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

Question Paper Code: 53105

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

Third Semester

Civil Engineering

01UCE305 – FLUID MECHANICS

(Regulation 2013)

Duration: 1.15 hrs   Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. A fluid, which is incompressible and is having no viscosity is known as

    (a) Real fluid   (b) Ideal Fluid

    (c) Newtonian Fluid   (d) Non Newtonian Fluid

2. The ratio of Compressive Stress to volumetric Strain is

    (a) Compressibility   (b) Bulk Modulus

    (c) Pressure   (d) Capillarity

3. The point through which force of buoyancy is supposed to act is known as

    (a) Force of Buoyancy   (b) Centre of Buoyancy

    (c) Floating point   (d) metacenter

4. Bernoulli's theorem deals with the law of conservation of

    (a) Mass   (b) Momentum   (c) Energy   (d) None of these

5. A flow is said to be steady when

    (a) conditions change steadily with time

    (b) conditions do not change with time at any point

    (c) conditions do not change steadily with time at any point

    (d) the velocity does not change at all with time at any point

6. The continuity equation is the result of application of the following law to the flow field
   (a) First law of thermodynamics   (b) Conservation of energy
   (c) Newton's second law of motion   (d) Conservation of mass

7. Bernoulli's equation cannot be applied when the flow is

   (a) rotational   (b) turbulent   (c) unsteady   (d) all the above

8. In pipe flow the critical Reynolds number is about

   (a) 640   (b) 5×10^5 (c) 2000   (d) 64000

9. Model analysis of free surface flows are based on

   (a) Reynolds number   (b) Froude number
   (c) Mach number   (d) Euler number

10. Geometric similarity between model and prototype means

    (a) Similarity of discharge   (b) Similarity of linear dimensions
    (c) Similarity of motion   (d) Similarity of forces

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Calculate the dynamic viscosity of oil, which is used for lubrication between a square plate of size $0.8m$x$0.8m$ and an inclined plane with an angle of inclination 30^0. The weight of the square plate is $300N$ and it slides down on an inclined plane at a velocity of $0.3m/s$. The thickness of the oil film is $1.5mm$.   (8)

12. A circular plate $1.5m$ diameter is submerged in water with its greatest and least depths below the surface being $2m$ and $0.75m$ respectively. Determine the total pressure and centre of pressure on the plate.   (8)

13. Derive the continuity equation for three dimensional flows in Cartesian coordinates.   (8)

14. Derive the discharge equation for venturimeter.   (8)

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

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