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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
 (AUTONOMOUS)
B.Tech I Year II Semester Regular & Supplementary Examinations October-2022
ENGINEERING MECHANICS
 (Civil Engineering)

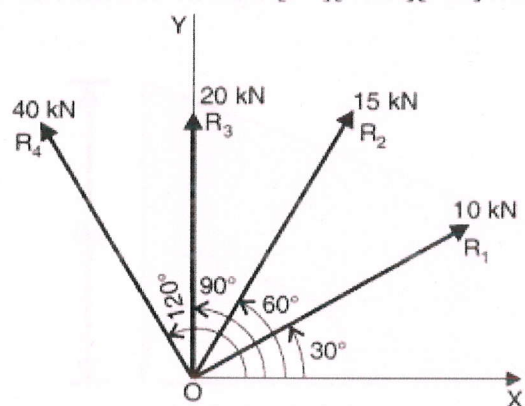
Time: 3 hours

Max. Marks: 60

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

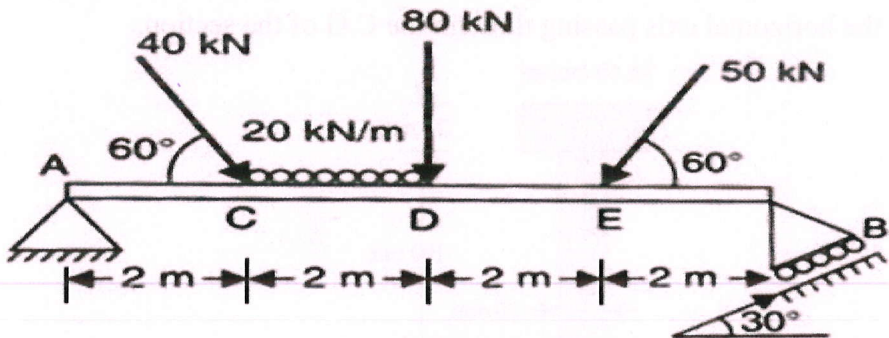
UNIT-I

- 1 Four forces of magnitude 10 kN , 15 kN, 20 kN and 40 kN are acting at a point O **L4 12M**
 as shown in Fig. The angles made by 10 kN, 15 kN, 20 kN and 40 kN with X-axis
 are 30°, 60°, 90° and 120° respectively. Find the magnitude, direction and
 inclination of the resultant force.



OR

- 2 A simply supported beam AB of length 8m, carries a system of loads as shown in **L4 12M**
 the Fig-.Calculate the reactions at A and B.

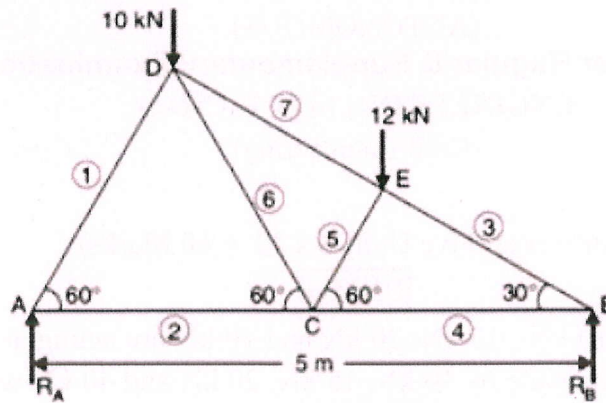


UNIT-II

- 3 A ladder 5m long rests on a horizontal ground and leans against a smooth vertical **L4 12M**
 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.

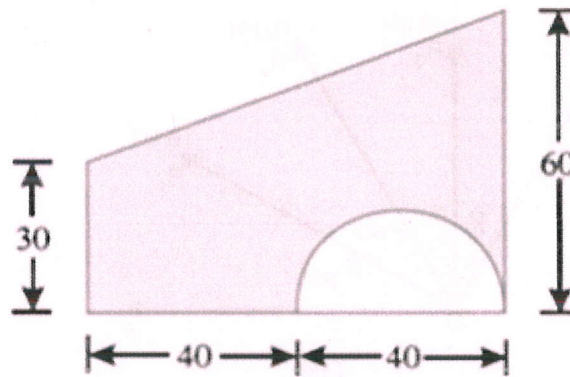
OR

- 4 A truss of span 5m is loaded as shown in Fig- Find the reactions and forces in the members of the truss. **L4 12M**



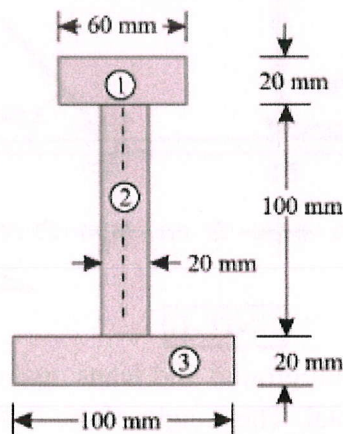
UNIT-III

- 5 Locate the centroid for the plane figure shown in fig. All dimensions are in mm **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. **L3 12M**



UNIT-IV

- 7 A steel rod of 2cm diameter is enclosed centrally in a hollow copper tube of external diameter 4cm and internal diameter 3.5cm. The composite bar is subjected to an axial pull of 50kN. If the length of each bar is 20cm, $E_S = 200\text{GPa}$, $E_C = 100\text{GPa}$ determine, (i) The stress in the rod and tube, (ii) Load carried by each bar. **L4 12M**

OR

- 8 The tensile stresses at a point across two mutually perpendicular planes are 120 N/mm^2 and 60 N/mm^2 . Determine the normal, tangential and resultant stresses on a plane inclined at 30° to the axis of minor stress using Mohr's circle. **L5 12M**

UNIT-V

- 9 A cylindrical shell 3m long which is closed at the ends has an internal diameter of 1m and a wall thickness of 15mm. Calculate the circumferential and longitudinal stresses induced and also change in the dimensions of the shell if it is subjected to an internal pressure of 1.5 MPa. Take $E = 200 \text{ GN/m}^2$ and $\mu = 0.3$. **L3 12M**

OR

- 10 A compound tube is composed of a tube 250mm internal diameter and 25mm thick shrunk on a tube of 250mm external diameter and 25mm thick. The radial pressure at the junction is 8 N/mm^2 . The compound tube is subjected to an internal fluid pressure of 84.5 N/mm^2 . Find the variation of the hoop stress over the wall of the compound tube. **L3 12M**

*** END ***

