

School of Engineering

Engineering Physics (ENPH101)		
Examination Number	Test 1	
Year	2025	
Internal Examiner	Adebola Adeyemi (Cand. Tech. Eng.)	
External Moderator	Andre Bester	
Total Marks	50	
Duration	1 hour 30 minutes (+ extra 15 minutes for document upload) = 1 hour 45 minutes	
Section A	Instructions	50 Marks
Section B	Questions	

Instructions to Candidates:

1. Read each question carefully.
2. You must answer ALL sections.
3. The students may use a personal scientific calculator

Important Notes:

- This Test paper consists of Seven (7) pages
- This Test contributes 10 % towards the final mark.

Engineering Physics (ENPH101)

Declaration:

I/we declare that all the information included in this assignment is my/our original work, apart from where source material has been acknowledged. I/we acknowledge that I/we am/are aware of AIE's Plagiarism Policy and understand the consequences of breaching this policy – as well as any other AIE policy relevant to me/us.

Student Name

Student Number

Student Signature

Date

Mark and Comments

Final Mark

____%

Lecturer Comments

Section A

Discussion Questions

50 Marks

Note to the students:

- Answer the following questions in your answer book.
- The numbers of the different figures are identical with the question number.

Section B

Question One (1)

[19]

Figure 1 shows three coplanar concurrent forces situated in a Cartesian system of coordinates.

Using the resolution method determine:

- 1.1 Draw a neat free hand sketch showing the horizontal and vertical components of the forces.
(3)
- 1.2 The magnitude, direction and sense of the resultant force
(6)
- 1.3 The magnitude, direction and sense of the Equilibrant force.
(1)
- 1.4 Draw a neat free hand sketch representing the Resultant and equilibrant forces of the system.
(2)

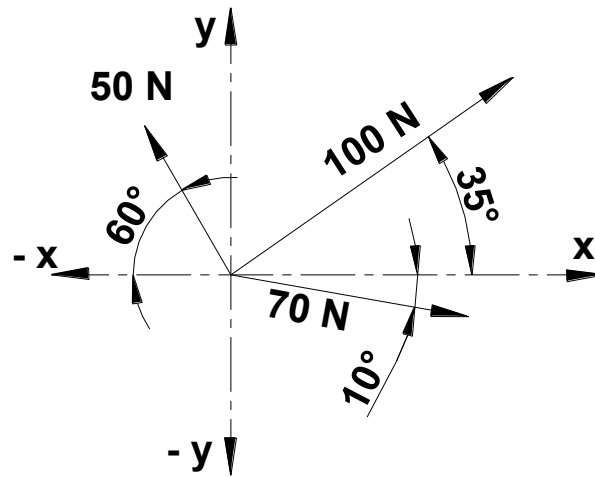


Figure 1

- 1.5. Below are four (4) vectors. Represent all vectors on the same set of axes, determine the resultant using i, j, k unit vector method. Determine the magnitude and direction of the resultant vector.

$$\vec{z}_1 = 2i + 3j$$

$$\vec{z}_2 = -3i + 2j$$

$$\vec{z}_3 = 4i - 3j$$

$$\vec{z}_4 = -4i - 5j$$

(7)

Total marks for question 1 [19]

Question Two (2)

[17]

Figure 2 shows a lever ABC hinged at B. If the lever is in static equilibrium, determine:

- 2.1 Draw a neat free hand sketch of the forces used to calculate the force P, and determine the magnitude of force P (5)
- 2.2 Draw a neat free hand sketch of the forces used to calculate the vertical and horizontal components of the reaction at the hinge B, and determine the magnitude, of the horizontal and vertical reactions at the hinge B (7)
- 2.3 The magnitude, direction and sense of the resultant reaction at the hinge B.

Solving hint:

- To calculate the moments of force P and 100 N about the hinge B , use the forces components perpendicular to the lever arms.
- To calculate the reaction at the hinge B , use the vertical and horizontal components of the forces P and 100 N .

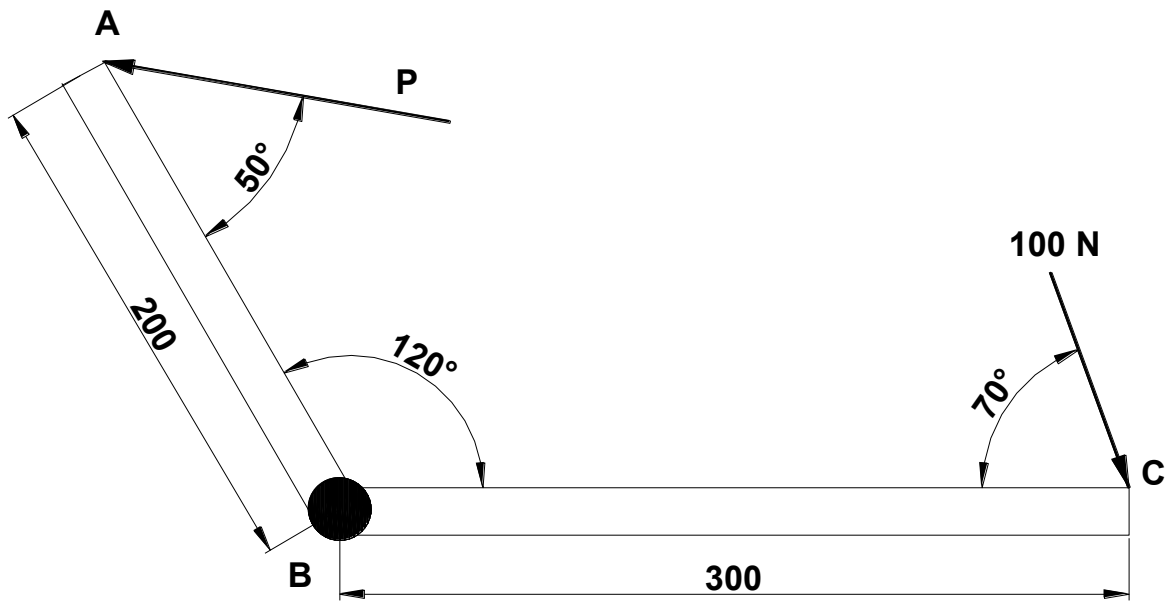


Figure 2

Total marks for question 2 [17]

Question Three (3)

Figure 3 shows a lamina with a half-circle hole in it. Place the lamina in a system of cartesian coordinate with the origin in B, and determine the position of the centroid "G" of the composite lamina relative to the vertical edge AB and horizontal edge BC.

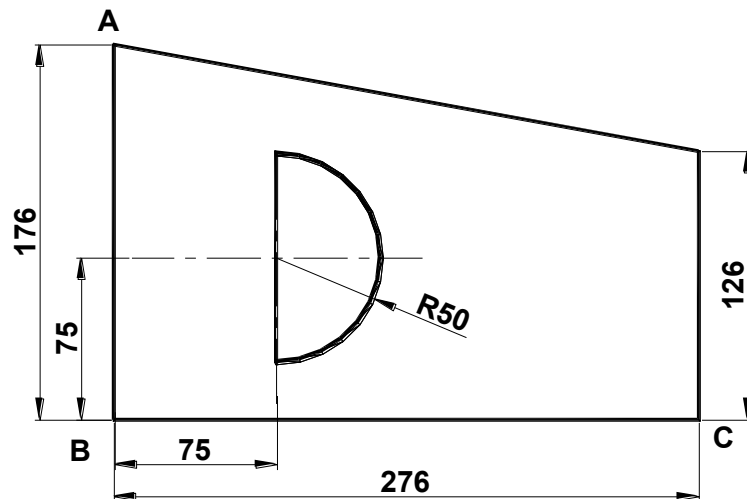
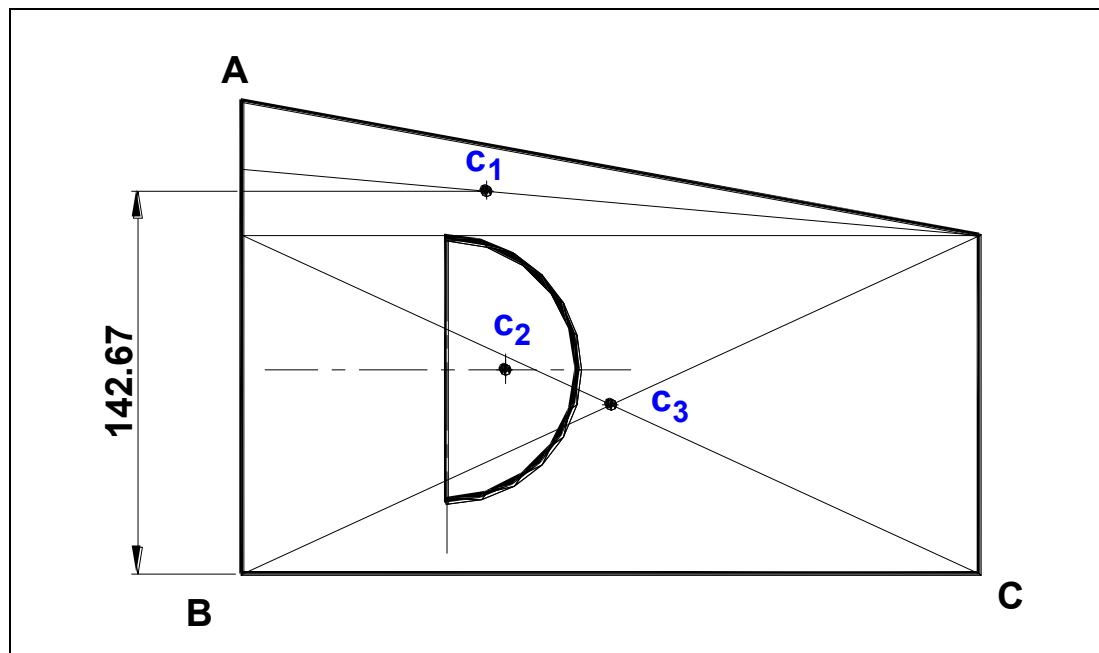


Figure 3

Solving hints:

Use the informationn below to find the position of "G"

Position of the centroid of a triangle	Position of the centroid of the half circle
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Total marks for question 3 [14]

TOTAL:50