

Total No. of Questions : 4]

SEAT No. :

PA-10015

[Total No. of Pages : 2

[6008]-274

S.E. (Automobile & Mechanical Engineering) (Insem)

FLUID MECHANICS

(2019 Pattern)(Semester - II) (202049)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4
- 2) Neat Diagrams must be drawn wherever necessary.
- 3) Assume Suitable data if necessary
- 4) Use of Non-Programmable scientific calculators is allowed

Q1) a) Explain fluid as continuum. [4]

b) Determine the specific weight, specific mass, specific volume and relative density of liquid having a volume of  $6\text{m}^3$  and weight of 40 kN. [4]

c) Derive an equation of intensity of pressure for (i) Soap bubble and (ii) Water jet. [7]

OR

Q2) a) Explain Rheological diagram. [4]

b) The capillary rise in the glass tube is not to exceed 0.2mm of water. Determine its minimum size if the surface tension for water in contact with air is  $0.0725\text{ N/m}$ . [4]

c) A cylinder of 0.30m diameter rotates concentrically inside a fixed cylinder of 0.31m diameter. Both the cylinders are 0.3m long. Determine the viscosity of the liquid which fills the space between the cylinders if a torque of 0.98 Nm is required to rotate the inner cylinder at 60rpm. [7]

Q3) a) A simple U-tube manometer is installed across an orifice meter. The manometer is filled with mercury of Specific gravity 13.6 and the liquid above the mercury is carbon tetrachloride of specific gravity 1.6. The manometer reads 200mm. Determine the pressure difference over the manometer in  $\text{N/m}^2$ . [4]

P.T.O.

- b) Explain Stability conditions of floating bodies. [4]
- c) Derive an expression for determination of metacentric height of floating bodies by analytical method. [7]

OR

- Q4)** a) State and prove Hydrostatics law. [4]
- b) Explain with neat sketch Inverted U-tube differential manometer. [4]
- c) A triangular plate of 1m base and 1.5m altitude is immersed in water. The plane of plate inclined at  $30^\circ$  With free water surface and base is parallel to and at a depth of 2m from free water surface. Determine total pressure on the plate and the position of center of pressure. [7]

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