Q.P. Code: 19CE0150 **R19**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

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

STRENGTH OF MATERIALS

(Common to ME & AGE)

Time: 3 hours Max. Marks: 60

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

UNIT-I

1	Derive the relation between Young's Modulus (E), Rigidity Modulus (G) and Bulk Modulus (K)	L1	12M

OR

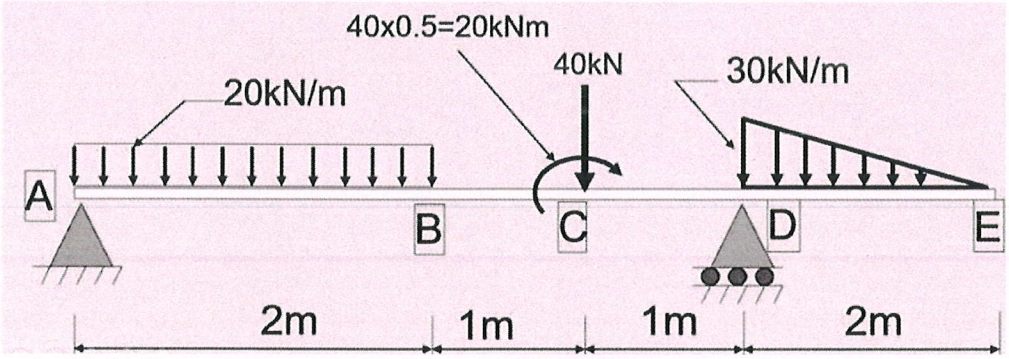
2	Determine the diameter of a bolt which is subjected to an axial pull of 9 kN together with a transverse shear force of 4.5 kN using : (i) Maximum principal stress theory. (ii) Maximum principal strain theory. Given the elastic limit in tension = 225 N/mm2, factor of safety = 3 and Poisson's ratio = 0.3.	L2	12M

UNIT-II

3	A horizontal beam 10 m long is carrying a uniformly distributed load of 1 kN/m. The beam is supported on two supports 6 m apart. Find the position of the supports, so that B.M. on the beam is as small as possible. Also draw the S.F. and B.M. diagrams	L2	12M

OR

4	Draw the bending moment and shear force diagrams for the beam shown in the figure.	L2	12M



UNIT-III

5	A hollow shaft, having an inside diameter 60% of its outer diameter, is to replace a solid shaft transmitting the same power at the same speed. Calculate the percent-age saving in material, if the material to be used is also the same.	L1	12M

OR

6	Derive pure torsion equation for a circular shaft with assumptions.	L2	12M

UNIT-IV

7	Derive the relation between slopes, deflection, and radius of curvature.	L1	12M

OR

8	Determine: (i) slope at the left support, (ii) deflection under the load and (iii) maximum deflection of a simply supported beam of length 5 m, which is carrying a point load of 5 kN at a distance of 3 m from the left end. Take E = 2 x 105 N/mm2 and I =1 x 108 mm8.	L2	12M

UNIT-V

9	A cylindrical shell 100 mm long 200mm internal diameter having thickness of a metal as 10 mm is filled with a fluid at atmospheric pressure. If an additional 200 mm3 pumped into the cylinder, Take E = 2 X 10 5 N/ mm2 and Poisson's ratio is 0.3Find (i) The pressure exerted by the fluid on the cylinder and (ii) The hoop stress induced.	L1	12M

OR

10	A copper cylinder, 90 cm long, 40 cm external diameter and wall thickness 6 mm has its both ends closed by rigid blank flanges. It is initially full of oil at atmospheric pressure. Calculate additional volume of oil which must be pumped into it in order to raise the oil pressure to 5 N/mm2 above atmospheric pressure. For copper assume E= 1.0 x 105 N/mm2 and Poisson's ratio 1/3. Take bulk modulus of oil as K= 2.6 x 103 N/mm2.	L2	12M

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