KATHMANDU UNIVERSITY
End Semester Examination [C]
April/May, 2023

03. May- 023

Level : B.E.
Year : II
Time : 2 hrs. 30 mins.

Course : CIEG 203
Semester : I
F.M. : 40

SECTION "B"

Attempt ***ALL*** questions. Assume data if necessary.

1. Describe briefly the concept of particle, rigid body, and deformable body. [3]

2. An electric light fixture weighing 15 N hangs from point C, by two strings AC and BC. The string AC is inclined at 60° to the horizontal and BC at 45° to the horizontal as shown in the given figure 1. Determine the forces in the strings AC and BC. [4]

3. The given figure 2 shows the cross-section of a cast iron beam. Determine the moments of inertia of the section about the horizontal and vertical axes passing through the centroid of the section. [6]

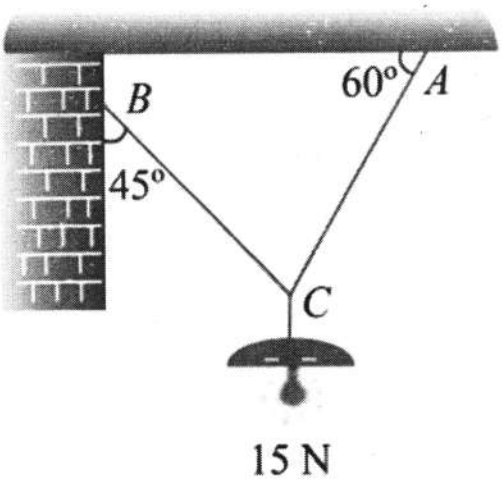

Figure 1

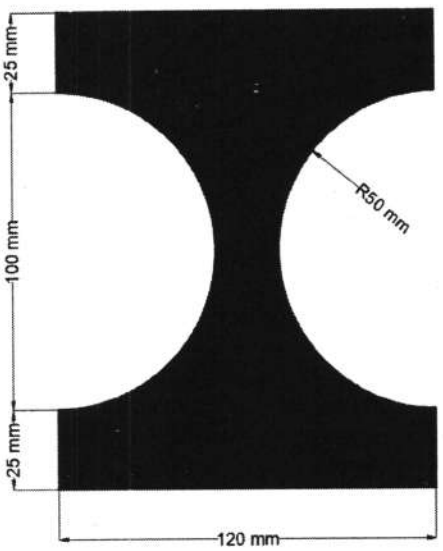

Figure 2

4. Define limiting friction, angle of friction, and coefficient of static and dynamic friction.[4]

5. Draw the bending moment diagram, shear force and axial force diagrams for the given figure 3. And also indicate the salient points. [8]

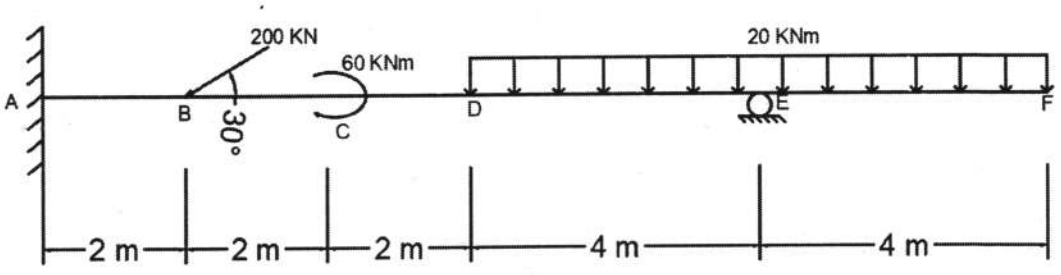

Figure 3

6. Determine the magnitude and nature of member forces in BC, CH, HG, and CG in the truss which carries a vertical load of 9 kN and 12 kN as shown in figure 4 below. [8]

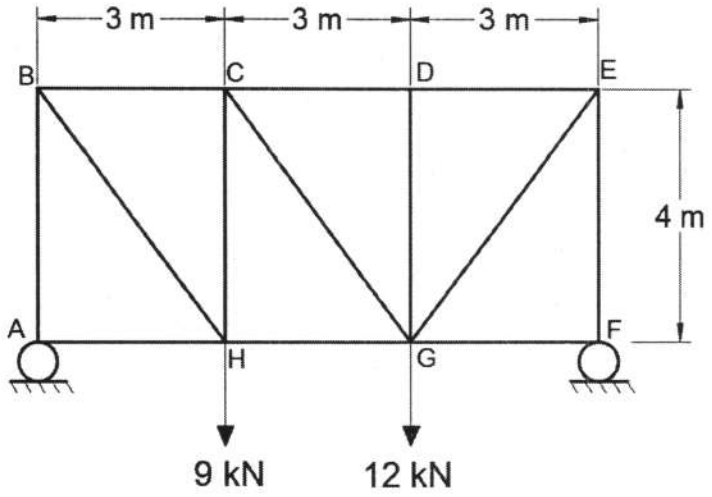

Figure 3

7. Explain the term General plane motion of a rigid body with example. The motion of an oscillating crank is defined by the relation $\Theta=\Theta_0 \sin(\pi t/T) - (0.5\ \Theta_0) \sin(2\pi t/T)$ where Θ is expressed in radians and t in seconds. Knowing that $\Theta_0=6$ rad and T = 4 s, determine the angular coordinate, the angular velocity, and the angular acceleration of the crank when (a) t = 0, (b) t = 2 s. [2+5]