

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
End Term Examination (Regular), Batch: 2019-23, December 2021
B. Tech. in Civil Engineering, Semester V

Roll No.....

CE1109: Fluid Mechanics and Hydraulic
Engineering

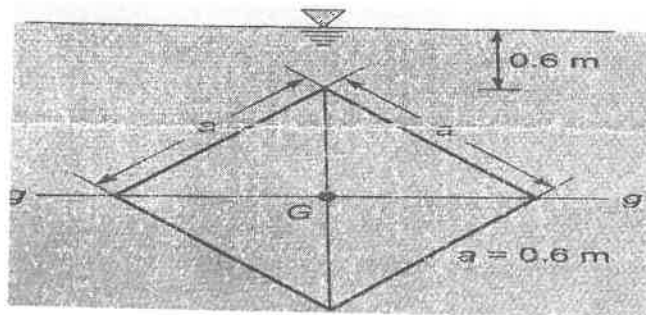
Time: 2 hours

Max. Marks: 30

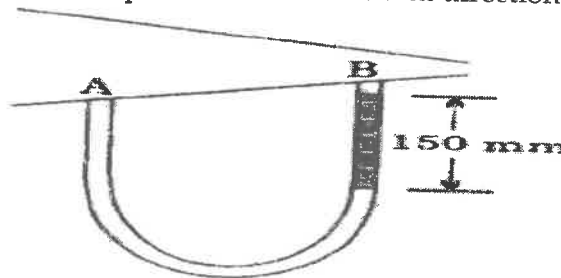
Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

- 1.
- i. A square lamina is immersed in water with one of the diagonals vertical as shown in given figure. Calculate the force on one side and the location of the centre of pressure. 05
CO1,2



- Q.2 A U-tube manometer with a small quantity of mercury is used to measure the static pressure difference between two locations A and B in a conical section through which an incompressible Fluid flows. At a particular flow rate, the mercury column appears as shown in the figure. The density of mercury is 13600 Kg/m^3 and $g = 9.81 \text{ m/s}^2$. Find out the pressure difference and direction of flow. 05
CO1



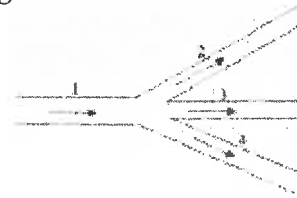
Q.3 Define intensive and extensive properties of a fluid. Three liter of petrol weigh 23.7 N. Calculate the mass density, specific weight, specific volume and specific gravity of petrol. 05
CO1,03

Q.4 A flow is described by the stream function $\Psi = 2\sqrt{3} xy$. Locate the point at which the velocity vector has a magnitude of 4 units and makes an angle of 150° with the x axis. 05
CO4

Q.5 A pipe 20 cm in diameter and 45m long conveys water at a velocity of 2.5m/sec. Find the head lost in friction 05
CO3,04
1) Using the Darcy weisbach formula
2) Using Chezy's equation
Take $f = 0.006$ and $C = 57$

Q.6 Pipe '1' branches to three pipes as shown in the given figure. The areas and corresponding velocities are given in the following table. 05
CO4

Pipe	Velocity (cm per second)	Area (sq cm)
1.	50	20
2.	V_2	10
3.	30	15
4.	20	10



Determine the value of V_2 in cm per second .