Total No. of printed pages = 5

**END SEMESTER EXAMINATION – 2020**

Subject Code : CT-403

**FLUID MECHANICS**

Full Marks – 70

Time – Three hours

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

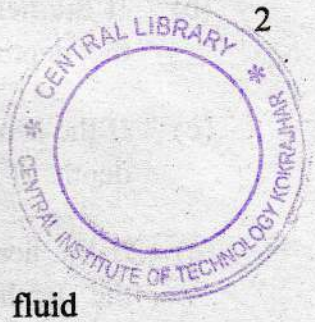
PART – A

Marks – 25

Answer *all* questions.

**Multiple choice questions :**

1. The value of the viscosity of an ideal fluid is 2




(a) zero

(b) unity

(c) infinity

(d) more than that of a real fluid

[Turn over

2. The specific gravity of a liquid has 2

(a) the same unit as that of mass density

(b) the same unit as that of weight density

(c) the same unit as that of specific volume

(d) no unit

3. Which of the following can not be the value of absolute pressure of a fluid at any point ? 2

(a) 0 (b) 1.013 bar

(c) –1 bar (d) 200 bar

4. When is orifice called 'large orifice' ? 2

(a) If the head of liquid is less than 5 times the depth of orifice

(b) If the head of liquid is less than 2.5 times the depth of orifice

(c) If the head of liquid is less than 4 times the depth of orifice

(d) If the head of liquid is less than 1.5 times the depth of orifice

5. The continuity equation is based on the principle of 2

(a) conservation of mass

(b) conservation of momentum

(c) conservation of energy

(d) conservation of force



6. **Short questions :**

(a) What is steady flow ? 2

(b) What is prismatic channel ? 2

(c) What is coefficient of discharge ? 2

(d) What is an ideal plastic fluid ? 2

(e) What is pitot tube ? 2

(f) What is an orifice meter 2

(g) What is stream tube ? 2

(h) Write down the Darcy -Weisbach equation. 1

## PART – B

Marks – 45

Answer any *five* questions.

7. State Pascal's law and Hydrostatic Law and provide a proof. 9

8. Derive the differential form of Continuity Equation. 9

9. (a) Classify the different types of fluids with examples.

   (b) Classify the different types of flows. 9

10. Derive the condition for critical flow. Also derive the equation for minimum specific energy for the rectangular section. 9

11. A concrete-lined trapezoidal channel (n = 0.015) is to have a side slope of 1.0 horizontal: 1 vertical. The bottom slope is to be 0.0004. Find the bottom width of the channel necessary to carry 100 $m^3/s$ of discharge at a normal depth of 3.0 m. 9

12. Write short notes on : 9

(a) Streamlines, Path lines and Streak Lines

(b) Orifice and Venturimeter.