22401

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) Use of Non-programmable Electronic Pocket Calculator is permissible.

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

Marks

1.   **Attempt any <u>FIVE</u> of the following :**   **10**

a) Define Ideal fluid and Real fluid.

b) State any two advantages of simple U tube manometer over a piezometer.

c) State any two application of pressure diagram.

d) Define uniform and non uniform flow.

e) Write modified Darcy-weisbach Equation.

f) State the equation of continuity of flow.

g) Define static head and manometic head of centifugal pump.

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

   a) Draw sketches of :

      i)   Simple U-Tube manometer

      ii)   Differential U-Tube Manometer

   b) Explain with neat sketch the working of Bourdon tube pressure gauge.

   c) Define pressure diagram for vertical contact surface with neat sketch and mention two application of it.

   d) A differential U tube mercury manometer connected at two points P and Q on horizontal pipe carrying liquid of sp. Gravity 0.85. It shows a difference in mercury level as 25 cm. Find the difference in pressure at the two points in N/m^2.

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

   a) A masonary dam 8 m high and 3 m wide has water level 2 m below its top.

     Calculate :

      i)   Total pressure per meter length of dam.

      ii)   Depth of centre of pressure.

   b) State Bernoulli's theorem and state the assumptions made in it.

   c) State the difference between orifice and notch.

   d) A circular plate 3 m in diameter is immersed in water such that, greatest and least depth below free surface of water are 6 m and 3 m respectively. Determine total hydrostatic pressure on plate.

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

   a) Define :

     i) Hydraulic Radius

     ii) Wetted Perimeter

     iii) Prismatic channel

     iv) Most Economical channel section.

   b) Draw neat sketch of Reciprocating pump showing its various component parts.

   c) Find power required for pump under following condition :

     i) Water to be pumped = 80 lit/sec.

     ii) Total lift = 20 m

     iii) Frictional loss = 4 m

     iv) Efficiency of Pump = 70%

   d) Differentiate between Laminar Flow and Turbulent Flow.

   e) Enlist any four component parts of centrifugal pump and state their function.

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

   a) Water is flowing through a horizontal pipe having diameters 25 cm and 15 cm at section A and B respectively. The discharge passes through pipe is 50 lit/sec. If pressure at section A is 400 KN/m^2. Calculate pressure at section B. Neglect losses.

   b) Two reservoirs are connected by a pipe line consisting of two pipes one of 15 cm. diameter and length 5 m and other of 25 cm diameter and 20 m length. If the difference of water level in two reservoirs is 10 m. Calculate discharge.

   c) Explain venturimeter with neat sketch, use, Principle and Component parts of it.

Marks

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

   a) Explain the phenomenon of water hammer. State causes and effect of water hammer.

   b) Find the bed slope of a trapezoidal channel of width $2\,m$, depth of water 3m and side slopes $2\,H : 3\,V$ when the discharge through the channel is 25 m³/sec. Take Manning's $N = 0.02$.

   c) A trapezoidal channel has side slope $1.5\,H$ to IV and bed slope 1 in 3000. Find the dimensions of the most economical section of the channel if it has to pass a discharge of 18 m³/sec. Assume Manning's $N = 0.04$.

————