R18

Code No: 153AW

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, March - 2021
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.a) How to find the resultant of coplanar forces?
 b) Forces of magnitude 15, 25, 35, 45, 55 and 65kN respectively act from the centre of a regular hexagon towards its regular corner points. Find the magnitude and directions of the resultant force. [7+8]

2.a) Differentiate between static and dynamic friction and explain about their existence?
 b) A screw Jack has a mean diameter of 60mm and pitch of 1.5mm. The coefficient of friction between screw and nut is 0.1. Find the magnitude required at the end of operating lever one metre long to raise a load of 20kN and also efficiency of the screw Jack. [7+8]

3.a) State the Pappus theorem and explain its applications.
 b) Determine the Centroid of the composite section shown in figure. All dimensions are in mm. [7+8]
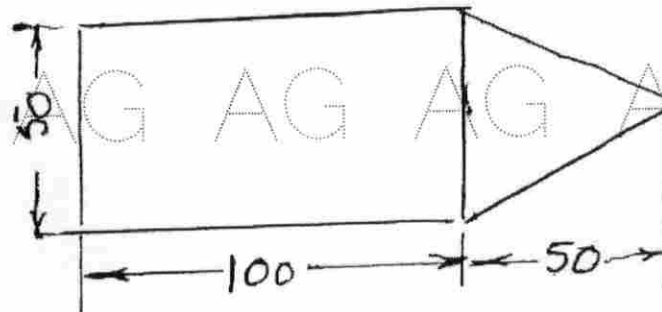
4.a) What is parallel axis theorem used in moment of inertia.
 b) A triangular lamina of sides 100mm, 80mm and 60mm is placed in such a way that its longest side is on the ground. Find the moment of inertia of the triangular lamina about the base. [8+7]

5.a) Differentiate between second moment of inertia and mass moment of inertia.
 b) What is the efficiency of screw jack and derive an equation to find the condition for maximum efficiency? [7+8]

6.a) Explain D'Alembert's principle.
 b) An automobile is driven at 16m/sec for 800 sec, then at 20 m/sec for 1300 sec and finally at 25m/sec for 500 sec. What is the average speed over the entire travel? [7+8]

7.a) Explain the work-energy principle.

b) A hammer of mass 500kg falls through a height of 4m on a pile of negligible mass. If the hammer drives the pile 1m into the ground, find the average resistance of the ground for penetration.   [7+8]

8. Two bodies of weights 50N and 30N are connected to the two ends of a light inextensible string which passes over a smooth pulley. The weight 50N is placed on a rough inclined plane of coefficient of friction 0.2, while the weight 30N is hanging free in the air. If the angle of the plane is 16^0, determine a) Acceleration of the system. b) tension in the spring.   [7+8]

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