

Symbol Number: \_\_\_\_\_ Invigilator's Sign: \_\_\_\_\_ Superintendent's Sign: \_\_\_\_\_

Symbol No. in Words: \_\_\_\_\_ Code No.

<b>Faculty: Engineering</b>	<b>Year/Part: II/I</b>
<b>Level: Bachelor</b>	<b>Exam Year: 2080, Push</b>
<b>Program: Civil Engineering</b>	<b>Subject: Fluid Mechanics (EG504CE)</b>

**GROUP A (Multiple Choice Questions)**

**[10x1=10]**

- i. *Answers should be given by filling the Objective Answer Sheet.*
- ii. *Rough can be done in the main answer sheet*
- iii. *Maximum time of 20 minutes within the total time is given for this group.*

Code No.

1. A flow is an irrotational flow if and only if
  - a.  $\nabla \times V = 0$
  - b.  $\nabla \cdot V = 0$
  - c.  $\nabla^2 V = 0$
  - d. None
2. The specific gravity of a liquid whose absolute viscosity is 0.048 poise and kinematic Viscosity is  $3.5 \times 10^{-2}$  stokes is
  - a. 2.74
  - b. 1.37
  - c. 2.26
  - d. 1.73
3. A fully submerged body is in a state of stable equilibrium if its CG lies
  - a. above center of buoyancy (CB)
  - b. below center of buoyancy (CB)
  - c. coincides with center of buoyancy (CB)
  - d. all of the above
4. For a freely falling liquid, pressure in the liquid varies with
  - a. Depth of the liquid column
  - b. Does n't vary at all
  - c. Acceleration due to gravity
  - d. Neither of the above
5. A jet strikes on series of flat vanes mounted on a wheel. The maximum efficiency that Can be obtained is :
  - a. 29.62 %
  - b. 59.25 %
  - c. 50 %
  - d. None
6. Piezometric head is the sum of
  - a. Pressure head and Potential head
  - b. Pressure head and Velocity head
  - c. Potential head and Velocity head
  - d. Pressure head, Velocity head and Potential head
7. Which of the following method is used exclusively in fluid mechanics?
  - a. Eulerian method
  - b. Both Lagrangian and Eulerian methods
  - c. Neither Lagrangian nor Eulerian method
  - d. Lagrangian Method
8. The momentum thickness ( $\theta$ ) for turbulent layer is given by :
  - a.  $\theta = \frac{7}{72} \delta$
  - b.  $\theta = \frac{1}{8} \delta$
  - c.  $\theta = \frac{9}{83} \delta$
  - d. None
9. Can the flow inside a nozzle be steady and uniform?
  - a. Yes
  - b. never
  - c. it can be steady but never uniform
  - d. it can be uniform but never steady
10. Three flows named as 1, 2 and 3 are observed in a pipe. The Reynolds's number for the Three are 100, 1000 and 10000. Which of the flows will be laminar?
  - a. only 1
  - b. only 1 and 2
  - c. 1, 2 and 3
  - d. only 3

**Multiple Choice Questions' Answer Sheet**

Marks Secured: \_\_\_\_\_

In Words: \_\_\_\_\_

Examiner's Sign: \_\_\_\_\_ Date: \_\_\_\_\_

Scrutinizer's Marks: \_\_\_\_\_

In Words: \_\_\_\_\_

Scrutinizer's Sign: \_\_\_\_\_ Date: \_\_\_\_\_

Corrected Fill

(A) ● (C) (D)

Incorrected Fill

✗ (A) ● (C) (D) ✓

1. (A) (B) (C) (D)	6. (A) (B) (C) (D)
2. (A) (B) (C) (D)	7. (A) (B) (C) (D)
3. (A) (B) (C) (D)	8. (A) (B) (C) (D)
4. (A) (B) (C) (D)	9. (A) (B) (C) (D)
5. (A) (B) (C) (D)	10. (A) (B) (C) (D)

**MANMOHAN TECHNICAL UNIVERSITY**  
**Office of the Controller of Examinations**

Budhiganga-4, Morang, Koshi Province, Nepal  
Exam Year: 2080, Push

<b>Faculty: Engineering</b>	<b>Level: Bachelor</b>	<b>Year/Part: II/I</b>
<b>Program: Civil</b>	<b>Time: 3 Hours</b>	<b>F.M.: 50</b>
<b>Subject: Fluid Mechanics (EG504CE)</b>		

- ✓ *Group A contains Multiple Choice Questions of 10 marks.*
- ✓ *Candidates are required to give their answers in their own words as far as practicable.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

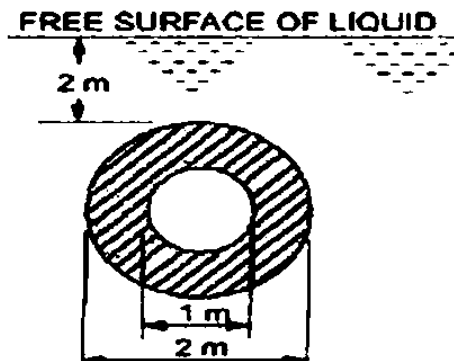
**GROUP A (Multiple Choice Questions and Answer Sheet in separate paper) [10x1=10]**

**GROUP B Short Answer Questions (Attempt any EIGHT questions only) [8x2=16]**

1. Distinguish fluid from solids with respect to following properties Temperature, Pressure, Density, Internal Energy and Shearing force.
2. Describe steady flow and uniform flow. Also mention the appropriate conditions.
3. What do you mean by absolute, vacuum and gage pressure? Explain with a diagram.
4. Distinguish between streamline and pathline.
5. Explain the working mechanism of Venturimeter.
6. With suitable figure and labeling, describe different features of a notch.
7. What do you mean by boundary layer? Discuss boundary layer for the case of flow over flat plate.
8. Discuss how flow varies in terms of Reynolds's number, when a fluid flows around a sphere.
9. A steel sphere with specific gravity of 7.82 is dropped in water at 20 °C. Calculate the terminal velocity if diameter of sphere is 10 cm and coefficient of viscosity of water at given temperature is 0.01 poise.

**GROUP C (Long Answer Questions - Attempt Any Four) [6x4=24]**

1. Derive the expression for variation of pressure with depth.
2. What are different types of pressure measurement devices? Explain in detail the working mechanism of micro manometer with suitable figure.
3. Determine total force and location of center of pressure on one face of the plate shown in the figure immersed vertically in a liquid of specific gravity 0.9. Take centroid of the figure to be the center of circles and moment of inertia about its cg :  $\frac{\pi}{64} = (D^4 - d^4)$



P.T.O.

4. What do you mean by an orifice? Develop the relation for actual discharge of totally submerged orifice.
5. Show that when a jet strikes a series of curved vanes mounted on a wheel, the maximum efficiency is obtained if the vanes are semicircular in nature.
6. For a two dimensional flow, the stream function

$$\psi = 2xy - \frac{1}{2}x^2y^2 + \frac{1}{12}x^4 + \frac{1}{12}y^4$$

Find the velocity components 'u' and 'v'. Is the flow irrotational? If yes, also find the Stream function  $\Phi$ .

7. List different types of boundary layer parameters. Derive the expression for displacement Thickness ( $\delta^*$ ) of a boundary layer.

∞∞**The End**∞∞

MODEL QUESTION