

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech Mid Semester Exam**

Semester: 4<sup>th</sup>  
 Subject Code: 303109253  
 Subject Name: Fluid and Mechanics and Machines

Date: 30/01/2024  
 Time: 1hr: 30min  
 Total Marks: 40

Sr. No.		Marks
<b>Q.1</b>	<b>(A) Five One line Questions</b>	<b>05</b>
	(1) Capillarity action is due to cohesion only. True or False (2) Define: Kinematic viscosity (3) The specific gravity of oil whose density is $745 \text{ kg/m}^3$ , is (4) What is the height of a water column equivalent to a pressure of 3.65 bar? (5) Surface tension is defined as the tensile force acting on the surface of a liquid in contact with a gas or on the surface between two immiscible liquids. True or False	
	<b>(B) Five Fill in the blanks</b>	<b>05</b>
	(1) The coefficient of discharge for the Venturimeter is always less than _____. (2) The CGS unit of Kinematic viscosity is _____. (3) The rise of kerosene through a cotton wick inserted into the reservoir of a kerosene lamp is due to _____. (4) $1 \text{ m}^3 =$ _____ liters (5) Pitot tube measures the _____ at any point.	
<b>Q.2</b>	<b>Attempt any four(Short Questions)</b>	<b>12</b>
	(1) Define: Specific volume, viscosity and bulk modulus of elasticity. (2) Determine the atmospheric pressure at a location where the barometric reading is 740 mmHg and the gravitational acceleration is $g = 9.805 \text{ m/s}^2$ . Assume the temperature of mercury to be $10^\circ\text{C}$ , at which its density is $13,570 \text{ kg/m}^3$ . (3) Explain Newton's Law of Viscosity. (4) The IV fluid and the blood pressures balance each other when the bottle is 1.2 m above the arm level, the gauge pressure of the blood in the arm is simply equal to the gauge pressure of the IV fluid at a depth of 1.2 m. (5) What is the Fluid Mechanics?	
<b>Q.3</b>	<b>Attempt any two questions</b>	<b>08</b>
	(1) Define: (i) Surface tension (ii) Capillary rise and fall. (2) Explain the Orifice meter with a schematic diagram. (3) Explain the U-tube manometer for measuring a gauge pressure or vacuum pressure.	
<b>Q.4</b>	<b>(A) Derive the Continuity Equation in Cartesian coordinates.</b>	<b>05</b>
	<b>(B) Oil of sp. Gravity 0.8 is flowing through a Venturimeter having an inlet diameter of 20 cm and a throat diameter of 10 cm. The oil mercury differential manometer shows a</b>	<b>05</b>

reading of 25 cm. Calculate discharge of oil through Venturimeter. Take Coefficient of discharge = 0.98.

OR

(B) A differential manometer is connected at two points A and B of two pipes as shown in fig.1. The pipe A contains a liquid of specific gravity = 1.5 while pipe B contains a liquid of specific gravity = 0.9. The pressure at A and B are 1 kgf/cm<sup>2</sup> and 1.80 kgf/cm<sup>2</sup> respectively. Find the difference in mm level in the differential manometer.

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