

# GIDEONS ELITE BOYS CENTRE OF EXCELLENCE

P.O BOX 583-20300 NYAHURURU

DECEMBER-2024 ASSIGNMENT

THIS ASSIGNMENT WILL COVER 70% OF OPENER EXAM.

ALL QUESTIONS SHOULD BE ANSWERED IN THE EXERSISE BOOK

PHYSICS FORM 2-2024 Website: [www.gideonseliteschools.sc.ke](http://www.gideonseliteschools.sc.ke)

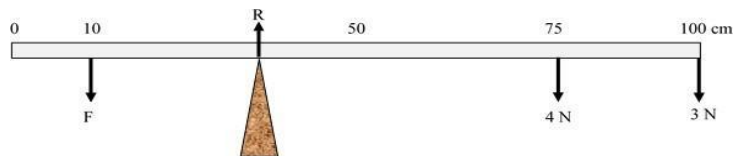
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Two metallic spheres A, B stand in contact as shown. A positively charged rod is held near sphere A.



Figure 1

- a. Show the charge on each sphere when the metallic balls are separated and the rod is removed.
  - b. Why are the balls supported on insulating rods?
2. A density bottle has a mass of **45g** when full of paraffin and a mass of **50g** when full of water if the empty bottle weighs **25g**, calculate the density of paraffin.
  3. State the reason why thermal conductivity of a metal increases with the increase in the cross-section area of the conductor?
  4. Describe how you would charge a gold leaf electroscope **negatively** by induction method
  5. Explain highly inflated balloon bursts when transferred to a hotter environment. Explain this observation using kinetic theory of gases. (2marks)
  6. In a ball and ring experiment, the ball goes through the rings at room temperature. When it is heated it does not go through the ring, but when left on the ring for some time, it goes through. Explain this observation
  7. A piece of metal weighs **3N** in air and **2N** when totally immersed in water.
    - i. Identify the force responsible for the difference in weight of the metal.
    - ii. Determine the value of the force in (i) above.
  8. Explain how a person is able to drink a soda using a drinking straw.
  9. Give a reason why air is not commonly used as the fluid in a hydraulic lift.
  10. State **one** assumption made when estimating the size of an oil molecule in the oil drop experiment.
  11. (a) State the law of moment  
(b) The figure 4 below shows a uniform metre rule of mass **200g** balanced at **40 cm** mark by a number of forces. Calculate,



- (i) The force  $F$       (ii) the reaction at  $R$
- (c) spherical ball bearing of mass **0.0024kg** is held between the anvil and spindle of a micrometer screw gauge. Use this information and the position of the scale in the figure 5 below to answer the questions (a) and (b) below:

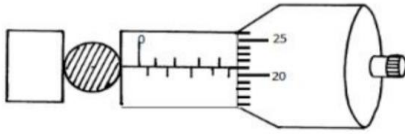


Figure 5

- I. What is the diameter of the ball bearing?
  - II. Find the density of the ball bearing correct to 3 significant figures.
12. In an experiment to estimate the diameter of an oil molecule, an oil drop of diameter **0.05 cm** spread over a circular patch whose diameter is **20cm**  
Determine:
- (i) The volume of the oil drop.
  - (ii) The area of the patch covered by the oil
  - (iii) The thickness of the oil molecule.
  - (iv) State the importance of lycopodium powder in the above experiment
  - (v) State two possible sources or errors in this experiment.
13. A concave mirror with a focal length of 8cm forms an upright image 15 cm from the mirror. If the object is 5 cm tall, calculate;
- (i) The distance of the object from the mirror
  - (ii) Image height
  - (iii) an object placed is 10cm in front of a concave mirror whose radius of curvature is 40cm. On a graph draw a ray diagram to show the position of the image formed.
  - (iv) Give a reason why convex mirror is preferred to plane mirror for use in supermarkets.
14. a) Define magnetic field.    b) The graph in the figure 7 below was obtained from an experiment.

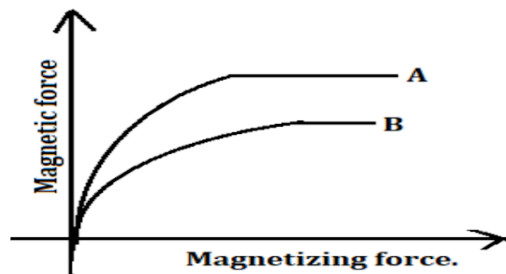
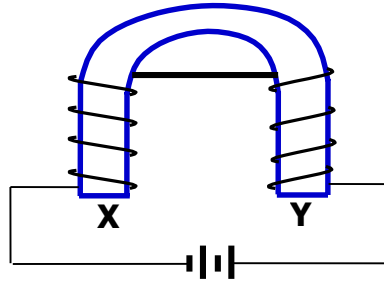


Figure 7

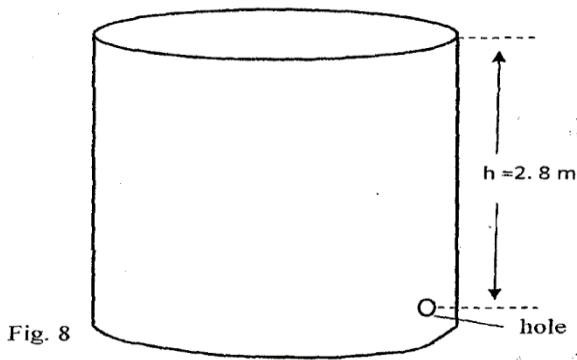
- i) Which material is easy to magnetize
  - ii) Using domain theory explain your answer (i) above.
  - iii) State one application of hard magnetic materials.
- c) State two methods of magnetization.  
d) Why is repulsion the surest way of identifying a magnet?



e) Figure 8 shows a magnetic material being magnetized

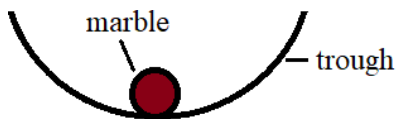
Identify the polarities of X and Y.  
f) Suggest three ways that can be done to make the electromagnet stronger.

15. 2.0 cm is drilled at a depth of 2.8 m from the top of the can.



Determine:

- i. The cross-sectional area of the hole. (2marks)
  - ii. The maximum pressure exerted by the liquid at the hole. (2marks)
  - iii. The maximum force exerted on a jet of liquid through the hole. (2marks)
- b) Name the states of equilibrium in the following diagrams. (2 marks)



c) State two ways to increase the stability of a body

(a) Show on a ray diagram the centre of curvature, axis, pole and principal focus for a concave spherical mirror.

(b) A concave mirror has a radius of curvature of 20cm. Find the position, magnification and nature of the image of small pin placed on the axis and at right angles to it and 15cm from the pole by scale drawing

16. List down three properties of an object whose volume can be measured using the displacement method

17. The density of mercury is 13.6 g/cm<sup>3</sup>. Find the volume of 2720g of mercury in m<sup>3</sup> (2 mks)

18. Mixture is made liquid A and water. Liquid A has a volume of X cm<sup>3</sup> and water has a volume of 100cm<sup>3</sup>. Liquid A has a density of 800 kg/m<sup>3</sup> and water has a density of 1000 kg/m<sup>3</sup>. If the mixture has a density of 960 kg/m<sup>3</sup>, calculate X of liquid A.

19. The mass of an empty density bottle is 25.5g. Its mass when filled with water is 45.2g. When filled with liquid L, its mass 55.2g. Calculate the density of liquid X. (Density of water is 1000kg/m<sup>3</sup>)

20. State Bernoulli's principle

21. State and explain any hazards of Bernoulli's principle

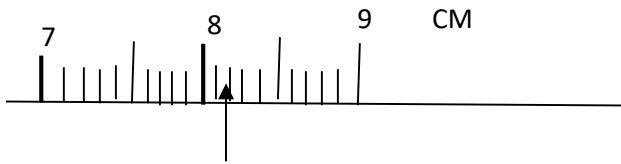
22. What is force

23. State and explain 7 types of forces

24. Differentiate between magnet and magnetic material using the domains theory

25. WHAT IS MATTER

26. State the reading shown by the arrow below



27. A sheet of paper measures 25cm by 15cm. calculate its area in  $\text{mm}^2$

A sphere of diameter 7.0CM is moulded into a thin uniform wire of diameter 0.35cm.calculate the length of the wire in metres (take  $\pi =$  )

A tank measures 20cm long, 10m wide and 2m high. Calculate the mass of water in the tankwhen it is full. Density of water is  $1000\text{kg/m}^3$

28. Give two effects of forces

29. Give two effects of force

1) The mass of an empty density bottle is 20g. it is 45g when full of water and it weighs 60gwhen full of liquid X. Calculate

- i. Mass of water
- ii. Mass of liquid X
- iii. Volume of water, given its density is  $1\text{g/cm}^3$
- iv. volume of the bottle
- v. Density of liquid X

2) You are provided with the following

- Eureka can
- A small beaker
- A stone
- A measuring cylinder
- Some water

Describe how you will use the apparatus above to measure the volume of the stone(A brick 30cm long, 20cm wide and 10cm thick has a mass of 500g. Determine.

- a) The weight of the brick
- b) The greatest area occupied by the brick when placed on the ground

The least area occupied by the brick when placed on a flat surface