



Reg. No. :

Name :

Third Semester B.Tech. Degree Examination, September 2014
(2008 Scheme)
(Special Supplementary)
08.304 : MECHANICS OF SOLIDS (MPU)

Time : 3 Hours

Max. Marks : 100

Instructions : Answer **all** questions from Part – **A** and **one** question from **each** Module in Part – **B**.

PART – A



1. Differentiate a normal stress with a shear stress.
2. Explain Hook's Law.
3. Explain the concept of Saint Venant's Principle.
4. Derive the relationship between Modulus of elasticity and Modulus of Rigidity.
5. Explain the assumptions made in deriving theory of simple bending.
6. Explain the method of Joints in analyzing a perfect frame.
7. Describe Core of the section.
8. What is the limitation of Euler's theory ?
9. Describe the working concept of a compound cylinder.
10. Derive the differential equation for deflection in a beam. **(10x4= 40 Marks)**



PART – B

(3×20=60 Marks)

Module – I

11. a) Determine the stresses developed in the copper tube and steel rod of an assembly when its temperature is raised from 25°C to 65°C. The external diameter of copper tube is 150 mm and internal diameter is 120 mm. The diameter of steel rod is 80 mm. E_b is 0.28×10^5 MPa.

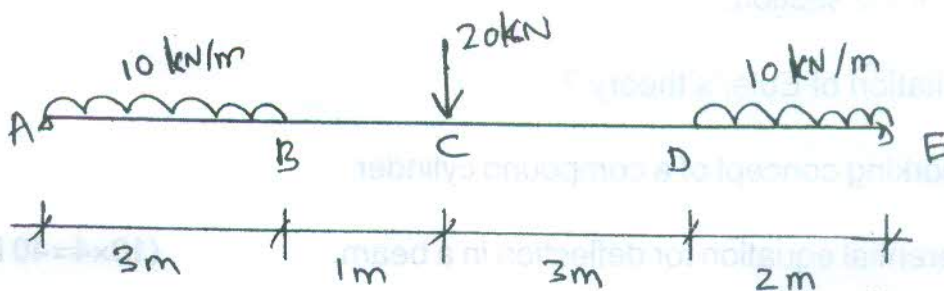
E_s is 2×10^5 MPa. α_b is $15 \times 10^{-6}/^\circ\text{C}$, α_s is $9 \times 10^{-6}/^\circ\text{C}$.

OR

- b) Determine maximum and minimum principal stresses in a block subjected to two stresses of 100 MPa [tensile] and 50 MPa [compressive] along with a shear stress of 30 MPa. Find also the angle of inclination of principal planes and the normal and tangential stress in a plane inclined at an angle of 30 degrees [counter clockwise] with the vertical plane carrying tensile stress. Verify answer using Mohr's circle.

Module – II

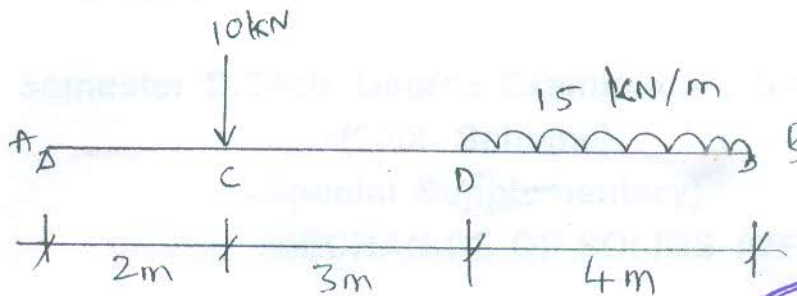
12. a) Determine the value of SF and BM and draw the figures for a ss beam shown below :



OR

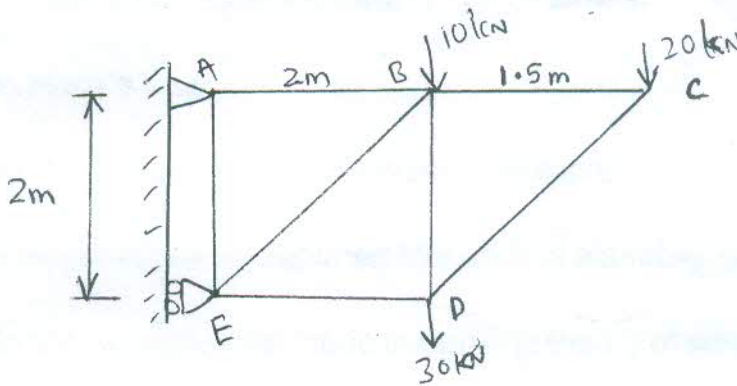


- b) Calculate the deflection at point D of a simply supported beam shown below :



Module – III

- 13. a) Analyse the plane perfect frame shown below using method of joints. Tabulate the results.



OR

- b) A 3m long steel rod having a size of 40 mm × 5mm is used as a column with both ends pinned. If Euler's formula can be used and the material attains the yield strength at the time of buckling, find the central deflection. E is 200 KN/mm² and Yield strength of steel is 300 MPa.