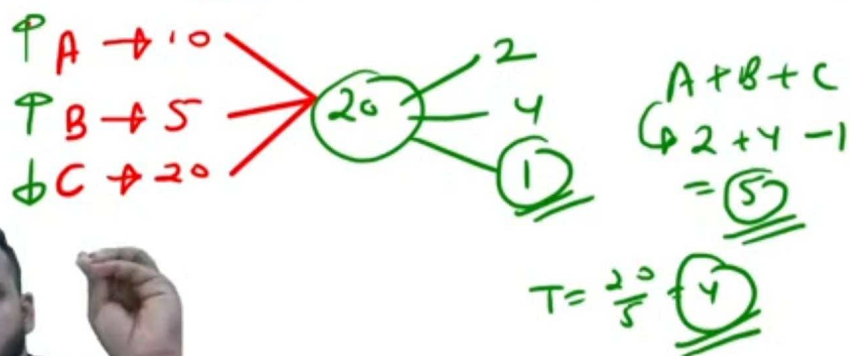
3) A cistern has three pipes A, B, and C. Pipe A can fill a cistern in 10 hrs, pipe B can fill a cistern in 5 hrs while pipe C can empty the cistern in 20 hrs. If they are switched on at same time; In how many hours will the cistern be filled?

A) 3 hrs

B) 4 hrs

C) 2 hrs

D) 5 hrs



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4) Pipe A can fill a tank in 12 hours. On account of a leak at the bottom of the tank it takes thrice as long to fill the tank. How long will the leaks at the bottom of the tank take to empty a full tank, when pipe A is kept closed?

A) 18 hours

B) 8 hours

C) 16 hours

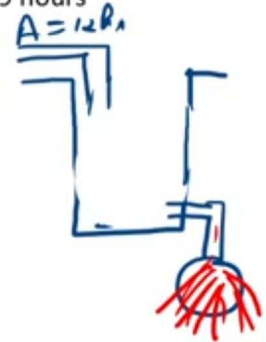
D) 9 hours

$T = 100L$ A $\rightarrow 12 \text{ hr}$
 $\hookrightarrow 100L$

$T \rightarrow 36 \text{ hr}$
 $\hookrightarrow 300L$

$100L + 200L$

$36 \text{ hr} \rightarrow 200L$
 $18 \text{ hr} \rightarrow 100L$



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✓ 5) A tap can fill a tank in 12 hours, but because of a hole in the bottom of the tank, it fills the tank in 15 hours. Determine the time it will take to empty the tank if it is completely filled once and tap is closed.

A) 30 hrs

B) 60 hrs

C) 20 hrs

D) 40 hrs

(100L) A → 12 hr
↳ 100L

$$T = \underline{15 \text{ hr}} = \frac{12 \text{ hr}}{\cancel{100 \text{ L}}} + \frac{3 \text{ hr}}{\cancel{25 \text{ L}}}$$

12 hr → 100L
3 hr → 25L

25L → 15 hr

100L → 60 hr



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- 6) If one pipe A can fill the tank in 10 hrs then 4 pipes each of efficiency 20% as that of pipe A can fill the same tank in how many hours?
- A) 15 hrs B) 12 hrs C) 10 hrs D) 12.5 hrs

A → 10 hrs
→ 100%

Pipe 10 hrs → 20%
4 pipes → 10 hrs → 80%
80% → 10 hrs
100% → ?
 $\frac{10}{80} \times 100 = 12.5 \text{ hrs}$



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✓ 10) Water in a tank becomes double after every minute through a water supply system. In 50 minutes the tank is full of water. The tank is half-filled after M minutes. Where M =

[CGPSC-2014]

A) 25

B) 47

C) 48

✓ D) 49

$$\left(\frac{1}{4}\right)^{25} \rightarrow 25\%$$

$$\begin{aligned} 50 \text{ min} &\rightarrow 100\% \\ 49 \text{ min} &\rightarrow 50\% \end{aligned}$$



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✓ Home Work Question

Pipe 'P' can fill tank in 36 hours and pipe 'Q' can fill this tank in 45 hours. If both the pipes are opened simultaneously, then how much time will be taken to fill this tank?

[RRB-2014(JE), BILASPUR]

✓ A) 20 hours

B) 40.5 hours

C) 9 hours

D) 42 hours

$$\begin{array}{l} P \quad 36 \\ Q \quad 45 \end{array} \rightarrow \begin{array}{l} 4 \\ 5 \end{array} \rightarrow \begin{array}{l} 9 \times 20 \\ 180 \end{array}$$

$$P + Q \rightarrow (5 + 4) = 9$$
$$T = \frac{180}{9} = \underline{\underline{20 \text{ hr}}}$$



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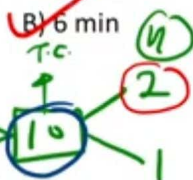
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✓ 1) Two pipes A & B can fill a tank in 5 min & 10 min respectively. Both the pipes are opened together but after 2 min, pipe A is turned off. What is the total time required to fill the tank?

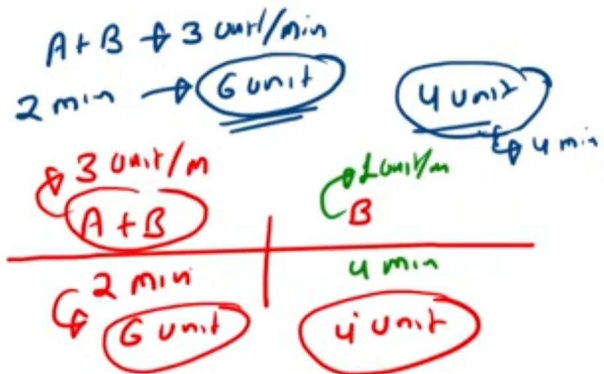
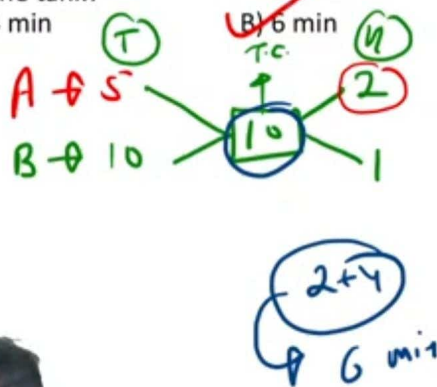
A) 4 min



[AAI (ATC)-2016]

C) 14 min

D) 20 min



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2) An oil tank can be filled by pipe X in 5 hours and pipe Y in 4 hours, each pump working on its own. When the oil tank is full and the drainage hole is open, the oil is drained in 20 hours. If initially the tank was empty and someone started the two pumps together but left the drainage hole open, how many hours will it take for the tank to be filled? (Assume that the rate of drainage is independent of the Head)

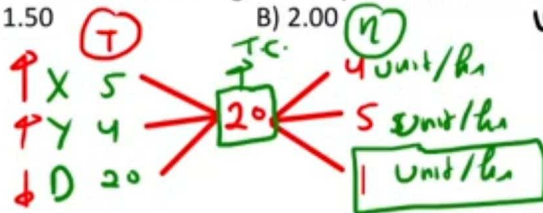
[GATE-2019]

A) 1.50

B) 2.00

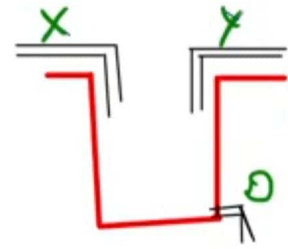
~~C) 2.50~~

D) 4.00



$$X + Y + D = \frac{1}{4} + \frac{1}{5} - \frac{1}{20} = \frac{8}{20} = \frac{2}{5} \text{ unit/hr}$$

$$T = \frac{20}{8} = 2.5 \text{ hr}$$



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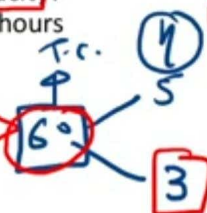
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~~Q~~ A tap can fill an empty tank in 12 hours and another tap can empty half the tank in 10 hours. If both the taps are opened simultaneously, how long would it take for the empty tank to be filled to half its capacity?

A) 30 hours B) 20 hours C) 15 hours D) 12 hours

↑ A → 12
↓ B → 20



$$A + B \rightarrow 5 - 3 = 2 \text{ units/hr}$$

$$\frac{30}{2} = 15 \text{ hr}$$



USE CODE

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✓ A pipe can fill a tank with water in 3 hours. Due to leakage in the bottom of the tank it takes $3\frac{1}{2}$ hours to fill it. In what time will the leakage empty the fully filled tank?

[AAI (ATC)-2016]

A) 12 hours

B) 15 hours

C) 18 hours

✓ D) 21 hours

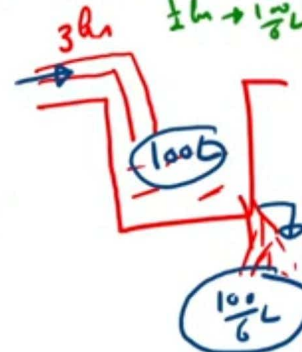
100L

A → 3 hr
100L

T = 3 hr + $\frac{1}{2}$ hr
100L 100L

$(\frac{100}{6} \text{L} \rightarrow 3\frac{1}{2} \text{hr}) \times 6$

100L → 21 hr



USE CODE

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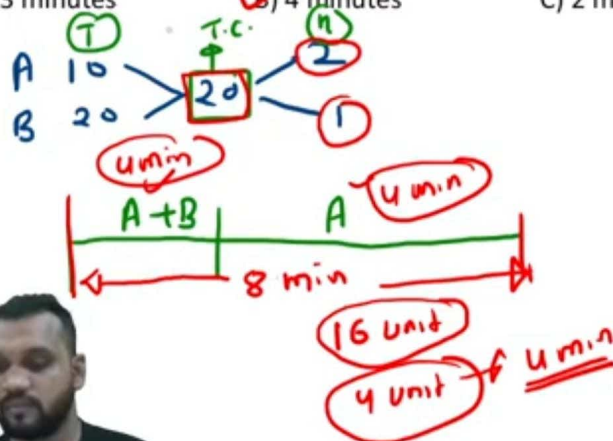
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- ✓ 5) Two pipes A and B can fill a tank in 10 and 20 minutes respectively. If both pipes are opened simultaneously, after how many minutes should pipe B be closed so that the tank is full in 8 minutes? [ONGC 2014]
- A) 3 minutes ✓ B) 4 minutes C) 2 minutes D) 5 minutes



USE CODE

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5) Two pipes A and B can fill a tank in 10 and 20 minutes respectively. If both pipes are opened simultaneously, after how many minutes should pipe B be closed so that the tank is full in 8 minutes?

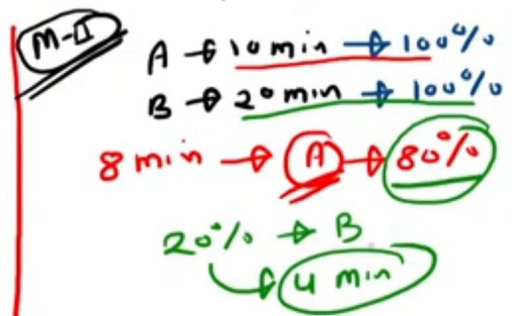
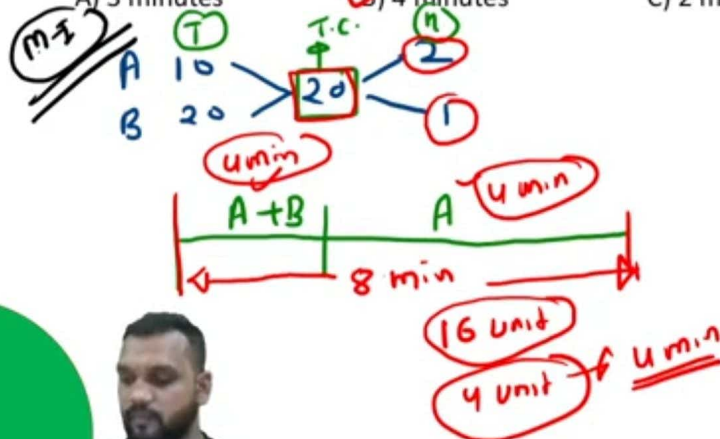
[ONGC 2014]

A) 3 minutes

B) 4 minutes

C) 2 minutes

D) 5 minutes



USE CODE

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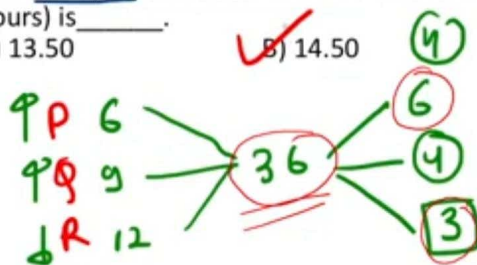
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- ***
6) Two pipes P and Q can fill a tank in 6 hours and 9 hours respectively, while a third pipe R can empty the tank in 12 hours. Initially, P and R are open for 4 hours. Then P is closed and Q is opened. After 6 more hours R is closed. The total time taken to fill the tank (in hours) is _____.
A) 13.50 B) 14.50 C) 15.50 D) 16.50

[GATE 2019]



3 unit/hr $\frac{1}{6} (6-3)$ P+R	1 unit/hr $\frac{1}{9} (4-3)$ Q+R	4 unit/hr Q
4 hr 12 unit	6 hr 6 unit	18 unit $\frac{18}{4} = 4.5$

$$4 + 6 + 4.5 = 14.5 \text{ hr}$$



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