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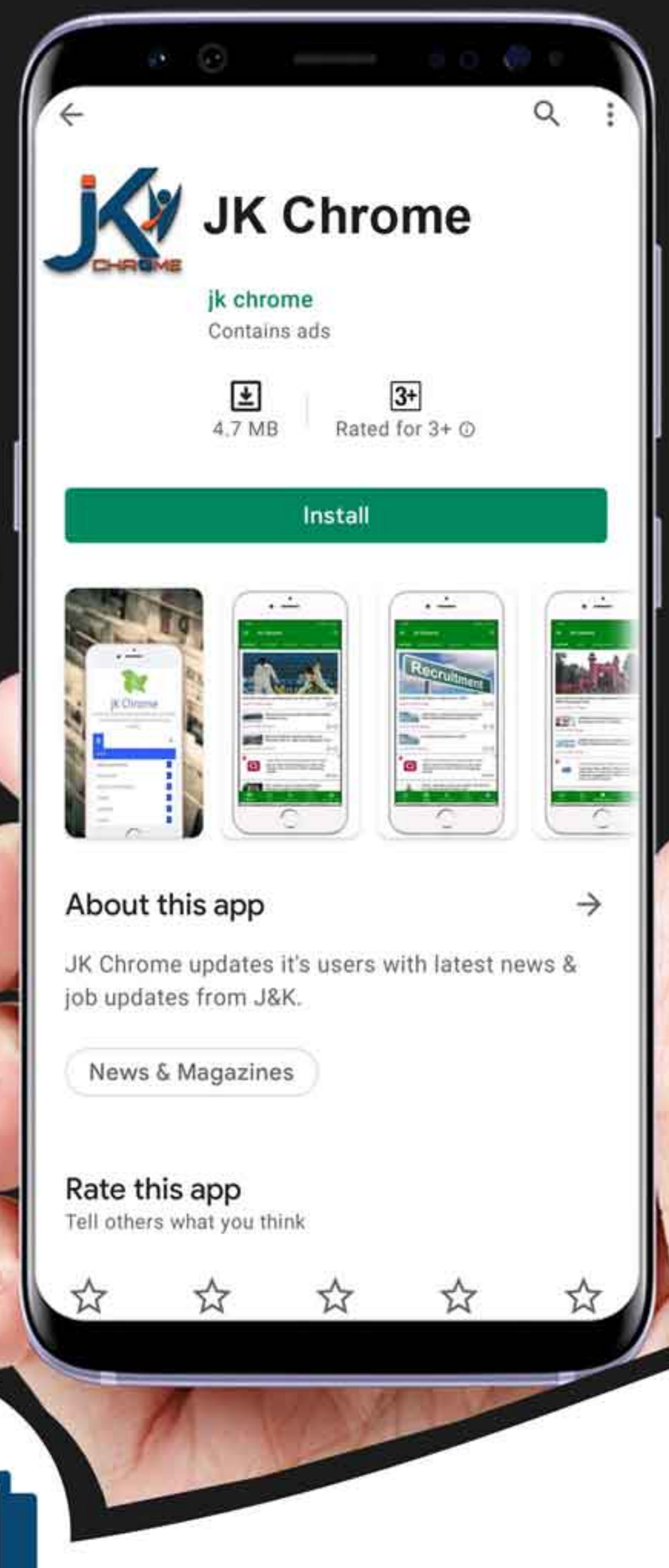

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Pipes & Tanks

Here, we've a '**Tank'** around which the whole question revolves. Basically, we've to find out in how long the **whole tank could be filled or emptied**. Then there are **Inlet Pipes (A and B),**there can any number of Inlet pipes.

Inlet pipes are responsible for filling the tank. They, basically, **bring the water in**. *The workdone by them is positive*.

Then we an **Outlet pipe**, there can be any number of outlet pipes too. Outlet pipes are responsible for emptying the tank. They, basically, **put the water out.** *The work done by them is negative.*

Rules for solving such questions:
1. If a pipe can fill the tank in 'x ' hours then, the part filled in 1 hour = 1/x

2. If a pipe can empty the tank in ' y' hours then, the part emptied in 1 hour = 1/y

3. If a pipe can fill the tank in 'x ' hours and another can empty it in '*y*' hours then, the **net part filled in 1 hour = 1/x – 1/y ; Total time taken to fill such tank = xy/y-x**

4. A pipe can fill the tank in 'x' hrs. Due to leak it is filled in 'y' hrs, time taken by leak to empty the tank **=xy/y – x hrs**

5. If leak time > Inlet pipe then tank will be filled; If leak time < Inlet pipe then tank will be emptied.

Sample Questions:

Qs. 1 – Pipe A can fill the tank in 20 hours while Pipe B alone can fill it in 30 hours and Pipe C can empty the tank in 40 hours. If all the pipes are opened together, in how long will the tank be full?

Solutions – Net part filled in 1 hour = 1/20 + 1/30 – 1/40 (as work done by C is negative)
= 7/120
⇒ Full tank will be full in **120/7 = 17 1/7 hours.**

Q2. There's a leak in the bottom of tank. When the tank is thoroughly repaired, it would be filled in 3.5 hours. It now takes half an hour longer. If tank is full, how long would it take to leak the tank?

Sol. Here, clearly the '**leak'** is working like an **Outlet pipe**.
Done using rule 5)

We need to find the time taken to empty tank by leak (or outlet pipe) if tank is full

Repaired tank is filled in 3.5 hours ⇒ Inlet pipe takes 3.5 hours

Un-repaired tank takes 3.5+0.5 = 4 hrs ⇒ time taken 4 hours to fill tank.

Total time taken to empty such tank **= xy/y-x = 3.5 x 4 / 4 – 3.5 = 28 hrs.**

Leak would empty the cistern in 28 hours.

Q3. Two pipes P and Q would fill tank in 24 hours and 32 hrs respectively. If both pipes are opened together, find when the first pipe must be turned off so that the tank may be just filled in 16 hrs?

Sol. Suppose the pipe P is closed after 'x' hours.
Then, P pipe would fill in 1 hr = 1/24 and in x hrs = x / 24

Pipe Q would fill in 1 hour = 1 / 32 and in 16 hrs (as tank is full in 16 hrs) = 16 /32 = 1/2

Pipe P work in 'x' hr + Pipe Q work in 16 hrs = 1 (as they complete the 1 unit of work) = x/24 + 16/32 = 1
⇒ x = 12 hours.

<u>Short method:</u>

Q4. Three pipes A, B and C can fill cistern in 6 hrs. After working together for 2 hrs, C is closed and A & B fill it in 8 hrs. Then find the time in which cistern can be filled by pipe C.

Sol: A + B + C work in 1 hr = 1/6 of cistern
A+B+C work in 2 hr = 1/6
A+B+C work in 2 hr = 1/6 × 2 = 1/3 of cistern
Unfilled part after 2 hrs = 1 – 1/3 = 2/3 of Cistern
This 2/3 of cistern is filled by A & B in 8 hrs.
⇒ A & B can fill the full cistern in = 8×3/2 = 12 hrs
We know that A+B+C = 6 hrs
C = (A+B+C) – (A+B) = (1/6) – (1/12) = 1/12
⇒ **C alone would fill it in 12 hrs.**

Q5. A tank has a leak which would empty it in 8 hrs. A tap is turned on which admits 6 liters a minute into tank, and it's now emptied in 12 hrs. How many liters does the tank hold?

Sol. Time by Outlet Pipe = 8 hrs
Tank emptied in = 12 hrs
Done using rule 5)

Time by Inlet pipe = (12×8)/(12 – 8) = 24 hrs.
Also given: Inlet pipe takes 6 liters in a minute ⇒ In 1 hr, intake = 6×60 = 360L
⇒ Intake in 24 hrs = **360×24 = 8640 liters**
Hence, the total capacity of tank is **8,640 L.**

Note: *If it's given that tank takes 8 hrs to get full but with leak it takes 2 hrs more, then 8 hrs is the time taken by Inlet pipe and 10 hrs is total time to fill with leak.*

Qs. 6*.* A can fill tank in 12 minutes, B in 15 minutes and C empties it in 6 minutes. A and B are opened for 5 minutes then C is also opened. In what time is the tank empty?

Sol. A + B in 5 minutes = [1/12 + 1/15]×5 = ¾
⇒ 3/4th part of tank is filled in 5 minutes.
When C is also opened, work done by all pipes in 1 minute = **1/12 + 1/15 – 1/6 = 1/60**

When all three are opened, the tank is emptied in 60 minutes.
So, 3/4 part will be emptied in **= 60 x 3/4 = 45 minutes**

Q7. Two pipes can separately fill a tank in 20 hrs and 30 hrs respectively. Both the pipes are opened to fill the tank but when tank is 1/3 full a leak is developed in the tank through which 1/3 of water supplied by both the tank leak out. What is total time taken to fill the tank?

Sol. Time taken by two pipes to fill the tank = (20×30)/(20+30) = 12 hrs.
1/3rd tank is filled in = 12×1/3 = 4 hrs; Left time = 12 – 4 = 8 hrs.

Now, leakage develops which empties 1/3rd of water supplied (by both pipes)
⇒ Now, efficiency of Inlet pipes = 1 – 1/3 = 2/3rd .

Earlier, at 1 efficiency they were taking 8 hrs
now at 2/3rd efficiency they will take 8 ÷ 2/3 = 12 hrs

⇒ Total time taken to fill the tank= 4 + 12 = 16 hrs.

⇒ Time taken to fill after leakage = **12×3 = 36 hrs.**

PIPES AND TANKS

Nature of Pipe :

Inlet: A pipe connected with a tank or reservoir for filling is called as inlet
Outlet: A pipe connected with a tank and used for empties it is called outlet.

Application of STD table (LCM Method)

Speed (S) or Efficiency	Time (T)	Distance (D) Total work (LCM)
LCM/T	LCM/S	LCM

A tank can **filled** with water by a pipe in 5 hours and it can **emptied** by a second pipe in 4 hours. If both pipe opened , find time to empty tank?
Ans 20 hours
Given: time taken by tanks 5h, 4h. take LCM of 5,4 =20 fill the table
Follow red arrow
Now net speed of both tanks will be -1.
To calculate time taken divide 20/-1 = 20.

	S	T	D
1st	?	5	20
2nd	?	4	20

Divide

	S	T	D
1st	+4	5	20
2nd	- 5	4	20
Net	- 1	?	20

Divide

Previous year questions

Q1.
Two pipes A and B can fill a tank in 20 minutes and 30 minutes respectively. If both pipes are opened together, the title taken to fill the tank is:
(a) 50 minutes
(b) 12 minutes
(c) 25 minutes
(d) 15 minutes
Q2.
If 1/3 of a tank holds 80 litres of water, then the quantity of water that 1/2 of tank holds is:
(a) 240 litres
(b) 120 litres
(c) 80/3 litres
(d) 100 litres
Q3.
Three taps A, B and C can fill a tank in 12, 15 and 20 hours respectively, If A is open all the time and B and C are open for one hour each alternatively, the tank will be full in
(a) 6 hours
(b) 13/2 hours
(c) 7 hours
(d) 19/2 hours
Q4.
A tap can empty a tank in one hour. A second tap can empty it in 30 minutes. If the both taps operate simultaneously how much time is needed to empty the tank
(a) 20 minutes
(b) 30 minutes
(c) 40 minutes
(d) 45 minutes
Q5.
A pipe of diameter 'd' can drain a certain water tank in 40 minutes. The time taken by a pipe of diameter "2d" for doing the same job in :
(a) 5 minutes
(b) 10 minutes
(c) 20 minutes
(d) 80 minutes
Q6.
A cistern can be filled with water by a pipe in 5 hours and it can be emptied by a second pipe in 4 hours. If both the pipes are opened when the cistern is full, the time in which it will be emptied the cistern:
(a) 9 hours
(b) 18 hours
(c) 20 hours
(d) 41/2 hours
Q7.
A pipe can fill the tank with water in 3 hours. Due to a leakage in bottom it takes 7/2 hours to fill it. In what time the leak will empty the fully filled tank
(a) 12 hours
(b) 21 hours
(c) 13/2 hours
(d) 21/2 hours
Q8.
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 it. 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) 110 minutes
(b) 100 minutes
(c) 120 minutes
(d) 90 minutes
Q9.
A tap can fill a tank in 6 hours, After half the tank is filled, three more similar taps are opened. What is the total time taken to fill the tank completely
(a) 4 hrs
(b) 4 hrs 15 min

(c) 3 hrs 15 min
(d) 3 hrs 45 min

Q10.

One pipe can fill a tank three times as fast as another pipe. If together the two pipes can fill the tank in 36 minutes, the slower pipe alone will be able to fill the tank in

(a) 81 minutes
(b) 108 minutes
(c) 144 minutes
(d) 192 minutes

Q11.

Two pipes can fill a cistern in 3 hours and 4 hours respectively and a waste pipe can empty it in 2 hours. If all the three pipes are kept open, then the cistern will be filled in:

(a) 5 hours
(b) 8 hours
(c) 10 hours
(d) 12 hours

Q12.

Two pipes can fill a tank in 15 hours and 20 hours respectively, while the third pipes can empty it in 30 hours. If all the pipes are opened simultaneously the empty tank will be filled in

(a) 10 hours
(b) 12 hours
(c) 15 hours
(d) 31/2 hours

Q13.

Two pipes A and B can fill a cistern in 74/2 minutes and 45 minutes respectively. Both pipes are opened the cistern will be filled just in half an hour if the pipe B is turned off after

(a) 15 minutes
(b) 10 minutes
(c) 5 minutes
(d) 9 minutes

Q14.

A tap can fill a cistern in 8 hours and another tap can empty it in 16 hours. If both the taps are open, the time (in hours) taken to fill the tank will be :

(a) 8
(b) 10
(c) 16
(d) 24

Q15.

A Cistern has two pipes . One can fill it with water in 8 hours and other can empty it in 5 hours. In how many hours will the cistern be emptied if both the pipes are opened together when 3/4 of the cistern is already full of water?

(a) 40/3 HOURS
(b) 10 HOURS
(c) 6 HOURS
(d) 10/3 HOURS

Q16.

3/4 part of the tank is full of water when 30 litres of water is taken out the tank becomes empty. The capacity of the tank is:

(a) 36 litres
(b) 42 litres
(c) 40 litres
(d) 38 litres

Q17.

A tank is fitted with two taps. The first tap can fill the tank completely in 45 minutes and the second tap can empty the full tank in one hour. If both the taps are opened alternately for one minute, then in how many hours the empty tank will filled completely

(a) 2 Hours 55 minutes
(b) 3 Hours 40 minutes
(c) 4 Hours 48 minutes
(d) 5 Hours 53 minutes

Q18.

A pipe can empty a tank in 40 minutes. A second pipe with diameter twice as much as that of the first is also attached with the tank to empty it. The two pipe together can empty the tank in:

(a) 8 Minutes
(b) 40/3 Minutes
(c) 30 Minutes
(d) 38 Minutes

Q19.

Two pipes can fill a tank with water in 15 and 12 hours respectively and a third pipe can empty in it 4 hours. If the pipe can empty it in 4 hours. If the pipe be opened in order at 8, 9 and 11 a.m. respectively , the tank will be emptied at

(a) 11:40 a.m.
(b) 12:40 p.m.
(c) 1:40 p.m.
(d) 2:40 p.m.

Q20.

A pump can fill a tank with water in 2hours. Because of a leak in the tank it was taking 7/3 hours to fill the tank. The leak can drain all the water off the tank in:

(a) 8 Hours
(b) 7 Hours
(c) 13/3 Hours
(d) 14 Hours

Q21.

A tank can be filled by two pipes in 20 minutes and 30 minutes respectively. When the tank was empty the two pipes were opened. After some time, the first pipe was stopped and the tank was filled in 18 minutes. After how much time of the start was the first pipe stopped

(a) 5 minutes
(b) 8 minutes
(c) 10 minutes

(d) 12 minutes

Q22.

A pipe can fill a tank in 'x' hours and another pipe can empty it in 'y' (y>x) hours. If both the pipes are open. In how many hours will the tank be filled ?

(a) (x-y) Hours

(b) (y-x) Hours

(c) xy/(x-y) Hours

(d) xy/ (y-x) Hours

Q23.

12 pumps working 6 hours a day can empty a completely filled reservoir in 15 days. How many such pumps working 9 hours a day will empty the same reservoir in 12 days?

(a) 15

(b) 9

(c) 10

(d) 12

Q24.

A tap takes 36 hours extra to fill a tank due to a leakage equivalent to half of its inflow. The inflow can fill the tank in how many hours?

(a) 36 hrs

(b) 24 hrs

(c) 30 hrs

(d) 18 hrs

Q25.

A tank can be filled with water by two pipes, A and B together in 36 minutes. If the pipe B was stopped after 30 minutes, the tank is filled in 40 minutes. The pipe B can alone fill the tank in

(a) 45 minutes

(b) 60 minutes

(c) 75 minutes

(d) 90 minutes

Q26.

Two pipes A and B can fill a water tank in 20 and 24 minutes respectively and a third pipe C can empty at the rate of 3 gallons per minute. If A, B and C are opened together to fill the tank in 15 minutes, find the capacity of tank?

(a) 180

(b) 150

(c) 120

(d) 60

Q27.

Three pipes P, Q and R can separately -fill a cistern in 4, 8 and 12 hours respectively, Another pipe S can empty the completely filled cistern in 10 hours. Which of the following arrangements will fill the empty cistern in less time than others?

(a) Q alone is open

(b) P, R and S are open

(c) P and S are open

(d) P, Q and S are open

Q28.

A tank has a leak which would empty the completely filled tank in 10 hours. If the tank is full of water and a tap is opened which admits 4 litres of water per minute in the tank, the leak takes 15 hours to empty the tank. How many liters of water does the tank hold ?

(a) 2400 L

(b) 4500 L

(c) 1200 L

(d) 7200 L

Q29.

An empty tank can be filled by pipe A in 4 hours and by pipe B in 6 hours. If the two pipes are opened for 1 hour each alternately with first opening pipe A, then the tank will be filled in

(a) 1 3/4hours

(b) 2 3/5hours

(c) 4 2/3 hours

(d) 5 1/2 hours

Q30.

A boy and girl together fill a cistern with water. The boy pours 4 liters of water every 3 minutes and the girl pours 3 liters of water every 4 minutes. How much time will it take fill 100 litres of water in the cistern

(a) 36 minutes

(b) 42 minutes

(c)48 minutes

(d) 44 minutes

Q31.

Two pipes can fill a cistern separately in 10 Hours and 15 Hours. They can together fill the cistern in:

(a) 6 hours

(b) 7 hours

(c) 8 hours

(d) 9 hours

Q32.

Three pipes A, B and C can fill a cistern in 6 hours. After working at it together for 2 hours, C is closed and A and B fill it in 7 hours more, The time taken by C alone to fill the cistern is

(a) 14 hours

(b) 16 hours

(c) 15 hours

(d) 17 hours

Q33.

Three taps A, B and C together can fill an empty cistern in 10 minutes. The tap A alone can fill it in 30 minutes and the tap B alone in 40 minutes. How long will the tap C alone take to fill it?

(a) 16 minutes

(b) 24 minutes

(c) 32 minutes

(d) 40 minutes

Q34.

One tap can fill a water tank in 40 minutes and another tap can make the filled tank empty in 60 minutes, If both the taps are open, in how many hours will the empty tank be filled?
(a) 2 hours
(b) 2.5 hours
(c) 3 hours
(d) 3.5 hours

Q35.
A tap can fill an empty tank in 12 hours and another tap can empty half the tank in 10 hours. It both the taps are opened simultaneously, how long would it take for the empty tank to be filled to half its capacity?
(a) 10 hrs
(b) 30 hrs
(c) 15 hrs
(d) 20 hrs

Q36.
A tap can fill a cistern in 40 minutes and a second tap can empty the filled cistern in 60 minutes. By mistake without closing the second tap, the first tap was opened. In how many minutes will the empty cistern be filled
(a) 72
(b) 84
(c) 108
(d) 120

Q37.
Two pipes, P and Q can fill a cistern in 12 and 15 minutes respectively. Both are opened together, but at the end of 3 minutes, P is turned off. In how many more minutes will Q fill the cistern ?
(a) 7 minutes
(b) 15/2minutes
(c) 8 minutes
(d) 33/4minutes

Q38.
Pipe A can fill a cistern in 6 hours and pipe B can fill it in 8 hours. Both the pipes are opened simultaneously, but after two hours, pipe A is closed. How many hours, will B take to fill the remaining part of the cistern?
(a) 2 Hrs
(b) 10/3 Hrs
(c) 8/3 Hrs
(d) 4 Hrs

Q39.
A cistern is normally filled in 8 hours but takes another 2 hours longer to fill because of a leak in its bottom. If the cistern is full, the leak will empty it in :
(a) 16 hours
(b) 25 hours
(c) 20 hours
(d) 40 hours

Q40.
Pipes P and Q can fill a tank in 10 hours and 12 hours respectively and C can empty it in 6 hours. If all the three open at 7 a.m. at what time one-fourth of the tank be filled?
(a) 10 am
(b) 10 pm
(c) 1 1 pm
(d) 11 am

Q41.
A tank can be filled by pipe A in 2 hours and pipe B in 6 hours. At 10 am pipe A was opened. At what time will the tank be filled if pipe B is opened at 11 A.M. ?
(a) 12.45 A.M.
(b) 5 P.M.
(c) 11.45 A.M.
(d) 12 P.M.

Q42.
If 3/5 th of a cistern is filled in 1 minute, the time needed to fill the rest is :
(a) 40 sec
(b) 30 sec
(c) 36 sec
(d) 24 sec

Q43.
A cylindrical cistern of diameter 25 cm is full of water. If 11 liters water is drawn off, the water level in the cistern will drop by
(a) 21/2 cm
(b) 90/7 cm
(c) 112/5 cm
(d) 102/5 cm

Q44.
There are two pumps to fill a tank with water. First pump can fill the empty tank in 8 hours, while the second in 10 hours, If both the pumps are opened at the same time and kept open for 4 hours, the part of tank that will be filled up is :
(a) 9/10
(b) 1/10
(c) 2/5
(d) 1/5

Q45.
Two pipes, P and Q, together can fill a cistern in 20 minutes and P alone can in 30 minutes. Then Q alone can fill the cistern in
(A) 62 minutes
(b) 60 minutes
(c) 61 minutes
(d) 51 minutes

Q46.
Two pipes A and B can fill a cistern in 3 hours and 5 hours respectively. Pipe C can empty in 2 hours. If all the three open, in how many hours the cistern will be full
(a) Can't be filled
(b) 10 hours
(c) 15 hours
(d) 30 hours

Q47.
Three taps A, B, C can fill an overhead tank in 4, 6 and 12 hours respectively. How long would the three taps take to fill the tank if all of them are opened together ?
(a) 2 hrs.
(b) 4 hrs.
(c) 3 hrs.
(d) 5 hrs.

Q48.
If two pipes function simultaneously, a tank is filled in 12 hours. One pipe fills the tank 10 hours faster than the other. How many hours does the faster pipe alone take to fill the tank ?
(a) 20 hrs
(b) 18 hrs
(c) 15 hrs
(d) 12 hrs

Q49.
Two pipes X and Y can fill a cistern in 24 minutes and 32 minutes respectively. If both the pipes are opened together, then after how much time (in minutes) should Y be closed so that the tank is full in 18 minutes?
(a) 10
(b) 8
(c) 6
(d) 5

Q50.
Three pipes A, B and C can fill a tank in 6 hours, 9 hours and 12 hours respectively, B and C are opened for half an hour, then A is also opened. The time taken by the three pipes together to fill the remaining part of the tank is :
(a) 3 hours
(b) 2 hours
(c) 5/2 hours
(d)7/2 hours

Q51.
A pipe can fill a cistern in 9 hours. Due to a leak in its bottom, the cistern fills up in 10 hours. If the cistern is full, in how much time will it be emptied by the leak?
(a) 70 hours
(b) 80 hours
(c) 90 hours
(d) 100 hours

Q52.
Which of these pipes will empty a pool the fastest ?
(a) One pipe of diameter 60 m
(b) Two pipes of diameter 30 cm
(c) Three pipes of diameter 20 cm
(d) None of these

Q53.
A water tank can be filled by a tap in 30 minutes and another tap can fill it in 60 minutes. If both the taps are kept open for 5 minutes and then the first tap is closed, how long will it take for the tank to be full
(a) 20 minutes
(b) 25 minutes
(c) 30 minutes
(d) 45 minutes

Q54.
Two pipes A B can fill a tank in 36 minutes and 45 minutes respectively. Another pipe C can empty the tank in 30 minutes. First A and B are opened. After 7 minutes, C is also opened. The tank is filled up in with water in 30 minutes and minutes respectively
(a) 39 min
(b) 46 min
(c) 40 min
(d) 45 min

Q55.
Two pipes A and B can separately fill a tank in 2 hours and 3 hours respectively. If both the pipes are opened simultaneously in the empty tank, then the tank will be filled in
(a) 1 hour 12 minutes
(b) 2 hour 30 minutes
(c) 1 hour 15 minutes
(d) 1 hour 20 minutes

Q56.
A tap drips at a rate of one drop sec 600 drops make 100 ml. The number of liters wasted in 300 days is
(a) 4320000
(b) 432000
(c) 43200
(d)4320

Q57.
Having the same capacity 9 taps fill up a water tank in 20 minutes. How many taps of the same capacity are required to fill up the same water tank in 15 minutes
(a) 10
(b) 12
(c) 15
(d) 18

Q58.
A cistern is provided with two pipes A and B. A can fill it in 20 minutes and B can empty it in 30 minutes. If A and B be kept open alternatively for one minute each, how soon will the cistern be filled?
(a) 121 minutes
(b) 110 minutes
(c) 115 minutes
(d) 120 minutes

Q59.
Two pipes A and B can fill a tank with water in 30 minutes and 45 minutes respectively. The third pipe C can empty the tank in 36 minutes. First A and B are opened after 12 minutes C is opened. Total time (in minutes) in which the tank will be filled up
(a) 12
(b) 24
(c) 30

(d) 36

Q60.

A pipe can fill a tank in x hours and another can empty it in y hours. In hours many can they together fill it in (y > x)

(a) x-y

(b) y-x

(c) xy /(x-y)

(d) xy/(y-x)

Q61.

Pipe A can fill a tank in 4 hours and pipe B can fill it in 6 hours. If they are opened on alternate hours and if pipe A is opened first then in how many hours, the tank shall be full?

(a) 9/2

(b) 14/3

(c) 7/2

(d) 13/4

Q62.

Pipe A can fill an empty tank in 6 hours and pipe B is 8 hours. If both the pipes are opened and after 2 hours pipe A is closed, how much time B will take to fill the remaining tank?

(a) 15/2 hours

(b) 12/5 hours

(c) 12/5 Hours

(d) 10/3 hours

Q63.

A tank has two pipes. The first pipe can fill it in 4 hours and the second can empty it in 16 hours. If two pipes be opened together at a time, then the tank will be filled in :

(a) 11/2 Hours

(b) 6 Hours

(c) 10 Hours

(d) 16/3 hours

Q64.

A pipe can fill a tank in 24 hours, Due to a leakage in the bottom, it is filled in 36 hours. If the tank is half full, how much time will they take to empty the tank?

(a) 24 Hours

(b) 48 hours

(c) 36 hours

(d) 72 hours

Q65.

A water reservoir has two inlets and one outlet. Through the inlet it can be filled in 3 hours and 3 hours 45 minutes respectively. It can be emptied completely in 1 hour by the outlet. If the two inlets are opened at 01:00pm and 02:00pm respectively and the outlet at 03:00pm then it will be emptied at

(a) 03:55 pm

(b) 05:00 pm

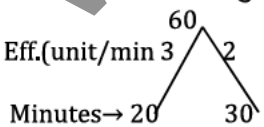
(c) 05:20 pm

(d) 05:30 pm

ANSWER :

1 b	**2** b	**3** c	**4** a	**5** b	**6** c
7 b	**8** b	**9** d	**10** c	**11** d	**12** b
13 d	**14** c	**15** b	**16** c	**17** d	**18** a
19 d	**20** d	**21** b	**22** d	**23** c	**24** a
25 d	**26** c	**27** d	**28** d	**29** c	**30** c
31 a	**32** a	**33** b	**34** a	**35** c	**36** d
37 d	**38** b	**39** d	**40** b	**41** c	**42** a
43 c	**44** a	**45** b	**46** d	**47** a	**48** a
49 b	**50** c	**51** c	**52** a	**53** d	**54** b
55 a	**56** d	**57** b	**58** c	**59** b	**60** d
61 b	**62** d	**63** d	**64** c	**65** c	

1. (b) (Total capacity(कुल धारिता))



(A+B)'s capacity of filling for one minute

(A+B) द्वारा 1 मिनट में भरा गया)

= (3+2) = 5 units/minute

(A+B) can fill the full tank in (A+B) टैंक को भर सकते हैं)

$$\frac{\text{Total capicity}}{\text{efficiency of A and B}} = \frac{60}{12} = \mathbf{12\ min}$$

2. (b) if $\frac{1}{3}$ unit of tank holds 80 liters (यदि $\frac{1}{3}$ भाग टैंक की क्षमता 80 लीटर है)

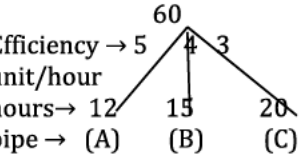
Then 1 unit of tank hold (तो 1 यूनिट टैंक की क्षमता)

$= \frac{80}{\frac{1}{3}} = \frac{80\times3}{1} =$ 240 liters

Then, $\frac{1}{2}$ unit of tank hold (तो $\frac{1}{2}$ भाग टैंक की क्षमता)

$= 240\times\frac{1}{2} = 120$ liters

3. (c) (Total capacity)



First hour, A and B works together and in second hour A and C works together and It becomes cycle.

(पहले घंटे A तथा B मिलकर काम करता है तथा दूसरे घंटे A तथा C मिलकर काम करता है और इस तरह एक चक्कर पूरा होता है)

(A+B)'s one hour work (A+B) के एक घंटे का काम) 5+4 = 9 units

(A+C)'s one hour work (A+C) के एक घंटे का काम 5+3 = 8 units

They complete (9+8) = 17 units 2 hours

×3 ×3

51 units 6 hours

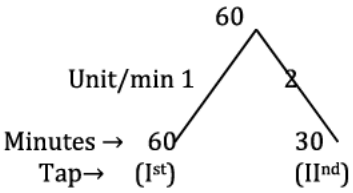
Capacity left (शेष धारिता) = 60–51) = 9 units

Now 3 cycle's are completes

Now pipes (A+B) will start filling then they will fill it in (अब (A+B) पाइप भरना शुरू करते है, तो वे इसे भरेंगे

$= \frac{\text{total capacity left}}{\text{effciency of A+B}} = \frac{9}{9}$ 1 hour

4. (a) (T.C)



(T.C = Total capacity)

(I + II) one hour empting efficiency

(I + II) को खाली करने की 1 घंटे की क्षमता)

= (2 +1) = 3 units

(I + II) can empty whole tank in

(I + II) पुरे टंकी को खली कर देंगे)

$\frac{\text{T.C}}{\text{effciency of (I+II)}} = \frac{60}{3} = 20$ min.

5. (b) Pipe : Pipe2

Diameter D : 2 D

$$\pi\left(\frac{D}{2}\right)^2 : \pi\left(\frac{2D}{2}\right)^2$$

$$\pi D^2 : 4\pi D^2$$

Efficiency of draining 1 : 4

Pipe 1 : Pipe2

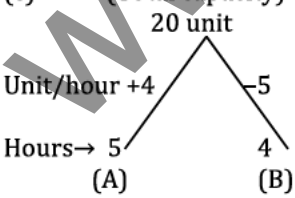
Efficiency 1 : 4

Time 4 : 1

×10 ×10

Actual time 40 min 10 min

6. (c) (Total capacity)



(+) sign shows filling efficiency

(+ संकेत भरने की क्षमता को दर्शाता है)

(–) sign show emptying efficiency)

(– खाली करने की क्षमता को दर्शाता है)

If A and B work simultaneously.

Then A will fill 4 units/hour and B Will empty 5 units/hour (यदि A तथा B एक साथ काम करते हैं तो A प्रति घंटा 4 यूनिट भरता है और B यूनिट प्रति घंटा खाली करता है)

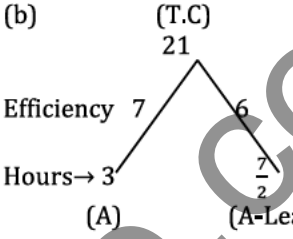
Overall 1 unit/hour will be emptied.

(1 यूनिट प्रति घंटा खाली करता है)

Full tank will empty in (पूरी टंकी खाली होने में लगा समय)

$\frac{total\ capcity}{A's\ eff.\ + B's\ eff.} = \frac{20}{4-5} = \frac{20}{-1} = 20\ hours$

7. (b) (T.C)



A's efficiency is 7 units/hr (A की कार्य करने की क्षमता 7 यूनिट प्रति घंटा है)

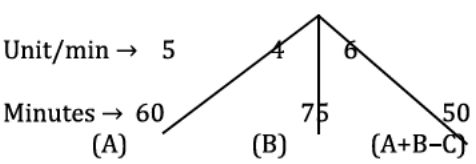
A's efficiency after leakage 6 units/ hr(रिसाव के बाद A की कार्य क्षमता 6 यूनिट प्रति घंटा है)

Leakage efficiency = 7 – 6 = 1 units/hour

Leakage will empty the full filled tank : (रिसाव द्वारा पूरी टंकी को खाली करने में लिया गया समय)

$\frac{T.C}{Efficiency} = \frac{21}{1} = 21\ hrs$

8. (b) (Total capacity)



(C is third pipe it is emptying pipe

(C एक तीसरा पाईप है जो खाली करता है)

Efficiency of A + B – C = 6

5 + 4 – C = 6

– C = 6 – 5 –4

– C = –3

C = 3 units/min

Third pipe can empty the tank, (तीसरा पाइप टैंक को खाली करेगा)

$\frac{T.C.}{C's\ eff.} = \frac{300}{3} = 100\ minutes$

9. (d) Let total capacity of tank ((माना की टंकी की कुल धारिता) = 6 units

∴ Efficiency of A/hr. = $\frac{6}{6}$ = 1 unit

Half tank capacity (आधे टंकी की धारिता)
$= \frac{6}{2} = 3$ units
It will be filled in (इसे भरने में लगा समय)
= 3 hrs
According to question,
3 more tap of capacity (1 unit/hr)
Are opened with first tap
Total capacity of 4 tap ((नलों की कुल क्षमता) = 4 units/hrs
They will complete in = $\frac{\text{T.C.}}{\text{effciency}}$
$= \frac{3\ units}{4\ units/h} = \frac{3}{4}\ hours$
Total time = $3\frac{3}{4}$ hrs
= 3 hr. 45 min

10. (c)

	Pipe A	:	Pipe B
Efficiency →	3	:	1
Time	1	:	3
Efficiency	3		1 (efficiency and time are inversely proportional)

3
(T.C)
Total time taken by
A + B (A+B द्वारा लिया गया कुल समय)
$= \frac{T.C}{efficiency\ of\ (A+B)} = \frac{3}{3+1} = \frac{3}{4}$
$\frac{3}{4}$ units of time = 36 min
1 units of time = $36 \times \frac{4}{3}$
(B takes 3 units of time to fill alone)
3 units of time = $36 \times \frac{4}{3} \times 3 = 144$ min

11. (d) (Total capacity)

12
Efficiency → 4 3 6
Hours → 3 4 2
(A) (B) (C)
(A and B are filling pipe and C is empty pipe
(A तथा B भरने वाली पाइप हैं तथा C खाली करने वाला पाइप है)
If all pipes are kept open then unit/hr filled:
A + B – C
⇒ 4 + 3 – 6
⇒ 1 units/hr
Empty tank will be filled in (खाली टंकी भरने में लगा समय) $\frac{T.C}{efficiency} = \frac{12}{1} = \mathbf{12\ hrs}$

12. (b) (Total capacity)

60
Efficiency → 4 3 2
Hours → 15 20 30
Pipe→ (A) (B) (C)
(A and B → filling pipe, C → waste pipe)
According to questions
All pipes function simultaneously
A+B will fill (4+3) = 7 units/hr
C will empty = 2 units/hr
Total filling/hr = 7 – 2 = 5 units
Tank will be filled in
$\frac{T.C}{Efficiency} = \frac{60}{5} = 12\ hrs$

13. (d) (Total Capacity)

225
Efficiency 6 5
Minutes→ $\frac{75}{2}$ 45
(A) (B)
According to questions :-
Cistern fills in 30 minutes
So pipe A worded for 30 minutes
It filled = 30×6 = 180 units
Capacity left = 225 – 180 = 45 units
So this left capacity must be filled by B
B must have filled it in $\frac{45}{5} = \mathbf{9min}$

14. (c) (Total Capacity)

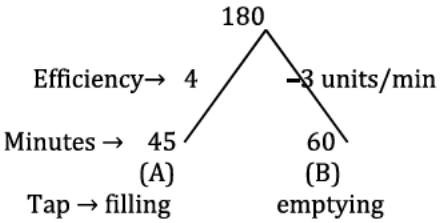
16
Efficiency→ 6 5
Hours → 8 16
(A) (B)
Pipe → filling emptying
One hour work of A and B = 2 – 1 = 1 unit
Time taken to fill the empty cistern
$\frac{T.C}{efficiency} = \frac{16}{1} = \mathbf{16\ hrs}$

15. (b) (Total Capacity)

40
Efficiency→ 5 8
Hours → 8 5
(A) (B)
Pipe → filling emptying
If both pipes are open, then total units/hr empty the tank
(A – B) = 5 – 8 = – 3 units
According to questions,
Tank has $\frac{3}{4}$ of its total capacity in
Beginning $\frac{3}{4} \times 40 = 30$ units
Time taken to empty the tank $\frac{30}{(-3)} = \mathbf{10\ hours}$

16. (c) According to questions,
If tank has $4x$ liters of total capacity
and it holds $3x$ liters of water and,
if 30 liters of water is taken out,
Then tank becomes empty. It mean
$3x$ Liters of water are taken out.
$3x = 30\ litres$
$x = 10\ litres$
$\therefore$ capacity of tank
$= 4x = 4 \times 10 = 40\ litres$

17. (d))



In first minutes A fills 4 units of water.
In second minutes B empty – 3 units of water.
After two minutes tanks has 1 units of water.
NOTE : Decrease the higher value i.e. 4 from total capacity 180 – 4 = 176 units.
1 unit filled in 2 minutes
176 units filled in 352 minutes
Now, in next minutes pipe A will fill 4 units.
And tank is full so total time taken
is 352 + 1 = 353 minutes or **5 hour 53 minutes**

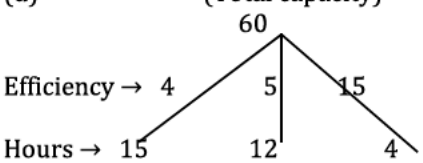
18. (a) Pipe A : Pipe B
Diameter D : 2 D

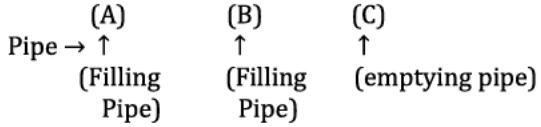
$$\pi\left(\frac{D}{2}\right)^2 : \pi\left(\frac{2D}{2}\right)^2$$
$$\frac{\pi D^2}{4} : \pi D^2$$
$$\pi D^2 : 4\pi D^2$$
$$1 : 4$$
$$A : B$$

Efficiency 1 : 4
Time 4 : 1
×10 ×10
40 min 10 min
Efficiency →1 4
40
(T.C)

(A+B) empties in = $\frac{40}{4+1}$ = **8 minutes**

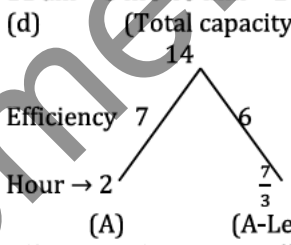
19. (d)





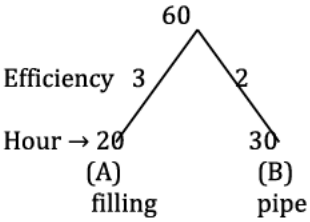
Pipe A opens at 8 am. It fills 4 units/hr
Pipe A fills 4×3 = 12 unit in 3 hrs
So, by 11 am. It fills 12 units
Similarly
Pipe B opens at 9 am. It fills 5 units/hr
By 11 am it fills 5×2 = 10 units total water in
Tank till 11 am = 12+10 = 22 units
Now, 11 am onwards all pipes work simultaneously
Including emptying pipe.
(A+B+C) efficiency is 4 + 5 – 15 = – 6 units
So, now 6 unit will be emptied per hour tank will be
Emptied at
$\frac{22}{6} = 3\frac{4}{6}$ = 3 hr. 40 minutes
11 am + 3 hrs 40 min = 2 : 40 pm

20. (d)



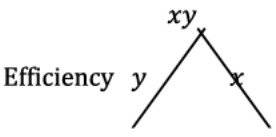
Efficiency of A = 7 units/hours
Efficiency of A after leak = 6 units/hours
Leak's efficiency = 7 – 6 = 1 unit/hour
Now, leak can draw Full tank in
$\frac{T.C}{efficiency\ of\ leak} = \frac{14}{1} =$ **14 hrs**

21. (b)



According to questions,
Pipe 'A' is closed after some time.
And Tank is filled in 18 minutes so
B started filling in beginning and
Worked till last i.e. 18 minutes
So, 2×18 = 36 units is filled
Work left = 60 – 36 = 24 units
This 24 units must be filled by Pipe A in beginning.
It can fill it in $\frac{24}{3}$ = **8 minutes**

22. (d)



Hours → x y
(filling) (emptying)
Total efficiency of both pipes is $(y-x)/hr$
Tank will be filled in
$\frac{xy}{y-x}\ hrs$

23. (c) Apply formula of
$\frac{M_1D_1h_1}{W_1} = \frac{M_2D_2h_2}{W_2}$
Let 'P' pumps are required to empty the Reservoir.
$\frac{12_{pumps}\times 6_{hours}\times 15_{days}}{1_{reservoir}} = \frac{P\times 9_{hours}\times 12_{days}}{1_{reservoir}}$
P = 10 pumps

24. (a) Pipe A : Pipe A-leakage
Efficiency → 2 : 1
Time 1 : 2
×36 | 1 unit = 36 hrs
36 hrs

25. (d) let (A+B) fills 1 liter in 1 minutes
Then (A+B) fills in 36 minutes = 36 liters
According to question
(A+B) work only 30 minutes then pipe filled by
(A+B) in 30 minutes is = 30 liters
Remaining part = 6 liters
6 liters part filled by A in = 10 minutes
1 part filled by A = $\frac{10}{6}$ minutes
36 part filled by A = $\frac{10}{6}\times 36$= 60 minutes
A + B = 36 minutes
A = 60 minutes

(T.W)
180
Efficiency 3 5 liters/minute
60 36
(A) (A+B)

A's efficiency = 3 liters/minutes
B's efficiency = 2 liters/minutes.
B can alone fill the tank in
$= \frac{T.C}{\text{eff. of B}} = \frac{180}{2} =$ **90 minutes**

26. (c) (Total capacity)
120
Efficiency → 6 5 8
Hours → 20 24 15
(A) (B) (A+B+C)
(A+B+C) one day work = 8
6+5−C = 8
11−C = 8
C = 3

C = 3 units T.C = 120
×1 ×1
Actual emptying capacity = 120 galons 3 Galons 120 units

27. (d)
120
Efficiency → 30 15 10 12
Hours → 4 8 12 10
(P) (Q) (R) (S)
In order to fill the cistern in less time.
So, efficiency of filling should be more
Now, check all options
(A) → Q efficiency 15 units/hr
(B) → (P + R − S) efficiency
= 30+10−12 = 28 units/hr
(C) → (P + S) efficiency = 30 − 12
= 18 units/hr
(D) → (P + Q − S) efficiency
= 30+15−12 = 33 units/hr
Option 'D' is answer.
Since efficiency of option 'D' is highest.

28. (d) (Total capacity)
30
Efficiency→ 3 2
Hours → 10 15
(−A) (−A+B)
Emptying Filling
Pipe A is emptying at 3 units/hr
When filling pipe 'B' start function then emptying rate comes down to 2 units/hr
So, filling pipe efficiency is
(3−2) = 1 unit/hr
Pipe 'B' will fill tank in = $\frac{30}{1}$ = 30 hrs
Filling rate is 4 liters/minutes
It will fill 4×60 = 240 liters/hr.
Total capacity = 240×30 = **7200 liters**

29. (c) (Total capacity)
12
Efficiency→ 3 2
Hours → 4 6
(A) (B)
A will fill 3 units of water in Ist hour

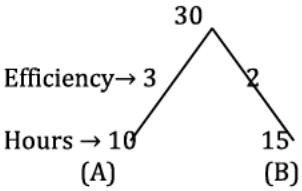
B will fill 2 units of water in IInd hours
5 units in 2 hours
5 units is filled in 2 hours
×2 ↓ ×2 ↓
10 units 4 hours
Work left = 12–10 = 2 units
Now, A will begin he completes 2
Units in $\frac{2}{3}$ hours
Total time = $4\frac{2}{3}$ hours

30. (c)

Qty	Time(in minutes)
Boy → 4 liters	3
Girl→ 3 liters	4
Boy → (4	3)×4 = 16 liters In 12 minutes
Girl→ (3	4)×3 = 9 liters In 12 minutes

(Boy + Girl) pour
25 liters 12 minutes
×4 ↓ ×4 ↓
100 liters **48 minutes**

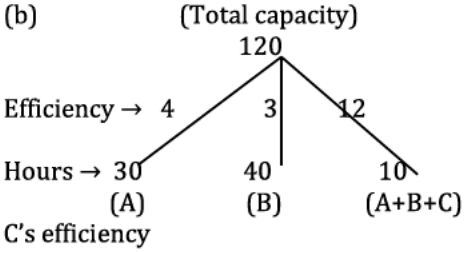
31. (a) (Total capacity)



Efficiency of both pipes = 3+2 = 5 units/hrs
They both will fill the tank in
$\frac{T.C}{efficiency} = \frac{30}{5}$ = 6 hours.

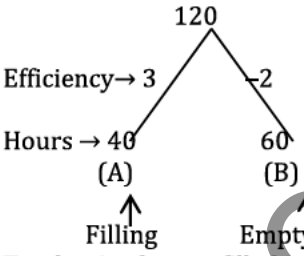
32. (a) let total capacity = 42 units
∴ (A + B + C) per hour work = $\frac{42}{6}$ = 7 units
A+B+C fills 7 units/hours
They all worked for 2 hours
Total water filled = 7×2 = 14 units
Capacity left = 42–14 = 28
A+B = $\frac{28}{7}$ = 4 units/hr.
(A+B) efficiency 4 units
C's efficiency
= [(A+B+C) –(A+B)] efficiency
= 7–4 = 3 units/h
C can alone fill the cistern in
$\frac{T.C}{Efficiency} = \frac{42}{3}$ = 14 hrs

33. (b) (Total capacity)



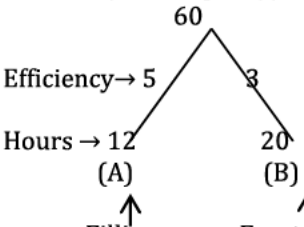
C's efficiency
= efficiency of (A+B+C) – efficiency
Of (A+B) = 12 – (4+3)
= 5 units/minutes
C can fill the cistern alone in
$\frac{T.C}{Efficiency} = \frac{120}{5}$ = 24 minutes

34. (a) (Total capacity)



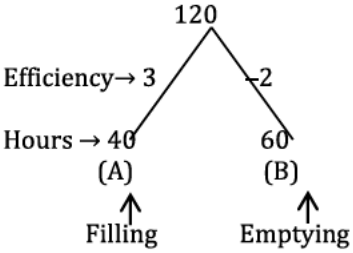
Total unit of water filled is
= 3 –2 = I unit/min
Tank will be filled in
= $\frac{120}{I}$ = **120 minutes**
Tank will be filled in 120 minutes
= **2 hrs**

35. (c) If emptying pipe empty half the tank in 10 hrs then emptying pipe empty full tank in
10×2 = 20 hrs
(Total capacity)



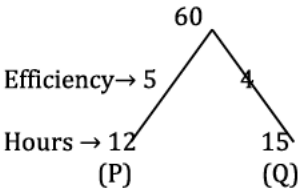
(A – B) efficiency = 5 – 3 = 2 units/h
$\Rightarrow \frac{\frac{1}{2}\text{ of T.C}}{2\text{ unit/s}} \Rightarrow \frac{30}{2}$ = **15 hrs**

36. (d) (Total capacity)



Total unit of water filled is
= 3 – 2 = 1 unit/min
Tank will be filled in
= $\frac{120}{1}$ = **120 minutes**

37. (d) (Total capacity)

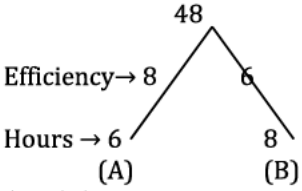


(P + Q) efficiency = (5+4)
= 9 units/minutes
(P + Q) fill in 3 minutes
= 9×3 = 27 units
Capacity left = 60 – 27 = 33 units
Q fill remaining cistern in

$$\frac{\text{T.C}}{\text{Effiecicency of Q}}$$

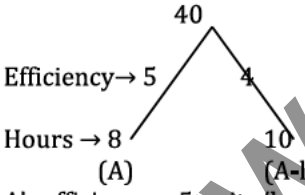
$= \frac{33}{4} = 8\frac{1}{4}$ minutes

38. (b) (Total capacity)



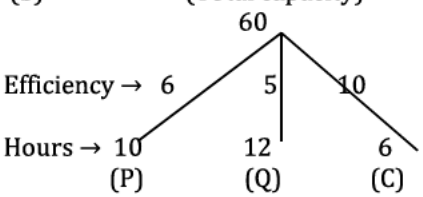
(A+B) fill a tank in 2 hr
= (8+6)×2 = 28 units
Capacity left = 48 – 28 = 20 units
B fills remaining Cistern in
$\frac{20}{6} = \frac{10}{3} = 3\frac{1}{3}$ **hours**

39. (d) (Total capacity)



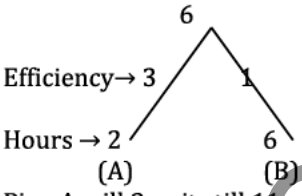
A's efficiency = 5 units/hr
A's efficiency after leakage
= 4 units/hr
∴ Leakage = 1 unit/hr
Leakage empty the whole cistern in
$\frac{40}{1}$ = 40 hours

40. (b) (Total capacity)



(P+Q) fills (6+5) = 11 units/hr
C empties = 10 units/hr
If all pipes are open
So, only 11 – 10 = 1 unit of water can be Filled in tank
$\frac{1}{4}$ of tank will be filled in
$\frac{T.C}{Efficiency} = \frac{\frac{1}{4}\times 60}{1} = \frac{15}{1}$ = 15 hrs
= 7 am +15 hr = **10 pm**

41. (c) (Total capacity)

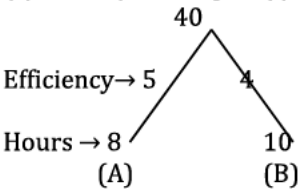


Pipe A will 3 units till 11 am.
Capacity left = 6 – 3 = 3
Now, both pipes will fill and they will take
$\frac{T.C}{Efficiency} = \frac{3}{(3+1)} = \frac{3}{4}$ hours
So, $\left(11 + \frac{3}{4}\right)$ am, tank will be filled
= **11 : 45 A.M.**

42. (a) let total capacity of cistern is 5 units.
Filled part of the cistern
= 5 units$\times\frac{3}{5}$ = 3 units
Rest part of the cistern
= 5 – 3 = 2 units
3 units filled in = 60 sec.
1 unit filled in = $\frac{60}{3}$
2 units filled in = $\frac{60}{3}\times 2$ = 40 sec

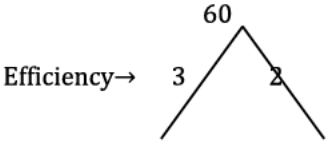
43. (c) Volume of cistern
$=\pi r^2 h$
$\pi r^2 h = 11000\ cm^3$
$\frac{22}{7}\times\frac{25}{2}\times\frac{25}{2}\times h = 11000\ cm^3$
$h = \frac{11000\times 7\times 2\times 2}{22\times 25\times 25}$
$h = \frac{28\times 4}{5} = \frac{112}{5} = 22\frac{2}{5}$ cm

44. (a) (Total capacity)



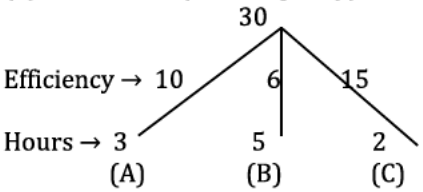
(A+B) one hour filling = 9 unit
(A+B)'s 4 hour filling
= 9×4 = 36 units
Part of tank filled
$\frac{36}{40} = \frac{9}{10}$

45. (b) (Total capacity)



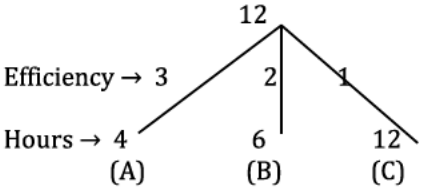
minutes → 20 30
(P+Q) (P)
Efficiency of Q
= (efficiency of P+Q – efficiency of P)
= (3 – 2) = 1 units
Q can alone fill cistern in
$\frac{T.C}{efficiency} = \frac{60}{1}$ = **60 minutes**

46. (d) (Total capacity)



If all pipes are open efficiency of filling/hour is
= efficiency of A+B – efficiency
of C = (10+6) – 15 = 1 unit/hr
1 unit is filled in 1 hr
30 units is filled in 1×30 = **30 hrs**

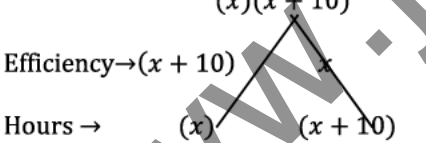
47. (a) (Total capacity)



(A+B+C)'s efficiency = 3+2+1 = 6 units/hr
(A+B+C) can fill the tank in
$= \frac{T.C}{Efficiency\ of\ (A+B+C)} = \frac{12}{6}$ = **2 hrs**

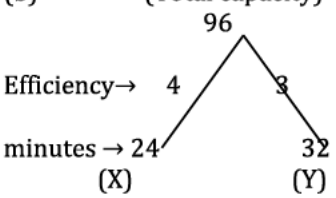
48. (a) Always try to solve this question by options save time.

(Total capacity)
$(x)(x+10)$



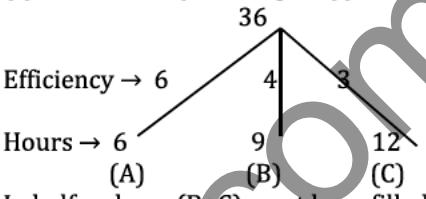
$= \frac{(x)\times(x+10)}{(x+10)+x}$ = total time taken by
Both pipe
Now take out one option and put it
In place of 'x'
$\Rightarrow x = 20$ (from option (all))
$\frac{(20)\times(20+10)}{(20+10)+(20)} = \frac{20\times30}{50}$ 12 hrs
It matches with question figure.
Total time matches. So this is answer 20 hrs

49. (b) (Total capacity)



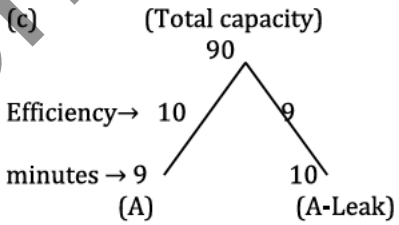
If tank is to full in 18 minutes so pipe 'x' will work for these 18 minutes
Pipe 'x' fills in 18 minutes = 18×4 = 72 units
Capacity left = 96 –72 = 24 units
So, left capacity of tank/cistern must
Be filled by pipe 'y'
Pipe y fills in $\frac{24}{3}$ = 8 mins
So, after 8 minutes it must have closed.

50. (c) (Total capacity)



In half an hour (B+C) must have filled
$= \frac{4}{2} + \frac{3}{2} = \frac{7}{2}$ units
Capacity left = $36 - \frac{7}{2} = \frac{65}{2}$ units
Now, all pipes will fill the remaining tank
$= \frac{65}{2\times(6+4+3)} = \frac{65}{2\times13} = \frac{5}{2}$
$= 2\frac{1}{2}$ hrs

51. (c) (Total capacity)



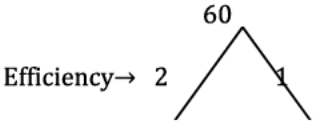
Efficiency of pipe with leak is 9 units
(A – leak) = 9 units
10 – leak = 9 units
– leak = 9 – 10
Leak = 1 units/hr
Leak will empty the full tank in
$= \frac{T.C}{Efficiency} = \frac{90}{1}$ = 90 hrs

52. (a) Flow of water depend upon

	Pipe1	Pipe2	Pipe3
Diameter →	60	30	20
Radius →	30	15	10
	$\pi(30)^2$	$\pi(15)^2$	$\pi(10)^2$
900π	225π	100π	
Unit of water			
They can flow			
(vocr²)	900	225	100
No. of pipes	$\frac{1}{900}$	$\frac{2}{225}$	$\frac{3}{300}$

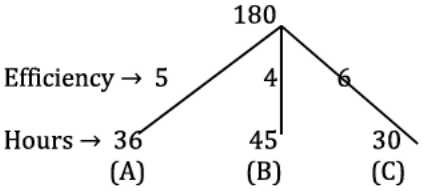
Total water
Flower
So pipe 1 with diameter 60 is fastest

53. (d) (Total capacity)



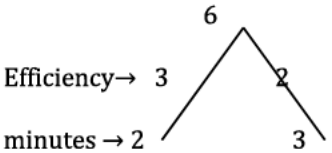
minutes → 30 60
(A) (B)
(A+B)'s filling (2+1) = 3 units/min)
In 5 minutes. They will fill 3×5 = 15 units
Capacity left = 60 – 15 = 45 units
Second pipe (B) fills it in
$\frac{T.C}{efficiency\ of\ B}$
$= \frac{45}{1} = 45$ minutes

54. (b) (Total capacity)



(A+B)'s 7 minutes filling = (5+4)×7 = 63 units
Capacity left = 180 – 63 = 117 units
Now C is opened, it empties by 6 units/min.
So total units filled in tank is
= (5+4)–6 = 3 units/min
Now tank can be filled in = $\frac{117}{3}$ = 39 min.
Tank is filled up in = 7+39 minutes
= 46 min.

55. (a) (Total capacity)

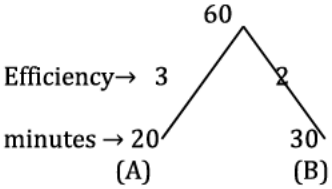


(A+B) fill tank in = $\frac{T.C}{Efficiency\ of\ (A+B)} = \frac{6}{3+2}$
$= 1\frac{1}{5}$ = 1 hour 12 min

56. (d) 1 Sec → 1 drop
No of second in 300 days.
$(24_{hrs} \times 60_{mins} \times 60_{sec}) \times 300\ days$
No of liters wasted
$100 \times \frac{24\times60\times60\times300}{600}$ 43200 × 100
= 4320000 ml
$= \frac{4320000}{1000} = 4320\ litres$

57.
(b) $\left[\frac{m_1\times h_1\times T_1}{W_1} = \frac{m_2\times h_2\times T_2}{W_2}\right]$
$9_{taps} \times 20_{mins} \times T_{taps} \times 15_{mins}$
T = 12 Taps

58. (c) (T.C)

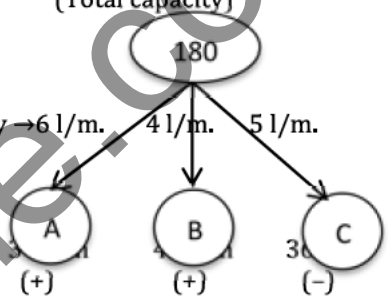


A fill 3 units in first minute and B empties 2 units in second minutes
(A–B)'s efficiency = 3–2/2min
= 1 units/2min

Efficiency	Time
1	2
×57	×57
57	114 min
A work +3	+1
60	115 min

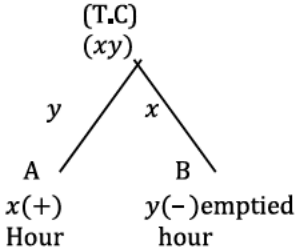
They take to fill 60 units in = 115 min.

59. (b) (Total capacity)



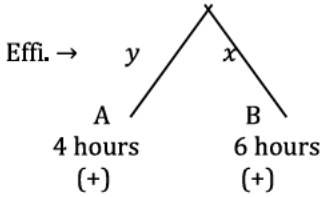
A ..... (+) 30 minutes
B .....(+) 45 minutes
C.....(–) 36 minutes
⇒ Filled water by (A+B) in 12 min
= 12×(6+4)
= 12×10 = 120 liter
⇒ Remaining capacity
= 180 – 120 = 60 liter
⇒ After 12 min. emptied pipe C is
Also opened
⇒ Total capacity (A+B+C)
= (6+4–5) = 5 l./m.
⇒ Time taken by (A+B–C) with capacity 5 l./m.
To fill the remaining part
$= \frac{60\ l.}{5\ l/m}$ = 12 min.
⇒ Therefore, total time which the tank will be filled up is = 12+12
= 24 minutes.

60.
(d)

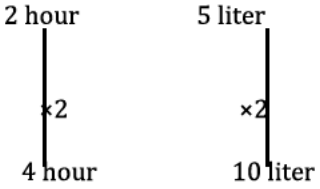


Time will be taken by with of them to fill the tank
$= \frac{xy}{y-x}$

61. (b) A → 4 hours
B → 6 hours
LCM → 12 liters → Total capacity

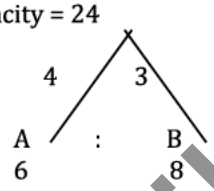


According to the question
⇒ for the first hour tap A is opened
And B for second hour
⇒ Work done by both in 2 hours →
3 l/h + 2 l/h



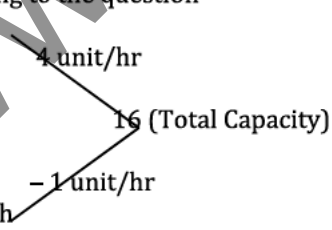
⇒ Remaining part
= 12–10 = 2 liter
⇒ Again 5th hour A will be opened
Tap A will fill the 2 liter water with
Its efficiency = $\frac{2}{3}$
⇒ Therefore tank will be filled in
= $\left(4+\frac{2}{3}\right)$ *hours* = $4\frac{2}{3}$ *hours.*

62. (d) Total capacity = 24



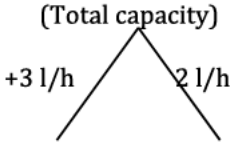
2 hours' work of both pipes
= (4+3)×2 = 14 units
Capacity Left = 24 – 14
= 10 units
Now B fills remaining capacity of tank in
⇒ $\frac{10}{3} = 3\frac{1}{3}$ *hours*

63. (d) According to the question
A → 4th



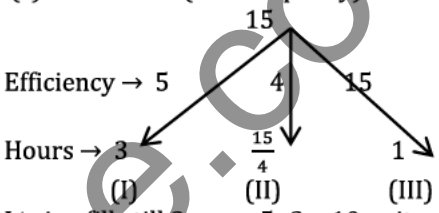
(A) & (B) one hour work (4–1) = 3 units
A & B complete in = $\frac{16}{3} = 5\frac{1}{3}$ *hours*

64. (c) 72
(Total capacity)



(A) (B)
(Pipe) (Pipe + leakers)
24 hours(+) 36 hours
According to Question
Efficiency of leakage
= 3 –2 = 1 L/h
Half capacity = $\frac{72}{2}$
= 36
Time taken by leakage to empty the Half-filled tank
= $\frac{36\ litre}{1\ litre/h} = 36\ hours$

65. (c) (Total capacity)



Ist pipe fills till 3 pm = 5×2 = 10 units
IInd pipe fill till 3 pm = 4×1 = 4 units
Total filled = 10+4 = 14 units
Net Pipe (III) efficiency = 15 – 9 = 6 units/hrs
Tank will be empty in = $\frac{14}{6}$ = 2 hr 20 min.
3 hr + 2 hr 20 min = 5 : 20 pm

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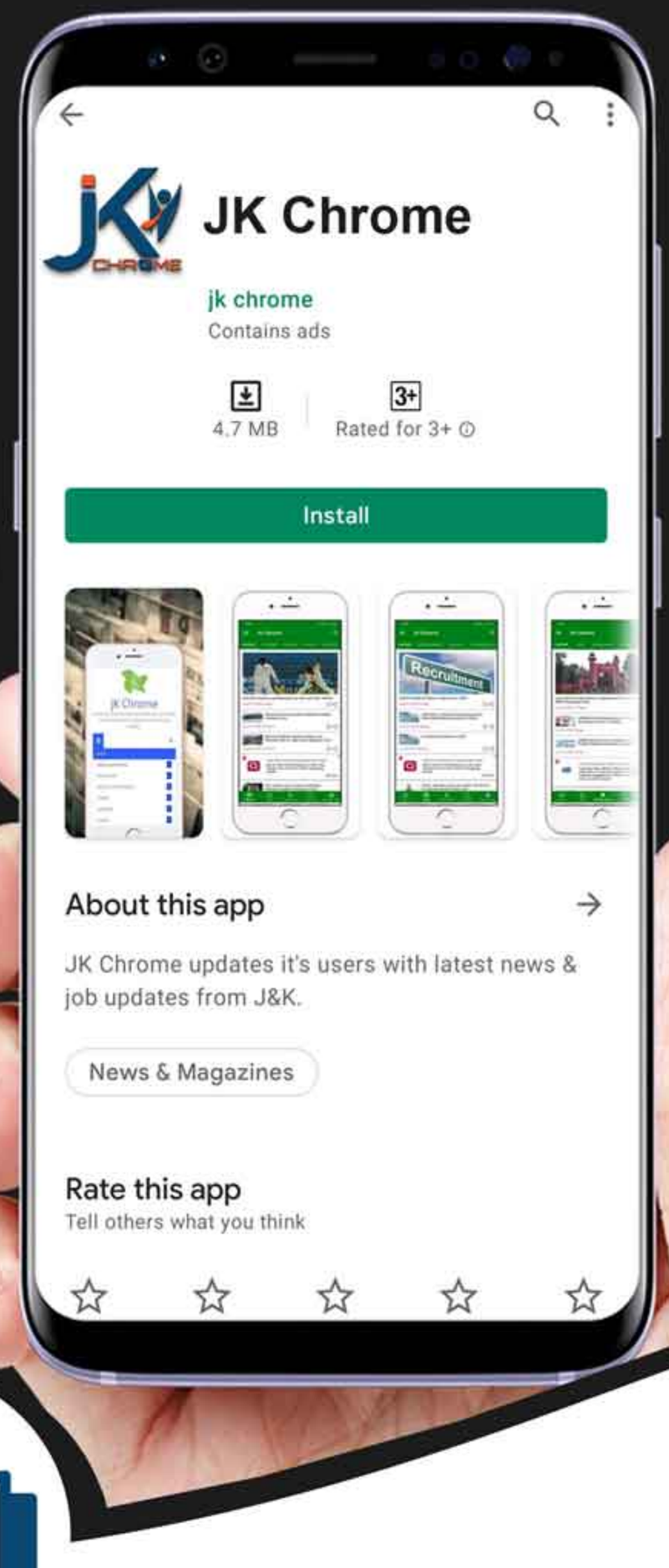

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