Code No: 153AX **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, October - 2020
FLUID MECHANICS
(Civil Engineering)

Time: 2 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) A U-tube differential Manometer is attached to two sections A and B in a horizontal pipe in which oil of specific gravity 0.8 is flowing. The deflection of the gauge is 60 cm, the level nearer to A being the lower one. Calculate the difference of pressure.

b) Define terms: gauge pressure, vacuum pressure and absolute pressure. Indicate their relative positions on a chart. [8+7]

2. Explain the phenomenon of capillarity. Derive an expression for capillary depression of a mercury. [15]

3. Write Euler's equation of motion. State the Bernoulli's equation and write the assumption made in it. How is modified while applying practice. [15]

4. Define and distinguish between (a) steady and unsteady flow (b) uniform and non-uniform flow (c) rotational and irrotational flow. [15]

5. A pipe bend placed in a horizontal plane tapers from 45 cm diameter at inlet to 20cm diameter at outlet. A fluid of density 900 kg/m^3 enters the reducing bend horizontally and get turned through 45^0 in the clockwise direction. The fluid flows at the rate of $0.5m^3/s$, the pressure of $50kN/m^2$ at the inlet section drops to $25kN/m^2$ at the outlet section due to frictional effects. Calculate the magnitude and direction of the resultant force on the bend. [15]

6. Derive Bernoulli's equation from the fundamentals. [15]

7. Explain Hydraulic gradient and total energy line with the help of examples. [15]

8. What do you understand by displacement thickness and momentum thickness? [15]

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