Total No. of Questions :5] *[Total No. of Printed Pages : 3*

Roll No .....

MI - 302

B.E. III Semester

Examination, June 2015

Mechanics of Solid and Fluids

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) What is Hook's law? Define the terms thermal stress and thermal strain.

b) What is factor of safety, for rigid body and deformable body.

c) Draw the stress -strain curve for ductile and brittle material and define its all significant points.

d) Define Mohr's circle, principal stress, principal plane and its calculation for biaxial stress and shear stress element.

OR

Direct tensile stress of 120 MN/m^2 and 70 M/m^2 act on a body on mutually perpendicular planes what is the magnitude of shearing stress that can be applied so that major principal stress at the point does not exceed 135MN/m^2. determine the value of major principal stress and the maximum shear stress.

PTO

Unit - II

2. a) Define the concept of pure bending.
   b) Define neutral axis.
   c) What are the assumptions made in the theory of simple bending?
   d) Drive the flexure equation of the beam.

OR

Determine the slope and deflection of simple supported beam carrying uniformly distributed load using Macaulay's method.

Unit - III

3. a) Write the assumptions deflection of beam.
   b) Prove the relation

$$M = -EI\frac{d^2y}{dx^2}$$

Where, M = Bending moment

E = Young modules

   c) Give the expression for slope and deflection of simply supported beam.
   d) What do you mean by Conjugate beam, Propped beam, Fixed beam and Continuous beam?

OR

A beam 4 m long, simply supported at its ands, carries a point load W at its centre. If the slope at the ends of the beam is not to exceed 1°, find the deflection at the centre of beam.

Unit - IV

4. a) What are the different properties of fluid?
   b) Explain the different types of fluid.
   c) Give the differences between comparable and incompressible fluids.
   d) Explain the Newton's law of viscosity and give the relation for kinematic viscosity.

OR

A dash pot 10 cm diameter and 12.5 cm long slides vertically down in a 10.05 cm diameter cylinder. The oil filling the annular space has a viscosity of 0.80 poise. Find the speed with which the piston slides down, if load on the piston is 10N.

Unit - V

5. a) What is the difference between laminar and turbulent flow.
   b) Define the terms stream lines, streak lines and path lines.
   c) What are the conditions for stability of flouting and submersed body?
   d) Drive the expression for meta - centre height.

OR

Drive the relation between the stream feinting and velocity potential formation.

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