Reg. No. :

Question Paper Code: 93105

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

Third Semester

Civil Engineering

19UCE305– FLUID MECHANICS

(Regulation 2019)

Duration: One hour   Maximum: 30Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The property of a fluid which determines its resistance to shearing stress is called   CO1- R

    (a) Viscosity   (b) Surface tension   (c) Compressibility   (d) None of the above

2. Atmospheric pressure held in terms of water column is   CO1- R

    (a) 7.5 m   (b) 8.5 m   (c) 9.81 m   (d) 10.3 m

3. Bernoulli's theorem deals with the law of conservation of   CO1-R

    (a) Mass   (b) Momentum   (c) Energy   (d) None of the above

4. Venturimeter is one of the application of   CO1-R

    (a) Equation of continuity   (b) Bernoulli's equation
    (c) Light equation   (d) Speed relation

5. Which of the following quantities has the dimensions $[M^0 L^0 T^0]$ CO1- U

    (a) Stress   (b) Strain   (c) Strain Rate   (d) Density

6. What are the dimensions of force?   CO1- R

    (a) $[M L T^{-2}]$ (b) $[M L T^{-1}]$ (c) $[M L^2 T^{-2}]$ (d) $[M L^2 T^2]$

7.   Friction factor for laminar flow is given by   CO1- U

    (a) (Re /64)   (b) (64 / Re)   (c) (Re / 16)   (d) (16 / Re)

8. What is the ratio of maximum velocity to average velocity, when the fluid is   CO1- U
    passing through two parallel plates and flow is laminar?
    (a) 3/2   (b) 2/3   (c) 4/3   (d) 3/4

9. The thickness of laminar boundary layer at a distance 'X' from the leading edge   CO1- U
    over a flat varies as
    (a) X   (b) $X^{1/2}$ (c) $X^{1/5}$ (d) $X^{4/5}$

10. The region between the separation streamline and the boundary surface of the   CO1- R
    solid body is known as

    (a) Wake   (b) Drag   (c) Lift   (d) Boundary layer

<center>PART – B (3 x 8= 24 Marks)</center>

<center>**(Answer any three of the following questions)**</center>

11. A 400 mm diameter shaft is rotating at 200r.p.m. in a bearing of length   CO2- App   (8)
    120mm. If the thickness of oil film is 1.5 mm and the dynamic viscosity of
    the oil is 0.7 Ns/m^2. Determine the torque required to overcome friction in
    bearing and power utilized in overcoming viscous resistance. Assume a
    linear velocity profile.

12. In a two dimensional incompressible flow, the fluid velocity components   CO2- App   (8)
    are given by *u =x-4y* and *v =-y-4x* Show that velocity potential exists and
    also obtain an expression for velocity potential function.

13. The efficiency η of a fan depends on the density ρ, the dynamic viscosity   CO2- App   (8)
    μ of the fluid, the angular velocity ω, diameter D of the rotor and the
    discharge Q. Express η in terms of dimensionless parameters.

14. A crude oil of kinematic viscosity 0.4 stoke is flowing through a pipe of   CO2- App   (8)
    diameter 300mm at the rate of 300 litres per sec. Find the head lost due to
    friction for a length of 50m of the pipe.

15. A Thin plate is an atmosphere air at a velocity of 7m/s. The length of the   CO2- App   (8)
    plate is 0.8m and width is 0.9m. Calculate the thickness of the boundary
    layer at the end of the plate and the drag force on one side of the plate. Take
    the density of air is as 1.55kg/m3 and kinematic viscosity as
    0.25 x 10-4 m2/s.

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