Total No. of printed pages = 3

FLUID MECHANICS

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks
for the questions.

Answer *all* the questions

PART – A

1. Answer the following questions :   10×2=20

   (a) Write down the definition of streamline.

   (b) What do you mean by fluid ?

   (c) Write down the differences of open channel
   flow and pipe flow.

   (d) Write the definition of Path line and Streak
   line.

   (e) What do you mean by fluid density ?

(f) What do you mean by hydraulic efficient channel ?

(g) Write down the definition of Coefficient of velocity.

(h) What do you mean by fluid pressure ? Mention units in SI system.

(i) Write down the unit of specific gravity of sea water.

(j) Define Pascal's law.

2. Write down the uses or applications of following :

$5 \times 1 = 5$

(a) Manning's Equation.

(b) Bernoulli's Equation.

(c) Venturimeter.

(d) Continuity Equation.

(e) U-tube manometer.

PART – B

1. Derive the mathematical expression for loss of head due to sudden expansion of pipe.   10

2. The head of water over an orifice of diameter 100 mm is 10 m. The water coming out from orifice is collected in a circular tank of diameter 1.5 m. The rise of water level in this tank is 1.0 m in 25 seconds. Also, the coordinate of a point on the jet, measured from vena-contarcta are 4.3 m horizontal and 0.5 m vertical. Find the coefficient of velocity, coefficient of contraction and coefficient of discharge.   10

3. Write down in details of following (*Draw the figure, if required*) : $3 \times 5 = 15$

(a) Hydraulic grade line and Energy grade line.

(b) Stream tube.

(c) Laminar flow and Turbulent flow.

4. Find the bed slope of trapezoidal channel of bed width 4 m, depth of water 3 m, and side slope of 2H:3V, when the discharge through the channel is 20 cubic meter per second. Take Manning's roughness coefficient (n) is 0.003.   10