17421

21314

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any <u>SIX</u> of the following:** **12**

i) Define real fluid and give one example.

ii) State Pascal's law of fluid pressure.

iii) Define total pressure.

iv) State the devices used for pressure measurement in pipe.

v) State practicle example for steady non uniform and unsteady non uniform flow.

vi) Define HGL and TEL.

vii) What is equivalent pipe?

viii) Define Froude's number.

Marks

b) **Attempt any <u>TWO</u> of the following:** **8**

i) If specific gravity of oil is 0.80 what is specific weight in N/m^3.

ii) How will you measure negative pressure?

iii) State any four difference between simple and differential manometers.

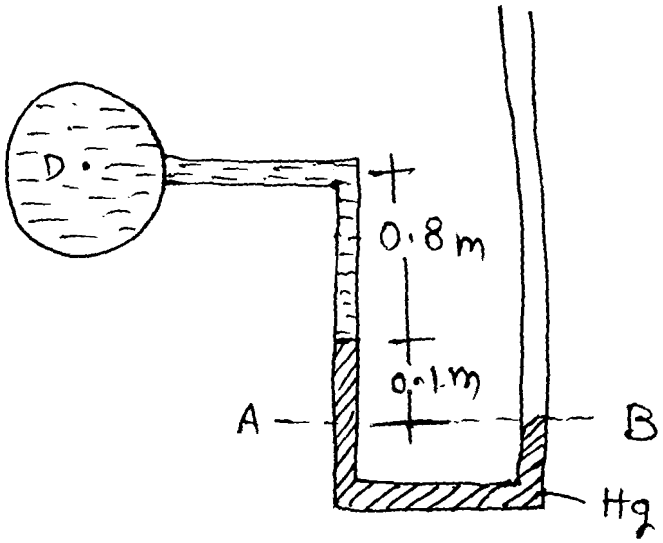
2. Attempt any <u>FOUR</u> of the following: **16**

a) A 400 ml of certain fluid weight 7.25 N calculate specific weight and specific gravity of liquid.

b) A vertical tank square in plan has side 3 m. It contains oil of sp. gravity 0.4 upto depth of 2.50 m. Calculate the total pressure on bottom and on one side of tank.

c) Explain with sketch Bourdon's tube pressure gauge.

d) Find the vacuume pressure in a pipe containing a liquid of specific gravity 0.85 as shown in Figure No. 1



<u>Fig. No. 1</u>

e) Differentiate between laminar and turbulent flow.

f) Explain Dupit's equation for equivalent pipe.

Marks

3. Attempt any <u>FOUR</u> of the following: **16**

a) Find maximum power that can be transmitted by a power station through a pipe 2.5 km long and 250 mm diameter. The pressure of water at power station is 1600 KPa and f = 0.01.

b) Calculate the discharge through pipe of diameter 20 cm when difference of pressure head between the two ends of pipe 500 m apart is 4 m of water, take f = 0.009.

c) Differentiate between pipe and open channel flow.

d) A rectangular channel having hydraulic mean depth 2 m discharges water with a velocity 1.2 m/sec. Find value of Chezy's constant if bed slope is 1 : 8000.

e) Differentiate between Notch and Weir.

f) Give classification of weirs.

4. Attempt any <u>FOUR</u> of the following: **16**

a) Give classification of orifices.

b) The head of water over the centre of an orifice of diameter 1.5 cm is 1 m. The actual discharge through the orifice is 0.75 lit/sec. Find the coefficient of discharge.

c) Explain with sketch parts of centrifugal pump.

d) Differentiate between centrifugal and reciprocating pump.

e) Explain with sketch types of flow.

f) Explain with sketch water hammer.

5. Attempt any <u>FOUR</u> of the following: **16**

a) Determine the rate of flow of water through a pipe of diameter 15 cm and length 40 m when one end of pipe is connected to a tank and other end is open to atmosphere. The pipe is horizontal and height of water in the tank is 3 m above centre of pipe. Consider all minor losses and f = 0.009.

b) Explain with sketch Bernoulli's theorem.

Marks

c) Find the slope of the bed of rectangular channel of width 4 m when depth of water is 2.5 m and rate of flow 20 m^3/sec. Take Chezy's constant C = 50.

d) Determine the discharge through 60° triangular notch in lit/sec. When the head is 0.20 m take C_d = 0.6.

e) Explain with sketches types of gauges.

f) Explain with sketch flow net.

6. Attempt any <u>FOUR</u> of the following: **16**

a) Explain with sketch submersible pump.

b) Define:

i) Coefficient of contraction

ii) Coefficient of velocity

iii) Coefficient of discharge

iv) Coefficient of resistance

c) What do you mean by most economical section of an open channel?

d) A trapezoidal channel with side slope 3 : 2 has to be designed to convery 15 m^3/sec. at a velocity of 2 m/sec., so that the amount of concrete limits for the bed and sides is minimum. Find:

i) Wetted perimeter

ii) Slope of bed if manning N = 0.014.

e) Define Prismatic and Non Prismatic channel and critical flow and subcritical flow.

f) State any four practical applications of hydrostatics.