

R7

Code: R7 210106

B.Tech II Year I Semester (R07) Supplementary Examinations, May 2012

FLUID MECHANICS

(Civil Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions

All questions carry equal marks

- 1 (a) Explain about units of measurement.
(b) If 5 m^3 of a certain oil weighs 50 kN, calculate specific weight, density and specific gravity of oil.
- 2 (a) Derive the expression for total pressure for curved surface.
(b) Explain about centre of pressure.
- 3 (a) Define and explain stream line, path line and streak line in fluid mechanics.
(b) For the following flow, find the equation of the stream line passing through (1, 1) $V = 3xi - 3yj$.
- 4 250 liters per second of water is flowing in a pipe having a diameter of 300 mm. If the pipe is bent by 135° , find the magnitude and direction of resultant force on the bend. The pressure of the water flowing is 400 kN/m^2 .
- 5 For the velocity profile for laminar boundary layer $u/U = 3/2 (y/\delta) - y^2/(\delta^2)$. Find the boundary layer thickness, shear stress, drag force and coefficient of drag in terms of Reynold's number.
- 6 Derive the equation to find velocity at a particular point from the centre of an inclined pipe through which laminar flow is there.
- 7 (a) List the various minor energy losses in a pipe flow.
(b) Find the loss of head when a pipe of diameter 150 mm is suddenly enlarged to a diameter of 300 mm. the rate of flow of water through the pipe is 200 lps .
- 8 A venturimeter with 200 mm at inlet and 100 mm throat is laid with axis horizontal and is used for measuring the flow of oil of specific gravity 0.8. The difference of levels in the U-tube differential manometer reads 180 mm of mercury and $1.52 \times 10^3 \text{ kg}$ of oil is collected in 4 minutes. Calculate the discharge coefficient for the meter. Take specific gravity of mercury as 13.6.
