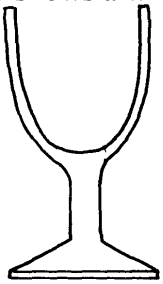
Equilibrium and centre of gravity

1. a) Define centre of gravity

   b) The figure below shows a wine glass



   State how the stability of the glass is affected if it is filled with wine

2. The diagram below shows an empty wine glass.

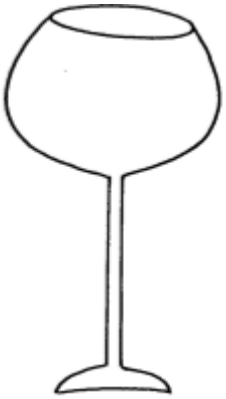
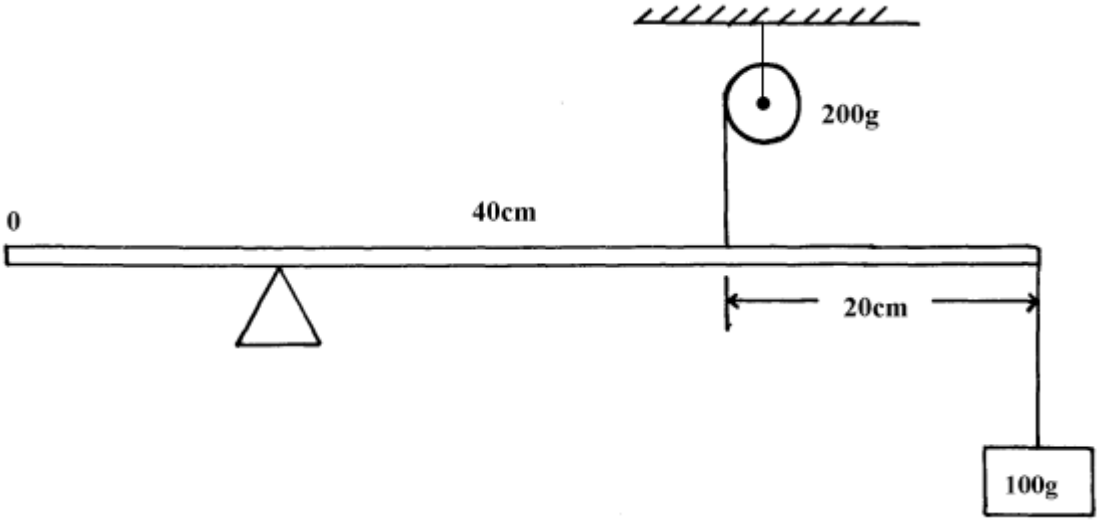


Figure 3

   State and explain the effect on its stability when wine is put into the glass.

3. State **two** ways in which stability of a body can be increased

4. In the set up in figure 5, the metre rule is in equilibrium



   Given that the metre rule is uniform, determine its weight

5. ***Figure 6*** shows a spring coin which tends to remain vertical but topples immediately it stops spinning

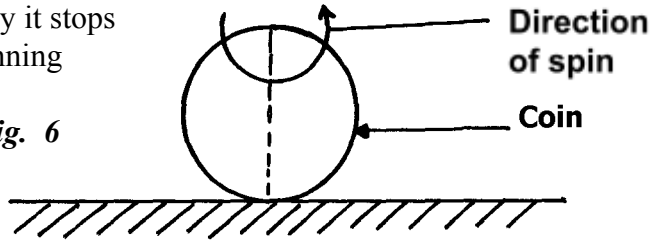
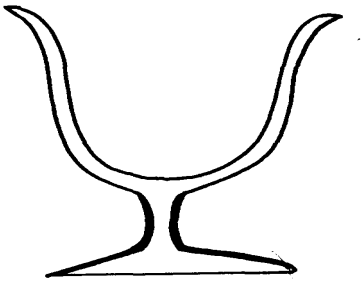


fig. 6

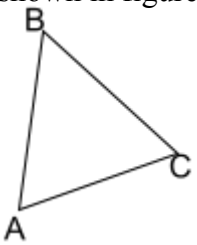
Explain this observation

6. The figure below shows a wine glass

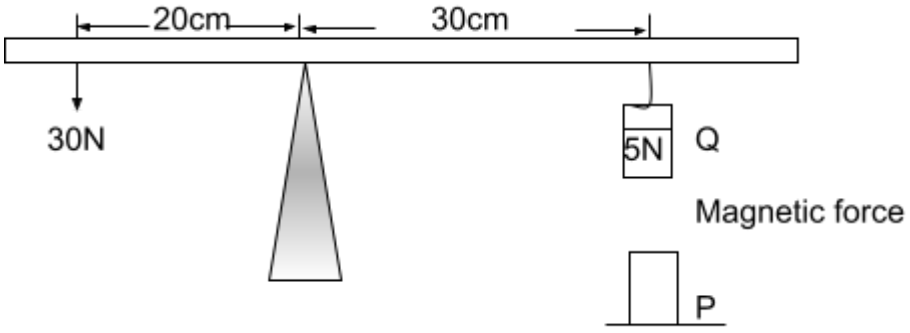


State how the stability of the wine glass is affected as it is filled with wine

7. In the thin triangular laminar ABC shown in figure below, determine geometrically the centre of gravity



8. A uniform metre rule is balanced at its centre. It is balanced by the 30N, 5N and the magnetic force between **P** and **Q**. **P** is fixed and **Q** has a weight of 5N



Ignoring the weight of the metre rule, calculate the value of the magnetic force between **Q** and **P**

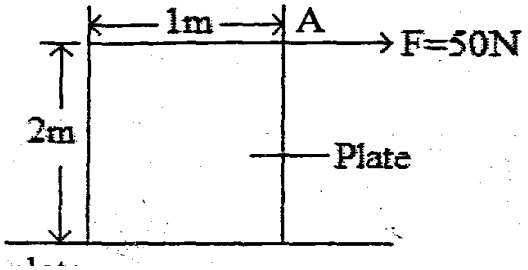
9. (a) Use simple sketches to show the three states of equilibrium. Name the states.

(b) Define center of gravity of a body.

(c) State **two** factors affecting stability of body

(d) The figure below shows a metal plate 2 m long, 1M wide and negligible thickness.

A horizontal force of 50 n applied at point 'A' Just makes the plate tilt.



Calculate the weight of the plate.

Equilibrium and centre of gravity

1. a) This is the point of application of the resultant gravitational force on a body.

- *Appoint at which the weight of the body seems to cut*

b) The figure below shows a wine glass

State how the stability of the glass is affected if it is filled with wine

- *The glass becomes more unstable since the c.o g is now raised*

2. - Stability reduces /is lowered/becomes deny unstable less;
- position of C.D.C is raised / there is more mass at the atop; (Deny unstable)

3. - Increasing the base area/ making base heavier √1

- Increasing COG/ making base heavier√1

4. 10w + (1.0 x 6.0) = 2.0 x 40√1

10w + 60 = 80

$W = {}^{20}/_{10} = 2N$√1

5. It remains vertical because the shape generated by the rotation is always symmetric, so its centre of gravity falls directly above the point of support. It therefore remains vertical for sometime.

6. As the wine fills the glass, the centre of gravity rises and this lowers the stability √ 1

7. Bisect any two sides and join the bisector to the apex where lines meet if the C.O.G

8. Clockwise Moment = Anticlockwise Moment

$\underline{20 \times 30} = 30(f + s)$

$600 = 30f + 150$

$30F = 450$

$\boldsymbol{F = 15N}$√