Reg. No. : | | | | | | | | | | |

Question Paper Code: 53105

B.E./B.Tech. DEGREE EXAMINATION, DEC 2020

Third Semester

Civil Engineering

15UCE305 - FLUID MECHANICS

(Regulation 2015)

Duration: 1.15 hrs Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The surface tension in a soap bubble of 40mm diameter, when the inside pressure is 2.5N/m^2 above atmospheric pressure IS CO1- R

   (a) 0.0025N/m (b) 0.025N/m (c) 0.25N/m (d) 2.5N/m

2. Density is the ratio of mass to CO1- R

   (a) Weight (b) Volume (c)Gravity (d) capillarity

3. Unit for surface tension CO2- R

   (a) N/m (b) Kg/mm (c) Kn/m (d) Kg/m

4. The unit for specific gravity is CO2- R

   (a) cm (b) m/s (c) No Unit (d) KN/m

5. Which of the following boundary conditions exist at the wall (y=0) in a boundary layer CO3- R

   (a) u=U (b) dp/dx= -ve (c) τ_o =0 (d) u=0,v=0

6. Venturimeter is used to find _____ of water. CO3-U

   (a) Weight (b) Discharge (c) Capillarity (d) All the above

7. For maximum transmission of power through the pipeline with total head H, the head loss due to friction h_f is given by h_f = CO4- R

   (a) H/3 (b) 2H/3 (c) H/2 (d) H/10

8. The following one is not the minor loss in a pipe flow CO4- U

(a) Loss of head due bend (b) loss of head due to contraction

(c) Loss of head due to friction (d)) Loss of head due to obstruction

9. Dynamic similarity exists between two fluid flows when at corresponding points there are CO5- R

(a) Geometric similarity and similarity of forces involved

(b) Kinematic similarity and dynamic similarity

(c) Interaction of inertia and viscous forces

(d) Interaction between inertia, viscus and pressure forces

10. Reynolds number is used to find out CO5- R

(a) Type of flow (b) head loss (c) Volume of liquid (d) Dimension

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. The dynamics viscosity of oil, used for lubrication between a shaft and sleeve is 6 poise. The shaft is of diameter 0.4 m and rotates at 190 r.p.m. calculate the power lost in the bearing for a sleeve length of 90mm. the thickness of oil film is 1.5 mm. CO1- App (8)

12. Water flows through a pipe AB 1.2 m diameter at 3 m/s and then passes through a pipe BC 1.5m diameter. At C, the pipe branches. Branch CD is .8m in diameter ad carries one-third of the flow in AB. The flow velocity in branch CE is 2.5m/s. Find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE. CO2- App (8)

13. Obtain an expression for boundary shear stress in terms of momentum thickness. CO3 - Ana (8)

14. Glycerine of viscosity 0.9 Ns/m2 and density 1260 kg/m3 is pumped along a horizontal pipe 6.5 cm long of diameter 0.014 m at a flow rate of 1.8 LPM. Determine the flow Reynolds number and verify whether the flow is laminar or turbulent. Calculate the pressure loss in the pipe due to frictional effects and calculate the maximum flow rate for laminar flow conditions to prevail. CO4- App (8)

15. The resisting force of (R) of a supersonic flight can be considered as dependent upon the length of aircraft ` l', velocity 'V', air viscosity 'μ', air density 'ρ', and bulk modulus of air 'k'. Derive the functional relationship between these variables and the resisting force. CO5- Ana (8)