**SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR**

**ROLL No:** | | | | | | | | | | | | | **Total number of pages:[2]**

**B.Tech. || CE || 3rd Sem**
**Fluid Mechanics –I**
**Subject Code:BTCE-301** (RP)
**Paper ID:** M|18
( 2011-2014 batch)

**Time allowed: 3 Hrs** **Max Marks: 60**

**Important Instructions:**

- **All questions are compulsory**
- **Assume any missing data**

## PART A (10x 2marks)

Q. 1. Short-Answer Questions:

(a)What is difference between dynamic viscosity and specific gravity of fluid.
(b) What are ideal and real fluids?
(c) What do you understand by the term buoyancy?
(d) What is a manometer?
(e) Convert 1 kg/s-m dynamic viscosity in poise.
(f) What are the advantages of triangular notch over rectangular notch?
(g) What do you understand from Newton's law of viscosity?
(h) How would you explain centre of pressure?
(i) How would you describe the properties of fluid?
(j) What do you understand by the term pressure drag?

## PART B (5×8marks)

Q. 2. Determine the viscosity of a liquid having kinematic viscosity 6 stokes and specific gravity 1.9. CO1

OR

Explain the following terms:- CO1

(i) Newtonian Fluids (ii) Vapour Pressure (iii) Gauge Pressure (iv) Absolute Pressure

Q. 3. Determine the total pressure on a circular plate of diameter 1.5 m which is placed vertically in water in such a way that the centre of the plate is 3m below the free surface of water . Find the position of centre of pressure also. CO2

OR

A rectangular plane surface is 2m wide and 3m deep .It lies in vertical plane in water. Determine the total pressure and position of centre of pressure on the plane surface when its upper edge is horizontal and (a)coincides with water surface ,(b) 2.5m below the free water surface CO2

Q. 4. A fluid flow field is given by $\mathbf{V=x^2yi + y^2zj - (2xyz + yz^2)k}$ Prove that it is a case of possible steady incompressible fluid flow. Calculate the velocity and acceleration at the point (2,1,3). CO3

OR

A 25 cm diameter pipe carries oil of specific gravity 0.9 at a velocity of 3m/s. At CO3

another section the diameter is 20 cm. Find the velocity at this section and also mass rate of flow of oil.

Q. 5. Explain the methods of dimensional analysis? CO4

OR

(a) State Buckingham's π-theorem. CO4

(b) The efficiency η of a fan depends on density, dynamic viscosity of the fluid, angular velocity, diameter of the rotor and discharge. Express η in terms of dimensionless parameters.

. 6. A horizontal venturimeter with inlet and throat diameters 30cm and 15 cm respectively is used to measure the flow of water. The reading of differential manometer is connected to the inlet and the throat is 20cm of mercury. Determine the rate of flow . Take $C_d$= 0.98. CO5

OR

State Bernoulli's theorem for steady flow of an incompressible fluid. Derive an expression for Bernoulli's theorem from first principle and also state the assumptions. CO5