**FLOW MEASUREMENT TECHNIQUES**

1. **Trajectory Method For Tubewells**

This method is used to measure the discharge or flow for rate of tubewells. It is very simple and easy method. It has three essential requirement/condition for discharge determination

* Inside diameter of pipe
* Measurement of X-coordinate of flow (Horizontal distance measured from the end of pipe)
* Measurement of Y-coordinate of flow (Vertical distance measured down from the horizontal point to the top of the water jet)

**Formula used For Full Flowing Pipe**

|  |  |  |
| --- | --- | --- |
| **Q** | **=** | **0.0174 D2x X/Y** |
| where |  |  |
| Q | = | lps |
| D | = | inside diameter of pipe (cm) |

1. =X-coordinate (cm)
2. =Y-coordinate (cm)

**Formula used For Partial Flowing Pipe**

|  |  |  |
| --- | --- | --- |
| Q | = | [0.0174 D2 x X (a/A)]/Y |
| where |  |  |
| Q | = | lps |
| a | = | Area of jet |
| A | = | Area of pipe |
| D | = | inside diameter of pipe (cm) |

1. =X-coordinate (cm)
2. =Y-coordinate (cm)

**LIMITATIONS**

* Pipe should be straight
* Discharging in air
* Length of pipe > 6 D
* Error upto 10 %

**2 -FLOAT METHOD**

Float method is used to measure discharge in open channels where accuracy is not of important. It is based on velocity- area relationship.

Discharge = Area x Velocity

Q = A x V

Q = m3/sec

V = S/t ( m/sec)

A = Cross Section Area of flow (m2)

Cross sections of water channels vary, i.e Rectangular Section, Trapezoidal or Parabolic Section

* Take 30 meter straight and long section of watercourse, and mark A and B points.
* Put float 1 m before point A.
* Float e.g. round wooden block, wooden sphere, orange, long necked bottle partly filled & capped
* Note time taken by float for distance from point A to B.
* Find Velocity (v)
* Repeat 3 to 4 times
* Measure average depth of flow (d), not of w/c
* Measure width of flow (b)Calculate area (A)
* Calculate discharge **Q = 0.9 x A x V for lined watercourse**