

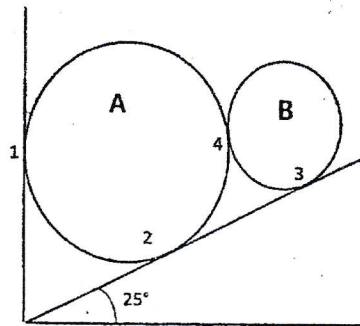
TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2077 Chaitra

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

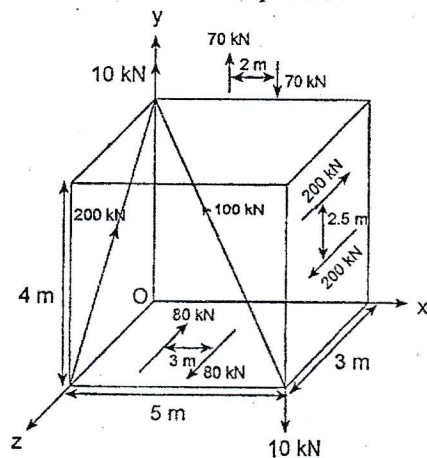
Subject: - Applied Mechanics (CE 451)

- ✓ 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.

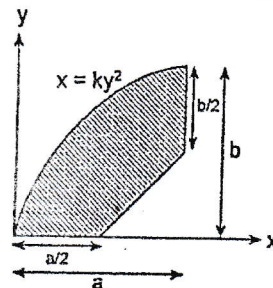
- What do you understand by Free Body Diagram? Explain with sketches. [4]
- The cylinder A and B rest in an inclined smooth surface which makes an angle of 25° with horizontal as shown in figure. Given, Weight of cylinder A = 200 N, Weight of cylinder B = 150 N, diameter of A = 90 mm, diameter of B = 60 mm. Determine all the contact forces. [8]



- Determine the resultant force and moment about point O. [10]

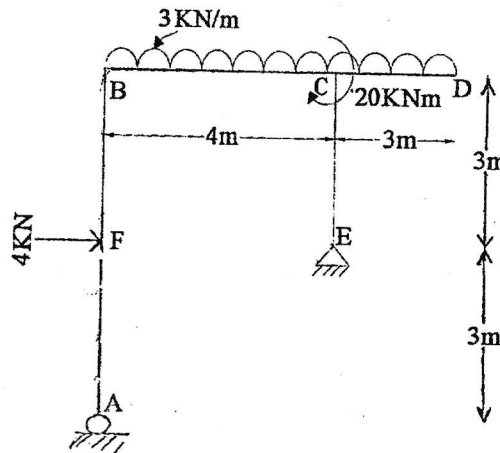


- State and prove Parallel Axis theorem. Determine the centroid of the shaded area. [4+8]



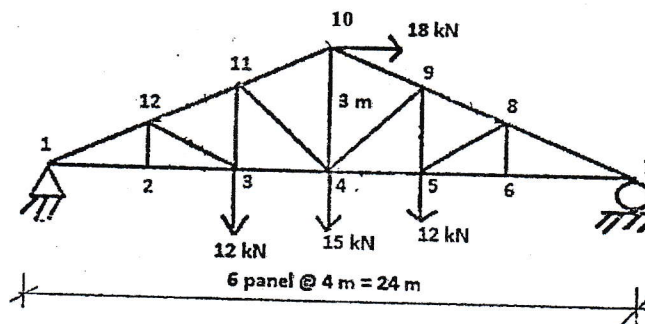
5. Calculate and draw the axial force, shear force and bending moment diagram with its salient features for the given frame as shown in figure below.

[13]



6. Calculate the member forces in 9-4, 9-5, 4-5, 5-8 of the given truss shown in figure.

[8]



7. A uniform ladder of weight 250N and length 5m is placed against a vertical wall in a position where its inclination to horizontal is 60° . A man of weight 800N climbs the ladder. At what position along a ladder will he induce slippage? Take $\mu = 0.2$ for all surface.

[5]

8. Explain about dependent motion. The motion of vibrating particle is defined by the equations $x = 100 \sin \pi t$ and $y = 25 \cos 2\pi t$ where x and y are expressed in mm and t in seconds. Determine

- The velocity and acceleration when $t = 1\text{sec}$
- Path of particle

[2+4+4]

9. Two rough plane inclined at 30° and 60° are placed as shown in figure. Mass of block A is 12kg and block B is 24kg are connected by string. If $\mu = 0.6$, find resulting acceleration. Define angular momentum and find the rate of change of angular momentum.

[8+2]

