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Question Paper Code: 41135

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Third Semester

Civil Engineering

14UCE305 - FLUID MECHANICS

(Regulation 2014)

Duration: Three hours

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 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. The point of application of the resultant pressure is
 - (a) Centre of pressure
 - (b) Force of Pressure
 - (c) Depth of Pressure
 - (d) none of these
5. The rate of increase of velocity with respect to time at a given point in a fluid flow is
 - (a) Local acceleration
 - (b) Total acceleration
 - (c) Convective Acceleration
 - (d) None of these

6. An important tool in analyzing 2-Dimensional irrotational Flow problems
 - (a) Flow net
 - (b) Stream function
 - (c) Velocity Potential
 - (d) None of these
7. If the flow is assumed to be ideal, viscous force(F_v) is zero and equation of motion are
 - (a) Reynolds equation of motion
 - (b) Navier stokes Equation
 - (c) Eulers equation of motion
 - (d) Bernoullis Equation of motion
8. A jet of water coming out from the nozzle in atmosphere is
 - (a) free Liquid Jet
 - (b) Orifice
 - (c) Both a and b
 - (d) None of these
9. The model which is geometrically similar to their prototype is
 - (a) Undistorted Model
 - (b) Distorted Model
 - (c) Froude Model
 - (d) Mach model
10. Similarity of motion between model and prototype
 - (a) Kinematic Similarity
 - (b) Dynamic Similarity
 - (c) Geometric Geometry
 - (d) all the above

PART - B (5 x 2 = 10 Marks)

11. Differentiate between Specific Weight and Specific Volume of Fluid.
12. Define the term meta-centre.
13. What is meant by Flow net?
14. Give the Assumptions of Bernoulli's Equation.
15. Define Model Analysis.

PART - C (5 x 16 = 80 Marks)

16. (a) A vertical gap 2.2 cm wide of infinite extent contains a fluid of viscosity 2.9 Ns/m^2 and specific gravity 0.9. A metallic plate $1.2\text{m} \times 1.2\text{m} \times 0.2\text{cm}$ is to be lifted up with a constant velocity of 0.15 m/sec, through the gap. If the plate is in the middle of the gap, find the force required. The weight of the plate is 40N. (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) Find the Volume of the water displaced and position of centre of buoyancy for a wooden block of width 2.5m and a depth 1.5m, when it floats horizontally in water. The density of wooden block is 650 kg/m^3 and its length 6.0 m. (16)

18. (a) Describe in detail about Types of Fluid Flow. (16)

Or

(b) A 30 cm diameter pipe, conveying water, branches into 2 pipes of diameters 20 cm and 15 cm respectively. If the average velocity in the 30 cm diameter pipe is 2.5 m/s, find the discharge in this pipe. Also determine the velocity in 15 cm pipe if the velocity in 20cm diameter pipe is 2m/s. (16)

19. (a) Derive Euler's Equation of Motion and Bernoulli's Equation. (16)

Or

(b) Explain Practical applications of Bernoulli's Equation. (16)

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

Or

(b) Write in detail about dimensionless numbers. (16)
