

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

B.Tech I Year II Semester Regular & Supplementary Examinations August-2023

ENGINEERING MECHANICS

(Civil Engineering)

Time: 3 Hours

Max. Marks: 60

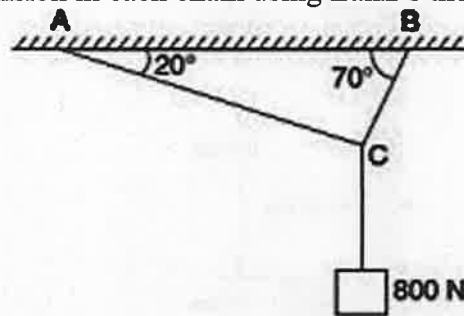
(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Classify different system of forces with suitable examples CO1 L2 6M
 b The resultant of two forces when they act at right angles is 10N, whereas when they act at an angle of 60° the resultant is $\sqrt{148}$. Determine the magnitude of the two forces CO1 L3 6M

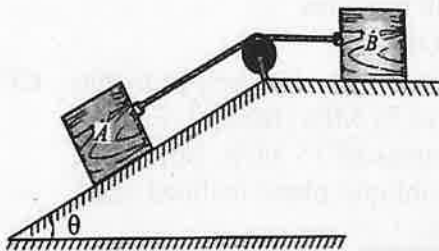
OR

- 2 a State and prove parallelogram law of forces. CO1 L2 7M
 b A weight of 800N is supported by two chains as shown in Fig. Determine the tension in each chain using Lami's theorem CO1 L3 5M



UNIT-II

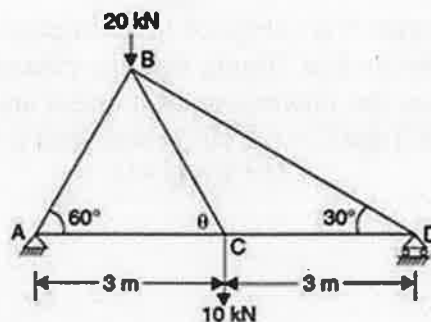
- 3 a Find the value of ' θ ' if the block 'A' and 'B' shown in Fig. have impending motion. Given weight of Block-A = 200 N and that of Block-B = 200 N, $\mu_A = \mu_B = 0.25$. CO3 L4 8M



- b What are the various laws of friction? CO3 L2 4M

OR

- 4 a Determine the forces in all the members of the truss shown in Fig using method of joints CO2 L4 9M

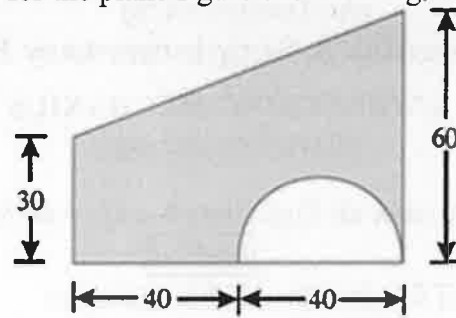


- b State the assumptions made in truss analysis CO2 L2 3M

UNIT-III

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

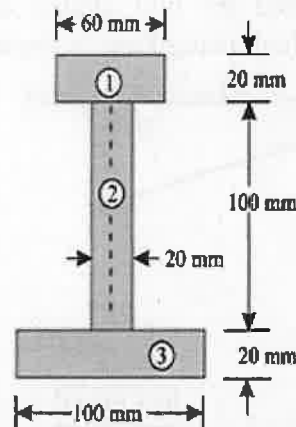
CO4 L3 12M



OR

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

CO4 L3 12M

**UNIT-IV**

- 7 Define the following terminologies.

CO5 L2 12M

- (a) Stress & its types (c) Modulus of elasticity & Modulus of rigidity
(b) Strain & its types (d) Poisson's ratio & Bulk modulus

OR

- 8 At a point within a body subjected to two mutually perpendicular directions, the stresses are 100 MPa (tensile) and 75 MPa (tensile). Each of the above stresses is accompanied by a shear stress of 75 MPa. Determine the normal, shear and resultant stresses on an oblique plane inclined at an angle of 45° with the axis of minor tensile stress

CO5 L4 12M

UNIT-V

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

CO6 L4 12M

OR

- 10 A shell 3.25m long, 1m in diameter is subjected to an internal pressure of 1 N/mm^2 . If the thickness of the shell is 10mm, find the circumferential and longitudinal stresses. Find also the maximum shear stress and the changes in the dimensions of the shell. Take $E = 2 \times 10^5 \text{ N/mm}^2$ and $\mu = 0.3$

CO6 L3 12M

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