B.Tech. (Sem. - 3rd)
FLUID MECHANICS - I (Theory)
SUBJECT CODE : CE - 203
Paper ID : [A0602]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours   Maximum Marks : 60

Instruction to Candidates:
   1) Section - A is **Compulsory**.
   2) Attempt any **Four** questions from Section - B.
   3) Attempt any **Two** questions from Section - C.

Section - A

Q1)   (10 × 2 = 20)

   a) Define Non-Newtonian fluids.

   b) Define specific weight and relative density of fluid.

   c) Define Pascal's law of fluid statics.

   d) What are streak lines and potential lines?

   e) Draw a sketch of pitot tube.

   f) Write the dimensions of force and viscosity.

   g) Write equation of continuity of a liquid flow.

   h) Define coefficient of discharge.

   i) Define meta centre height.

   j) What is rotational and irrational flow?

Section - B

(4 × 5 = 20)

Q2) What is viscosity? How viscosity depends upon temperature? Explain.

Q3) A circular plate of 2.5 m in diameter is vertically immersed in an oil of specific gravity 0.9. The centre of the plate is 2m below the oil surface. Find the total pressure and the depth of centre of pressure.

Q4) For two dimensional flow, the stream function is given by $\psi = x + y^2$. Calculate the velocity at the point (2, 6).

Q5) Derive Darcy's equation for the determination of loss of head due to friction in pipe line?

Q6) A vertical pipe line 1.5 m long tapers top to bottom from 75mm diameter to 150mm diameter. Find the difference in pressure if the discharge through the pipe is 25 litres/sec.

Section - C

$(2 \times 10 = 20)$

Q7) Explain the Rayleigh's method for dimensional analysis?

Q8) (a) What are the advantages of V-notch over rectangular notch?

(b) During an experiment, 50litres of water flowing over a right angled notch was collected in one minute. If the head of the sill is 50mm calculate the coefficient of discharge of the notch.

Q9) Write short note on ***any two*** of the following:

(a) Flow net.

(b) Bernoulli's equation.

(c) Vortex flow.