

NAME:.....ADM NO.....CLASS:.....

SCHOOL: ..... CANDIDATES SIGNATURE: .....DATE: .....

FORM 4

232/2

PHYSICS

TIME: 2 HOURS

## LAIKIPIA EAST TERM 2 2022 FORM 4 EVALUATION EXAM

*Kenya Certificate of Secondary Education – K.C.S.E*

### PHYSICS PAPER 2 2022

#### 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 **15 printed pages**. Candidates should check to ensure that all pages are printed as indicated and no questions are missing.
- 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	14	
	16	10	
	17	12	
	18	08	
	19	13	
	<b>Total Score</b>	<b>80</b>	

## SECTION A (25 MARKS)

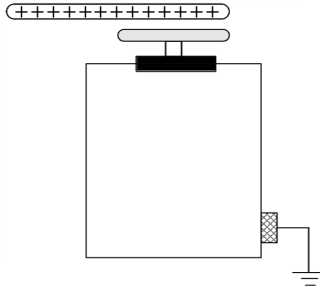
*Answer all the questions in this section in the spaces provided.*

1. Give a reason when light strikes a mirror at  $90^\circ$  on a mirror, it is reflected along the same path (1 mark)

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2. The figure below shows an electroscope that is being charged.



If the final charge on an electroscope is positive

- a) State the method of charging that produces the above electroscope to be positively charged (1 mark)

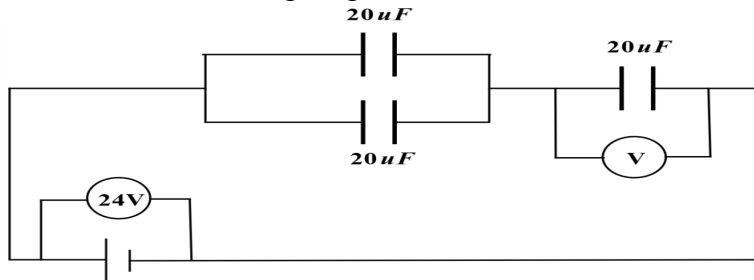
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- b) Explain how the final charge was acquired (2 marks)

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3. Three capacitors of capacitance  $20\mu\text{F}$  are arranged as shown below. Find the Reading on the voltmeter across the  $20\mu\text{F}$  shown in the following diagram. (3 marks)

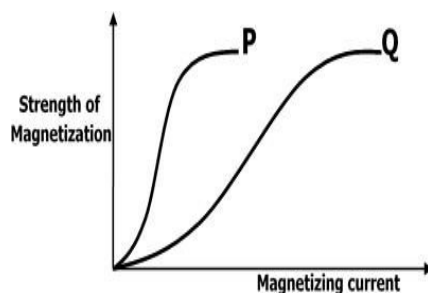


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4. In an experiment to magnetize two substances P and Q using electric current, two curves were obtained as shown below. State with a reason which substance will be used as an armature in an electric bell. (2 mks)



5. A current of 2A flows through a conductor for 2.5minutes. If the electronic charge is  $1.6 \times 10^{-19}$  C, calculate the number of electrons involved. **(3marks)**

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6. Give a reason why parabolic reflectors are used as car headlight lamps. **(1 mark)**

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7. Give two reasons why Ultra sound is used in pulse echo techniques in determining the depth of the sea. **(2 marks)**

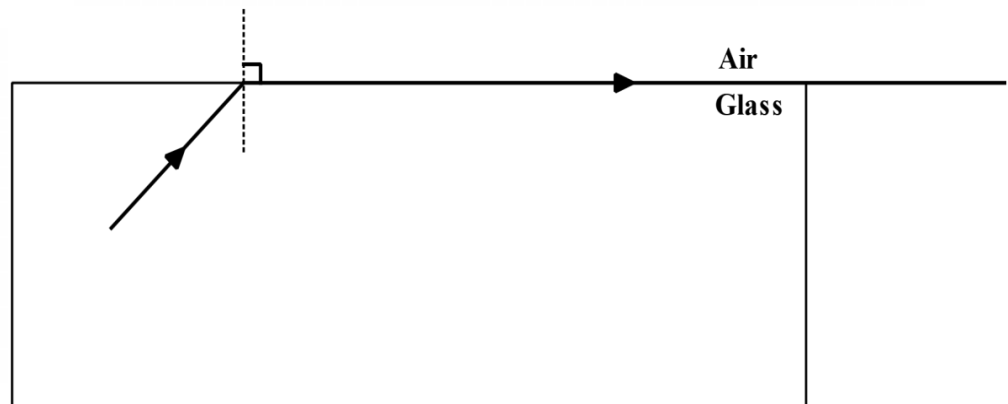
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8. The figure below is drawn to scale. Use this information on the figure to answer the questions that follow;



Determine the refractive index of the glass material.

**(3 marks)**

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9. Give an example of a longitudinal wave.

**(1mark)**

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10. State the function Argon and Nitrogen in a fluorescent lamp.

**(1 mark)**

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11. State the use of the objective lens in a light microscope

**(1 mark)**

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12. Explain two ways of enhancing the capacitance of a parallel plate capacitor.

**(2 marks)**

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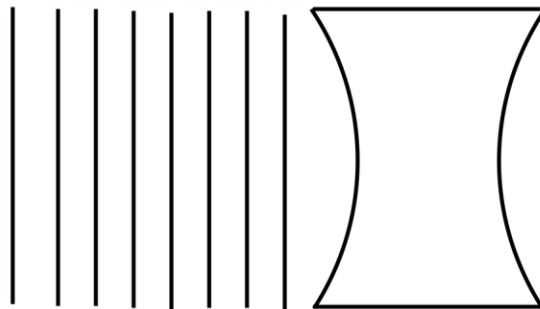
13. Give the formula relating to the Emf of a cell, the internal resistance,  $r$ , and the terminal voltage,  $V$  and the current,  $I$

**(1 mark)**

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14. Complete how the wave fronts emerge from the concave lens below.

**(2 marks)**



**SECTION B (55 MARKS)**

*Answer all the questions in the spaces provided below*

- 15.** a) Explain in terms of flow of electric charges why a thin wire feels warmer than copper leads in the same current **(2 marks)**

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- b)** i) State the main energy changes that take place in a filament lamp **(1 mark)**

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- ii)** Give a reason why tungsten wire is used in a filament bulb. **(1 mark)**

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- c) A light bulb is found to have a resistance of  $950\Omega$ . When operating normally on a 240V mains.

Calculate

- i)** Current flowing in the circuit **(1 marks)**

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- ii)** Power rating of the Bulb **(2 marks)**

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- iii)** Electric energy converted to heat when the bulb operates for 2 hours **(3 marks)**

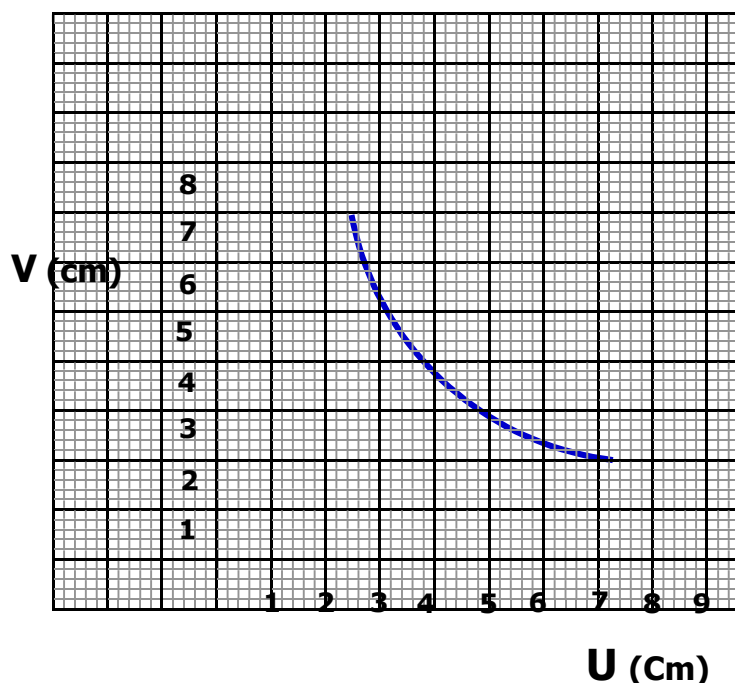
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16. a) The figure below shows an object placed in front of a concave mirror .



- i) On the same figure indicate a point X where the object distance is equal to the image distance of the mirror. (1 mark)

Use the point X in 16 (a) (i) to determine;

- ii) The radius of curvature (2 marks)

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- b) A compound microscope with an objective lens  $L_0$  of focal length 1.2cm and an eye piece lens  $L_e$  of focal length 2.8cm. An object is placed 1.8cm from the objective lens. The system of lenses produces a final image a distance of 12.0cm from  $L_e$ . Determine the distance of separation of lens  $L_0$  and  $L_e$ . (4 marks)

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c) An object is placed 12cm from a convex lens and it forms a virtual image 36cm from the lens. Calculate the focal length of the lens. **(3 marks)**

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17. (a) State two factors affecting the strength of an electromagnet **(2 marks)**

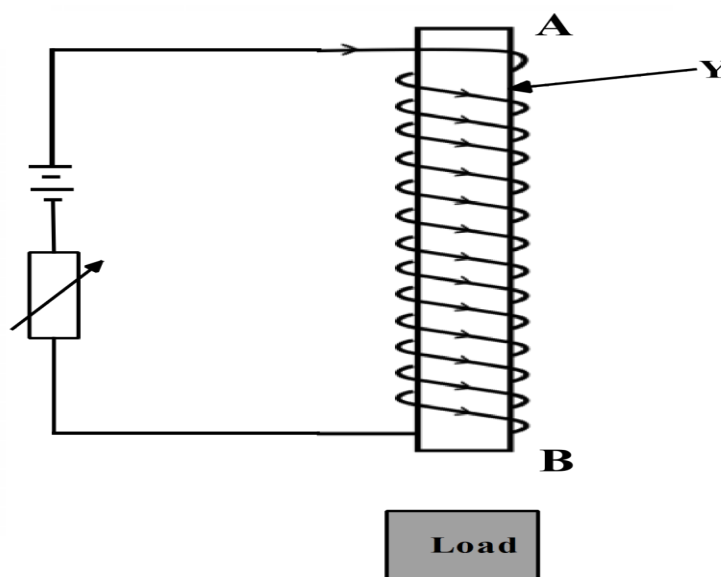
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(b) The figure below shows a simple electro magnet for lifting heavier container loads in the kilindini port in Mombasa city in Kenya.



i) Which material is Y made from? Explain why it is a preferred choice for its use in the above diagram **(2 marks)**

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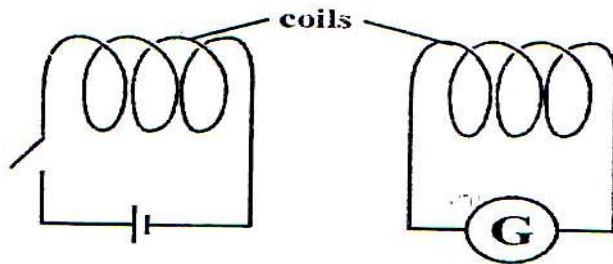
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ii) State the polarity of B **(1 mark)**

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(C) Figure 9 below shows two circuits close to each other.



When the switch is closed, the galvanometer shows a reading and then returns to zero. When the switch is then opened, the galvanometer shows a reading in the opposite direction and then returns to zero. Explain these observations. **(3 Marks)**

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(b) Explain how energy losses in a transformer are reduced by having:

(i) A soft-iron core.

**(1 Marks)**

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(ii) A laminated core

**(1 Marks)**

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**18.** a) (i) How are sound waves different from radio waves.

**(1mark)**

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(ii) A student stands between two high walls and 400m from the nearest wall. The walls are X distance apart. Every time she claps her hands once, she hears two echoes; the first one comes after 2.5 seconds while the second follows 2 seconds later. From this information, calculate. The value of X **(3 marks)**

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iii) The following table shows part of the electromagnetic wave spectrum.

Ultraviolet rays	
Microwaves	
X-rays	
Visible light	

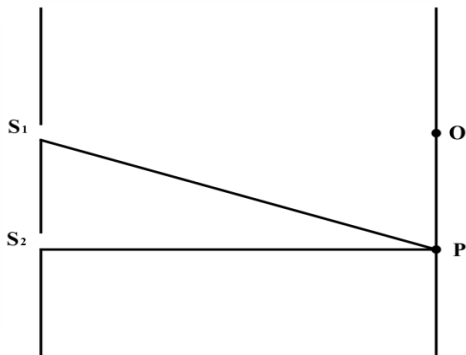
I) On the right column of the table, arrange the waves in the order of decreasing energy. (1 marks)

II) Give an application of each of the following electromagnetic waves. (2 marks)

i) Ultraviolet rays:  
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ii) Microwaves:  
 .....

b) The figure below shows the waves starting from two coherent sources  $S_1$  and  $S_2$



What would be observed at P if the waves are;

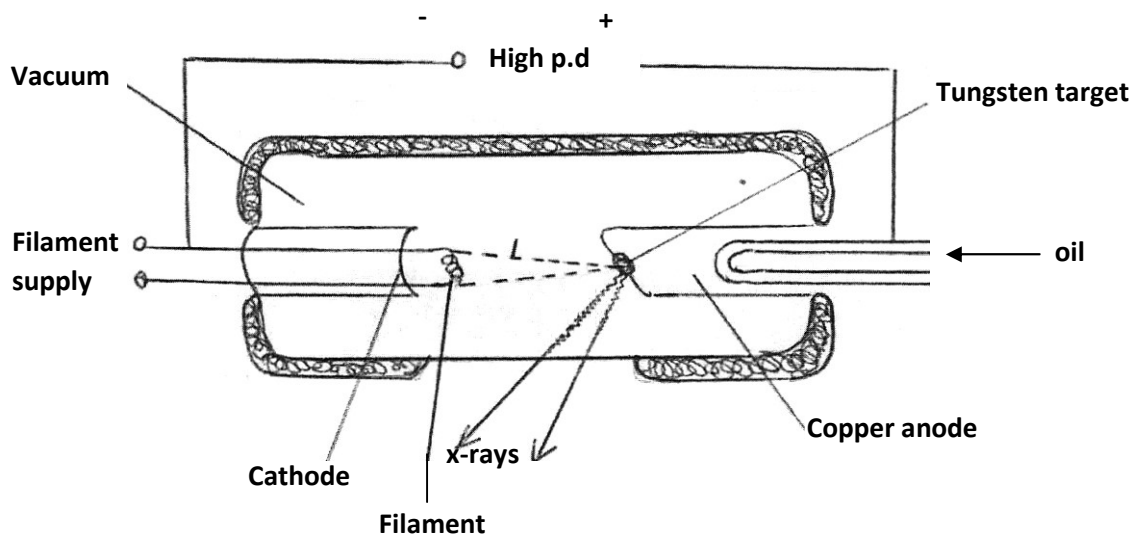
(i) Light waves. (1 mark)

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(ii) Sound waves. (1 mark)

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c) The figure below shows the features of an X-ray tube



I (i) What is the purpose of the oil going in and out of the anode (1mk)

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(ii) State the property of tungsten that makes it suitable as a target (1mk)

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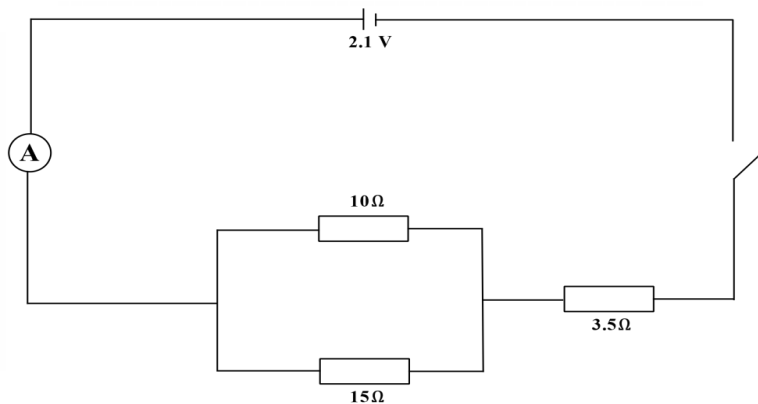
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(iii) Explain how x- rays are produced (2mks)

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19. (a) In the circuit below, the e.m.f of the battery is 2.1V and has an internal resistance of 0.5Ω.



- (i) Determine the effective resistance in the circuit. (2 marks)

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- (ii) Determine the ammeter reading when the switch is closed. (2 marks)

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- (iii) Determine the current through the  $10\Omega$  (3 marks)

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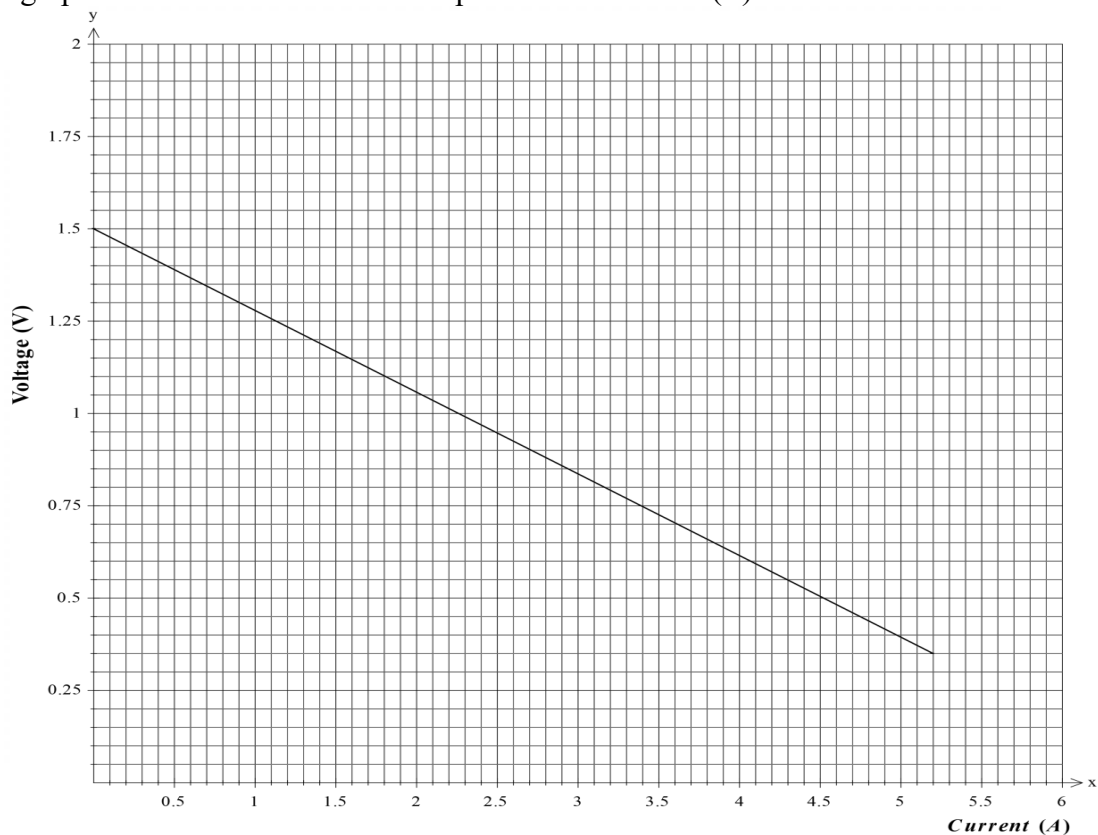
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- b) The graph below shows the relationship between the Emf (E) and the internal resistance of a cell r.



From the graph determine;

i) Emf of the cell

(2 marks)

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ii) The internal resistance and Emf of the cell

(3 marks)

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