Q.P. Code: 18CE0151 **R18**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

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

STRENGTH OF MATERIALS

(Common to AG & ME)

Time: 3 hours Max. Marks: 60

PART-A

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

1	**a**	Define elasticity and plasticity.	**2M**
	b	What is the use of SFD and BMD?	**2M**
	c	What are the assumptions made in theory of simple bending?	**2M**
	d	What is torsion of circular shaft?	**2M**
	e	Define thin cylinder and thick cylinder.	**2M**

PART-B

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

UNIT-I

2	**a**	Define stress and strain and Explain their types.	**5M**
	b	A circular rod of diameter 20 mm and 500 mm long is subjected to a tensile force of 45 KN. the modulus of elasticity for the material is 2.1x105 N/mm^2 . Find the stress, strain & the elongation of circular rod.	**5M**

OR

3		Determine the changes in length, breadth and thickness of a steel bar which is 4 m long, 30 mm wide and 20 mm thick and is subjected to axial pull of 30 KN in the direction of its length. Take E=2x105N/mm2 and μ=0.3	**10M**

UNIT-II

4		A cantilever of length 3 m carries a uniformly distributed load of 2.5 KN/m length over the whole length and a point of 3.5 KN at the free end. Draw SFD and BMD for the cantilever	**10M**

OR

5		A simply supported beam of length 8 m carries point load of 4 KN and 7 KN at distances 3 m and 6 m from the left end. Draw SFD and BMD for the beam.	**10M**

UNIT-III

6		A timber beam of rectangular section is to support a load of 30 k N uniformly distributed over a span of 4 m when beam is simply supported. If the depth of section is to be twice the breadth, and the stress in the timber is not to exceed 8 N/mm2, find the dimensions of the cross section	**10M**

OR

7		A steel beam of I –section, 200 mm deep and 160 mm wide has 16 mm thick flanges and 10 m 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		Determine: (i) slope at the left support, (ii) deflection under the load and (iii) maximum deflection of a simply supported beam of length 6 m, which is carrying a point load of 5 KN at a distance of 2 m from the left end. Take E = 2 x 1055 N/mm2 and I = 1 x 108 mm4 .	**10M**

OR

9 A beam of length 8 m is simply supported at its ends and carries two-point loads of 36 KN and 46 KN at a distance of 1.5 m and 4 m from the left support. Find: (i) deflection under each load. (ii) Maximum deflection and (iii) The point at which maximum deflection occurs, given E = 2 x 105 N/mm2 and I = 85 x 106 mm4. Use Macaulay's method? **10M**

UNIT-V

10 A cylindrical thin drum 80 cm in diameter and 3 m long has a shell thickness of 1 cm. If the drum is subjected to an internal pressure of 2.5 N/mm2 , determine (i) change in diameter (ii) change in length and (iii) change in volume. Take E= 2x 105 N/mm2 Poisson's ratio 0.25. **10M**

OR

11 A cylindrical vessel, whose ends are closed by means of rigid flange plates, is made of steel plate 3 mm thick. The length and the internal diameter of the vessel are 50 cm and 25 cm respectively. Determine the longitudinal and hoop stresses in the cylindrical shell due to an internal fluid pressure of 3 N/mm2 . Also calculate the increase in length, diameter and volume of the vessel. Take E as 2x 105 N/mm2 and Poisson's ratio 0.3. **10M**

END