Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Regular Examinations May-2022
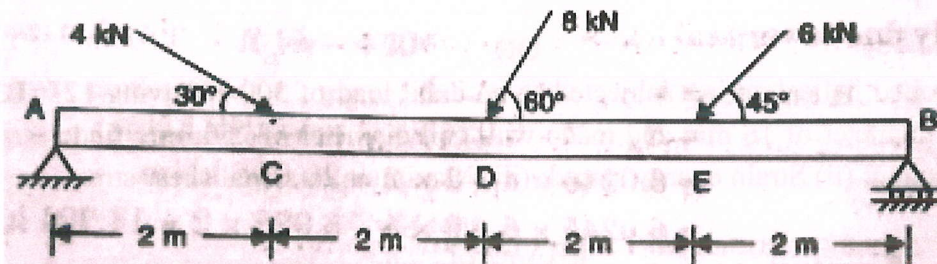**STRENGTH OF MATERIALS**
(Civil Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

1 A horizontal beam AB of length 8 m is hinged at A and placed on rollers at B. The beam carries three inclined point loads as shown in figure. Draw the S.F, B.M and axial force diagrams of the beam. **L3 12M**

OR

2 **a** Derive the relationship between load, shear force and bending moment for a beam. **L2 6M**

   b A simply supported beam of span 'l' is subjected to gradually varied load as shown in figure. Draw the shear force and bending moment diagrams. **L3 6M**
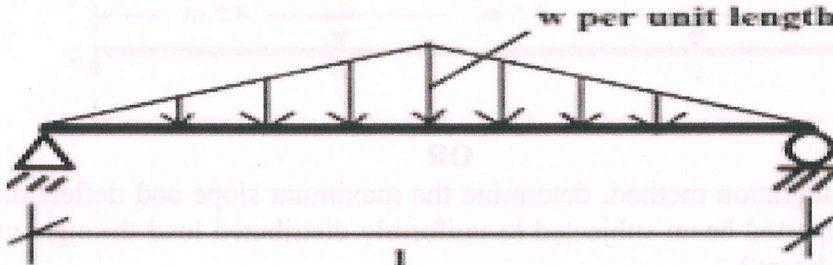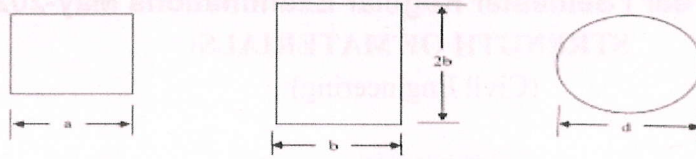

UNIT-II

3 Draw the shear stress distribution for an I section which is symmetrical about both the axes. The width of flanges being 'B' and web 'b'. The overall depth 'D' and depth of web 'd'. **L3 12M**

OR

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4	Three beams have the same length, the same allowable stress and the same bending moment. The cross-section of the beams are a square, a rectangle with depth twice the width and a circle as shown in figures. Find the ratios of weights of the circular and the rectangular beams with respect to the square beam?	L3	12M

UNIT-III

5	Two shafts of the same material and same lengths are subjected to the same torque, if the first shaft is of a solid circular section and second shaft is of hollow circular section, whose internal diameter is 2/3 of the outside diameter and the maximum shear stress developed in each shaft is the same, compare the weights of the shafts.	L3	12M

OR

6	For a close-coiled helical spring subjected to an axial load of 300 N having 12 coils of wire diameter of 16 mm and made with coil diameter of 250 mm, find: (i) Axial defection; (ii) Strain energy stored; (iii) Maximum torsional shear stress in the wire?	L3	12M

UNIT-IV

7	A horizontal steel girder having uniform cross-section is 14 m long and is simply supported at its ends. It carries two concentrated loads as shown in figure. Calculate the deflections of the beam under the loads C and D. Take E = 200 GPa and I = 160 x 10^6 mm^4.	L3	12M
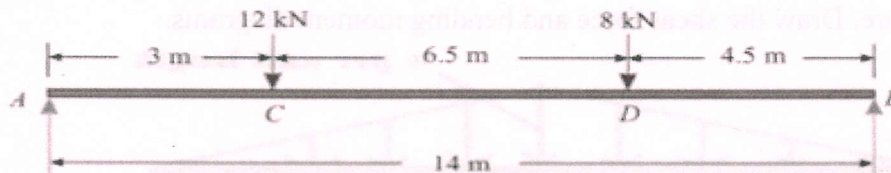
OR

8	Using double integration method, determine the maximum slope and deflection for a simply supported beam subjected to uniformly distributed load throughout the length of the beam?	L2	12M

UNIT-V

9	A hallow alloy tube 4 m long with external and internal diameters of 40 mm and 25 mm respectively was found to extend 4.8 mm under a tensile load of 60 kN. Find the buckling load for the tube with both ends pinned? Also find the safe load on the tube, taking a factor of safety as 5?	L3	12M

OR

10	A masonry wall 5 m high and 1.8 m wide is containing water up to a height of 4 m. If the coefficient of friction between the wall and the soil is 0.6, check the stability of the wall. Take weight of the masonry and water as 22 kN/m^3 and 9.81kN/m^3.	L3	12M

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