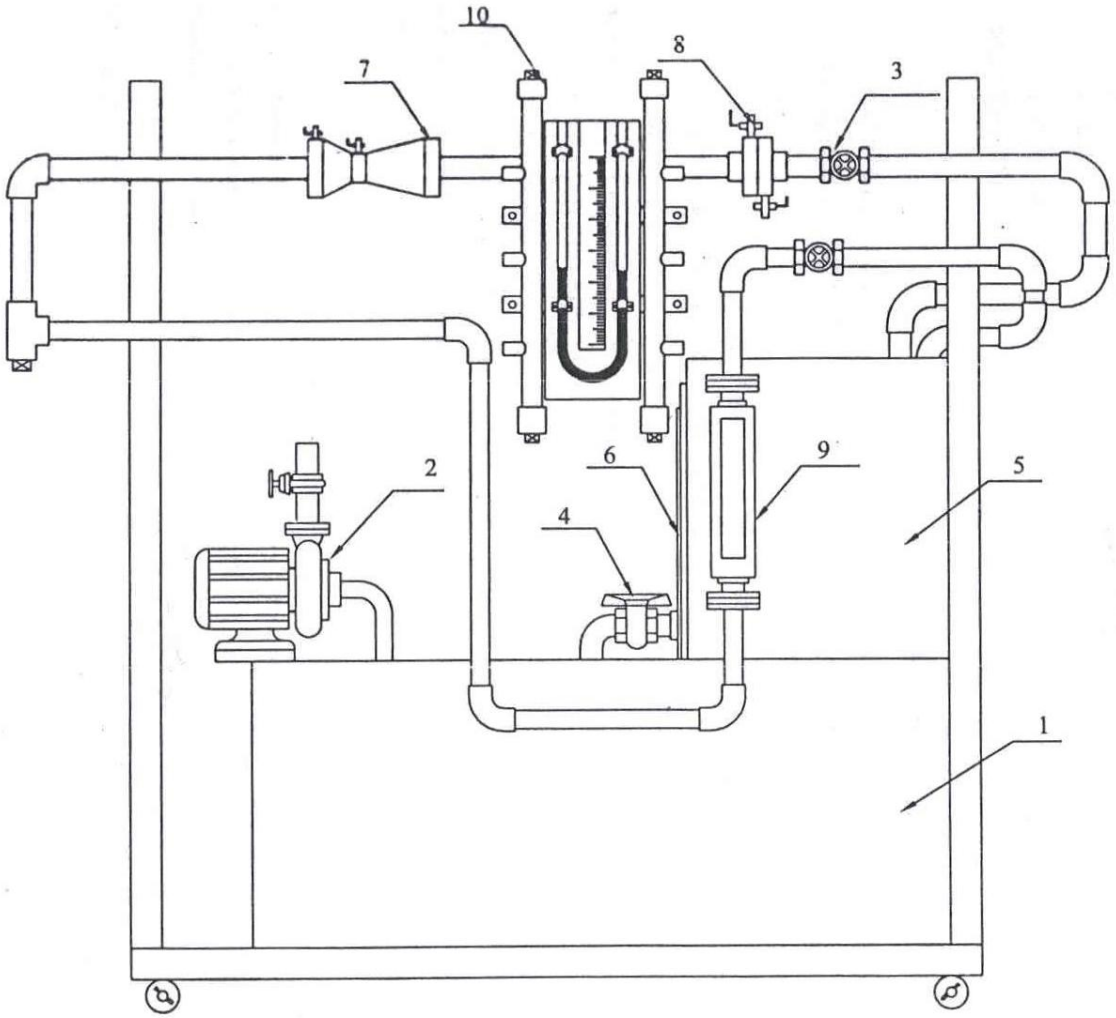

1. Sump tank
2. Supply pump
3. Flow controlvalve
4. Drain valve
5. Collecting tank
6. Gauge glass
7. Venturimeter
8. Orificemeter
9. Rotameter
10. Manometer

VENTURIMETER, ORIFICEMETER AND ROTAMETER TEST RIG

DETERMINATION OF THE CO-EFFICIENT OF DISCHARGE OF GIVEN ORIFICE METER

AIM:

To determine the co-efficient discharge through orifice meter

APPARATUS REQUIRED:

1. Orifice meter
2. Differential U tube
3. Collecting tank
4. Stop watch
5. Scale

FORMULAE:

1. **ACTUAL DISCHARGE**:

$$Q_{act} = A \times h / t \quad (m^3 / s)$$

2. **THEORTICAL DISCHARGE**:

$$Q_{th} = a_1 \times a_2 \times \sqrt{2 g h} / \sqrt{a_1^2 - a_2^2} \quad (m^3 / s)$$

Where:

A = Area of collecting tank in m^2

h = Height of collected water in tank = 10 cm

a_1 = Area of inlet pipe in, m^2

a_2 = Area of the throat in m^2

g = Specify gravity in m / s^2

t = Time taken for h cm rise of water

H = Orifice head in terms of flowing liquid

$= (H_1 \sim H_2) (s_m / s_1 - 1)$

Where:

H1 = Manometric head in first limb

H2 = Manometric head in second limb

s_m = Specific gravity of Manometric liquid

(i.e.) Liquid mercury Hg = 13.6

s_1 = Specific gravity of flowing liquid water = 1

S.No	Diameter in mm	Manometric reading		Manometric head H=(H1~H2) x 12.6 x 10^{-2}	Time taken for 'h' cm rise of water 't' Sec	Actual discharge Q act x 10^{-3} m^3 / s	Theoretical discharge Qth x 10^{-3} m^3 / s	Co-efficient of discharge Cd (no unit)
		H1 cm of Hg	H2 cm of Hg					
							Mean Cd =	

3. CO EFFICENT OF DISCHARGE:

Co- efficient of discharge = Q act / Q th (no units)

DESCRIPTION:

Orifice meter has two sections. First one is of area a_1, and second one of area a_2, it does not have throat like venturimeter but a small holes on a plate fixed along the diameter of pipe. The mercury level should not fluctuate because it would come out of manometer.

PROCEDURE:

1. The pipe is selected for doing experiments
2. The motor is switched on, as a result water will flow
3. According to the flow, the mercury level fluctuates in the U-tube manometer
4. The reading of H_1 and H_2 are noted
5. The time taken for 10 cm rise of water in the collecting tank is noted
6. The experiment is repeated for various flow in the same pipe
7. The co-efficient of discharge is calculated

MODEL CALCULATION:

RESULT:

The co efficient of discharge through orifice meter is …… (No unit)