B. Tech 3rd Semester G-Scheme
(Mechanical and Automation)
Examination, December-2023
MECHANIC OF SOLID
Paper–PCC-MA-207G

Time allowed : 3 hours]   *[Maximum marks :75*

Note : Question 1st is compulsory. Attempt total five questions selecting one question from each unit. All questions carry equal marks.

1. Write short notes on :

    (a) Poisson's ratio

    (b) Mohr's Circle

    (c) Rankine Formula.

    (d) Different types of Load.

    (e) Flitched Beam

    (f) Helical Spring   (6×2.5)

UNIT-I

2. Three sections of a bar are having different lengths and different diameter. The bar is subjected to an axial load P. Determine the total change in length of the bar. Take Young's modulus of different section same.   (15)

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 $\sigma_{Yt} = 200 \text{N/mm}^2$, $\upsilon = 0.3$ (15)

UNIT-II

4. Draw Shear force and bending moment diagrams for SSB AB of span 9m carrying ud*l* 1800 N/m run on the part CD of span so that AC = 2m, CD = 4m and BD = 3m

(15)

5. A beam section is 10m long is simply supported at the ends. It carries concentrated loads of 100 kN and 60 kN at distances 2m and 5m respectively from left end. Calculate the deflection under each load. Find also the maximum deflection. Take $l = 18 \times 10^8$ mm^4, E = 200 kN/mm^2.

(15)

UNIT-III

6. Find an expression for crippling load for a long column when both ends are fixed.

(15)

7. Prove that a hollow shaft of the same weight and material as that of a solid shaft can resist more torque.

(15)

UNIT-IV

8. Find an expression for deflection of a close coiled helical spring when subjected to axial load W.

(15)

9. 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 find out the maximum shear stress in the cylinder wall.

(15)