

## ALTERNATIVE TO PHYSICS PRACTICAL

**DATE: 19 June 2025**

**Period: 8:30 am -10:00 am**



### END OF TERM III EXAMINATION MARKING GUIDE

**GRADE: SENIOR ONE (S1)**

**LEVEL: ORDINARY**

**COMBINATION: -**

**DURATION: 1 H 30 MIN**

**MARKS:**

.... /20

**CAMIS(Theory+Practical):**

...../40

### INSTRUCTIONS

- 1)This paper is composed of **ONE** compulsory question
- 2)Use only a blue or black pen.
- 3) The total marks on school report will be the results of adding Theory and Practical Examinations' marks then converted to 40 marks

### **ATTEMPT ALL SUB QUESTIONS (20 MARKS)**

a) Use of the following materials

- i) Pin or sharp point is used to make hole and suspend the lamina **(1mark)**
- ii) Piece of string is used to create plumb lines. **(1mark)**
- iii) Ruler is used for measuring distances and draw lines. **(1mark)**
- iv) Retort stand set is for securely suspending the lamina. **(1mark)**

b) Procedures

➤ Prepare the object:

Use the pin to create a hole near the edge of the lamina preferably spaced out and suspend the irregular lamina **(1mark)**

➤ Create a plumb line:

Attach a weight to the end of a string. **(1mark)**

➤ Hanging the Lamina

Hang the object from one of the holes, allowing it to swing freely. **(1mark)**

➤ Marking the Vertical Line:

Hang the plumb line from the pin. When the object is at rest, draw a line on the lamina along the plumb line, marking its position. **(1mark)**

➤ Repeating the above processes:

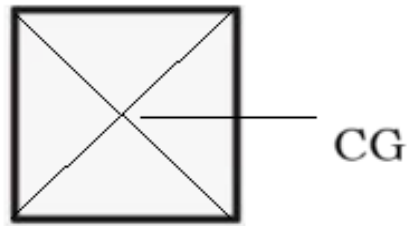
Move the pin to a different point on the lamina and repeat the process, creating another vertical line. **(1mark)**

➤ Finding the Intersection:

The point where the vertical lines intersect is the center of gravity. **(1mark)**

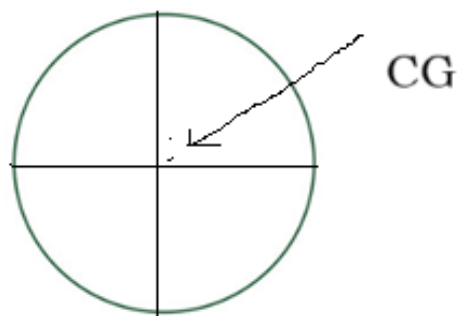
c) Centre of gravity of some regular laminae

- i) Square lamina. See the figure **(2 marks)**



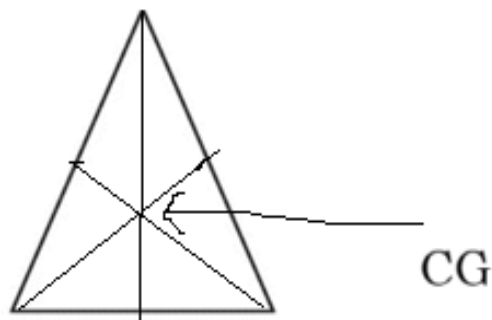
This point is the intersection of the square's diagonals and is equidistant from all four vertices

ii) Circular lamina. See the figure **(2 marks)**



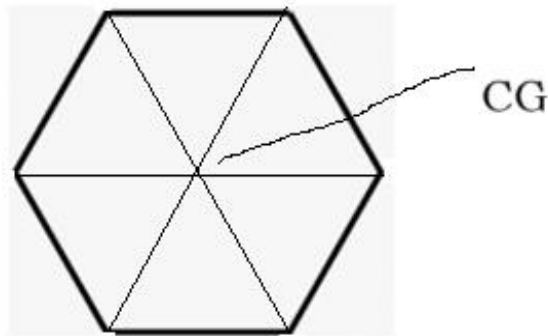
This point is the intersection of diameters of a circular lamina

ii) triangular lamina; Mark the figure **(2marks)**



The centre of gravity is the point of intersection of the three medians

iv) Hexagon lamina: Mark the figure **(2marks)**



d) Two real life applications of centre of Gravity(COG).

Center of gravity (CG) of an object is helpful in balancing the object in real life.

Center of Gravity is the point at which all the weight of the object is concentrated. It is the point at which the object would balance perfectly if it were suspended

➤ Static Structures (Engineering):

In civil engineering, COG calculations are crucial for the design and construction of buildings, bridges, and other structures to ensure stability. **(1mark)**

➤ Balancing a Bicycle

When riding a bicycle, the rider's Center of Gravity should be positioned over the bike's centerline to maintain stability. Placing the Center of Gravity directly above the bike's wheels ensures that the gravitational force acting on the rider is balanced by the contact forces between the tires and the ground, preventing the bike from tipping over. **(1mark)**

➤ Package Design:

In packaging industries, ensuring a product's COG is properly positioned guarantees stability during handling and transportation, reducing damage and improving logistics.

➤ Load distribution in Aircraft or in a car

Accurate COG calculations are critical when loading an aircraft to ensure proper flight control and prevent takeoff problems

➤ Rigging and Lifting:

When lifting objects, the COG is the point at which the weight is concentrated. Lifting directly above the COG ensures the load is most stable and reduces the risk of it swaying or tipping.

➤ Etc.

**END**