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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations December-2021

STRENGTH OF MATERIALS-I

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

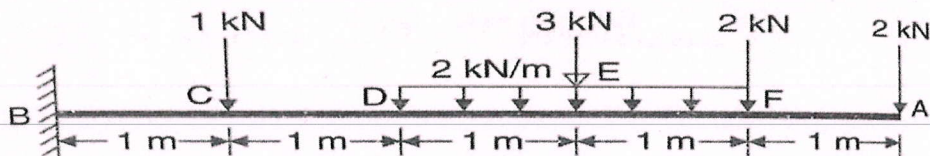
- 1 Find the Young's Modulus of a brass rod of diameter 25 mm and of length 300 mm subjected to a tensile load of 60 kN when the extension of the rod is equal to 0.2 m. **9M**
Write the classification of stresses. **3M**

OR

- 2 The modulus of rigidity for a material is $0.51 \times 10^5 \text{ N/mm}^2$. A 10 mm diameter rod of a material was subjected to an axial pull of 10 kN and the changes in diameter was observed to be $3 \times 10^{-3} \text{ mm}$. Calculate Poisson's ratio, E and K. **12M**

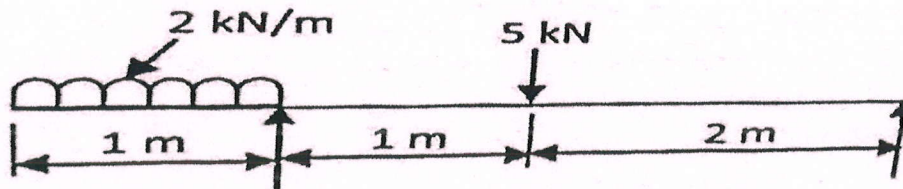
UNIT-II

- 3 Draw shear force and bending moment diagram for the following beam. **12M**



OR

- 4 Draw shear force and bending moment diagram for the overhanging loaded as show in fig. And also locate the point of contra-flexure. **12M**



UNIT-III

- 5 A cast Iron beam is of T- section has the following dimensions Flange: 100 mm x 20 mm Web: 80 mm x 20 mm. The beam is simply supported on a span of 8 meters and carries a uniformly distributed load of 1.5 KN/m length of entire span. Determine the maximum tensile and compressive stresses. **12M**

OR

- 6 A simply supported beam carries a uniformly distributed load of intensity 30 N/m over the entire span of 2 m. The cross section of beam is a T-section having flange 125 x 25 mm and web 175 x 25 mm. Calculate the maximum shear stress for the section subjected to maximum shear force. Also draw the shear stress distribution. **12M**

UNIT-IV

- 7 A beam of uniform rectangular section 200 mm wide and 300 deep is simply support at its ends. It carries a uniformly distributed load of 9 kN/m run over the entire span of 5 m. If the value of E for the beam material is 1×10^4 N/mm² , find : (i) Slope at the supports and (ii) Maximum deflection. **12M**

OR

- 8 A beam of length 5 m of uniform rectangular section is supported at its ends and carries a uniformly distributed load over the entire length. Calculate the depth of the section if the maximum permissible bending stress is 8 N/mm² and central deflection not to exceed 10 mm. Take $E = 1.2 \times 10^4$ N/ mm² . **12M**

UNIT-V

- 9 A tensile test, a test piece 25 mm in diameter, 200 mm gauge length stretched 0.0975 mm under a pull of 50,000 N. In a torsion test the same rod twisted 0.025 rad over a length of 200 mm, when a torque of 400 Nmm was applied. Evaluate the Poisson's ratio and the three elastic moduli for the material. **12M**

OR

- 10 A closely coil helical spring of round steel wire 10 mm in diameter having 10 complete turns with a mean diameter of 12 cm is subjected to an axial load of 200 N. Determine : (i) Deflection of the beam spring (ii) Maximum shear stress in the wire and (iii) Stiffness of the spring. Take $C = 8 \times 10^4$ N/mm² . **12M**

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