Total No. of printed pages = 2

CT-403/FM/4th Sem/2013/N

FLUID MECHANICS

Full Marks – 70

Pass Marks – 28

Time – Three hours

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

1. (a) Define viscosity. Explain the variation of viscosity with temperature. 6

   (b) A plate 0·025 mm distant from a fixed plate moves at 60 cm/s and requires a force of 2N per unit area i.e $2N/m^2$ to maintain this speed. Determine the fluid viscosity between the plates. 8

2. (a) Define Pascal's law. 4

   (b) The diameter of a small piston and a large piston of a hydraulic jack are 3 cm and 10 cm respectively. A force of 70N is applied on the small piston. Find the load lifted by the large piston when :

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(i) The pistons are at the same level.

(ii) Small piston is 40 cm above the large piston.

Given density of liquid in the jack as 1000 kg/m^3. 10

3. How can we measure pressure? Give a brief explanation about manometer and its types. 14

4. Water flows through a pipe AB 1·5m diameter at 3m/s and then passes through a pipe BC 1·8 in diameter. At, C the pipe branches. Branch CD is 0·8m in diameter and carries one-fourth 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 BC, the velocity in CD and the diameter of CE. 14

5. (a) Mention Bernoulli's equation with the assumption made during the theorem. 4

(b) The water is flowing through a pipe having diameters 25 cm and 15 cm at sections 1 and 2 respectively. The rate of flow through pipe is 40 l/s. The section 1 is 5m above datum and section 2 is 3m above the datum. If the pressure at section 1 is 39·42 N/cm^2, find the pressure intensity at section 2. 10