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

B.Tech I Year II Semester Regular Examinations November-2021

ENGINEERING MECHANICS

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

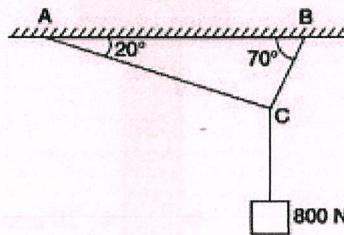
(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Prove Varignon's theorem. L3 6M
b State and prove parallelogram law of forces. L4 6M

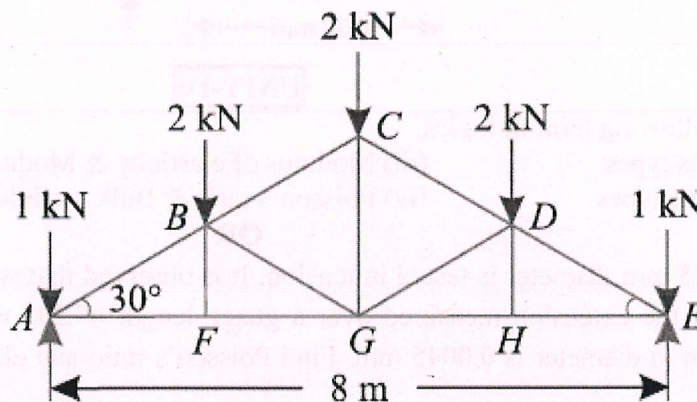
OR

- 2 a Classify different system of forces with suitable examples. L3 6M
b A weight of 800N is supported by two chains as shown in Fig. Determine the tension in each chain using Lami's theorem. L2 6M



UNIT-II

- 3 A king post truss of 8m span is loaded as shown. Find the forces in each member of the truss and tabulate the results. L4 12M



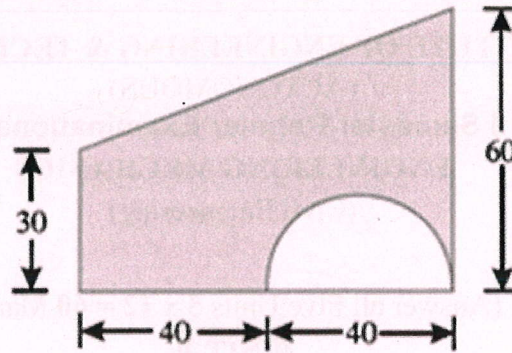
OR

- 4 A ladder 5m long rests on a horizontal ground and leans against a smooth vertical wall at an angle 70° with the horizontal. The weight of the ladder is 900N and acts at its middle. The ladder is at the point of sliding, when a man weighing 750N stands on a rung 1.5m from the bottom of the ladder. Calculate the coefficient of friction between the ladder and the floor. L4 12M

UNIT-III

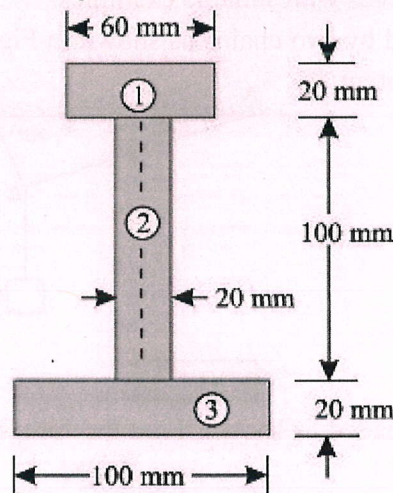
- 5 Locate the centroid for the plane figure shown in fig

L3 12M



OR

- 6 An I-section is made up of three rectangles as shown in Fig. Find the MOI of the section L3 12M about the horizontal axis passing through the C.G of the section.



UNIT-IV

- 7 Define the following terminologies. L2 12M
 (i) Stress & its types (iii) Modulus of elasticity & Modulus of rigidity
 (ii) Strain & its types (iv) Poisson's ratio & Bulk modulus

OR

- 8 a A bar of 25 mm diameter is tested in tension. It is observed that when a load of 60 kN is applied, the extension measured over a gauge length of 200 mm is 0.12 mm and contraction in diameter is 0.0045 mm. Find Poisson's ratio and elastic constants E, G, K. L4 8M
 b A metallic bar 320mm long, 40mm wide and 30mm thick is subjected to a pull of 250 kN in the direction of its length. Determine the change in volume, if $E = 20 \times 10^6$ N/cm² & $\mu = 0.25$. L4 4M

UNIT-V

- 9 Derive an expression for determining the circumferential stress (or hoop stress) and longitudinal stress for thin cylinder. L4 12M

OR

- 10 A closed cylindrical vessel made of steel plates 4mm thick with plane ends, carries fluid under a pressure of 3 N/mm². The diameter of cylinder is 25cm and length is 75cm, calculate the longitudinal and hoop stresses in the cylinder wall and determine the change in diameter, length and volume of the cylinder. Take $E = 210$ GPa and $\mu = 0.286$ L3 12M

*** END ***