Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Regular & Supplementary Examinations Nov 2018

STRENGTH OF MATERIALS – I

(Civil Engineering)

Time: 3 hours Max. Marks: 60

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

UNIT-I

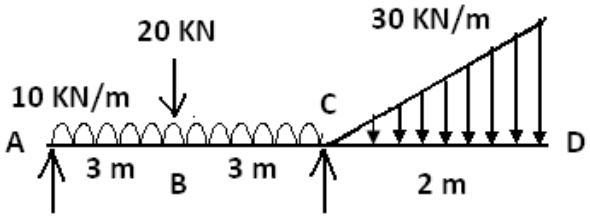
1 A rectangular block 300 mm x 200 mm x 100 mm is subjected to axial load as follows: 580kN tensile in the direction of its length, 1000 kN compressive on the 300 mm x 200 mm faces and 900 kN tensile on 300 mm x 100 mm. Assuming Poisson's ratio as 0.25, find in terms of modulus of elasticity of the material E, the strain in the direction of force. If E = 2 x 10^5 N/ mm^2, find the values of the modulus of rigidity and bulk modulus for the material of the block. Also calculate the change in volume of the block. 12M

OR

2 Derive the relation between Young's Modulus (E), Rigidity Modulus (G) and Bulk Modulus (K) 12M

UNIT-II

3 Draw the shear force and bending moment diagrams for the beam loaded as shown figure 12M



OR

4 Draw shear force and bending moment diagram for cantilever beam subjected to uniformly distributed load. 12M

UNIT-III

5 A cast Iron beam is of T- section has the following dimensions Flange: 120 mm x 40 mm Web: 100 mm x 40 mm. The beam is simply supported on a span of 10 meters and carries a uniformly distributed load of 2.5 KN/m length of entire span. Determine the maximum tensile and compressive stresses. 12M

OR

6 A rectangular beam 150 mm wide and 300 mm deep is subjected to a maximum shear force of 80 KN. Determine i) Average shear stress ii) Maximum shear stress iii) Shear stress at a distance of 30 mm above neutral axis. 12M

UNIT-IV

7 Derive the expression for slope and deflection of a simply supported beam carrying a point load at centre using double integration method. 12M

OR

8 A beam of length 10 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 12 N/mm^2 and central deflection not to exceed 12 mm. Take E = 1.2 X 10^4 N/mm^2. 12M

UNIT-V

9 Derive the expression for slope and deflection of a simply supported beam with a point load at the center by Conjugate beam method. 12M

OR

10 A solid circular shaft transmits 100 kW power at 300 rpm. Calculate the shaft diameter, if the twist in the shaft is not to exceed 10^o in 2 m length of shaft, and shear stress is limited to 60 N/mm^2. Take C= 1 x 10^5 N/mm^2. 12M

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