01 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Bhadra

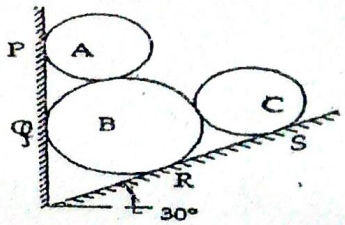
Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCE, BGE, BME	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

Subject: - Applied Mechanics *(CE451)*

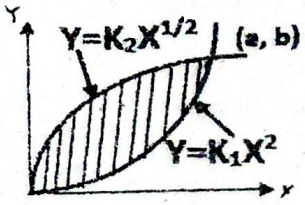
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is applied mechanics? Mention scope of applied mechanics in engineering. [1+2]
2. What is free body diagram? Determine the support reaction at contact point of given system. Assume contact surfaces are smooth. [1+7]

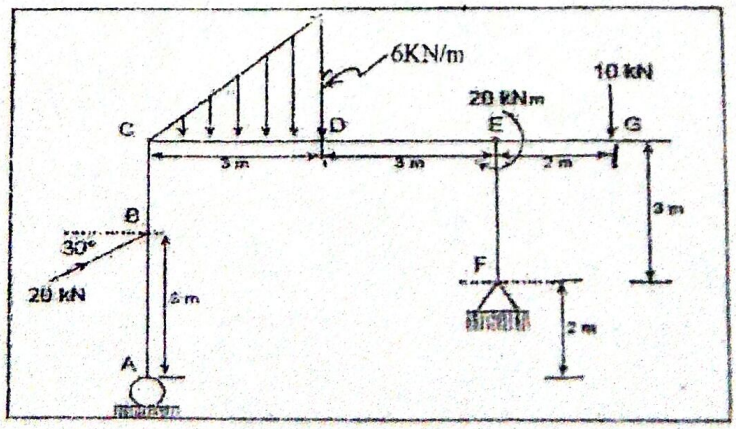
   Take,
   Weight of sphere A and C = 300N
   Weight of sphere B = 600N
   Diameter of A and C = 800mm
   Diameter of B = 1200mm



3. State and prove the parallel axis theorem for moment of inertia. Determine the moment of inertia about centroidal 'Y' axis of given shaded area. [4+8]



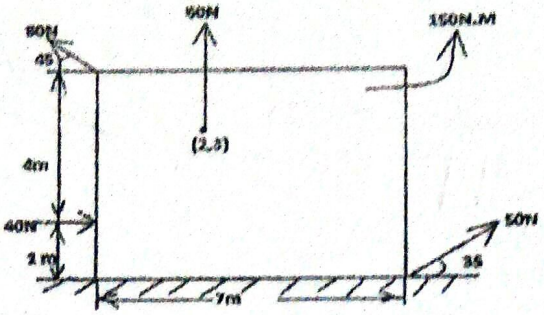
4. Define angle of friction, coefficient of friction. Why coefficient of static friction is greater than coefficient of kinetic friction. [1+1+2]
5. Draw axial force, shear force and bending moment diagram; and obtain salient features for the given frame Loaded as shown in figure. [13]



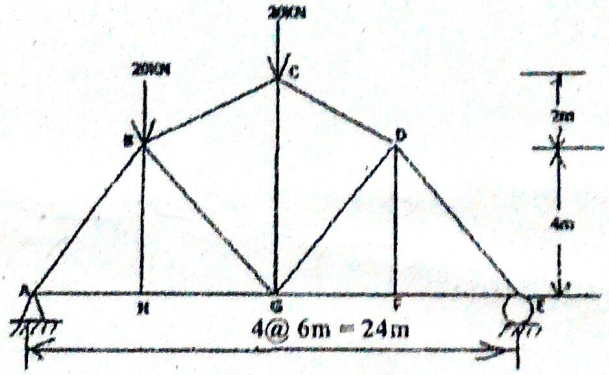
6. The acceleration of a particle is defined by the relation $a = 12x-28$ where a in m/s^2 and x in m. knowing that $v = 8m/s$ when $x = 0$; determine [8+2]

a) the maximum value of x.
b) the velocity when the particle has travelled a total distance of 3m.
c) What do you mean by dependent motion of particle? Explain with suitable example.

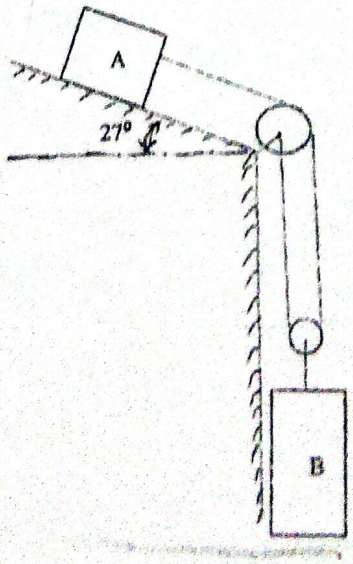
7. Explain free body diagram and its importance. Find the magnitude, direction of resultant force and locate two points on the edge of the plate where the resultant meet. [4+8]



8. Determine the member force in members BC, BG and DF. How can we check the determinacy and stability of the truss? Explain with suitable example. [5+3]



9. Derive the expression for angular momentum and rate of change. Two blocks, A of mass 150 kg and block B of mass 350 kg, shown starts from rest. The coefficient of friction between horizontal plane and the pulley is 0.2 and the pulleys assumed to be of negligible mass. Determine the acceleration of each block and tension in each chord. [2+8]



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