Q.P. Code: 16CE103 **R16**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations November-2020

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** Define Poisson's ratio and Factor of safety. **5M**

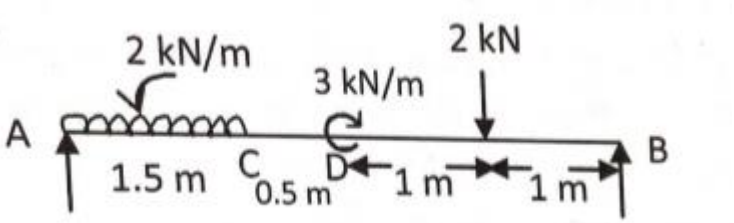
b A rod 150 cm long and of diameter 2.0 cm is subjected to an axial pull of 20 kN. If the modulus of elasticity of the material of the rod is $2x10^5$ N/ mm^2; determine the Stress, Strain and Elongation of the rod. **7M**

OR

2 The modulus of rigidity for a material is 0.51 x 10^5 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 x 10^{-3} mm. Calculate Poisson's ratio, E and K. **12M**

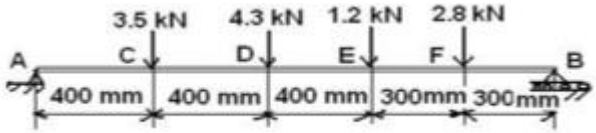
UNIT-II

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



OR

4 Draw shear force and bending moment diagram for the following beam **12M**



UNIT-III

5 An I-section has 100 mm wide and 12 mm thickness, a web of 120 mm height and 10 mm thickness. The section is subjected to bending moment of 15 KN-m and shear force of 10 KN. Find the maximum bending stress and maximum shear stress and draw shear stress distribution diagram. **12M**

OR

6 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**

UNIT-IV

7 A beam of length 6 m is simply supported at its ends and carries a point load of 40 kN at a distance of 4 m from the left support. Find the deflection under the load and maximum deflection. Also calculate the point at which maximum deflection takes place. Given moment of inertia of beam is 7.33×10^7 N/mm^2 and E = 2×10^5 N/mm^2. Use Macaulay's method. **12M**

OR

8 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/mm^2, find : **12M**
(i) Slope at the supports and (ii) Maximum deflection.

UNIT-V

9 A cantilever beam of length 3 m carries a point load of 10 kN at a distance of 2 m from the fixed end. If E=2×10^5 N/mm^2 and I = 1×10^8 mm4, find the slope and deflection at the free end using conjugate bean method. **12M**

OR

10 A hollow shaft of external diameter 120 mm transmits 300 kW power at 200 r.p.m. (rotations per minute) Determine the maximum internal diameter if the maximum stress in the shaft is not exceeded to 60 N/mm^2. **12M**

*** END ***