**Chapter-13**

**Pipes and Cisterns**

**What is Inlet?**  
Inlet: A Pipe is connected with tank and it fills with water or some liquid is called as Inlet.

**What is Outlet?**  
Outlet: A Pipe connected with tank it emptying is called as an outlet.

**Remembering points of pipe examples:**

* If a pipe can fill a tank in x hours, then, part filled by 1 hours =.
* If a pipe can empty a tank in y hours, then, part emptied in 1 hours =
* If a pipe can fill a tank in x hours and another pipe can empty the full tank in y hours (where y>x), then on opening both the pipes, the net part filled in 1 hours = (-).
* If a pipe can fill a tank in x hours and another pipe can empty the full tank in y hours (where y>x), then on opening both the pipes, the net part emptied in 1 hours = (–).

**Example:**  
Two pipes A and B can fill a tank in 12 hours and 14 hours respectively while a third pipe C empties the full tank in 30 hours. If all the A, B, C operate simultaneously, How much time will take be filled the tank?

**Answer:**  
**Step 1:** Net part filled by 1 hour = (+) – = .  
**Step 2:** The Time taken will fill the tank is  = 8 hr 12 minutes.  
So time taken to fill the tank 8 hr 12 minutes.

**Example:**  
Two pipes A and B can fill a tank in 36 hours and 45 hours respectively. If both the pipes are simultaneously, how much time will be taken to fill the tank?

**Answer:**  
Here both pipes are working like a inlet,  
**Step 1:** So at first of we calculate fill pipe in 1 hours time taken.  
A + B together filled a tank in 1 hour = (+) = = 

**Step 2:** So in 1 hour it fill with 1 / 20.  
Hence time taken both the pipe A and B will fill the tank in 20 hours.

**Example:**  
If A pipe can fill a tank in 12 hr. and pipes B can empty a tank in 20 hr. When both pipes are opened simultaneously, How much time will be taken to fill the tank?  
**Answer:**  
**Step 1:** At we calculate time taken to fill in hourhr and time taken to empty the a tank in hr.  
**Step 2:** When both pipes are opened then time taken to fill  
 – = 5 –   
=   
So in 1 hour to take fill tank both are open A and B =  
time taken when A and B are opened, A + B = = 30hr.

**Example:**  
Pipes X fill the tank in 6 hours , Pipes Y fill the tank in 10 hours , Pipes Z fill the tank in 20 hours , If all the Pipes are open , in how many hours will the tank be filled ?  
**Answer:**  
Part filled by ( X + Y + Z ) in 1 hour  = (++) = .  
So that All the three pipes together will fill the tank in 60 / 19hours.

**Example:**  
There are two types Pipes, Pipes A and B can fill a tank in 3 and 6 hours respectively. Pipe C can empty it in 12 hours. If all the three pipes are opened together, then the tank will be filled in:   
**Answer:**   
Net part filled in 1 hour = ( + –) =.  
The tank will be full in  hrs.