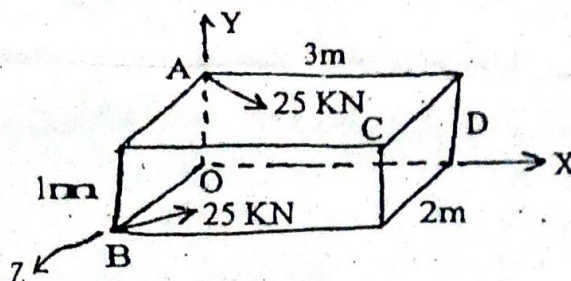


Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCE, BGE, BME	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

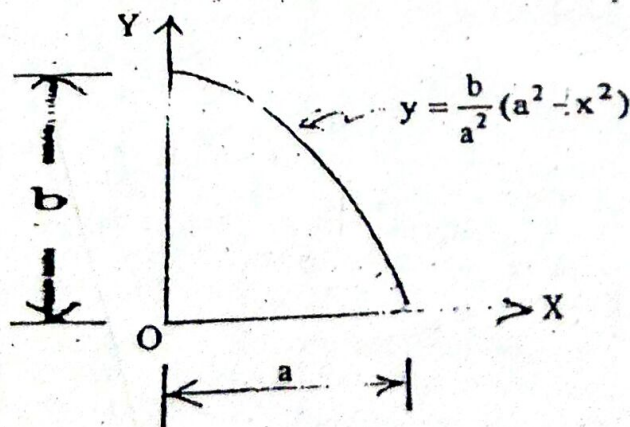
**Subject: - Applied Mechanics (CE451)**

- ✓ 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.

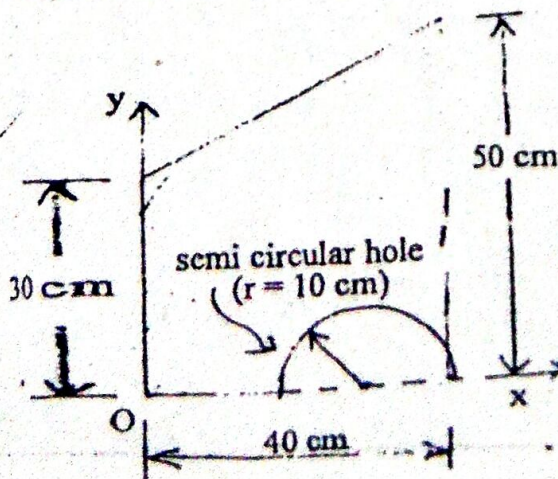
1. What do you mean by rigid body? Why it is necessary to assume a body as "perfectly rigid" for the study of statics. [1+2]
2. What is free body diagram? Why is it necessary to draw free body diagram in solving any structural problems? Also describe equation of equilibrium in two dimension. [2+3+3]
3. If two forces of same magnitude 25 kN act at points A and B as shown in figure and force at A passes through C and force at B passes through D. (a) Find equivalent force-couple system at 'O' (b) Find equivalent wrench and give pitch and axis of wrench. [12]



4. Locate the centroid of the area bounded by the curve as shown in figure, by the method of integration. [6]

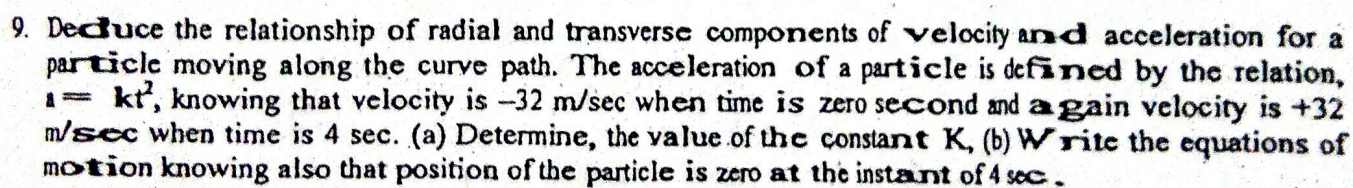
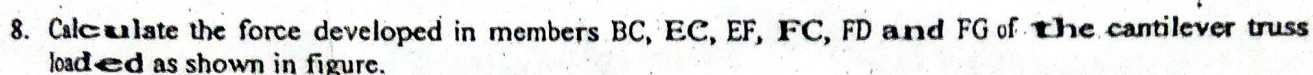
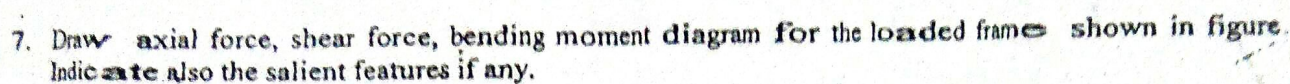


5. Calculate the moment of inertia of the composite area as shown in figure, about x-axis. [6]

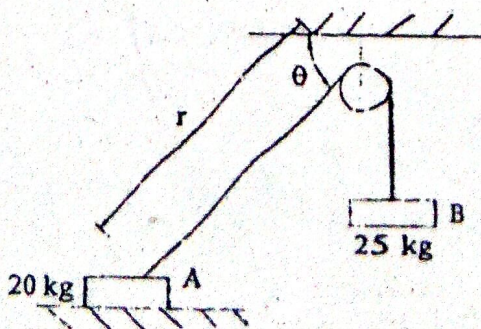




- [5]



10. The velocity of block 'A' is 2 m/s to the right at the instant when  $r = 0.8$  and  $\theta = 30^\circ$ . Neglecting the mass of pulleys, and the effect of friction in the pulley, and between block 'A' and the horizontal surfaces. Determine at this instant (a) the tension in the cable (b) the acceleration of the block A (c) the acceleration of the block B.



[10]