6.

TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2072 Ashwin

| Exam.		Regular		
Level	BE	Full Marks	80	
Programme	BCE, BGE, BME	Pass Marks	32	
Year / Part	I / II	Time	3 hrs.	

Subject: - Applied Mechanics *(CE451)*

✓ 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. What is mechanics? Mention scope of applied mechanics in engineering. [3]

2. Define Free body diagram with example. Explain about the principle of transmissibility. Determine the force couple system at origin of given system. Take F_1 = 100 KN F_2 = 300 KN and F_3 = 200 KN. [2+2+8]
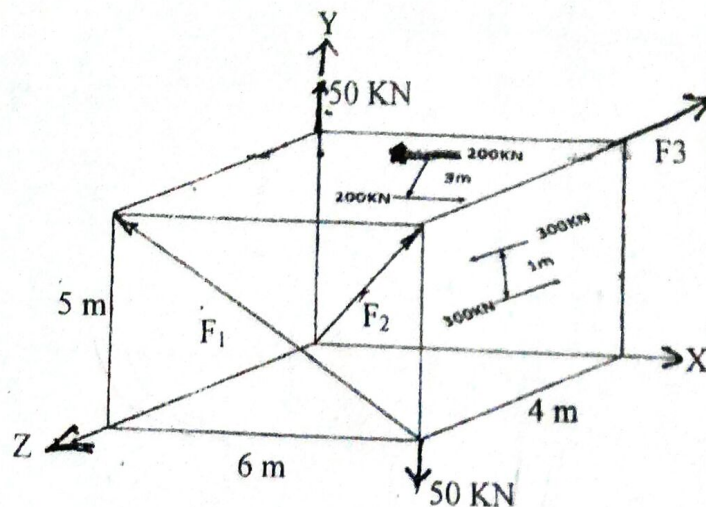
3. Determine the reaction at all contact points. Assume all contact surfaces are smooth. Take weight of sphere A = 200 KN, weight of sphere B = 400 KN, Radius of sphere A = 120 mm, Radius of sphere B = 250 mm. [8]
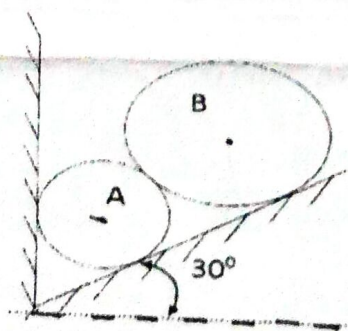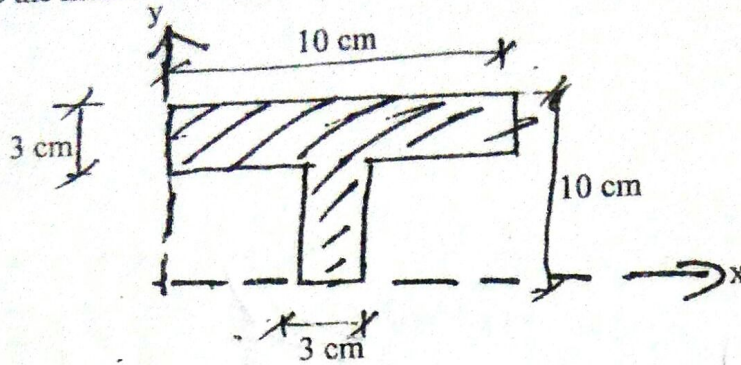

4. a) Locate the centroid of the plane area as shown in figure below by the method of integration. [6]
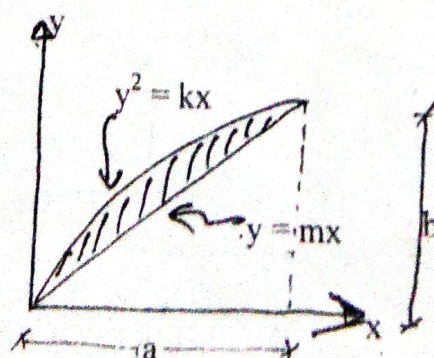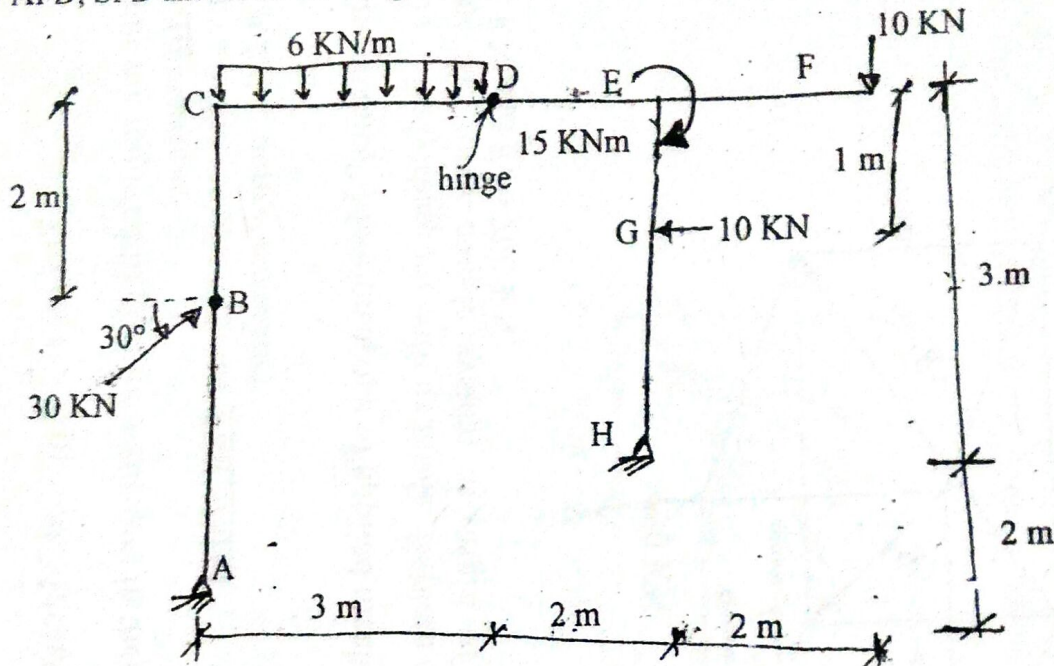
b) Determine the moment of inertia of the given section about it's centroidal axes. [6]
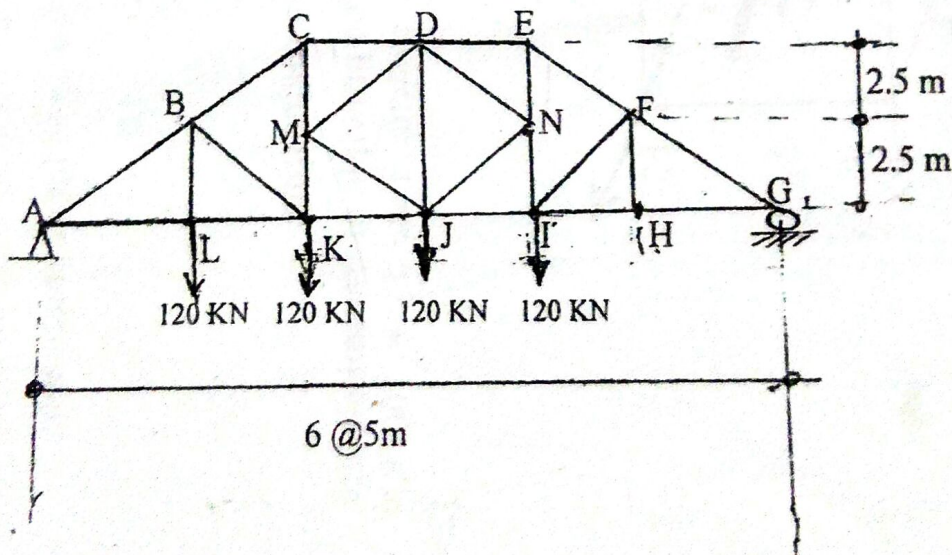

5. Draw AFD, SFD and BMD of the given frame and indicate salient features, if any: [13]

6. Determine the member forces of BC, BK, CD, MD, and DJ of the given truss. [8]

6 @5m

7. Explain the laws of static friction. Also define the limiting friction and angle of friction with suitable example. [2+1+1]

8. a) What is uniformly accelerated rectilinear motion? [2]

b) The acceleration of a particle is given by a relation $a = v^3$. It is known that at time $t = 0$, position is -2m and velocity is 1m/sec. Find the displacement, position velocity and acceleration at instant of ¼ sec. [8]

9. a) Two blocks as shown in figure below start from rest. The pulleys are frictionless and have no mass. The kinetic friction co-efficient between block A and the inclined plane is 0.4. Determine the acceleration of each block and tension in each cord. [8]

150 kg

A

20° D

C

B 400 kg
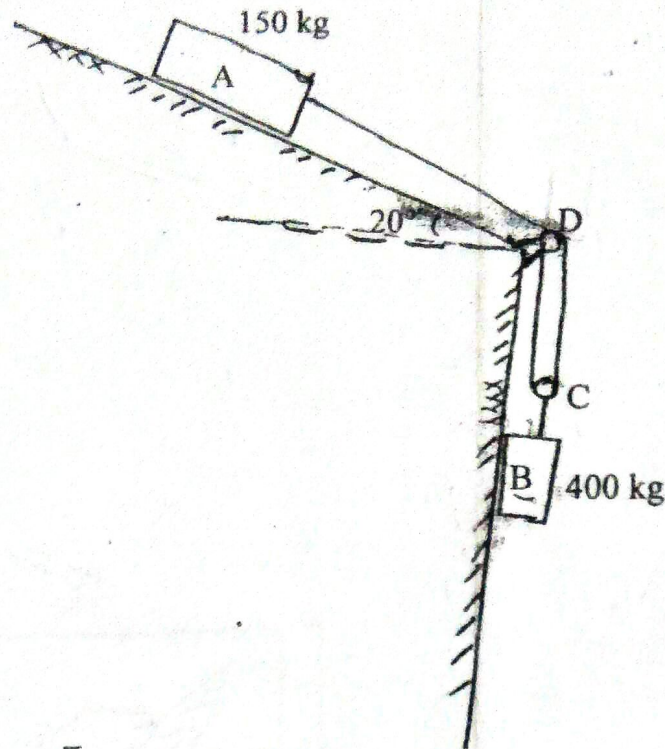
b) Prove that rate of change of angular momentum about any point is equal to moment of the force about the same point. [2]

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