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Code No: 153AW

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, March - 2022
ENGINEERING MECHANICS
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1. Six forces of magnitudes 20, 30, 40, 50, 60 and 70 kN respectively act from the centre of regular hexagon and act towards its six angular points. Find the magnitude and direction of the resultant of the forces. [15]

2. A lamp weighing 6N is suspended from the ceiling by means of a wire. It is pulled to one side by a horizontal cord until the wire makes an angle of 45^0 with the ceiling. Find the tension in the wire and cord. [15]

3. A block weighing 600N just starts moving down a rough inclined plane when supported by a force of 250N acting parallel to the plane in the upward direction. The same block is on the verge of moving up the plane when pulled by a force by 350N acting parallel to the plane. Find the inclination of the plane and coefficient of friction between the inclined plane and block. [15]

4. An I-section is made of top flanges 100×20 mm web 100×200mm and bottom flange 120×20mm. Find the centroid of this section. [15]

5. A bar of T-section has flange 60 mm side and 15mm thick. The web is 90 mm deep and 15mm thick. Find the moment of inertia of section about centroidal axis XX and YY. [15]

6. A brass cone of base diameter 500 mm and height 300mm is placed centrally on the top of the vertical Aluminium cylinder of diameter 500 mm and height 400 mm. Density of brass is 85 kN/m^3 and density of Aluminum is 300kN/m^3. Determine the mass moment of inertia of composite body about vertical geometrical axis. [15]

7. A motorist travelling at a speed of 90 kmph suddenly applies brakes and stops after skidding a distance of 10m. Determine:
   a) The time required to stop the car
   b) The coefficient of friction between tyres and road. [7+8]

8. An elevator weighing 5000N is moving with an acceleration of $4m/sec^2$. During ascent, its operator having a weight of 600 N is standing on the scales placed on the floor. What is the scale reading? What will be the total tension in the cable of the elevator? [15]

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