<u>Pipe and Cistern –</u> Easy

1. Two inlet pipes can fill an empty tank in 15 and 18 hours and one outlet pipe can empty the tank in 20 hours. If all the pipes opened simultaneously, then how many hours required fill the full tank?

A. $11 \frac{8}{11}$ hours B. $12 \frac{5}{7}$ hours C. $13 \frac{11}{13}$ hours D. $9 \frac{5}{9}$ hours E. None of these 1. Correct option is : C Solution: If all the pipes are opened simultaneously, then in, = > (1/15) + (1/18) - (1/20) = > (12 + 10 - 9)/180 = > 13/180Required hours = 180/13 = 13 11/13 hours

2. Two pipes A and B alone can fill an empty tank in 20 min and 24 min respectively. Two pipes are opened simultaneously, after some time pipe B is closed. In how many minutes after pipe B is closed if the tank was filled in 15 minutes

- A. 5 min
- B. 6 min
- C. 4 min
- D. 4.5 min
- E. None of these

2. Correct option is : B Solution: 15/20+x/24=1 18+x=24=>x=6 minutes

3. A tank has a leak which can empty a full tank in 28 minutes. A tap is turned on which can fill 2.5 liters a minutes. The tank now becomes empty in 42 minutes. What is the capacity of the tank?

A. 210 liters

- B. 342 liters
- C. 250 liters
- D. 389 liters
- E. None of these

3. Correct option is : A Solution: (1/x)-(1/28) = -(1/42)(1/x) = (1/28)-(1/42)(1/x) = 84 min Capacity of the tank = 84 *2.5 =210 liters

4. Two pipes A and B can fill a tank in 15 minutes and 25 minutes respectively. Both pipes are opened together and pipe B isclosed,5 minutes before the tank is filled completely. Calculate the total time required to fill the tank?

A. 11 ¹/₄ min B. 13 $\frac{3}{5}$ min C. 12 $\frac{7}{8}$ min D. 14 $\frac{5}{6}$ min E. None of these 4. Correct option is : A Solution: Let total capacity = 75 litres (LCM of 15 and 25) A = 5 litres/min B = 3 litres/min A+B fill 75 litres A can fill 5*5 = 25 litres in 5 min But B was closed 5 min before the tank is filled. So A+B together filled (75-25) = 50 litres 50 litres can be filled by A + B in, = > (50/8) = 6 1/4

Total time = $6 \frac{1}{4} + 5 = 11 \frac{1}{4} \min$

5. Pipe P can fill an empty tank in 24 hours and pipe Q can fill the same tank in 16 hours. How many hours required to fill the whole tank, if P and Q fill alternatively doing the work, P begins on first hour?

A. $17\frac{1}{2}$ B. $19\frac{1}{3}$ C. $18\frac{1}{3}$ D. $18\frac{3}{5}$ E. None of these 5. Correct option is : B Solution: LCM of 24 and 16 =48 units 1 cycle (2 hours) = 5 units 9th cycle (18 hours) = 45 units 19th hour =2 units Required no of hours = 18+1+1/3=19 1/3 hours

<u>Pipe and Cistern – Moderate</u>

1. Pipes p, q and r releases three different solution HNO_2 , HCL and HI. And these three pipes fill the empty tank in 25minutes, 30minutes and 40 minutes respectively. If all the pipes are opened, what is the ratio of HI in that mixed solution in tank after 5 minutes?

A. 15/59

- **B.** 5/21
- C. 7/19
- D. 6/21

E. None of these

Correct option is : A

Solution:

Part filled by p , q and r in 5 minutes = 5(1/25 + 1/30 + 1/40) = 59/120

Part filled by r alone = 5/40 = 1/8

The ratio of HI in mixture = 1/8*(120/59) = 15/59

Ratio of HI in solution = 15/59

2. Three pipes A, B and C can fill a tank in 10 hours. After working at it together for 3 hours, C is closed and A and B can fill the remaining part in 14 hours. How much time taken by C to fill the tank alone?

- A. 18 hours
- B. 20 hours
- C. 24 hours
- D. 22 hours
- E. None of these

Correct option is : B

Solution:

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Three pipes A, B and C can fill a tank in 8 hours. A, B and C's 1 hour work=1/10 A, B and C's 3 hour work=3/10 Remaining work=1 - (3/10) = 7/10
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The remaining part will be filled by A and B in 14 hours. Then,

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= > (7/10) * (A+B) = 14
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= > (A+B)'s whole work= 14*(10/7) = 20 hr (A+B)'s 1 hour work= 1/20
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A, B and C's 1 hour work = 1/10
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C's 1 hour work= (A+B+C) - (A+B)
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$$=>(1/10)-(1/20)$$

= > 1/20

C can fill the tank in 20 hours.

3. P, Q and R can fill the tank in 12, 16 and 24 min respectively. All three began to fill the tank together but P and Q left 3 and 4 min respectively before filling the tank. Find the total time taken by all of them to fill the tank?

A. 12 min

- B. 16 min
- C. 8 min

D. 10 min E. None of these Correct option is : C Solution: (x-3)/12 + (x-4)/16 + x/24 = 1(4x - 12 + 3x - 12 + 2x)/48 = 19x - 24 = 489x = 72X = 8 min

4. Pipe B is two times efficient as pipe C. Pipe A and B together can fill an empty tank in 8 4/7 hours. Pipe A and C together can fill the same tank in 12 hours. In how many hours required filling by pipe B alone?

A. 15 B. 12 C. 20 D. 30 E. 10 Correct option is : A Solution: Efficiency ratio of B and C =2:1 Time ratio of B and C = 1:2 Given, (1/A+1/B)-(1/A+1/C) =7/60-1/121/B-1/C=2/60=1/301/x-1/2x=1/30=>1/2x=1/301/x=1/15

5. Pipe A and B can fill an empty tank in 8 hours. Pipe B and C together can fill the same tank in 9 3/5 hours. Pipe A opened for first one hour, Pipe B opened for second one hour and pipe C opened for third one hour and this process is repeated until the tank filled completely. How many hours required filling half of the tank if A is twice efficient as B?

A. 10 hrs

B. 12 hrs

C. 6 hrs

D. 9 hrs

E. 8 hrs

Correct option is : E Solution: Efficiency ratio of A and B = 2:1 and time ratio of A and B = 1:2 1/x+1/2x=1/8 3/2x=1/8=>x=12 hours A= 12 hrs B= 24 hrs C= 16 hrs LCM of 12, 24 and 16 =48 units 1st cycle (3 hrs) = 4+2+3=9 units Half of the tank 24 units filled in 8 hrs

Pipe and Cistern – Hard

1. A cistern can be filled by three pipes A, B and C alone12hrs, 24hrs and 48 hrs respectively. There is an opening D in the cistern that empties the cistern at the rate of 6m/hr. If the cistern is 96m deep then, in how much time will it be filled upto 72hrs of its depth if all the pipes are opened together at the start but B is closed after an hour.

A. 17 hrs B. 20 hrs C. 10 hrs D. 12 hrs E. None of these Correct option is : A Solution: Tank filled by A alone in 1 hr = 1/12Tank filled by B alone in 1 hr = 1/24Tank filled by C alone in 1 hr = 1/48D empty the tank at the rate of 6m/hr So, Tank empty by D in 1hr = 6/96 = 1/16Now, tan is to be filled upto 72m i.e., 72/96 = 3/4 of tank So, Let the 3/4th of the tank to be filled in 't' hours time For 1 hr all are opened then B closed So, for (t-1) hr A,C and D opened $(1/12 + 1/24 + 1/48 - 1/16) + (t - 1) (1/12 + 1/48 - 1/16) = \frac{3}{4}$ $(1/12) + (t-1)(1/24) = \frac{3}{4}$ t = 17hrs

2. A Tank is filled with the mixture of Milk and Water in the ratio of 3:2 up to 2/5 of its capacity. The tank has two inlet pipes i.e., Milk and Water inlets. Milk and Water pipe can fill an empty tank in 12 and 18 hours respectively. Now both pipes are opened simultaneously and closed after the Tank is completely filled, then what is the ratio of Milk and Water in the full Tank if it can accommodate 250Litre?

- A. 1:1
- **B**. 2:3
- C. 3:2
- D. 5:4
- E. None

Correct option is : C Solution: Initial Milk = 2/5*250*3/5 = 60 L Water = 2/5*250*2/5 = 40 L Rest of Tank =150 L Pipes are opened then can fill rest of tank in 108/25 hours H/W = constant then (108/25)/12/x = (108/25)/18(150-x)X = 90 = Milk, Water = 60 Final ratio = 3:2

3. A Special pump can be used for filling as well as for emptying a Cistern. The capacity of the Cistern is 2400m³. The emptying capacity of the Cistern is 10m³ per minute higher than its filling capacity and the pump needs 8 minutes lesser to Cistern the tank than it needs to fill it. What is the filling capacity of the pump?

A. 40m³/min

B. 50m³/min

C. 60m3/min

D. 30m³/min

E. None of the Above

Correct option is : B

Solution:

Filling Capacity of the Pump = x m/min

Emptying Capacity of the pump = (x+10) m/min

2400/x - 2400/x + 10 = 8

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(x - 50) + (x + 60) = 0
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x = 50

4. A Cistern has an inlet pipe and outlet pipe. The inlet pipe fills the cistern completely in 1 hour 20 minutes when the outlet pipe is plugged. The outlet pipe empties the tank completely in 6 hours when the inlet pipe is plugged. If there is a leakage also which is capable of draining out the water from the tank at half of the rate of the outlet pipe, then what is the time taken to fill the empty tank when both the pipes are opened?

A. 3 hours
B. 2 hours
C. 5 hours
D. 4 hours
E. None of the Above
Correct option is : B
Solution:

Inlet pipe Efficiency = 100/(8/6) = 75%

Outlet pipe Efficiency = 100/(6) = 16.66%Efficiency of leakage = half of the rate of the outlet pipe = 8.33% Net Efficiency = 75 - (16.66 + 8.33) = 50%Required time = 100/50 = 2 hours

5. Three pipes A, B, and C can fill the tank in 10 hours, 20 hours and 40 hours respectively. In the beginning all of them are opened simultaneously. After 2 hours, tap C is closed and A and B are kept running. After the 4th hour, tap B is also closed. The remaining work is done by tap A alone. What is the percentage of the work done by tap A alone?

A. 30 %

B. 35 %

C. 45 %

D. 50 %

E. None of the Above

Correct option is : B

Solution:

Pipe A's work in % = 100/10 = 10%

Pipe B's work in % = 100/20 = 5%

Pipe C's work in % = 100/40 = 2.5%

All of them are opened for 2 hours + after 2 hours, tap C is closed + After the 4th hour, tap B is also closed = 100

=>(10+5+2.5)*2+(10+5)*2+X=100

=> 35 + 30 +work by tap A alone = 100

= work by tap A alone = 100-65 = 35%