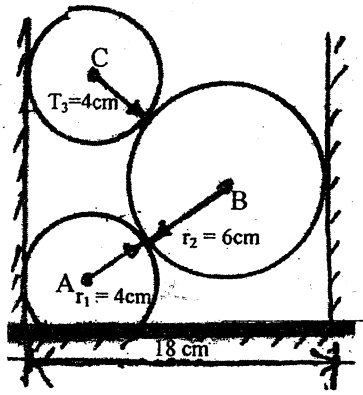
21 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

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

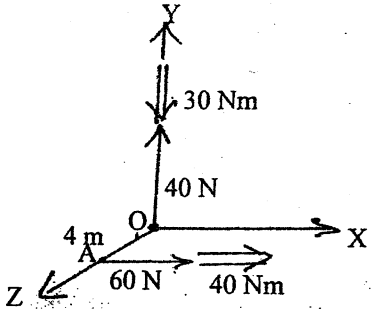
Subject: - Applied Mechanics *(CE401)*

- ✓ 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.*

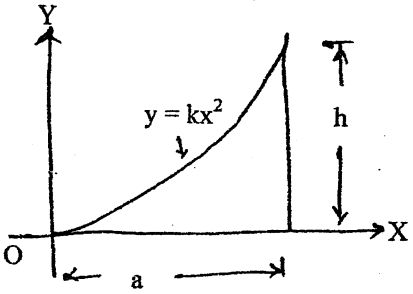
1. Describe the scope and importance of applied mechanics in engineering study. Define free body diagram with examples. [2+2]
2. Determine the reactions at the contact points, if three cylinders are piled in a rectangular ditch as shown in figure. Given that the weight of the cylinders are: $W_A = 2$ KN [8]
   $W_B = 5$ KN
   $W_C = 3$ KN



3. How can you reduce a force into a force and couple? Obtain the resultant of the two pairs of wrench shown in the figure. Indicate it's line of action. [3+8]

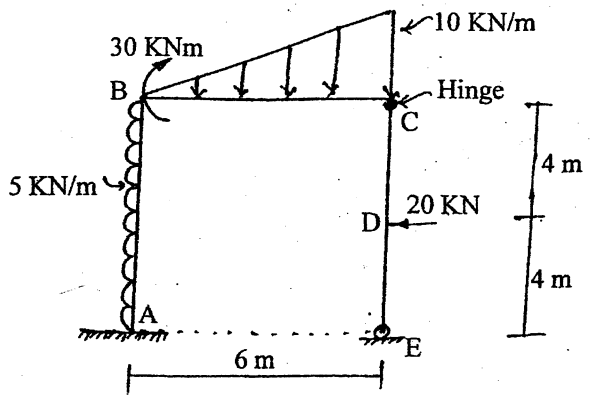


4. Determine centroid of the given plane figure. State and prove parallel axes theorem for moment of inertia. Define centroid and center of gravity. [7+3+2]

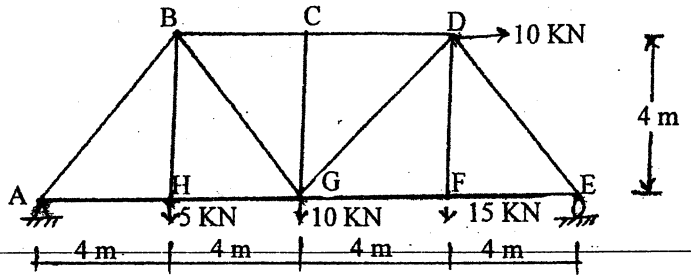


5. Define the angle of friction and also write the laws of static friction. [4]

6. Draw axial force, shear force and bending moment diagram for the loaded frame as shown in figure below. Also indicate the salient featutes if any. [13]

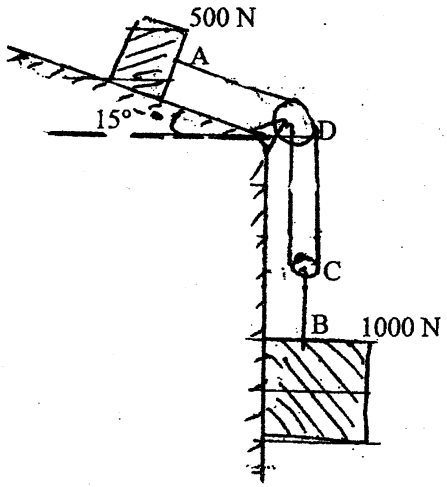


7. Determine the total degree of internal, external indeterminacy of given truss. Also determine the member forces in members BC, BG, HG and GD. [2+6]



8. The acceleration of a partial is given by a relation $a = v^3$. It is known that at time t = 0, position is -2m and velocity is 2m/sec. Find the displacement, position, velocity and acceleration at instant of ½ sec. What do you mean by projectile and obtain the equations for projectile motion. [7+3]

9. What do you mean by impulse momentum principle? Two blocks A and B having respective weights 500 N and 1000 N start form rest. The pulley is frictionless and also practically mass less. The kinetic coefficient of friction between the block A and the inclined surface is 0.35. Determine the acceleration of each block and tension in the cord. [2+8]



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