

## Pipe and Cisterns

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.

**Concept:**

If a pipe can fill a tank in  $x$  hours, then the part filled in 1 hour =  $1 / x$

If a pipe can fill a tank in  $x$  hours and another pipe can empty the full tank in  $y$  hours, then the net part filled in 1 hour, when both the pipes are opened:

$$(1/x - 1/y)$$

Time taken to fill the tank, when both the pipes are opened:

$$(x \times y / y - x)$$

If a pipe can fill a tank in  $x$  hours and another fill the same tank in  $y$  hours, then the net part filled in 1 hr, when both pipes are opened:

$$(1/x + 1/y)$$

So time to fill the tank will be:

$$[x \times y / (x + y)]$$

If a pipe fills a tank in  $x$  hrs and another fills the same tank in  $y$  hrs, but a third empties the full tank in  $z$  hrs and all of them are opened together, the net part filled in 1 hr:

$$(1/x + 1/y - 1/z)$$

So time taken to fill the tank:

$$xyz / (yz + xz - xy)$$