TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Bhadra

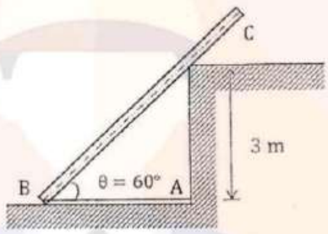
Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BEI, BAM, BIE, BAG, BAR, BAS	Pass Marks	32
Year / Part	I / I	Time	3 hrs.

Subject: - Applied Mechanics (*CE 401*)

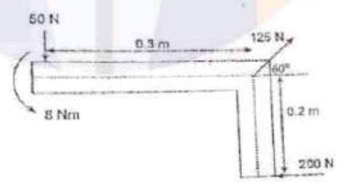
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt* ***All*** *questions.*
- ✓ *The figures in the margin indicate* ***Full Marks***.
- ✓ *Assume suitable data if necessary.*

1. Why do you think idealization in applied mechanics is necessary? List out the idealization used. [3]

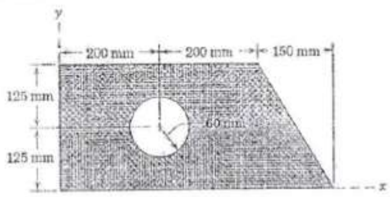
2. A cable AB holds a post BC of 4 m length from sliding as shown in figure. The post BC has a mass of 8 kg. Assuming all surface are smooth, determine the tension in the cable AB. How can you draw a good FBD? [6+2]



3. State and prove Varignon's theorem. An angle bracket has been subjected to three forces and a couple as shown in the figure. Determine the resultant of these forces. Locate the position of resultant. [4+8]

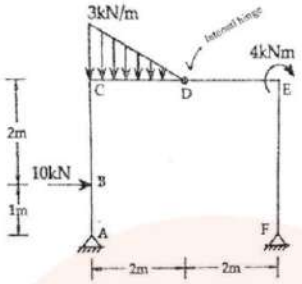


4. State and prove parallel axis theorem. Find moment of inertia of the given composite figure about its centroidal axis. [4+8]

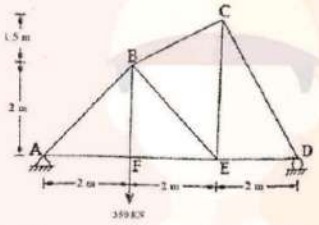


5. Define impending motion. How can we assure the condition of sliding or tipping of a block? [1+3]

6. Draw axial force, shear force and bending moment diagram of the given frame. Indicate salient features (if any). [13]

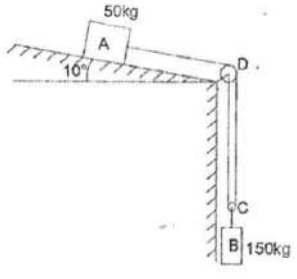


7. What are the assumptions of an ideal truss? Determine the force developed in the members AB, BC, BF, BE of the truss loaded as shown in figure below. [2+6]



8. Explain about the radial and transverse for components of velocity and acceleration for a particle moving in a curvilinear path. A projectile is fired from the edge of a 145 m cliff with an initial velocity of 200 m/s at an angle of 30° with the horizontal. Neglecting air resistance, find [3+7]
   a) the greatest elevation above the ground
   b) the horizontal distance from the gun to the point where the projectile strikes the ground
   c) the velocity with which it strikes the ground

9. Define impulse momentum principle for particles. Two blocks start from rest. The pully is frictionless and having no mass. If μ_k between block A and inclined plane is 0.35. Determine the acceleration of each block and tension in each cord. [2+8]



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