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Bengaluru

Mid Term Examinations - October 2026

Date: 07/10/2026 **Time:** 09:30 AM - 11:00 AM

Course Code: MEC2502 **Course Name:** Fluid Mechanics and Machinery

Semester: Third Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2
Marks	44	46

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	Define mass density and specific gravity of a fluid.	2	CO1	BT1
2	What is capillarity? Mention the angle of contact for water and mercury with a glass tube.	2	CO1	BT1
3	Define metacentric height and its significance.	2	CO2	BT1
4	Write the mathematical relationship between absolute, gauge, and atmospheric pressure.	2	CO2	BT1
5	State Archimedes' principle.	2	CO2	BT1

PARTB: Answer Any 1 Following Questions. 20 M

Q.N.	Questions	M	CO	BT
06.A	Discuss the macroscopic (Eulerian) and microscopic (Lagrangian) approaches to describing fluid motion.	10	CO1	BT2
06.B	At a certain point in an oil the shear stress is 0.2 N/m^2 and the velocity gradient is 0.21 s^-1. If the mass density of the oil is 950 kg/m^3 find the kinematic viscosity.	10	CO1	BT3
07.A	Derive the expressions for Pascals Law and Prove.	10	CO1	BT2
07.B	If the equation of a velocity profile over a plate is v = 5y^2 + y, determine the shear stress at y=0 and at y=7.5 cm. Given the viscosity of the liquid is 8.35 poise.	10	CO1	BT3

PARTC: Answer Any 1 Following Questions. 20 M

Q.N.	Questions	M	CO	BT
08.A	A simple U-tube manometer containing mercury is connected to a pipe in which a fluid of specific gravity 0.9 is flowing. The pressure in the pipe is vacuum. The difference of mercury level in the two limbs is 20 cm and the height of fluid in the left limb from the datum is 15 cm. Find the vacuum pressure in the pipe.	10	CO2	BT3

08.B	Two pipes A and B, at different levels, are connected by a U-tube differential manometer containing mercury. Pipe A contains a fluid of specific gravity 0.9 and Pipe B contains a fluid of specific gravity 1.2. The center of Pipe A is 20 cm above the datum line (X-X) and the center of Pipe B is 10 cm above the datum line. If the mercury level in the right limb (connected to B) is at the datum line and the mercury level in the left limb is 15 cm above the datum line, determine the pressure difference between the two pipes.	10	CO2	BT3
09.A	A rectangular pontoon is 5 m long, 3 m wide and 1.20 m high. The depth of immersion of the pontoon is 0.80 m in sea water. If the centre of gravity is 0.6 m above the bottom of the pontoon, determine the meta-centric height. (Density for sea water = 1025 kg/m^3).	10	CO2	BT3
09.B	Find the volume of the water displaced and position of centre of buoyancy for a wooden block of width 2.5 m and of depth 1.5 m, when it floats horizontally in water. The density of wooden block is 650 kg/m^3 and its length 6.0 m.	10	CO2	BT3