21 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division

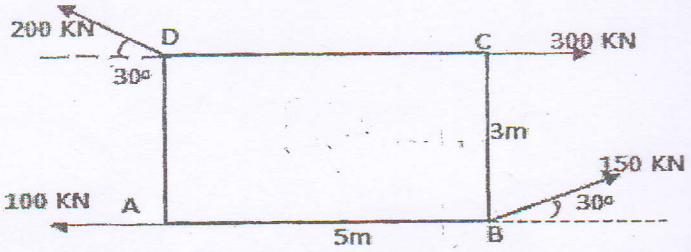
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, BAME, BIE, B. Agri. B. Arch.	Pass Marks	32
Year / Part	I / I	Time	3 hrs.

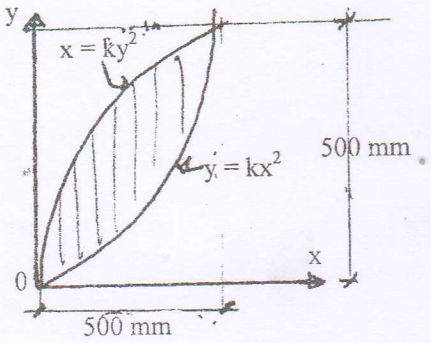
Subject: - Applied Mechanics *(CE401)*

- ✓ 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.*

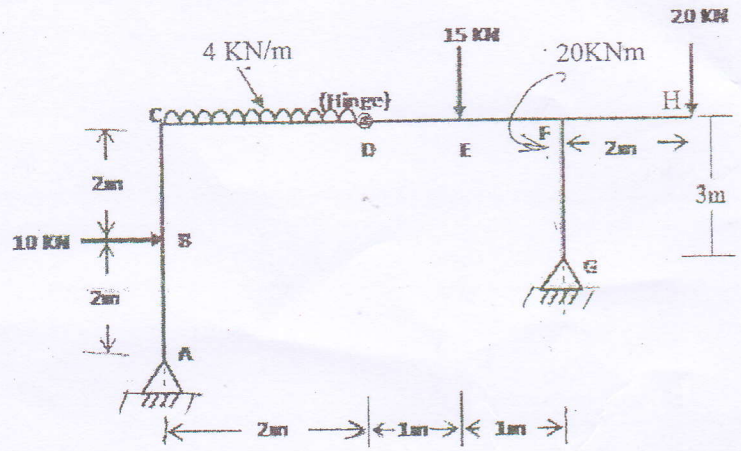
1. Describe about the fundamental principle of applied mechanics. [3]
2. Write down the steps to be considered while drawing a free body diagram. Illustrate equilibrium condition of particle and rigid body in two and three dimensional analysis. [8]
3. Find the magnitude, direction and Position of resultant force of the following system as shown in figure. [10]



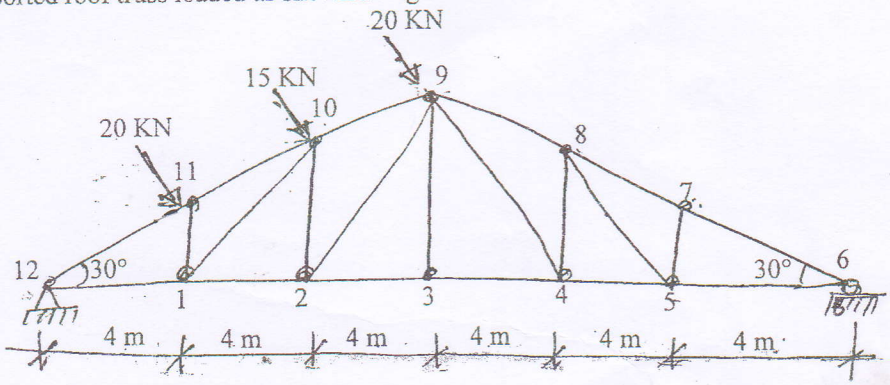
4. Describe the condition illustrating No friction, No motion, Impending motion and motion with proper sketches. How can we assure condition of sliding and over turning of a block? Explain with suitable figure. [3+2]
5. State and prove parallel axes theorem for moment of inertia. Determine centroid of the given plane in figure below. [4+8]



6. Draw the Axial Force, Shear Force and Bending Moment diagram for the given frame shown in figure below. Also show the salient features. [14]



7. Find the member force of members 1-11, 1-10, 1-2 ,2-10 and 10-11 of the simply supported roof truss loaded as shown in figure below. [8]

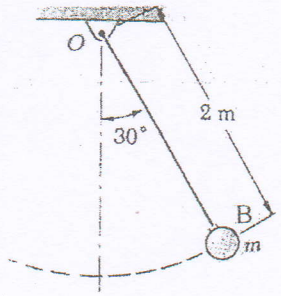


8. A ball is tossed with velocity of 10 m/s directed vertically upward from a window located 20 m above the ground. Knowing that the acceleration of the ball is constant and equal to 9.81 m/s^2 downward, determine: [8+2]

   i) The velocity 'v' and the elevation 'y' of the ball above the ground at any time 't'.
   ii) The highest elevation reached by the ball and the corresponding value of 't'.
   iii) The time when the ball will hit the ground and the corresponding velocity.

   What do you mean by dependent motion? Explain with example.

9. Define the linear momentum and angular momentum. Find the velocity and the acceleration of the bob in the given position. The bob of a 2 m pendulum describes an arc of a circle in a vertical plane, which is shown in figure below. If the tension in the cord is 2.5 times the weight of the bob for the position shown. [2+8]



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