26 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chitra

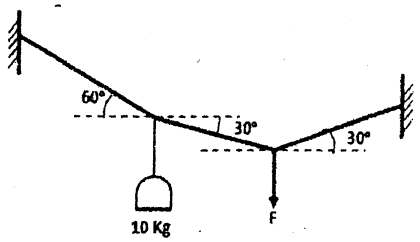
Exam.	Old Back (2065 & Earlier Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT	Pass Marks	32
Year / Part	I / I	Time	3 hrs.

Subject: - Applied Mechanics *(EG439CE)*

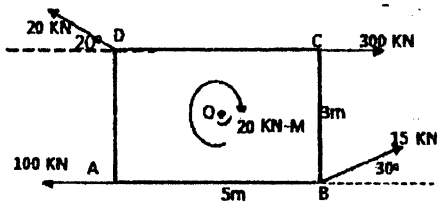
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. (a.) Describe the Free Body Diagram and its importance in analysis of structure. (3)

(b.) Determine the force in each cable and the force *F* needed to hold the 10Kg lamp in the position shown in figure below. (5)

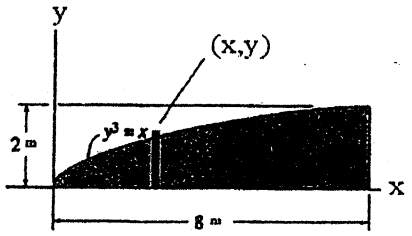


(c.) Determine the magnitude and direction of the resultant force in the given force system (8)



2. (a.) Define the Moment of Inertia, Polar Moment of Inertia and Radius of Gyration. (6)

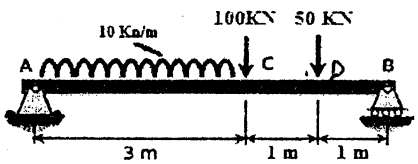
(b.) Determine the Moment of Inertia of following enclosed (hatched) area with the curves $y^3 = x$. Use suitable method. (10)



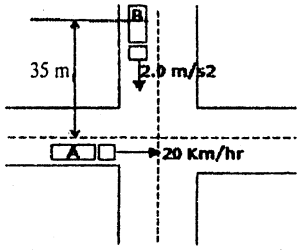
3. (a.) Define the limiting friction, coefficient of friction and angle of friction. (3)

(b.) Write down the ideal assumptions of Truss. (3)

(c.) Draw the ***Axial Force***, ***Shear Force*** and ***Bending Moment diagram*** of the given beam. Also show the salient features, if any. (10)



4. **(a.)** Auto mobile 'A' is travelling east at the constant speed of 20 Km/hr. As automobile 'A' crosses the intersection shown, automobile 'B' starts from rest 35m North of a intersection and moves south with a constant acceleration of $2m/s^2$. Determine the position, velocity, and acceleration of 'B' relative to 'A'; 10 sec after 'A' crosses the intersection. (10)



(b.) Derive the expression for the tangential and normal components of the acceleration. (6)

5. (a.) Describe the translational, rotational and general plane motion of rigid body? Illustrate with suitable examples. (8)

(b.) Describe the impulsive motion and eccentric impact for the rigid body with suitable expression. (8)

6. Write short notes on: (any four) [4×4]

a) Force analysis for rigid bodies and their equations of motion
b) Conservative and non-conservative systems
c) Projectile motion with examples and applications
d) Distribution and centre of pressures on submerged surfaces with examples
e) Determinate and indeterminate frames

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