EQUILIBRIUM & CENTRE OF GRAVITY

KCSE QUICK REVISION

Compilation of Possible Questions in Physics Likely to be examined in KCSE.

A Special Analysis of Prediction Questions that may be Tested in KCSE from this Topic in Form 2.

PHYSICS

SERIES 1

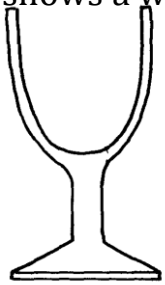
For Marking Schemes

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MWALIMU CONSULTANCY

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.

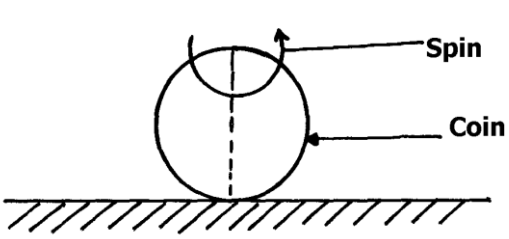
State and explain the effect on its stability when wine is put into the glass.

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

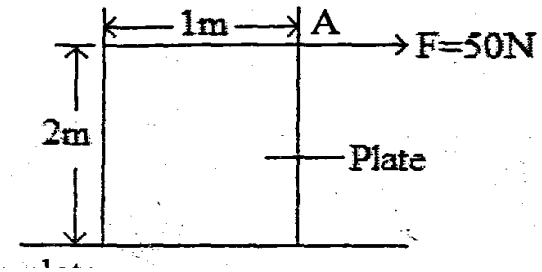
8. (a) Use simple sketches to show the three states of equilibrium. Name the states.

(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.

Fluid flow

1. Figure 5 below shows the cross-section of an aerofoil, with the aeroplane moving in the direction shown by the arrow.

Sketch the streamlines to show how air flows past the wing as the aeroplane moves

2. State Bernoulli's principle

3. The diagram below shows a section of a pipe with different cross – sectional area.

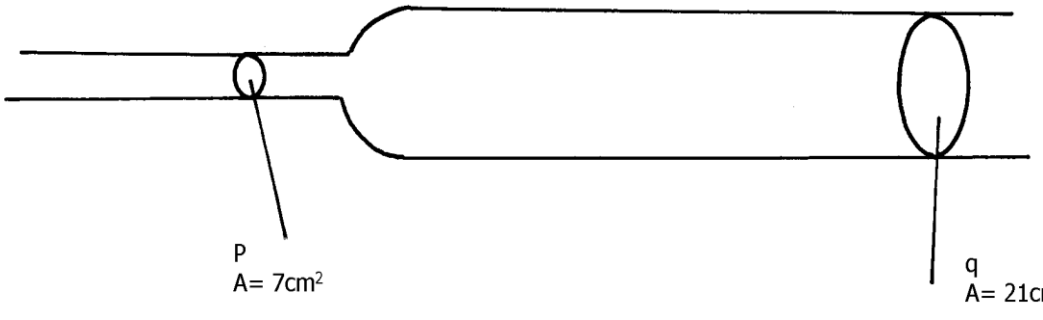
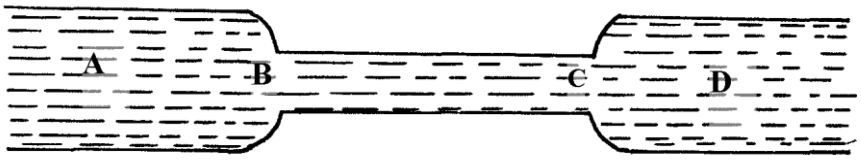


Figure 4

If water flows with a velocity of $5ms^{-1}$ in section **P**, what would be the velocity of water in section **Q** if the cross sectional areas are as shown?

4. In the diagram in ***figure 3***, water flows through a section of a pipe whose diameter changes
as shown

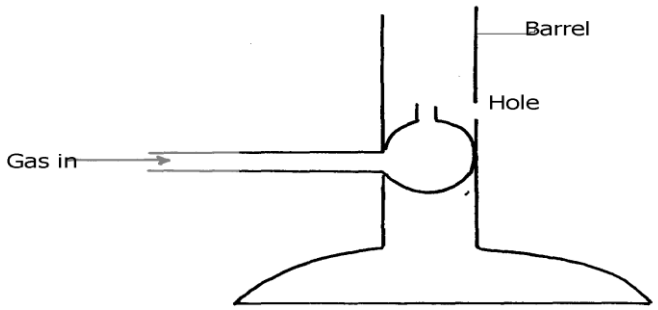
figure 3



Sketch a graph of the variation of pressure along the line **ABCD**

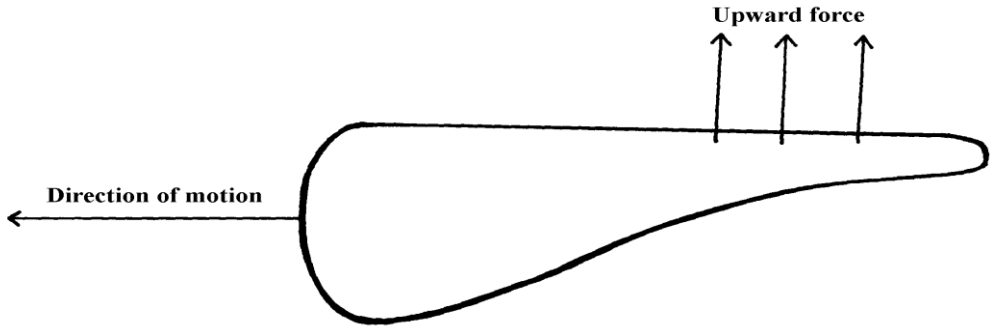
5 (i) State Bernoll'su principle

(ii)



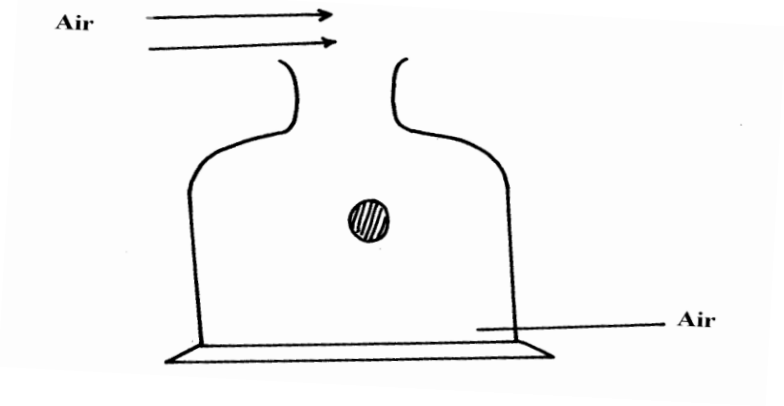
Explain how air is drawn into the barrel

6. The diagram below (figure 6) shows a cross- section of an aeroplane wing. When the aeroplane
is moving at a constant height and constant speed, an upward force is exerted on its wing



What is the cause of the upward force?

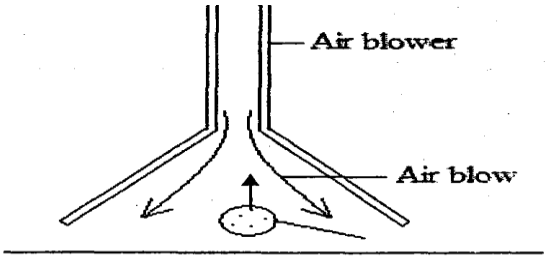
7. The figure below shows a light body floating in a container



State and explain the observation when a stream of air is blown over the mouth of the container
as shown

8. Sea water of density **1.04g/cm^3** is being pumped into a tank through a pipe of uniform cross-sectional area of 3.142cm^2. If the speed of water in the pipe is 5m/s, determine the volume flux in S.I units

9. The figure below shows a pith ball being lifted in to a funnel end of a blower.



Explain this observation

10. (a) Define turbulent flow in fluids .

(b) The diagram below shows an obstacle placed in front of flowing water.
Complete the diagram to show how the water flows around the obstacle.

11. Water flows in a horizontal pipe of varying cross –sectional area and diameter and shown in the figure below.

If the cross-sectional area of A is $5cm^2$ and that of B is $4{,}5cm^2$ and also the rate at which the water flows from A is 100m/s,. Calculate the speed water through B.

(d). Given the apparatus, density bottle, beam balance, granular solid, water and blotting paper, describe the measurement on the experiment that can enable one to determine the relative density of the granular solid.

(e).Draw a single pulley with a velocity ratio of 2.

For Marking Schemes/Answers

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