O.P.Code: 20CE0163	R20	H.T.No.									

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

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

BASICS OF ENGINEERING MECHANICS
(Common to AGE & ME)

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	CO1	L4	6M
	b	A system of forces are acting at the corners of a rectangular block as shown in Fig.1. Determine the magnitude and direction of the resultant force.	CO1	L4	6M

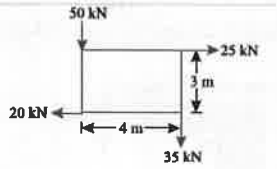

Fig.1

OR

2		A simply supported beam AB of span 4.5 m is loaded as shown in Fig.7. Find the support reactions at A and B.	CO1	L4	12M

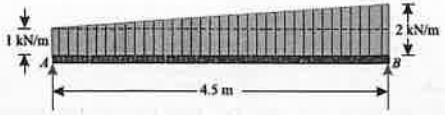

Fig.7

UNIT-II

3	a	Define the following: a) Limiting Force of Friction (b) Kinetic Friction (c) Co-efficient of Friction	CO2	L1	6M
	b	Find the least force required to drag a body of weight W'placed on a rough inclined 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	CO2	L4	6M

OR

4		Two blocks W1 and W2 resting on two inclined planes are connected by a horizontal bar AB as shown in Fig.9. If W1 is equals 1000 N, determine the maximum value of W2 for which the equilibrium can exists. The angle of limiting friction is 20o at all rubbing faces.	CO2	L4	12M

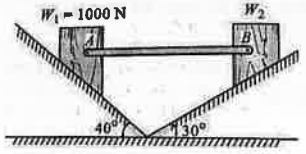

Fig.9

UNIT-III

5 Determine the centroid of the area shown in Fig. 15 with respect to the axis shown — CO3 L1 12M

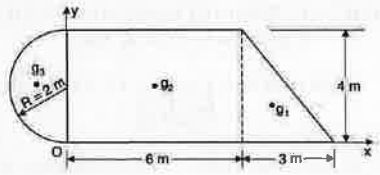

Fig. 15

OR

6 Find the centre of gravity of a channel section 100 mm × 50 mm × 15 mm as shown in Fig.18 — CO3 L1 12M

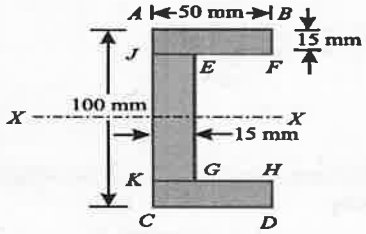

Fig.18

UNIT-IV

7 Find the moment of inertia of a T-section with flange as 150 mm × 50 mm and web as 150 mm × 50 mm about X-X and Y-Y axes through the centre of gravity of the section as shown in fig..20 — CO4 L1 12M

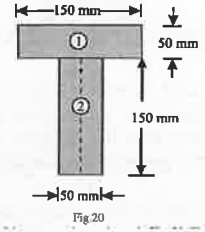

Fig.20

OR

8 A rectangular hole is made in a triangular section as shown in Fig.23.Determine the moment of inertia of the section about X-X axis passing through its centre of gravity and the base BC — CO4 L2 12M

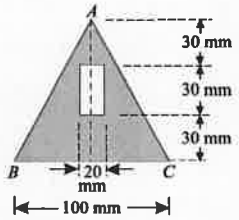

Fig.23

UNIT-V

9 A plane is loaded & suppoerted as shown in fig.29. Determine the nature and magnitude of the forces in the members 1,2 and 3 — CO5 L5 12M

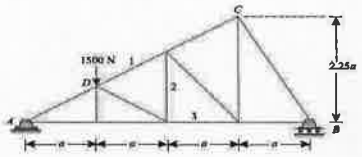

Fig.29

OR

10 A king post truss of 8 m span is loaded as shown in Fig.33. Find the forces in each member of the truss and tabulate the results — CO5 L5 12M

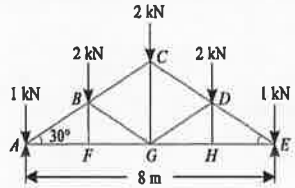

Fig.33

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