Q.P. Code: 16CE101 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR

(AUTONOMOUS)

B.Tech I Year II Semester Supplementary Examinations July-2021

ENGINEERING MECHANICS

(Common to CE, ME & AGE)

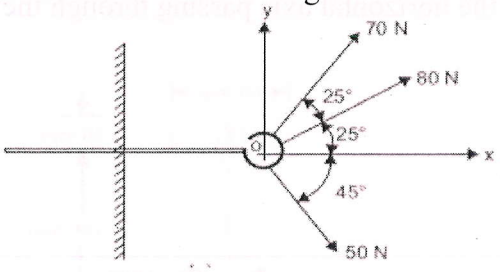
Time: 3 hours Max. Marks: 60

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

UNIT-I

1 **a** Derive the expressions of parallelogram law of forces. **6M**

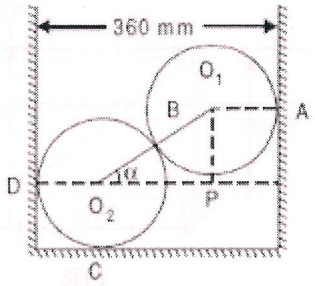
b Determine the resultant of the three forces acting on a hook as shown in Fig. **6M**



OR

2 **a** What are the different types of supports? **4M**

b Two smooth spheres each of radius 100 mm and weight 100 N, rest in a horizontal channel having vertical walls, the distance between which is 360 mm. Find the reactions at the points of contacts A, B, C and D shown in Fig. **8M**



UNIT-II

3 **a** Define the following terms: **6M**

i) Limiting force of friction

ii) Co-efficient of friction

iii) Angle of friction

b A pull of 20N, inclined at 25o to the horizontal plane, is required just to move a body placed on a rough horizontal plane. But the push required to move the body is 25N. If the push is inclined at 15o to the horizontal, find the weight of the body and coefficient of friction. **6M**

OR

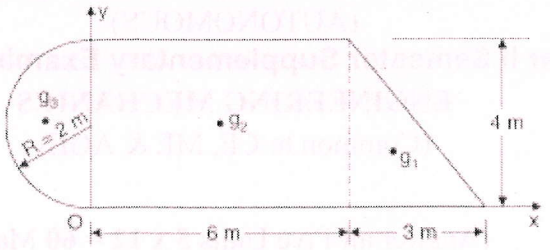
4 **a** The force required to pull a body of weight 50N on a rough horizontal plane is 15N. Determine the coefficient of friction If the force is applied at an angle of 15o with the horizontal. **6M**

b A body of weight 500N is pulled up on an inclined plane, by a force of 350N. The inclination of the plane is 30o to the horizontal and the force is applied parallel to the plane. Determine the coefficient of friction. **6M**

UNIT-III

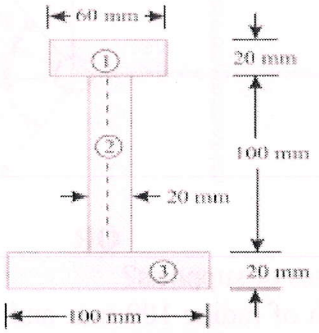
5 **a** Define the terms 'Centre of gravity' and 'Mass moment of inertia' **4M**

b Determine the centroid of the area shown in Fig. with respect to the axis shown **8M**



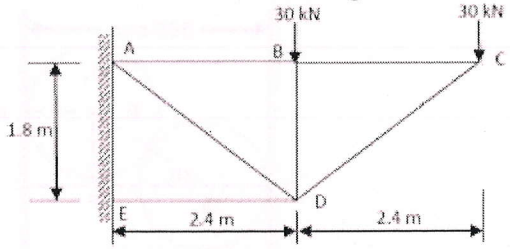
OR

6 An I-section is made up of three rectangles as shown in Fig. Find the moment of inertia of the section about the horizontal axis passing through the centre of gravity of the section. **12 M**



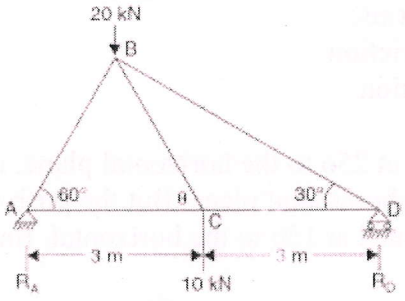
UNIT-IV

7 Find the forces in the members of a truss as shown in fig. **12M**



OR

8 Determine the forces in all the members of the truss shown in Fig. **12M**



UNIT-V

9 a A stone is dropped from the top of a tower. During the last second of its flight it is found to fall ¼ th of the whole height of tower. Find the height of the tower. What is the velocity with which the stone hits the bottom of the tower? **6M**

b A particle moves along a straight line so that its displacement in meter from a fixed point is given by $x = t^3 + 3.0\ t^2 + 4.0\ t + 5$, where 'x' is in meters and't' in seconds. Find. (i) Velocity at start and after 4 seconds. (ii) Acceleration at start and after 4 seconds. **6M**

OR

10 a Define the following terms **6M**
i) Velocity
ii) Acceleration
iii) Rectilinear motion

b A car moves along a straight line whose equation of motion is given by $s = 12t + 3t^2 - 2t^3$, where (s) is in meters and (t) is in seconds. Calculate (i) velocity and acceleration at start, and (ii) acceleration, when the velocity is zero **6M**

*** END ***