Roll No. _____

3208

B. Tech (ME) 5th Semester Examination – February, 2022

SOLID MECHANICS

Paper : PCC-ME-303G

Time : Three hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* from each section. Question No. **1** is **compulsory**. All questions carry equal marks.

1. (a) Define Maxwell Theorem.

   (b) Define Hoop Stress & Longitudinal Stress.

   (c) What is the role of spring ? What are various types of springs.

   (d) What is strain energy & impact loading ?

   (e) Differentiate between a thin cylinder and a thick cylinder.

   (f) Define and explain the term unsymmetrical bending and shear centre.

P. T. O.

SECTION – A

2. Derive the expression for strain energy stored in body when load is applied.
   (a) Gradually
   (b) Suddenly
   (c) Impact

3. If principal stresses at a point in an elastic material are 2F tensile, F tensile, F/2 compressive, Calculate value of F according to five different theories. $\sigma_{yt} = 200$ N/mm^2, $\upsilon = 0.3$.

SECTION – B

4. Explain the following :
   (i) Derivation of Lame's Equation.
   (ii) Spherical shell subjected to internal pressure only.

5. Determine the position of shear centre of a channel having dimension: flanges 120mm * 20mm and web 16mm * 10mm.

SECTION – C

6. A Thick cylinder with internal radius of 8cm and external radius of 16cm is subjected to an internal fluid pressure of 80 MPa. Draw the variation of radial and hoop stress in the cylinder wall. Also fmd out the maximum shear stress in the cylinder wall.

7. Prove that the circumferential stress in a rotating disc with a pin hole at a centre is two times the maximum circumferential stress in solid disc.

SECTION – D

8. Derive the expression for the stresses in open coiled helical spring subjected to axial load and twisting couples.

9. Determine the expression for bending stress produced in a curved bar which is subjected to bending moment.