22401

12223

3 Hours / 70 Marks Seat No. | | | | | | | | |

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

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

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

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

Marks

1. Attempt any FIVE of the following : **10**

a) Define specific mass and specific volume.

b) Calculate the weight density and specific gravity of liquid, if 600 ml liquid weighs 6 N.

c) Define pressure and It's S.I. units.

d) State Bernoullis theorem.

e) Define Hydraulic gradient line (H.G.L.) and Total Energy Line (T.E.L.).

f) Describe uniform and Non-uniform flow.

g) Enlist any two discharge measuring devices.

Marks

2. Attempt any <u>THREE</u> of the following : 12

a) Give Importance of Hydraulics with respect to Irrigation Engineering and Environmental Engineering.

b) An oil of specific gravity 0.85 is flowing through a pipe. A simple manometer is connected to the pipe containing mercury. The deflection of mercury level in left limb from center of pipe is 50 mm, Where as right limb (from center of pipe), it is 80 mm. Calculate the pressure in K.P.a.

c) A circular plate of 4m diameter is immersed in water such that it's greatest and Least depth below the free surface of water are 5m and 3m. respectively. Calculate.

i) Total pressure on one Face of plate.

ii) The position of center of pressure.

d) State Pascal's Law of Fluid pressure. Enlist any four application of it.

3. Attempt any <u>THREE</u> of the following : 12

a) Explain the concept of pressure diagram. With neat sketches and explain the use of pressure diagram.

b) A Horizontal pipe carrying water tapers from 20 cm diameter at A and 10 cm diameter at B. in length of 2 m. the pressure at 'A' is 100 N/cm^2. if the discharge 400 lit/min. Calculate pressure at 'B' in N/cm^2. if the loss of Head from A to B is 10 cm.

c) Draw a neat sketch of cup type current meter and Explain it's working.

d) A circular plate of 2 m diameter immersed vertically in liquid having specific gravity 0.8, so that the center of plate is 3.5 m below free surface. Determine the total pressure and center of pressure.

Marks

4. Attempt any THREE of the following : **12**

a) Explain Hydraulic Jump and states it's two applications.

b) Differentiate between centrifugal pump and Reciprocating pump.

c) Draw neat sketch of centrifugal pump. Showing all components.

d) Explain Reynolds number with it's equation and give it's significance.

e) A centrifugal pump is required to pump 20 lit/sec against a head of 40 m. Find the power required by pump. if efficiency of pump is 70%.

5. Attempt any TWO of the following : **12**

a) Calculate Loss of Head and direction of flow for pipe 400 m long having slope of 1 in 200. it tapers from 1.4 m diameter at higher end to 0.6 m diameter at lower end. Discharge of water flowing through pipe is 800 lit/sec. pressure at higher end is 8 N/cm^2 and at lower end 10 N/cm^2.

b) Explain the major and minor Losses in pipe with their expression.

c) A pipe 20 cm diameter is 20 m Long and Velocity in pipe is 8 m/sec. what loss of Head would be saved. if the last 5 m length of pipe is replaced by 30 cm diameter pipe, the change in section being sudden ? Assume F = 0.04, for both pipes. Neglect entry and Exit Losses.

Marks

6. Attempt any <u>TWO</u> of the following : 12

a) Explain the Hydraulic coefficient of an orifice with their expression and show relation between them.

b) Design a trapezoidal most economical channel section having side slopes 1.5 H : IV. it is required to discharge of 20 m^3/sec. With a bed slope of 1:6000. design section using Mannings formula; Take N = 0.015.

c) Find the discharge over following Notches for a Head of 20 cm.

i) Triangular notch with $\theta = 60°$ and $C_d = 0.62$

ii) Rectangular notch 1.2 m long and $C_d = 0.6$
