**18CE003**

**Hall Ticket Number**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

**II/IV B.Tech (Regular / Supplementary) Degree Examination**

**February-2021 Electrical & Electronics Engineering**

**Third Semester Engineering Mechanics**

**Time**: Three Hours Maximum: 50 Marks

Answer ALL Questions from Part - A. (1 x 10 = 10 Marks)

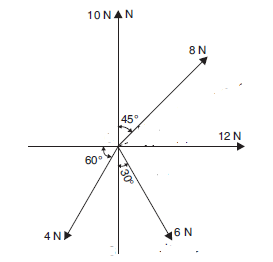
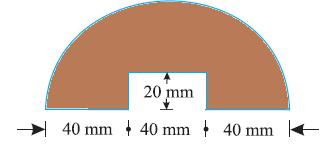
Answer ANY FOUR Questions from Part - B. (4 x 10 = 40 Marks)

Part - A

1. Answer all questions
2. Define free body diagram.
3. Write the conditions for equilibrium of particle for coplanar concurrent forces.
4. Differentiate between centroid and centre of gravity.
5. State Perpendicular axis theorem.
6. Define coefficient of friction.
7. Write the laws of dry friction.
8. Differentiate between kinematics and kinetics.
9. State D’Alemberts principle.
10. What is the relation between linear displacement and angular displacement?
11. Write the relation between linear velocity and angular velocity.

**Part - B**

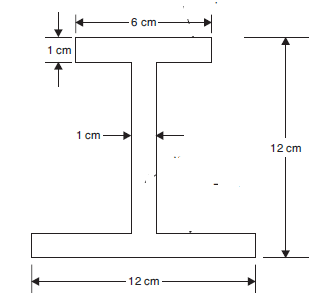
1. Determine the magnitude and direction of the resultant of the given concurrent force system as shown in **Fig 1**. **10M**

**Fig (1) Fig (2)**

1. Determine the centroid of the shaded area as shown in **Fig 2**. **10M**

**4**. Determine the M.I of the I-section about the centroidal axes as shown in following **Fig 3**. **10M**



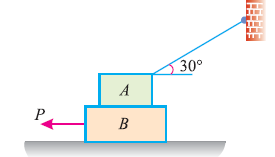
1cm

**Fig (3)**

**P.T.O.**

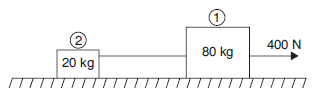
**18CE003**

**5**. Two blocks A and B of weights 100 N and 200 N respectively are in equilibrium position as shown in **Fig 4**.If the coefficient of friction between the two blocks as well as the block B and the floor is 0.3, find the force (P) required to move the block B. **10M**



**Fig (4)**

**6**. Two bodies of masses 80 kg and 20 kg are connected by a thread and move along a rough horizontal surface under the action of a force 400 N applied to the first body of mass 80 kg as shown in **Fig 5**. The co-efficient of friction between the sliding surface of the bodies and plane is 0.3. (**Use D’Alemberts principle**) **10M**



**Fig (5)**

**7**. The equation of motion of an engine is given by *S* = 2*t*3 – 6*t*2 – 5, where (*s*) is in meters and (*t*) in seconds. Calculate (*i*) displacement and acceleration when velocity is zero; and (*ii*) displacement and velocity when acceleration is zero. **10M**

**8**. Determine the mass moment of inertia of a sphere of radius R about centroidal axes. **10M**

**9**. The equation for angular displacement of a particle, moving in a circular path is given by θ = 18t + 3t2 – 2t3,where θ is the angular displacement at the end of t sec. Find (i) angular velocity and acceleration at start, (ii) time and angular acceleration, when the angular velocity is zero.

**10M**

****