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

B.Tech I Year I Semester Supplementary Examinations June 2019

ENGINEERING MECHANICS

(Common to CE, AGE & ME)

Time: 3 hours

Max. Marks: 60

**PART-A**

(Answer all the Questions 5 x 2 = 10 Marks)

- 1 a What are the different types of Beams? 2M
- b Define the following: (i) Limiting Force of Friction (ii) Kinetic Friction. 2M
- c Define the following: (i) center of mass (ii) first moment of area. 2M
- d Define the following: (i) Moment of Inertia (ii) Polar Moment of Inertia. 2M
- e What are the types of vibrations? 2M

**PART-B**

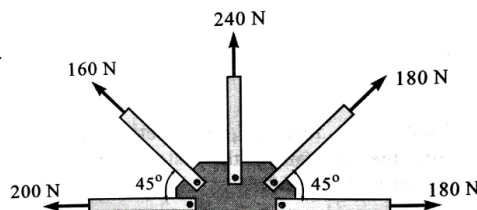
(Answer all Five Units 5 x 10 = 50 Marks)

**UNIT-I**

- 2 a Explain free body diagram with example. 5M
- b State and prove Lami's theorem. 5M

**OR**

- 3 A gusset plate of roof truss is subjected to forces as shown in Figure. Determine the magnitude of the resultant force and its orientation measured counter clockwise from the positive x-axis. 10M

**UNIT-II**

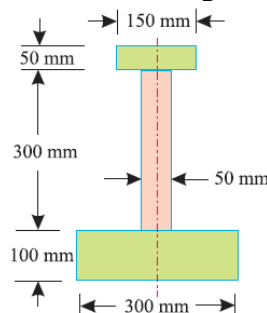
- 4 a State laws of friction. 6M
- b Explain Cone of Friction with a neat sketch. 4M

**OR**

- 5 Find the least force required to drag a body of weight 'W' placed on a rough inclined plane having inclination ' $\alpha$ ' to the horizontal. The force is applied to the body in such a way that it makes an angle ' $\theta$ ' to the inclined plane and the body is on the point of motion up the plane. 10M

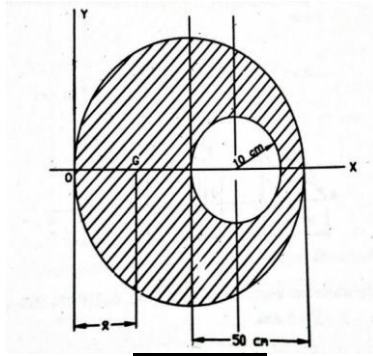
**UNIT-III**

- 6 An I-section as shown in Fig.2 has the following dimensions in mm units: Bottom flange = 300 x 100, Top flange = 150 x 50, Web = 300 x 50. Determine mathematically the position of center of gravity of the section. 10M

**OR**

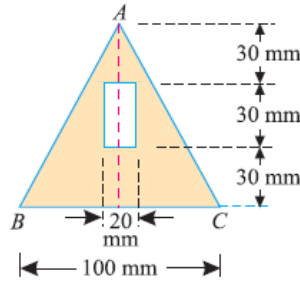
- 7 Determine the centroid of the remaining portion of a circular sheet of metal of radius 50cm when a hole of 10cm radius is taken out from the Centre of the circular disc along its horizontal diameter as shown in figure. 10M

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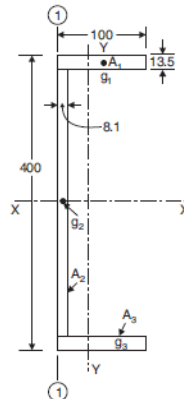
**UNIT-IV**

- 8 A rectangular hole is made in a triangular section as shown in Figure. Determine the moment of inertia of the section about X-X axis passing through its center of gravity and the base BC. 10M



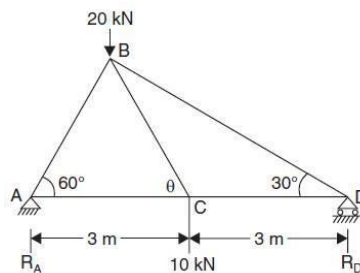
**OR**

- 9 Compute the second moment of area of the channel section shown in Figure about centroidal axis x-x and y-y. 10M



**UNIT-V**

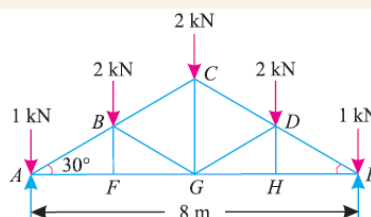
- 10 Determine the forces in all the members of the truss shown in Figure.



10M

**OR**

- 11 A king post truss of 8 m span is loaded as shown in Figure. Find the forces in each member of the truss and tabulate the results. 10M



\*\*\*END\*\*\*