Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

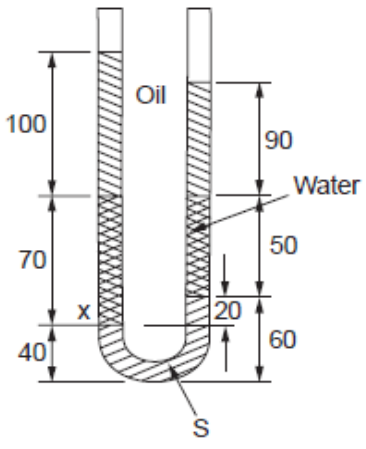
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December, 2021

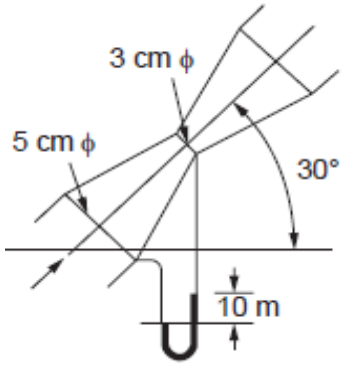
Course: Fluid Flow **Semester: III**
Program: B. Tech Food technology **Time: 3 hrs**
Course Code: MECH2033 **Max. Marks: 100**

Instructions: (1) Answer **ALL** questions

SECTION A

S. No.	Questions	Marks	CO
Q1	Define Specific gravity	**1.5**	**CO1**
Q2	Define Kinemaic viscosity	**1.5**	**CO1**
Q3	Define Capillarity	**1.5**	**CO1**
Q4	Define Vapour pressure	**1.5**	**CO1**
Q5	Cohesive forces between molecules/atoms are highest in the _____ phase. (fill in the blank)	**1.5**	**CO1**
Q6	The atoms/molecules are _____ to move in fluids (fill in the blank)	**1.5**	**CO1**
Q7	Bulk modulus of liquid will _____ with pressure. (fill in the blank)	**1.5**	**CO1**
Q8	Pascals law states _____ (complete the statement)	**1.5**	**CO1**
Q9	When gravitational forces are zero, the pressure exterted by a column of fluid is---------- (fill in the blank)_____	**1.5**	**CO1**
Q10	The pressure in a fluid at rest _____ with depth. (fill in the blank)	**1.5**	**CO1**
Q12	Steady flow is defined as flow where the flow parameters ----------(fill in the blank)	**1.5**	**CO1**
Q13	Under unsteady flow conditions the flow parameters vary with ----------(fill in the blank)	**1.5**	**CO1**
Q14	Bernoulli equation is applicable for flows which are ----------.(fill in the blank)	**1.5**	**CO1**
Q15	Cavitation will occur when the pressure at a point ----------.(fill in the blank)	**1.5**	**CO1**
Q16	The head loss due to sudden expansion is ----------.(fill in the blank)	**1.5**	**CO1**
Q17	For the same flow area and flow rate, a square section will give a ---------- pressure drop. (fill in the blank)	**1.5**	**CO1**
Q18	On a free surface of a liquid the pressure is _____(fill in the blank)	**1.5**	**CO1**
Q19	The pressure exerted by a column of fluid of height y m and specific weight γ is---------- ---------- _____(fill in the blank)	**1.5**	**CO1**

Q20	In micromanometer, the density difference between the filler fluid and the manometer fluid should be ----------(fill in the blank)_____	**1.5**	**CO1**
	SECTION B		
Q1	Calculate the pressure difference between the inside and outside of a soap bubble of 2.5 mm dia if the surface tension is 0.022 N/m.	**5**	**CO2**
Q2	A flow is defined by $u = 2\ (1 + t)$, $v = 3(1 + t)$ where t is the time. Determine the velocity at $t = 2$	**5**	**CO2**
Q3	A plate 0.0254 mm distant from a fixed plate, moves at 0.61 m/s and requires a force of 2 N/m^2 to maintain this speed. Determine the dynamic viscosity of the fluid between the plates.	**5**	**CO2**
Q4	Determine the mass density, and specific volume whose specific gravity is 0.85	**5**	**CO2**
	SECTION C		
Q1	A shaft of 100mm diameter rotates at 60 rpm in a 200 long bearing. Taking that the two surfaces are uniformly separeated by a distance of 0.5 mm and taking linear velocity distribution in the lubricating oil having dynamic viscosity 0.04 poise, find the power absorbed in bearing.	**15**	**CO3**
Q2	A U-tube is filled first with a fluid of unknown density. Over this water is filled to depths as in figure 1. Lubricating oil of specific gravity 0.891 is filled over the water column on both limbs. The top of both limbs are open to atmosphere. Determine the density of the unknown fluid (dimensions in mm).  Figure 1	**15**	**CO3**
	SECTION D		

Q1	A venturimeter as shown in Fig 2 is used measure flow of petrol with a specific gravity of 0.8. The manometer reads 10 cm of mercury of specific gravity 13.6. Determine the flow rate.  Figure2	**10**	**CO4**
Q2	A shaft of 145 mm dia runs in journals with a uniform oil film thickness of 0.5 mm. Two bearings of 20 cm width are used. The viscosity of the oil is 19 cP. Determine the speed if the power absorbed is 15 W. OR A cruid oil of viscosity 0.9 poise and relative density 0.9 is flowing through a horizontal circular pipe od diameter120mm and length 12m. calculate the difference of pressure at two ends of the pipe, if 785N of the oil is collected in a tank in 25seconds.	**10**	**CO4**