School of Engineering

B.TECH Civil Engineering
Semester End Examination - Jun 2024

Duration : 180 Minutes
Max Marks : 100

**Sem II - G3UB201T - Engineering Mechanics**

General Instructions
Answer to the specific question asked
*Draw neat, labelled diagrams wherever necessary*
Approved data hand books are allowed subject to verification by the Invigilator

1) Define coplanar and non coplanar forces. K1(2)

2) Explain the concept of displacement-time curve and velocity-time curve. What information can be obtained from these curves? K2(4)

3) A sphere weighing 100 N is tied to a smooth wall by a string as shown in fig. Find the tension T in the string and the reaction R from the wall. K2(6)
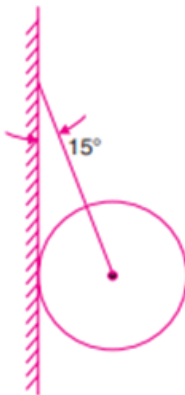

4) Make use of parallel axis theorem to Find the moment of inertia about the centroidal X-X and Y-Y axes of the angle section shown K3(9)

in Fig
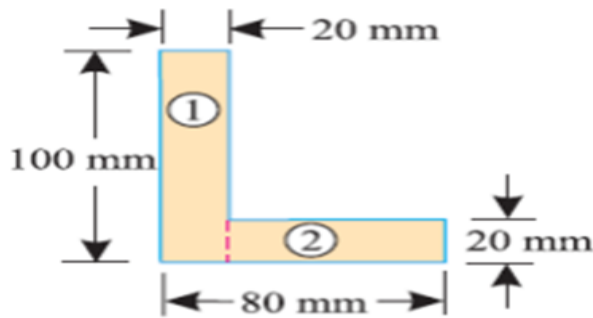
5) Derive the expressions for the maximum height reached and the time required to reach the maximum height for a particle projected with an initial velocity u at an angle α with the horizontal. K3(9)

6) A stone dropped into a well is heard to strike the water in 4 seconds.Find the depth of the well, assuming the velocity of sound to be 335 m/sec. K5(10)

7) ABCD is a square section of sides 100 mm. Determine the ratio of moment of inertia of thesection about centroidal axis parallel to a side to that about diagonal AC K4(12)

8) A uniform lamina shown in fig. Consists of a rectangle, a circle and a triangle. Determine the center of gravity of the lamina. All dimensions are in mm K5(15)
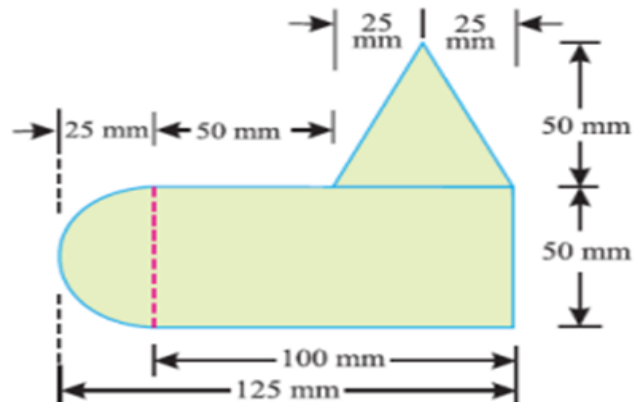
9) A ball is dropped from the top of a tower 30 m high. At the same instant a second ball is thrown upward from the ground with an initial velocity of 15 m/sec. When and where do they cross and with what relative velocity? K5(15)

10) Three forces acting at center of gravity of a block are shown in Fig. The direction of 300 N forces may vary, but the angle between them is always 40°. Determine the value of 6 for which the resultant of the three forces is directed parallel to the plane. K6(18)