Pipes and Cisterns: 5 Important Shortcuts with Solved Examples

Pipe and Cistern problems are similar to time and work problems. A pipe is used to fill or empty the tank or cistern.

Inlet Pipe: A pipe used to fill the tank or cistern is known as Inlet Pipe.
Outlet Pipe: A pipe used to empty the tank or cistern is known as Outlet Pipe.

Some Basic Formulas

1. If an inlet pipe can fill the tank in x hours, then the part filled in 1 hour = 1/x

2. If an outlet pipe can empty the tank in y hours, then the part of the tank emptied in 1 hour = 1/y

Some Shortcut Methods

Trick-1:

Two pipes can fill (or empty) a cistern in xand y hours while working alone. If both pipes are opened together, then the time taken to fill (or empty) the cistern is given by

= (x*y)/(x+y)

Ex : Two pipes can fill (or empty) a cistern in 5 and 4 hours while working alone. If both pipes are opened together, then the time taken to fill (or empty) the cistern ?

a. 9 hrs b. 1 hr c. 20 hrs d. 20/9 hrs

Sol : = (5*4)/(5+4) = 20/9 hrs

Trick-2:

Three pipes can fill (or empty) a cistern in x,y and z hours while working alone. If all the three pipes are opened together, the time taken to fill (or empty) the cistern is given by

= (x*y*z)/(xz+yz+xy)

Ex : Three pipes can fill (or empty) a cistern in 1,2 and 3 hours while working alone. If all the three pipes are opened together, the time taken to fill (or empty) the cistern ?

a.6 hrs b.6/11 hrs c.3 hrs d.1.5 hrs

Sol: (1*2*3)/[(1*2)+(2*3)+(1*3)]

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= 6/11 hrs

Trick-3:

A pipe can If a pipe can fill a cistern in x hours and another can fill the same cistern in y hours, but a third one can empty the full tank in z hours, and all of them are opened together, then

= (x*y*z)/(xz+yz-xy)

Ex : A pipe can If a pipe can fill a cistern in 3 hours and another can fill the same cistern in 4 hours, but a third one can empty the full tank in 2 hours, and all of them are opened together.how much time taken fill the cistern ?

a. 15 hrs b. 12 hrs c. 24 hrs d. 9 hrs

Sol: (2*3*4)/[(2*3)+(2*4)-(3*4)]

= 12 hrs

Trick-4:

A pipe can fill a cistern in x hours. Because of a leak in the bottom, it is filled in y hours. If it is full, the time taken by the leak to empty the cistern is

= (x*y)/(y-x)

Ex: A pipe can fill a cistern in 5 hours. Due to a leak in the bottom, it is filled in 6 hours. If it is full, the time taken by the leak to empty the cistern ?

a. 11 hrs b. 1 hrs c. 30 hrs d. 1.2 hrs

Sol: = (5*6)/(6-5) = 30 hrs

Trick-5:

'A' pipe in 'x' hours & 'B' pipe in ' y' hours. Both opened for 'a' hours . then,A is shut-off .alone 'B' pipe fill the remaining tank in

= y-[a*(x+y)]/x hours

Ex: A tank can be filled by a tap in 20 minutes and by another tap in 6O minutes. Both the taps are kept open for 10 minutes and then the first tap is shut off. After this, how much time required to fill tank will be completely ?

a.10 min b.15 min

c.12 min d. 20 mm

Sol: = 60-[10*(20+60)/20]= 20 min

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