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

B.Tech II Year I Semester Supplementary Examinations June 2019

STRENGTH OF MATERIALS – I

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

- 1 a A rod 200 cm long and of diameter 3.0 cm is subjected to an axial pull of 30 kN. If the modulus of elasticity of the material of the rod is 2×10^5 N/mm². Determine: the Stress, Strain and Elongation of the rod. 8M

- b Define Poisson's ratio and Factor of safety. 4M

OR

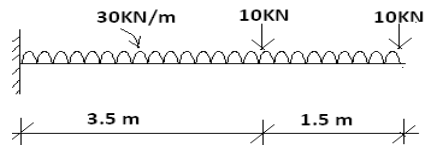
- 2 The modulus of rigidity for a material is 0.68×10^5 N/mm². A 12 mm diameter rod of a material was subjected to an axial pull of 20 kN and the changes in diameter was observed to be 2.5×10^{-3} mm. Calculate Poisson's ratio, E and K. 12M

UNIT-II

- 3 Draw the SFD and BMD for simply supported beam carrying uniformly distributed load of whole length and also derive equation for it. 12M

OR

- 4 A cantilever of span 5 m, carries loads as shown in fig. Draw shear force and bending moment diagrams for the beam.



12M

UNIT-III

- 5 Derive the bending equation $M/I = f/y = E/R$ Writing all the assumptions made. 12M

OR

- 6 The shear force acting on a beam at a section is 'F'. The section of the beam is triangular base b and of an altitude h. The beam is placed with its base horizontal. Find the maximum shear stress and the shear stress at the neutral axis. 12M

UNIT-IV

- 7 Derive the expression for slope and deflection of a simply supported beam carrying a uniformly distributed load of w per unit length over the entire length using double Integration method. 12M

OR

- 8 A beam of uniform rectangular section 250 mm wide and 400 deep is simply support at its ends. It carries a uniformly distributed load of 12 kN/m run over the entire span of 8 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

UNIT-V

- 9 A Simply supported beam of length 6 m carries a point load of 8 kN at a distance of 3 m from left end. If $E = 2 \times 10^5$ N/mm² and $I = 1 \times 10^8$ mm⁴ for the beam, determine: (i) slope at left support and (ii) deflection under the point load using conjugate beam method. 12M

OR

- 10 A closely coiled helical spring of round steel wire 12 mm in diameter having 8 complete turns with a mean diameter of 10 cm is subjected to an axial load of 300 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

*** END ***

