GANPAT UNIVERSITY

B.Tech. Semester III (CIVIL), Regular Examination –Nov /Dec : 2011

C-305 FLUID MCHANICS -I

Max.Time: 3 Hours   **Max. Marks: 70**

Exam. No. of the candidate: _____   **Supervisor's dated initial: _____**

Instructions: -   (1) Answer to the two sections must be written in **separate** answer books.

                (2) Figures to the **right** indicate **full** marks.

                (3) Assume suitable data if required.

Section - I

1   **Answer the following questions:**   **(12)**

   (A) Differentiate between :(1) Liquids and Gases,(2) Specific Weigh and Specific Volume of a fluid.

   (B) What are the assumptions of Bernoulli's equation?

   (C) How will you determine the loss of head due to friction in pipes by using (1) Darcy's formula and (2) Chazy's formula?

2   **(A)** Derive the expression for the loss of head due to sudden contraction of a pipe.   **(6)**

   (B) Find the time required to lower the water level from 5 m to 2.5 m in a reservoir of dimension 100M x 70M, by a rectangular notch of length 4.0m. Take C_d=0.55   **(5)**

OR

2   **(A)** Explain in brief continuity equation, Euler's equation of motion and Bernoulli's equation of motion.   **(6)**

   (B) Water flows through a pipe AB 1.5 m diameter at 3m/s and then passes through a pipe BC 1.8 m diameter. At C, the pipe branches. Branch CD is 0.8 m in diameter and carries one-third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in CD and the diameter of CE.   **(5)**

3   **(A)** Derive an equation for Flow through an external cylindrical mouthpiece.   **(6)**

   (B) A closed vessel contains water up to height of 3.0 m and over the water surface there is air having pressure 8.829 N/cm^2 above atmospheric pressure. At the bottom of vessel there is an orifice of diameter 25 cm. find the rate of flow of water from orifice. Take C_d = 0.55   **(6)**

OR

3   **(A)** Define Cipolletti weir and derive equation for finding out discharge through it.   **(6)**

(B) Find the discharge through a trapezoidal notch which is 1.5 m wide at the top **(6)** and 0.5m at the bottom and is 50 cm in height. The head of water on notch is 40 cm. Assume Cd=0.62 for rectangular portion and Cd=0.60 for triangular portion.

Section - II

4 (A) Define :Laminar and turbulant flow, Compressible and incompressible flow, **(6)**

(B) A horizontal venturi meter with inlet and throat diameters 40 cm and 20 cm **(6)** respectively is used to measure the flow of water. The pressure at inlet is 18 N/cm^2 and the vacuum pressure at the throat is 29 cm of mercury. Find the discharge of water through venturimeter. Take Cd = 0.96.

5 (A) Derive hydrostatic law of pressure variation. **(6)**

(B) The barometric pressure at the sea level is 760mm of mercury while that at **(5)** mountain top is 735mm, if the specific weight of air is assumed constant $12.33N/m^2$, what is the elevation at the mountain top?

OR

5 (A) Define: ' Notch', and 'Crest'. Classify Notches and Weirs through chart. **(6)**

(B) A driver descends from the surface of the sea to depth of 30 m. What would be **(5)** the pressure under which driver would be working above the surface assuming that the density of sea water is 1025 g/M^3 and remain constant.

6 Attempt any Three: **(12)**

(A) Define: Buoyancy, Centre of buoyancy, Metacentre, Meta-centric height.

(B) Explain conditions of equilibrium of floating and sub-merged bodies.

(C) State the Newton s Law of viscosity and give examples of its application.

(D) A 35 cm diameter pipe, conveying water, branches into two pipes of diameters 20 cm and 15 cm respectively. If the average velocity in the 35 cm diameter pipe is 2.5 m/s, find the discharge in this pipe. Also determine the velocity in 15 cm pipe if the average velocity in 20 cm diameter pipe is 2 m/s.

END OF THE PAPER