

PHYSICS GURUS JOINT EXAM

Kenya Certificate of Secondary Education
TERM THREE 2021 OPENER EXAMINATIONS

232 Composite

PHYSICS

FORM 2

May 2021 – TIME 2Hours

Name: Adm No:

School: Class Date:/05/2021.

INSTRUCTIONS TO CANDIDATES:-

- Write your **name**, **index number** and **school** in the spaces provided above.
- This paper consist of **two** sections; **A** and **B**
- Answer **all** the questions in section **A** and **B** in the spaces provided
- All working **must** be clearly shown.
- Mathematical tables and electronic calculators may be used

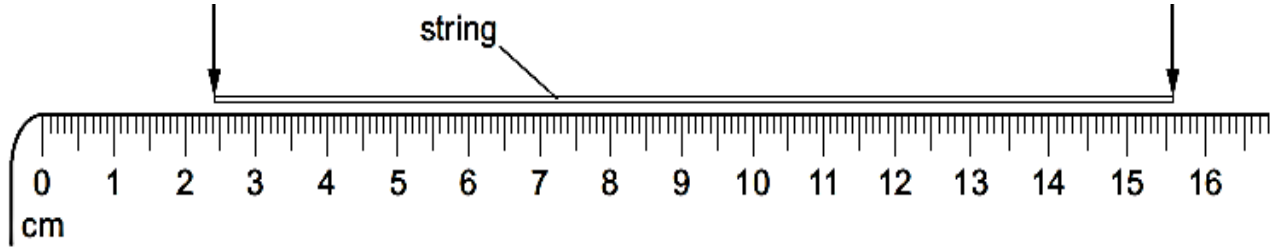
For Examiners' Use Only:

| SECTION | QUESTIONS | MAXIMUM SCORE | CANDIDATE'S SCORE |
|--------------|-----------|---------------|-------------------|
| A | 1-13 | 25 | |
| | B | | |
| | 14 | 10 | |
| | 15 | 07 | |
| | 16 | 10 | |
| | 17 | 10 | |
| | 18 | 08 | |
| | 19 | 10 | |
| TOTAL | | 80 | |

This paper consists of 13 Printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing

SECTION A (25 Marks)

1. A length of string is measured between two points on a ruler.



When the length of string is wound closely around a pen, it goes round six times. Find the distance round the pen. (2mks)

2. State **two** limitations of using the displacement method in measuring volume of irregularly shaped solids. (2mks)

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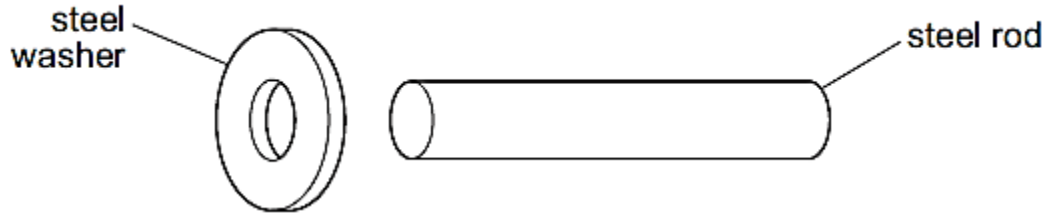
3. Explain the use of detergents in washing clothes. (2mks)

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4. State the reason why it is easier to separate water into drops than to separate a solid into smaller pieces. (1 mark)

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5. An engineer wants to fix a steel washer on to a steel rod. The rod is slightly big to fit into the hole of the washer.



Explain how the engineer can fit the washer on to the steel rod. (2mks)

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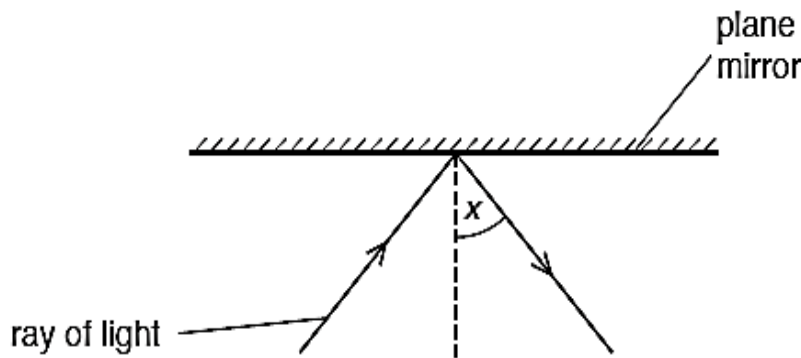
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6. (a) Write down the formula used to calculate pressure in solids. (1 mark)

b) A sea diver is 35 m below the surface of sea-water. If density of the sea-water is 1.03 g/cm^3 and g is 10 N/kg . Determine the total pressure on him. Take atmospheric pressure as $103\,000 \text{ N/m}^2$. (3mks)

7. (a) The figure below shows a ray of light striking a plane mirror.



State the name given to angle x . (1 mark)

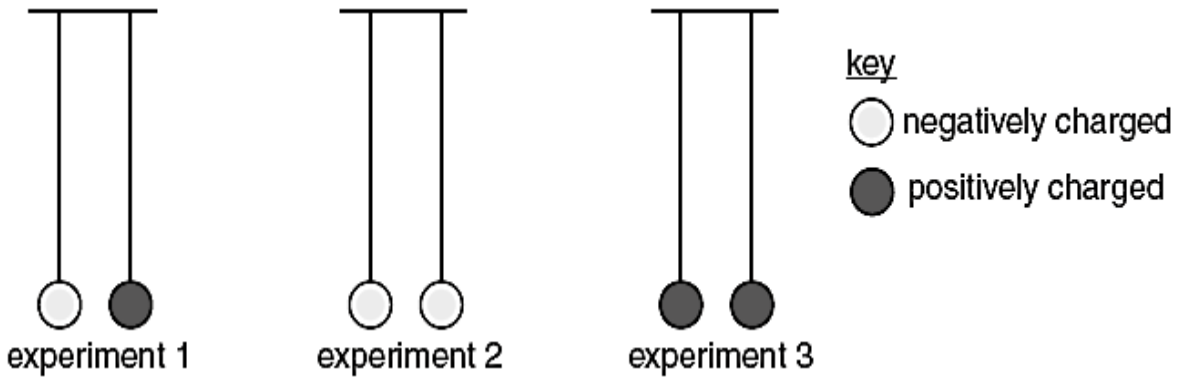
- b) Explain why the inner part of a pinhole camera is painted black. (1 mark)

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8. Three different experiments are carried out using the arrangements shown below.



For each of the experiments above describe the force if any between the spheres. (2mks)

Experiment 1.....

Experiment 3

9. The diagram below shows drop of liquids X and Y carefully put on a clean glass slab.



Explain the difference in the shapes. (2mks)

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10. The diagram below shows a bimetallic strip at room temperature. Brass expands more than iron.



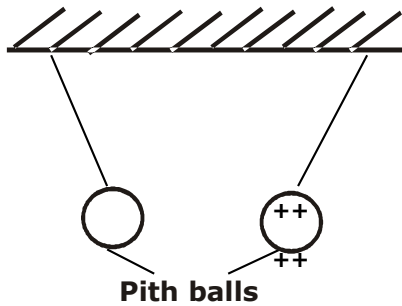
Sketch a diagram to show the appearance of the bimetallic strip when heated. (1mark)

11. What is meant by the term **polarization** in a simple cell.

(1mark)

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12. The figure below shows an uncharged pith ball under the attraction of a charged ball.



State and explain what would be observed after the two pith balls touch.

(2mks)

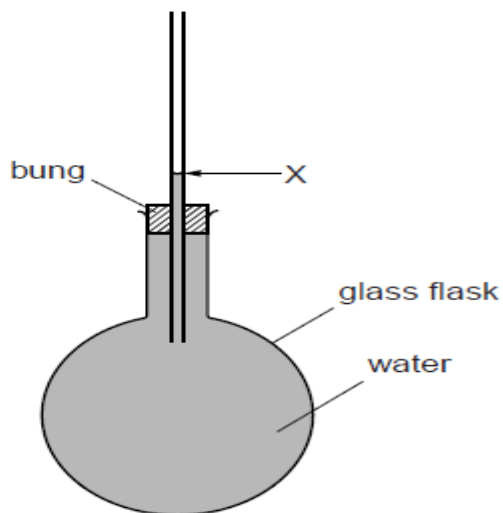
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13. Calculate the amount of current flowing through a bulb if 3000 coulombs of charge flow through it in two minutes.

(2mks)

SECTION B (55 Marks)

14. (a) The figure below shows a glass flask full of water at 10°C and sealed with a bung. A long glass tube passes through the bung into the water. The water level in the tube is at X.



When the flask is placed in hot water, the water level initially falls a little below X and then rises some way above X. Suggest why?

i. The water level initially falls. (1 mark)

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ii. The water level then rises. (1 mark)

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iii. The rise is greater than the fall. (1 mark)

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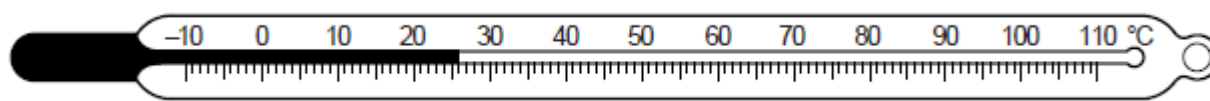
iv. Suggest a change that would make the fall and rise of the water level greater. (1 mark)

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b) State **two** variables that must be controlled in an experiment for comparing thermal conductivities of **different** metal rods of the **same** diameter. (2mks)

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The figure below shows a liquid in a glass thermometer.



v. State the accuracy of the instrument. (1 mark)

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vi. In the process of making the thermometer the scale divisions were spaced equally. What assumption was made about the liquid. (2mks)

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vii. Suggest a change to the thermometer that would require the spacing of the scale divisions to be larger. (1 mark)

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15. In an experiment to estimate the size of olive oil. A drop of oil of diameter 0.05 mm was placed on a clean water surface sprinkled lightly with lycopodium powder. The oil spread into a patch of diameter 0.2m.

a) Determine the thickness of the oil molecule. (4mks)

b) State the role of **lycopodium** powder in this experiment. (1 mark)

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c) State **two** assumptions made in this experiment. (2mks)

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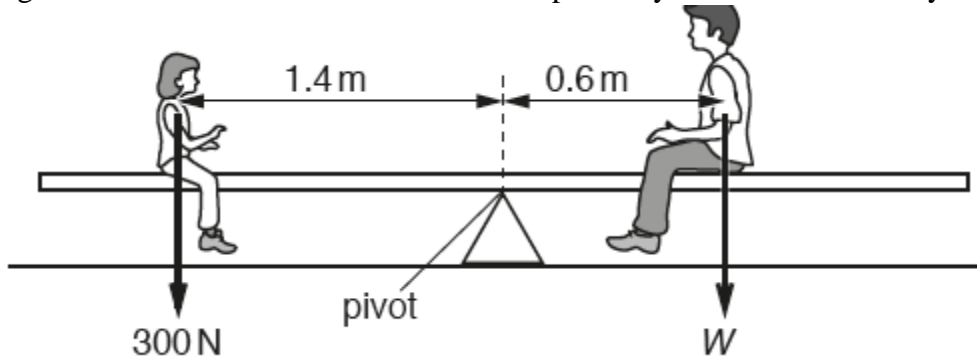
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16.

a) State the principle of moments. (1 mark)

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b) The figure below shows a child and an adult respectively on a see-saw. The system is in equilibrium.



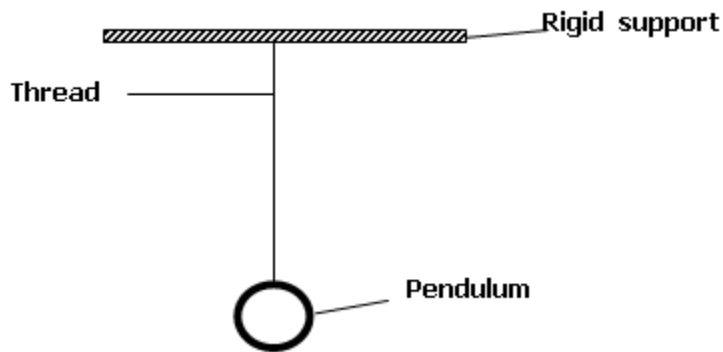
I. Calculate the moment of the child about the pivot. (2mks)

II. Calculate the weight W of the adult. (2mks)

III. State what would happen if the child moved further away from the pivot. (1 mark)

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c) The figure below shows a suspended simple pendulum.



State and explain the state of equilibrium of the pendulum. (2mks)

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d) State two conditions that are necessary for a body to be in equilibrium. (2mks)

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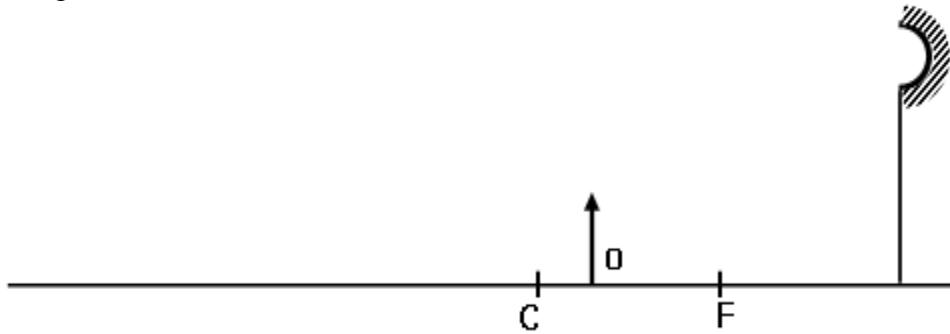
17.

a) A real object of height 1 cm placed 50 mm from a concave mirror forms a virtual image 100 mm from the mirror. Determine the;

I. Focal length of the mirror. (3mks)

II. Magnification. (2mks)

- b) The figure below shows an object placed in front of a concave mirror. Using ray diagrams locate the image. (3mks)



- c) State **two** applications of convex mirrors. (2mks)

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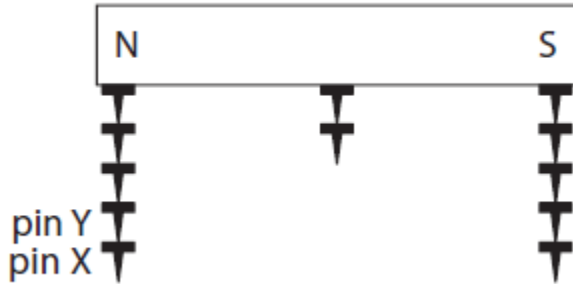
18.

a) Define the following terms.

I. Dipole (1mark)

II. Domain (1mark)

b) A student placed a bar magnet into a tray of steel pins and then removes the magnet. The diagram below shows the magnet after it has been removed from the tray.



I. Explain why pin X is attached to pin Y. (2mks)

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II. State the polarity of the tip of pin X (1 mark)

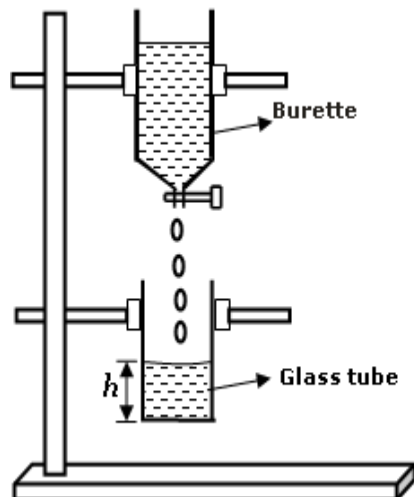
III. If the student repeats the same experiment using soft iron pins instead of steel pins. State the difference he would observe. (1 mark)

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c) Explain why repulsion is regarded as the surest test for polarity. (2mks)

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19. The diagram below shows an arrangement that a certain student set up in a physics lab without the consent of the teacher. He allowed some volume of water into the glass tube and measured the corresponding height h of water in the tube using a ruler. He tabulated his data as below.



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|---|-----|-----|------|------|------|------|
| Burette reading cm^3 | 5.1 | 8.2 | 15.4 | 21.5 | 28.0 | 35.6 |
| Height h, cm | 3.8 | 5.8 | 10.5 | 14.5 | 18.7 | 23.2 |

- a) Draw a graph of the burette reading against height h of the water in the glass tube. (5mks)



b) Use your graph above to determine the area of cross section of the glass tube. (3mks)

c) Use your graph to determine how far the zero mark of the ruler is from the end placed on the base of the stand. (2mks)

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