Roll No												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - FEB 2023

Semester : Semester I - 2022
Course Code : CIV1003
Course Name : Sem I - CIV1003 - Elements of Engineering Mechanics
Program : B.Tech - CIV

Date : 23-FEB-2023
Time : 1.00PM - 4.00PM
Max Marks : 100
Weightage : 50%

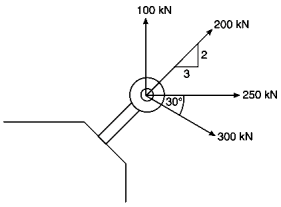
Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **(5 X 5 = 25M)**

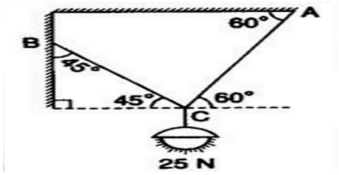
1. Describe the concept of Rigid body and Particle. Also mention any 4 assumptions made in Engineering Mechanics. (CO1) [Knowledge]

2. Four forces are acting on a bolt as shown in the figure. Determine the magnitude and direction of the resultant force.



(CO1) [Knowledge]

3. An electric light fixture weighing 25 N hangs from a point C, by two strings AC and BC. The string AC is inclined at 60° to the horizontal and BC at 45° to the vertical; as shown in figure. Determine the forces in the strings AC and BC.



(CO2) [Knowledge]

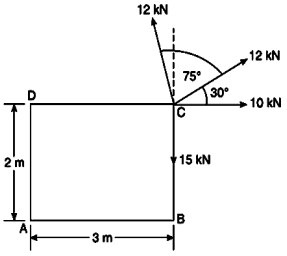
4. Explain the types of beams and supports with the help of neat figures. (CO2) [Knowledge]

5. Prove angle of repose equal to angle of friction. (CO3) [Knowledge]

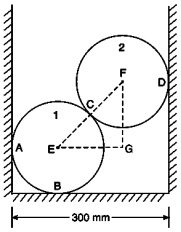
PART B

ANSWER ALL THE QUESTIONS **(3 X 10 = 30M)**

6. Determine: (i) The resultant of the forces (ii) The sum of moments of the forces about the point A, the 10 kN force acts parallel to AB as shown in the figure. (CO1) [Comprehension]

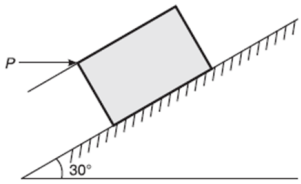


7. Two spheres each of radius 100 mm and weight 5 kN are in a rectangular box as shown in the figure. Calculate the reactions at all the points of contact.



(CO2) [Comprehension]

8. A small block of weight 1000 N as shown in the figure, is placed on a 30° inclined plane with μ = 0.25. Determine the horizontal force to be applied for:
(i) Impending motion down the plane
(ii) Impending motion up the plane.

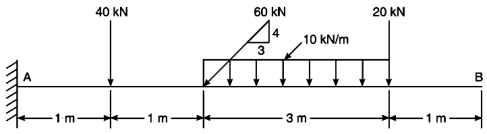


(CO3) [Comprehension]

PART C

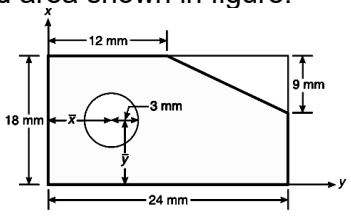
ANSWER ALL THE QUESTIONS **(3 X 15 = 45M)**

9. Calculate the support reactions for the cantilever beam loaded as shown in figure.



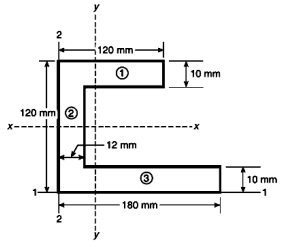
(CO2) [Application]

10. Determine the centroid of the shaded area shown in figure.



(CO3) [Application]

11. Determine the moment of inertia of the section, shown in figure, about its centroidal axes.



(CO3) [Application]

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