21 TRIBHUVAN UNIVERSITY INSTITUTE OF ENGINEERING

Examination Control Division

2073 Shrawan

Exam.	New Back (2066 & Later Batch)		
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.

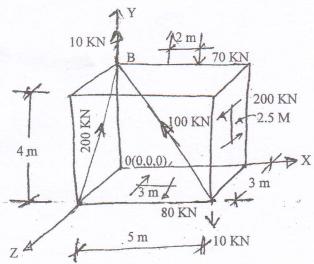
[3]

[8]

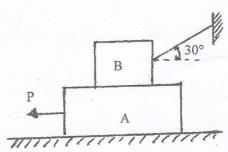
[5]

Subject: - Applied Mechanics (CE401)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt <u>All</u> questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.
- 1. What do you understand by a Rigid Body? Why it is necessary to assume a body as 'perfectly rigid' for your present study?
- 2. Write down the concept of rigid bodies and deformable bodies. What is Free Body Diagram and why it is used during analysis of structure?
- 3. Determine the resultant force and moment of the following system about the point 'O' as shown in figure below. [10]

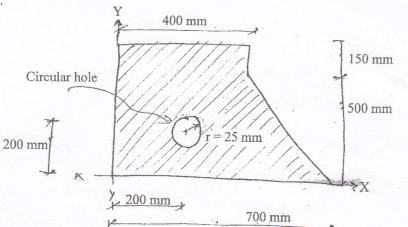


4. Two blocks A and B of 40 N and 20 N respectively are in equilibrium position as shown in figure below. Calculate the force P required to move block A. Take μ = 0.3 for all surface.

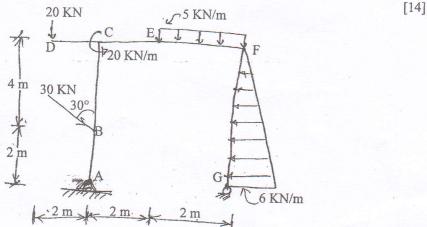




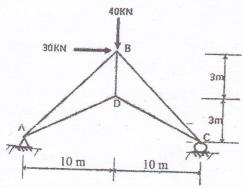
5. Calculate the moment of inertia of the composite area as shown in figure about it's centrorial axes. Define centroid, center of gravity, axis of symmetry and radius of gyration.



6. Draw AFD, SFD and BMD for the given frame and loading. Indicate salient points, if any.



7. Write down the ideal assumptions of Truss. Calculate the member forces in all members of the truss loaded as shown in figure below by using suitable method. [2+6]



8. Define the uniformly rectilinear motion and the uniformly accelerated rectilinear motion. A projectile is fired with an initial velocity of 244m/s at a target B located 610m above the gun A and at a horizontal distance of 3658m. Neglect air resistance, determine the value of the firing angle α.

9. The motion of a 1000 gm block B in a horizontal plane is defined by radius, $r = 2(1+\cos 2\pi t)$ and $\theta = 2\pi t$ where 'r' is expressed in meters and t in seconds. Determine the radial and transverse components of the force exerted on the block B at 0.8 sec. Explain about principle of impulse and momentum.

[2+8]

[8+4]

[8+2]
