

Code No: RT21013

R13

SET - 1

II B. Tech I Semester Supplementary Examinations, Oct/Nov - 2017

STRENGTH OF MATERIALS - I

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

PART -A

1. a) Write about resilience? (3M)
- b) Explain about types of loads? (4M)
- c) Write about theory of simple bending? (3M)
- d) Write about shear stress distribution across triangular cross section? (4M)
- e) Define slope and deflection? (4M)
- f) Explain about thin spherical shells? (4M)

PART -B

2. a) Derive the relationship between the three elastic constants? (8M)
- b) A bar of steel 25mm diameter is subjected to a tensile load of 30kN and the measured extension on a 200mm gauge length is 0.08 mm and the change in diameter is 2.32×10^{-3} mm. Calculate the Poisson's ratio and the values of three moduli. (8M)
3. Construct S. F. D & B. M. D for the simply supported beam shown in Figure:1 (16M)

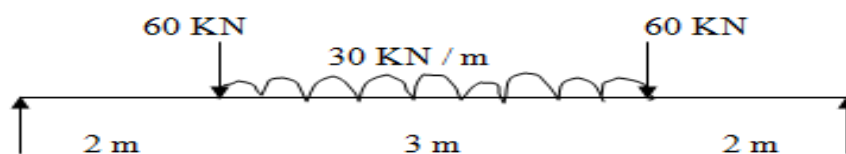


Figure:1

4. For a hollow circular section obtain the section modulus. Hence calculate the maximum bending stresses in a section external radius 300 mm and internal radius 180 mm, subjected to B. M = 50 kN-m. (16M)

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5. A beam of channel section $130\text{mm} \times 65\text{mm}$ has a uniform thickness of 20mm. Draw a diagram showing the distribution of shear stress for a vertical section where shear force is 160KN. Find the ratio between maximum and mean shearing stresses. (16M)
6. a) What are the limitations of the moment area method? (6M)
b) Find the max. slope and deflection of a cantilever beam, when loaded with uniformly distributed load. (10M)
7. a) A long boiler tube has to withstand an internal pressure of 6N/mm^2 . The internal diameter of the tube is 60 mm. Determine the thickness and mass/m of the tube if the circumferential stress is not to exceed 130 N/mm^2 . Mass density of steel is 7850 kg/m^3 . (8M)
b) A cylindrical shell with internal diameter 60mm and having a thickness equal to 3 mm is made of mild steel. Determine the permissible internal fluid pressure if the factor of safety on maximum shear stress is 4. (8M)