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

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations July-2022

STRENGTH OF MATERIALS-1

(Civil Engineering)

Time: 3 hours Max. Marks: 60

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

UNIT-I

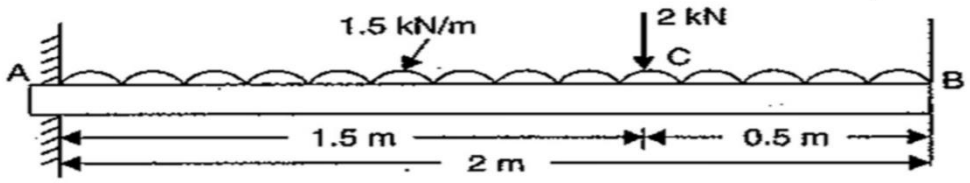
1	**a**	A rod 150 cm long and of diameter 2.0 cm is subjected to an axial pull of 20 kN. If the modulus of elasticity of the material of the rod is 2x105 N/ mm2 ; determine : the Stress, Strain and Elongation of the rod.	**L1**	**9M**
	b	Define Poisson's ratio and Factor of safety.	**L2**	**3M**

OR

2		A tension bar 5 m long is made up of two parts, 3m of its length has a cross-sectional area 10 cm2 while the remaining 2 m has a cross-sectional area of 20 cm2 . An axial load of 80 kN is gradually applied. Find the total strain energy produced in the bar and compare this value with that obtained in a uniform bar of the same length and having the same volume when under the same load. Take E= 2 x 105 N/ mm2 .	**L1**	**12M**

UNIT-II

3		Draw shear force and bending moment diagram for the following beam	**L3**	**12M**

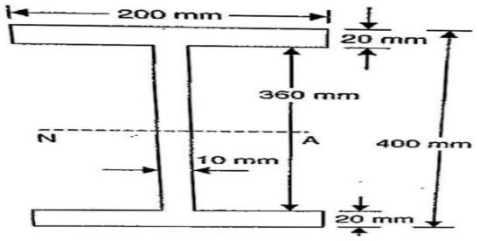


OR

4		A cantilever beam AB of span 10 m carries a uniformly distributed load of 50 kN /m on span 5 m from free end B. A point load of 30 kN at the mid span. Draw shear force and bending moment diagrams.	**L1**	**12M**

UNIT-III

5		A rolled steel joist of I section has a dimensions as shown in fig. This beam of I section carries a uniformly distributed load of 40 kN /m run on a span of 10m, calculate the maximum stress produced due to bending	**L1**	**12M**



OR

6	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.	**L1**	**12M**

UNIT-IV

7	Derive the expression for slope and deflection of a simply supported beam carrying a uniformly distributed load by Mohr's theorem.	**L4**	**12M**

OR

8	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.	**L3**	**12M**

UNIT-V

9	A solid shaft of 200 mm diameter has the same cross sectional area as that of a hollow shaft of the same material with inside diameter of 150 mm. Find the ratio of the power transmitted by the hollow shaft by the same speed.	**L4**	**12M**

OR

10	A solid circular shaft transmits 75 kW power at 200 rpm. Calculate the shaft diameter, if the twist in the shaft is not to exceed 10 in 2 m length of shaft, and shear stress is limited to 50 N/mm2 . Take C= 1 x 105 N/mm2 .	**L1**	**12M**

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