

# URANGA PHYSICS EXAMINATIONS

Kenya Certificate of Secondary Education  
JOINT EXAMINATIONS 2021

FORM 2 PHYSICS

(General Paper)

June 2021 – TIME 2 Hours

Name: ..... Adm No: ..... Class.....

Candidate's Signature: ..... Date: ...../07/2021.

## INSTRUCTIONS TO CANDIDATES

- 1) Write your name and your admission number in the spaces provided above.
- 2) Write the date and your signature.
- 3) This paper consists of two sections; **A** and **B**
- 4) Answer **all** questions in section **A** and **B** in the spaces provided.
- 5) All working **must** be clearly shown in the spaces provided in this booklet.
- 6) Non programmable silent electronic calculators may be used.
- 7) This paper consists of **13 printed pages**.
- 8) Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.
- 9) Candidates should answer the questions in English.

## FOR EXAMINER'S USE ONLY

Section	Question	Maximum Score	Student's score
<b>A</b>	1 – 14	25	
<b>B</b>	15	08	
	16	10	
	17	06	
	18	08	
	19	11	
	20	12	
	<b>Total Score</b>	<b>80</b>	

**PAPER SET BY: TOP JOINT EXAMINATIONS**

**SECTION A: 25 MARKS**

1. State the reading shown on the instrument on **figure 1** below used to measure length.

(1 mark)



**Figure 1**

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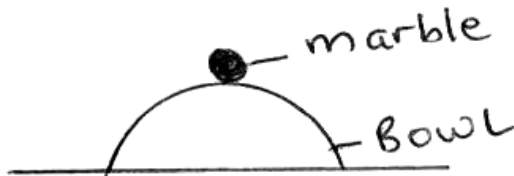
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2. The **figure 2** below shows a marble placed on an inverted bowl.



**Figure 2**

State and explain the type of equilibrium the marble is in.

(1 mark)

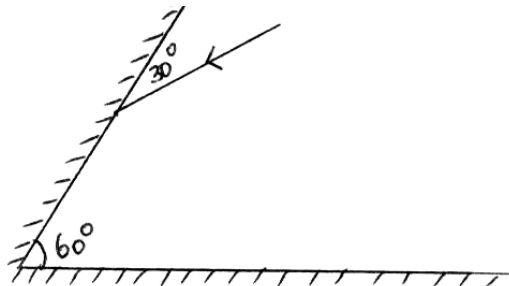
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3. Two mirrors are inclined at  $60^\circ$  to each other as shown in **figure 3**.



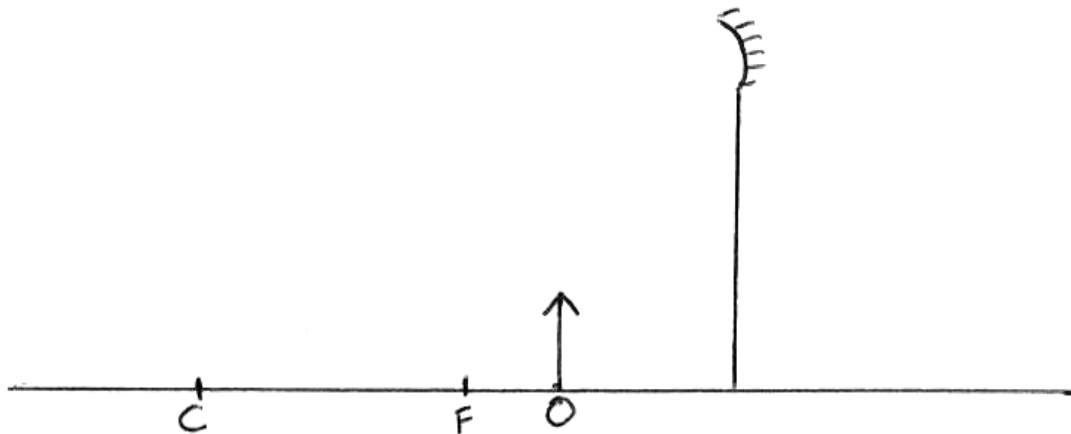
**Figure 3**

Complete the ray diagram to show how it travels after striking the two mirrors and find the angle of reflection on each surface.

(2 marks)

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4. The **figure 4** below shows an object placed in front of a concave mirror. By use of correct ray diagram, locate the position of image. (2 marks)



**Figure 4**

5. How much work is done in stretching a spring of spring constant  $25\text{Nm}^{-1}$  when length is increased from 1cm to 2cm? (2 marks)

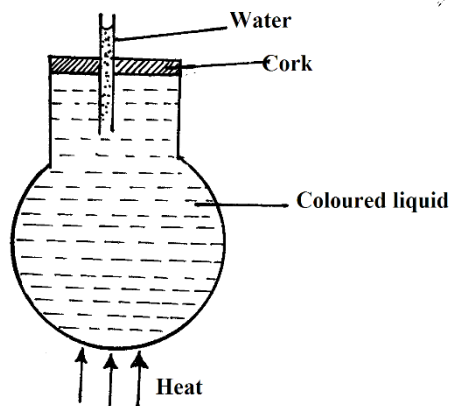
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6. In the set up in **figure 5** below, it is observed that the level of water initially drops before starting to rise. (2 marks)



**Figure 5**

Explain the observations.

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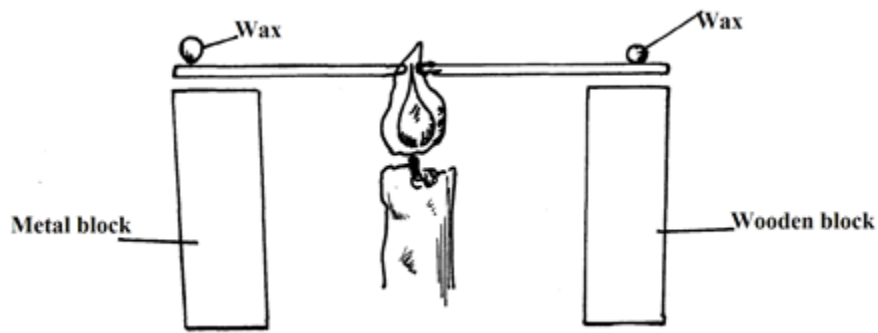
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7. Two identical rods are placed as shown in **figure 6**. One rests on a metal block and the other on a wooden block. The protruding ends are heated on a Bunsen burner as shown.



**Figure 6**

State with a reason, on which rod is wax likely to melt sooner. (2 marks)

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8. A mass of 100g is placed on a 20cm mark and a mass of 50g on a 40cm mark of a uniform metre rule which is balanced at its centre. Where should a further 100g mass be placed to balance the arrangement? (3 marks)

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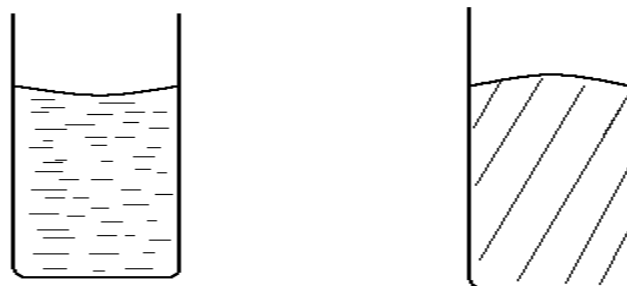
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9. The diagram in **figure 7** below shows two clear glass tubes containing water and mercury.



**Figure 7**

(a)

(b)

Explain the shapes of the surface of each of the liquids inside the tube. (2 marks)

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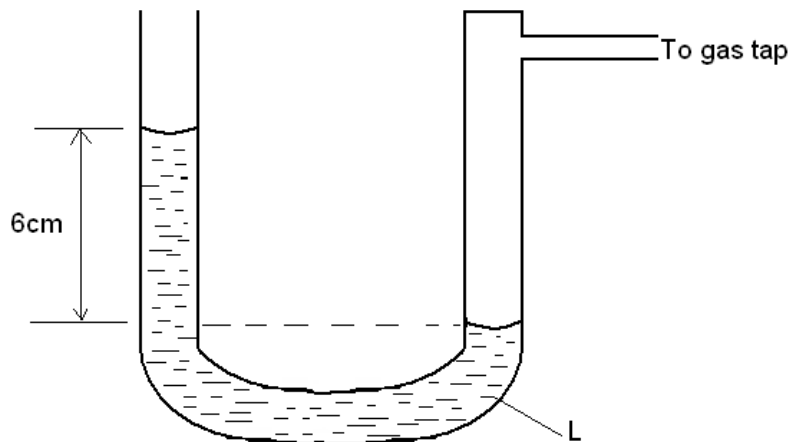
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12. **Figure 8** shows a U-tube manometer containing a liquid L, one end in connected to a gas tap.



**Figure 8**

Given that the atmospheric pressure is  $1.0 \times 10^5$  Pa, determine the pressure of the gas (density of liquid L is  $900 \text{ kg/m}^3$ . (Take  $g = 10 \text{ N/kg}$ ) (3 marks)

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13. A negatively charged rod is brought near the cap of a leaf electroscope. The cap is then earthed momentarily by touching with the finger. Finally the rod is withdrawn. State and explain the observation made. (3 marks)

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14. An electromagnet is made by winding insulated copper wire on an iron core. State two changes that could be made to increase the strength of the electromagnet. (2 marks)

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**SECTION B: 55 MARKS**

15.

a) Distinguish between solid and liquid states of matter in terms of intermolecular forces. (1 mark)

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b) In an experiment to estimate the diameter of an oil molecule, an oil drop of diameter 0.06cm spreads over a circular patch whose diameter is 20cm. Determine:-  
i) The volume of the oil drop. (2 marks)

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ii) The area of the patch covered by the oil. (2 marks)

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iii) The diameter of the oil molecule (1 mark)

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c) State any two assumptions made in b (iii) above (2 marks)

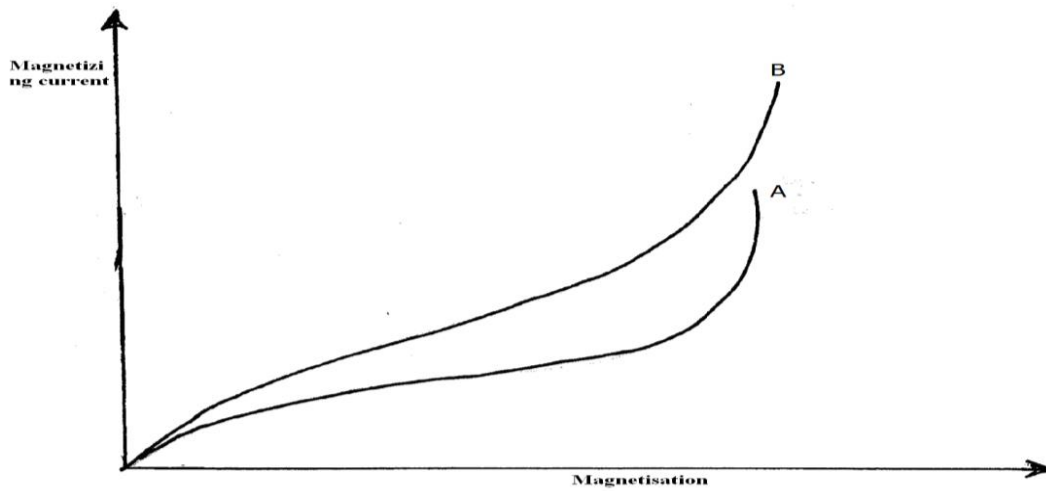
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16.

a) Given a bar magnet, a steel bar and a string describe a simple experiment to distinguish between the magnet and the steel bar. (4 marks)

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b) In an experiment to magnetize two substances A and B using electric current, two curves were obtained as shown in **figure 9**.



**Figure 9**

Using the information in **Figure 9**; explain the difference between the substances A and B with reference to the domain theory (4 marks)

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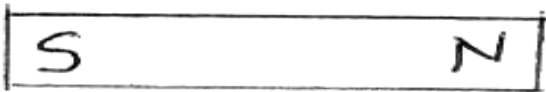
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c) **Figure 10** shows two parallel magnets with unlike poles adjacent to each other. Sketch the magnetic field pattern around the magnets. (2 marks)



**Figure 10**





17.

a) Explain how a person is able to draw milk from a glass using a straw. (2 marks)

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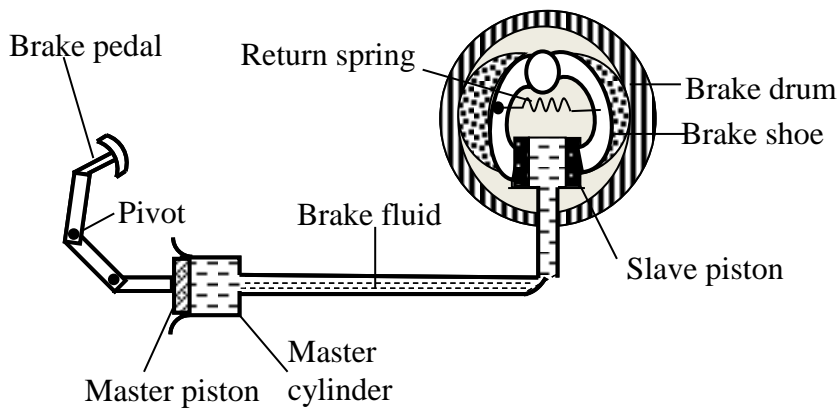
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b) The diagram in **figure 11** below shows a simplified hydraulic braking system of a car.



**Figure 11**

i) State the property of the liquid that makes it more suitable than a gas for use as a brake fluid. (1 mark)

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ii) Explain how the system works starting from when the driver presses the foot pedal. (3 marks)

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18. Figure 12 below shows a wave profile.

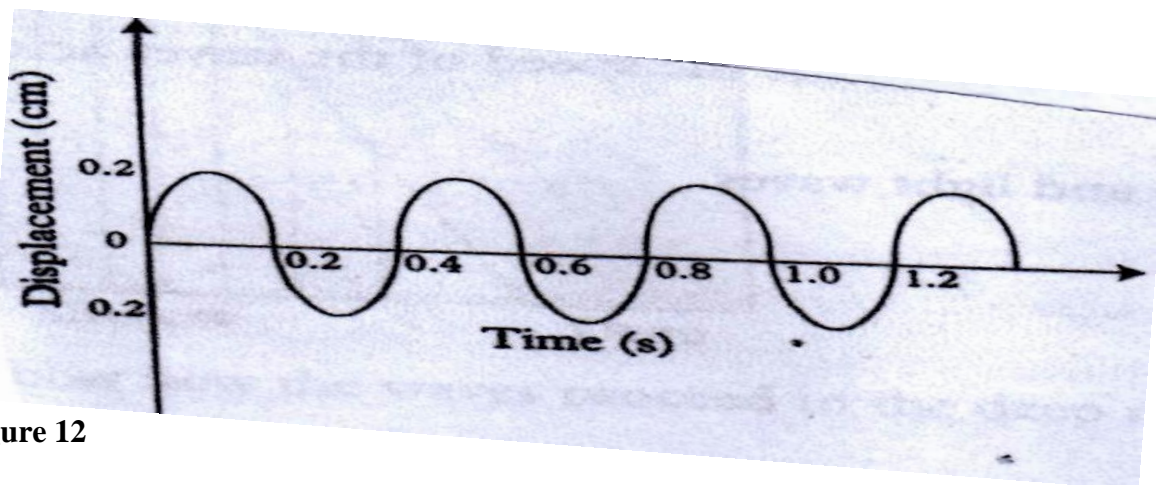


Figure 12

a) How many complete cycles are shown? (1 mark)

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b) Use the graph to determine:

I. Amplitude (1 mark)

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II. Period (1 mark)

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III. Frequency (2 marks)

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c) Given that the speed of the wave is 30cm/s find the wavelength. (3 marks)

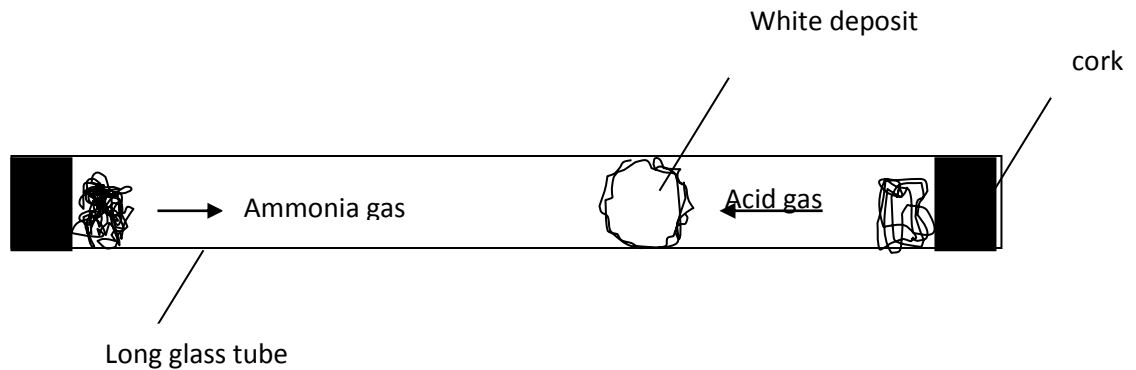
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19. In **figure 13** below, ammonia gas and acid gas diffuse and react to form a white deposit on the walls of the glass tube. The deposit forms nearer the end on the right.



**Figure 13**

(a) Which gas diffuses faster? (1 mark)

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(b) How does the rate of the diffusion depend on the size and the mass of a gas? (1 mark)

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(c) If the experiment was performed at a higher temperature, would it take longer or shorter time to form the white deposits? Explain. (3 marks)

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(d) A smoke cell contains a mixture of trapped air and smoke. The cell is strongly illuminated by a powerful bulb and viewed through a microscope. Small bright specks are seen dancing in a random manner.

(i) What are the bright specks? (1 mark)

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(ii) Why do they move in the manner described above? (2 marks)

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(iii) Explain the role of the smoke particles, lens and microscope in the experiment.

I. Smoke cell. (1 mark)

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II. Lens (1 mark)

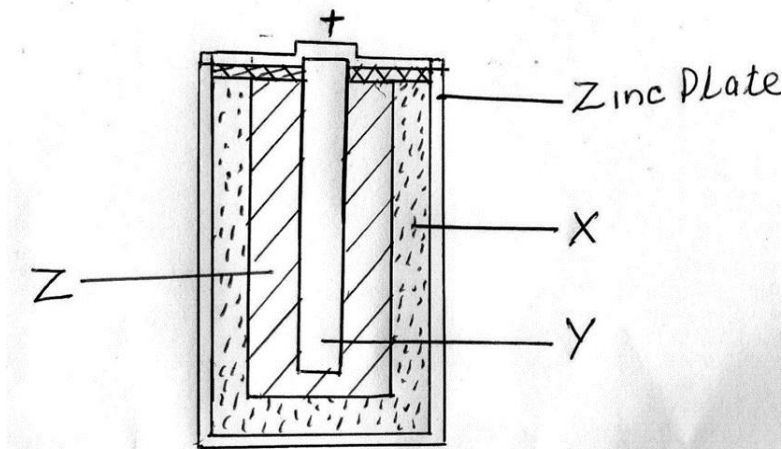
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III. Microscope (1 mark)

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20.

(a) **Figure 14** below shows a dry cell.



**Figure 18**

(i) Name the parts labelled X, Y and Z. (3 marks)

X.....

Y.....

Z.....

- (ii) Explain why e.m.f falls even when the cell is not in use. (2 marks)

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- (iii) A battery circulates charge round a circuit for 1.5 minutes. If the current is held at 2.5A. What quantity of charge passes through the wire? (3 marks)

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(b)

- (i) Outline any two differences between a dry cell and an accumulator. (2 marks)

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- (ii) Explain how the state of charge in a lead-acid accumulator is tested. (2 marks)

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