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

B.Tech II Year I Semester Supplementary Examinations November 2020

STRENGTH OF MATERIALS

(Common to ME & AGE)

Time: 3 hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

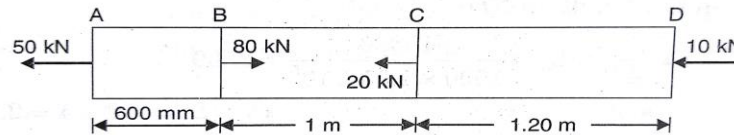
- 1 a State Hooke's law with equation. 2M
- b Explain the different types of loads with diagrams. 2M
- c What is the meaning of strength of section? 2M
- d Define polar modulus. 2M
- e Define thin cylinder and thick cylinder. 2M

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

- 2 a Explain briefly about the stress strain diagram for mild steel. 5M
- b A brass bar, having cross-sectional area of 1000 mm², is subjected to axial forces as shown in figure. Find the total elongation of the bar. Take $E=1.05 \times 10^5$ N/mm².

**OR**

- 3 Define Strain energy & resilience. A tensile load of 60 KN is gradually applied to a circular bar of 4 cm diameter and 5 m long if $E=2 \times 10^5$ N/mm². Determine: i) stretch in the rod (ii) stress in the rod and (iii) strain energy absorbed by the rod. 10M

UNIT-II

- 4 A cantilever of length 3 m carries a uniformly distributed load of 1.5 KN/m run over a length of 2 m from the free end. Draw SFD and BMD for the beam. 10M

OR

- 5 a Define beam. Sketch different types of beams, types of supports and types of loads indicating their names 5M
- b Draw the S.F and B.M diagram for a S.S.B of span 'L' m loaded with UDL of W KN/m. 5M

UNIT-III

- 6 Derive the bending equation. 10M

OR

- 7 A steel beam of I-section, 200 mm deep and 160 mm wide has 16 mm thick flanges and 10 mm thick web. The beam is subjected to a shear force of 200 KN. Determine the shear stress distribution over the beam section. 10M

UNIT-IV

- 8 A cantilever of length 4 m carries a uniformly distributed load 3 KN/m over a length from the free end and a point load of 2 KN at the free end. Find the slope and deflection end if $E = 2.1 \times 10^5$ N/mm² and $I = 6.667 \times 10^7$ mm⁴.? 10M

OR

- 9 Derive an expression for Torque transmitted by a hollow circular shaft. 10M

UNIT-V

10 A cast iron pipe 200 mm internal diameter and 12 mm thick is wound closely with a single layer of circular steel wire of 5 mm diameter, under a tension of 60 N/mm^2 . Find the initial compressive stress in the pipe section. Also find the stresses set up in the pipe and steel wire, when water under a pressure of 3.5 N/mm^2 is admitted in to the pipe. Take $E = 1 \times 10^5 \text{ N/mm}^2$ for cast iron and for steel $E = 2 \times 10^5 \text{ N/mm}^2$. poisson's ratio is given as 0. **10M**

OR

11 Derive the formula for longitudinal and circumferential stresses. **10M**

*****END*****