MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(GOVERNMENT AIDED AUTONOMOUS ENGINEERING COLLEGE)

DEPARTMENT OF CIVIL ENGINEERING

First Sessional Examination October 2026

B24CE1T02 - ENGINEERING MECHANICS

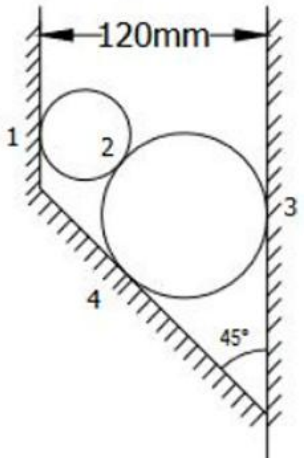
(S1 CA & CB)

Max. Marks 40 Time :1 Hour 30 Minutes

Answer all questions from Part A and Part B

PART A (4 × 3=12 Marks)

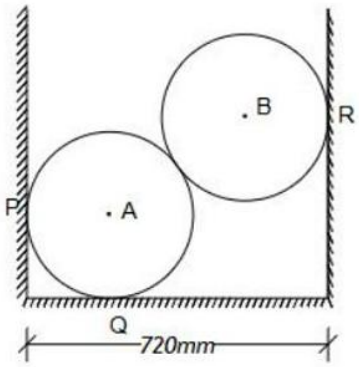
1. Determine the magnitude and direction of the resultant of the two forces of magnitude 12 N and 9 N acting at a point, if the angle between the two forces is 30°. (CO1)
2. Draw the free-body diagram of each sphere for the following figure. (CO1)



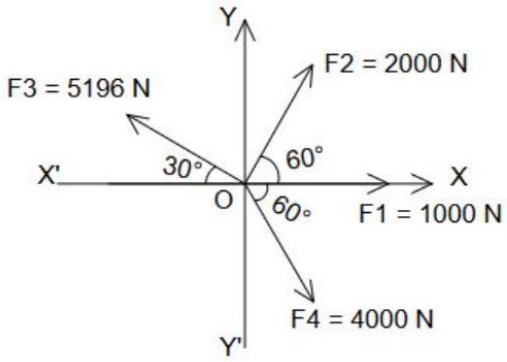
3. Consider a wooden door in your classroom, attached to the door frame with hinges. What type of support is it? How many degrees of freedom does this door have? (CO2)
4. Identify the most appropriate type of beam for each application mentioned below
   (a) A balcony slab/beam projecting outward from a building and supported only at one end.
   (b) A long floor beam in a building is supported by three or more columns along its length.
   (c) A beam in a building that is supported at two points but extends beyond one of the supports. (CO2)

PART B (2 × 14=28 marks)

5. a) Two smooth cylinders A and B, each of diameter 500 mm and weight 250 N, rest in a horizontal channel having vertical walls and base width of 720 mm, as shown in the figure. Find the reactions at P, Q and R. (9 Marks) (CO1)



b) Four coplanar forces are acting at a point as shown in Figure. Determine the resultant force in magnitude and direction. (5 Marks) (CO1)



6. a) Explain different types of beams with neat sketches. (8 Marks) (CO2)

b) Explain the different types of loading acting on a beam with neat sketches. (6 marks) (CO2)

Course Outcomes:
Students will be able to

CO1	Understand the concepts and theorems connected with rigid body mechanics And solve the problems with the system of forces acting on a rigid body.
CO2	Analyze the beams and apply the principle of virtual work to beam members.

Vision

A department that is proficient in all aspects of civil Engineering education, blending theory and practice.

Mission

- To impart the right combination of civil Engineering fundamentals and use of modern tools to the students.
- To encourage learning with due emphasis given to professional ethics and traditional norms.
- To enhance the knowledge base of students in liaison with practice and research.
- To encourage life-long learning.

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Question No	1	2	3	4	5a	5b	6a	6b	Total Marks
CO Mapping	CO1	CO1	CO2	CO2	CO1	CO1	CO2	CO2	40
Bloom's Taxonomy level	2	2	3	3	3	3	2	2	
Marks	3	3	3	3	9	5	8	6	

	Prepared by	Scrutinized by	Approved by
Name	Dr. Anna Mariya Shajan Dr. Indu Susan Raj	Prof. Nidhin B Parapattu	Dr. Elson John (HOD, CE)
Signature			
Date			