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SECTION :- 'B'

SUBJECT :- 'FLUID MECHANICS'

SEMESTER :- 'SUMMER'

SUBMITTED TO :-

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Q NO. 1

Part = A

⇒ Define Discharge? Write it's equation?

Ans :- The amount of fluid passing a section of a stream in unit is called the discharge. If V the mean velocity and " A " is the cross-sectional area, the discharge Q is defined by $Q = Av$ which is known as volume flow rate.

Discharge is also expressed as mass flow rate and weight flow rate.

(3)

QNO. 1

PART-13

⇒ Define head and it's types :-

Ans ⇒ Energy head :-

It is the sum of all energy head at the point in fluid or total energy per unit weight of fluid at a point.

⇒ Kinetic head :-

It is kinetic energy per unit weight of fluid.

$$\frac{K.E}{wt} = \frac{1}{2} \frac{\rho v^2}{\rho g} = \frac{v^2}{2g} \text{ is Kinetic Head.}$$

This is also known as velocity head, it's unit is meter.

⇒ Potential head :-

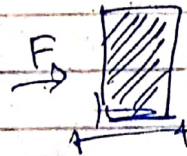
The vertical height of a free surface above any point in a liquid at rest in pressure head or level of fluid.

(4)

due to pressure exerted by fluid.

$$\text{Work } W = \frac{\text{work}}{W} = \frac{F \cdot ds}{W}$$

$$= \frac{P_A \cdot ds}{W} = P \times \frac{\text{Volume}}{W} = \frac{P}{\gamma}$$



(5)

QNO.2 : " NUMERICAL "

PART-A

⇒ DATA :

$$\text{Velocity} = 20 \text{ cm/s} = 0.2 \text{ m/s}$$

$$\text{Datum height} = 0.4 \text{ m}$$

$$\text{pressure "p"} = 30 \text{ kpa}$$

$$\rho = 9810$$

Solution :

$$H = ?$$

$$H = z + \frac{v^2}{2g} + \frac{P}{\rho}$$

$$H = 0.4 + \frac{(0.2)^2}{2 \times 9.8} + \frac{30 \times 10^3}{9810}$$

$$H = 3.4601$$

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Q NO. 2

PART-B

DATA ::

$$\text{dia} = 150 \text{ mm} = 0.15 \text{ m}$$

$$\text{discharge, } Q = 0.5 \text{ m}^3/\text{s}$$

Required

$$\text{Velocity} = ?$$

Formulas

$$Q = A \cdot V$$

$$V = \frac{Q}{A}$$

$$= \frac{0.5}{\frac{\pi}{4} \times d^2}$$

$$= \frac{0.5}{\frac{\pi (0.15)^2}{4}}$$

$$= 28.29$$



(7)

QNA 3

⇒ NUMERICAL

⇒ GIVEN DATA

$$\text{Specific Gravity} = 0.9$$

$$\text{Length} = 40 \text{ m}$$

$$\text{dia} = 200 \text{ mm} = 0.2 \text{ m}$$

$$\text{Velocity} = 6 \times 10^{-5} \text{ N/s/m}^2$$

$$Q = 0.06 \text{ m}^3/\text{s}$$

$$f = 0.032$$

Required

$$\text{Head loss} = H_c = ?$$

Solution

$$h_c = f \frac{L}{D} \frac{V^2}{2g}$$

Now we will find

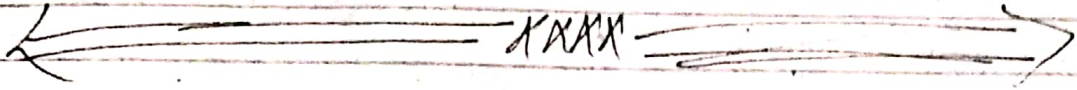
$$Q = AV, \quad V = \frac{Q}{A}$$

$$= \frac{0.06}{\frac{\pi (0.2)^2}{4}}$$

$$V = 1.9098$$

2

LC 20.119



THE
END

