Q.P. Code: 19CE0101

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech I Year I Semester Supplementary Examinations Feb-2021
ENGINEERING MECHANICS
(CIVIL ENGINEERING)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

1 a State and prove parallelogram law of forces.   6M
   b A system of forces are acting at the corners of a rectangular block as shown in   6M
   figure. Determine the magnitude and direction of the resultant force.

OR
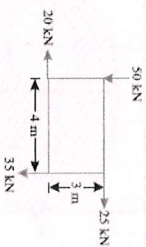
2 a Explain free body diagram with example.   4M
   b State and prove Lami's theorem.   8M

UNIT-II

3 Find the least force required to drag a body of weight 'W' placed on a rough inclined   12M
   plane having inclination 'α' to the horizontal. The force is applied to the body in such
   a way that it makes an angle 'Θ' to the inclined plane and the body is on the point of
   motion up the plane.

OR

4 Two blocks W_1 and W_2 resting on two inclined planes are connected by a horizontal   12M
   bar AB as shown in figure. If W_1 is equals 1000 N, determine the maximum value of
   W_2 for which the equilibrium can exists. The angle of limiting friction is 20° at all
   rubbing faces.
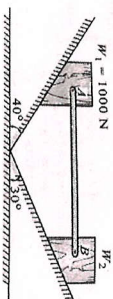
UNIT-III

5   A semicircle of 90 mm radius is cut out from a trapezium as shown in figure. Find the   **12M**
position of the centre of gravity of the figure.
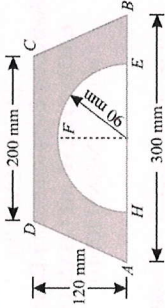
OR

6   Determine the centroid of the remaining portion of a circular sheet of metal of radius   **12M**
50cm when a hole of 10cm radius is taken out from the centre of the circular disc along
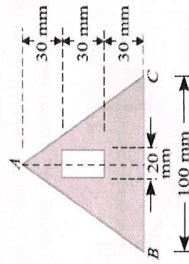its horizontal diameter as shown in figure.
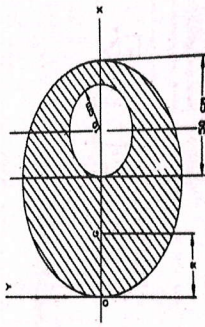
UNIT-IV

7   Prove the parallel axis theorem in the determination of moment of inertia of areas with   **12M**
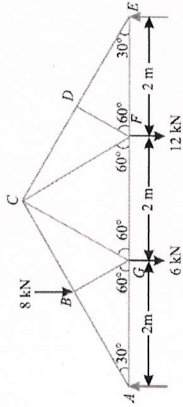the help of a neat sketch.

OR

8   A rectangular hole is made in a triangular section as shown in figure. Determine the   **12M**
moment of inertia of the section about X-X axis passing through its centre of gravity
and the base BC.

UNIT-V

9   An inclined truss loaded as shown in figure.   **12M**

Determine the nature and magnitude of the forces in the members BC, GC and GF of
the truss.

OR

10 Explain the procedure to find forces in members of truss by using method of sections.   **12M**

*** END ***