

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--

Question Paper Code: 43105

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Third Semester

Civil Engineering

14UCE305-FLUID MECHANICS

(Regulation 2014)

Duration: Threehours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 1 = 10 Marks)

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 increase of temperature
 - (a) Increase the viscosity of a liquid
 - (b) Decrease the viscosity of a liquid
 - (c) Increase the viscosity of a gas
 - (d) Both (b) & (c).
3. The centre of gravity of the volume of the liquid displaced is called
 - (a) Centre of pressure
 - (b) Centre of buoyancy
 - (c) Metacentre
 - (d) None of these
4. Bernoulli's theorem deals with the law of conservation of
 - (a) Mass
 - (b) Momentum
 - (c) Energy
 - (d) None of these
5. The equation of continuity in fluid mechanics
 - (a) is a condition of equilibrium in the flow pattern
 - (b) is an embodiment of the law of thermodynamics
 - (c) express the relation between work and energy
 - (d) is an embodiment of laws of conservation of mass

6. Continuity equation can take the form

(a) $A_1V_1 = A_2V_2$ (b) $\rho_1A_1 = \rho_2A_2$ (c) $\rho_1A_1V_1 = \rho_2A_2V_2$ (d) $P_1A_1V_1 = P_2A_2V_2$

7. In pipe flow the critical Reynolds number is about

(a) 640 (b) 5×10^5 (c) 2000 (d) 64000

8. The point through which the buoyant force acting is called

- (a) Centre of pressure (b) Centre of gravity
(c) Centre of buoyancy (d) None of these

9. Reynolds number is defined as the ratio of

- (a) Gravity force to viscous force (b) Viscous force to inertia force
(c) Inertia force to viscous force (d) Gravity force to inertia force

10. Which of the following is a dimensionless equation?

- (a) Reynold's equation (b) Euler's equation
(c) Weber's equation (d) all the above

PART - B (5 x 2 = 10 Marks)

11. Differentiate between Specific Weight and Specific Volume of Fluid.

12. Define centre of buoyancy and metacenter.

13. Define velocity.

14. Give the Assumptions of Bernoulli's Equation.

15. What are distorted models?

PART - C (5 x 16 = 80 Marks)

16. (a) The velocity distribution of flow over a plate is parabolic with vertex 30 cm from the plate, where the velocity is 180 cm/s. If the viscosity of the fluid is 0.9 Ns/m^2 find the Properties of fluids velocity gradients and shear stresses at distance of 0.15 cm and 30 cm from the plate. (16)

Or

(b) Explain in detail about Types of Fluid & discuss about Surface tension. (16)

17. (a) Explain in detail about the Pressure Measuring Devices. (16)

Or

(b) Prove that the pressure at a point in a static fluid is equal in all direction. (16)

18. (a) Derive an expression for a three dimensional continuity equation for Cartesian co- ordinate and reduces to two and one dimensional flow . (16)

Or

(b) For an incompressible fluid the velocity components are:

$$u = x^3 - y^3 - z^2, v = y^3 - z^3, w = -3x^2z - 3y^2z + \frac{z^3}{3}.$$

Determine whether the continuity equation is satisfied. (16)

19. (a) The water is flowing through a taper pipe of length 100 *m* having diameter 600 *mm* at upper end and 300 *mm* at lower end at the rate of 50 *lit/s*. The pipe have a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62 *N/cm²*. (16)

Or

(b) Explain the principle of venturimeter with a neat sketch. Derive the expression for the rate of flow of fluid through it. (16)

20. (a) Explain the methods of Dimensional Analysis. (16)

Or

(b) Explain the Buckingham's π theorem method of dimensional analysis. (16)

