Code No: 152AH **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, June - 2022
ENGINEERING MECHANICS
(Common to CE, ME, MCT, MMT, AE, MIE, PTM)

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

Answer any five questions
All questions carry equal marks
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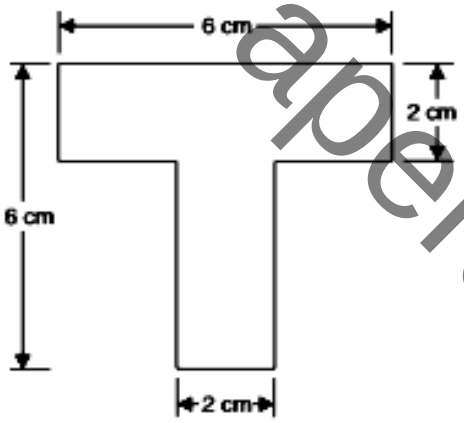
1.a) State and explain the triangle law of forces and polygon law of forces.
b) Three forces acting on a rigid body, are represented in magnitude, direction and line of action by the three sides of a triangle taken in order. Prove that the forces are equivalent to a couple whose moment is equal to twice the area of the triangles. [5+10]

2.a) How will you distinguish between static friction and dynamic friction?
b) Determine the centroid of the area remaining after a circle of diameter r is removed from a circle of diameter. [7+8]

3.a) State and explain the theorem of parallel axis for the moment of inertia f a plane lamina.
b) Calculate the moment of inertia about horizontal and vertical gravity axis of the section of the given figure. [6+9]



4.a) Determine the moment of inertia of a circle about its diametral axis from the first principles.
b) Describe the method of finding out the moment of inertia of a composite section. [8+7]

5.a) Derive the differential equation of curvilinear motion.
b) What is the work done by the weight of a body if it is moved horizontally? [8+7]

6.a) State the principle of conservation of energy? What is the fundamental interpretation of kinetic energy.
b) A Car is travelling east at a constant speed 7 m/s, at the same time another car starts from rest towards north with a constant acceleration of 2 m/s^2. Determine the position, velocity and acceleration of second car relative to the first car after 5 seconds. [5+10]

7.a) State and explain D'Alembert's principle and its application in plane motion.

b) The speed of the flywheel increase from 300 to 600 rev/min in 10 seconds. If the diameter of the wheel is 2m, Determine the angular acceleration and number of revolutions made during this period of 10 seconds. Find the normal and tangential acceleration at the rim of the wheel at the end of 10 seconds. [4+11]

8.a) Explain the instantaneous centre of rotation of a plane motion.

b) State and discuss the principle of work and energy. [8+7]

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