NAME:……………………………………… ADMNO:….………………………

SCHOOL: ……………… ……………………. STREAM…………………….

SIGNATURE:………………………………… DATE:…………………………

232/2
PHYSICS
PAPER 2
SEPTEMBER 2022

NYAHOKAKIRA CLUSTER THREE EXAMINATION 2022

Kenya Certificate of Secondary education

Instructions to candidates

• *This paper consists of two sections A and B.*
• *Answer all the questions in the two sections in the spaces provided after each question*
• *All working must be clearly shown.*
• *Electronic calculators, mathematical tables may be used.*
• *All numerical answers should be expressed in the decimal notations.*

SECTION	QUESTION	MAX MARKS	CANDIDATE'S SCORE
A	1 – 12	25	
B	15	10	
	16	10	
	17	10	
	18	10	
	19	9	
	20	6	
TOTAL		80	

SECTION A (25 MARKS)

1. **Figure 1** below shows a ray of light reflected from a mirror.

Figure 1
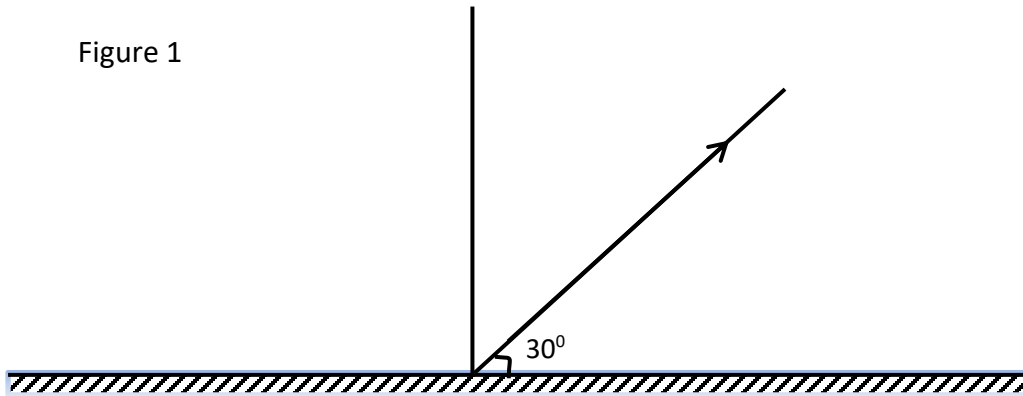
Complete the ray diagram and find the new angle of reflection after it is rotated 10^0 anticlockwise with the incident ray fixed. (2mks)

2. State **two** defects of a simple cell (2mks)

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3.The figure below shows wave fronts approaching a concave sphere.
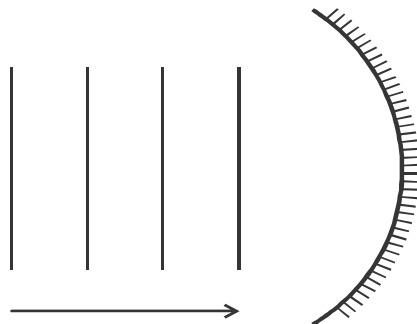
Compete the igrm to how the wave front formed after after stricking the surface.Show how focal point of the surface is located (3mks)

4.State with a reason the effect of the X-rays produced in an X-ray tube, when the pd across the tube is increased.   (2 marks)

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5.Two light bulbs are labelled 40W 240V and 100W 240V. Determine the cost of using   the two bulbs for six hours daily for 5 days given that the cost of electricity is 40 cents per kilowatt hour. (2marks)

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6.Fuel tankers have a loose chain hanging under them to touch the ground as they move. State its purpose.   (1mark)

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7.State one way in which infra-red radiation can be detected.   (1mark)

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8.Give a reason why attraction in magnetism is not regarded as a reliable method of testing for polarity.   (1mark)

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9.) Two light bulbs are labelled 40W 240V and 100W 240V. Determine the cost of using   the two bulbs for six hours daily for 5 days given that the cost of electricity is 40 cents per kilowatt hour.

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10.Distinguish between the terms 'photoelectric' and 'thermionic' effect.   (2mks)

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11. What is the purpose of a fuse in domestic wiring system? (1mrk)

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12. Determine the ammeter reading when the potential difference of 3.0 volts is supplied across PQ in figure 3. (3mks)

Figure 3

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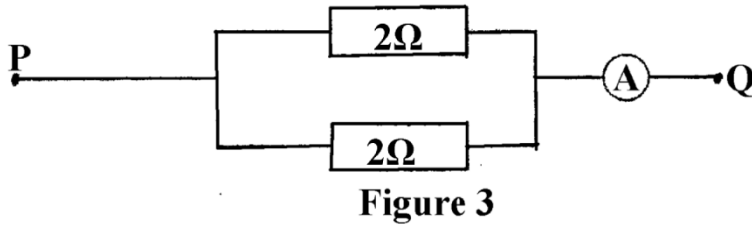
13. The figure shows an object O in front of a curved mirror M, on the same figure, locate the image. (3mks)
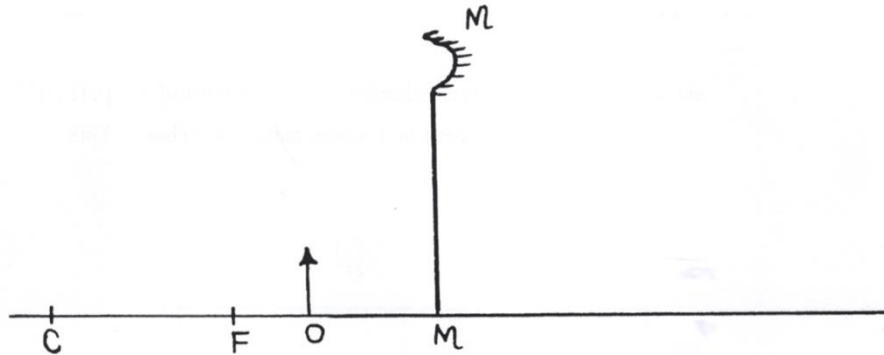
14. A soldier standing between 2 cliffs fires a gun. He hears the first echo after 2.16s and the next after 4.75s. Determine the distance, between the two cliffs. *(Take speed of sound as 330 m/s.)* (3mks)

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SECTION B: (55 MARKS)

Answer ALL questions in this section.

15.(a) State Snell's law of refraction. (1 mark)

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b) In an experiment to determine the refractive index of a liquid, the liquid was poured into a measuring cylinder, a pin was placed at the bottom of the cylinder and another pin was used to locate the apparent position of the first pin. The values of real and apparent depth were used to plot a graph in the figure below.
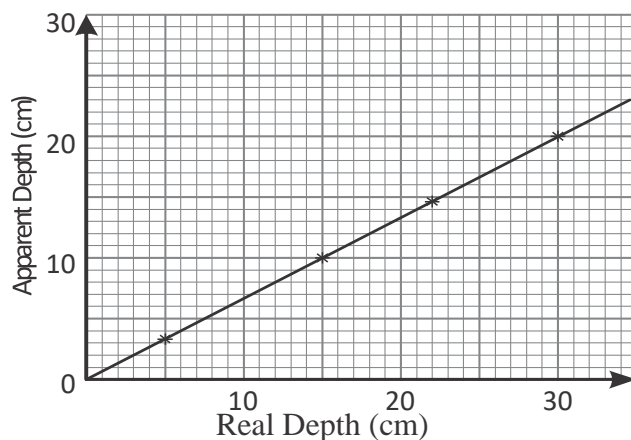
i) From the graph determine the refractive index of the liquid. (3 marks)

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ii) Given that the velocity of light in vacuum is 3.0×10^8 m/s what would be the velocity of light in the liquid above. (2 marks)

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c) State two conditions necessary for total internal reflection to occu (2 marks)

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    d) The figure below shows a ray of light incidents on glass-air interface.
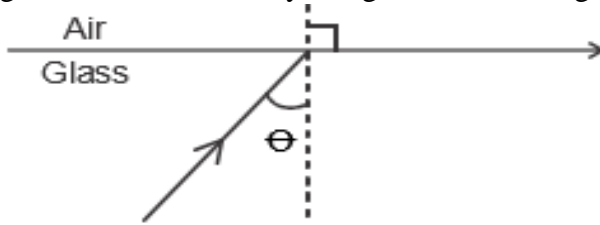
Given that the refractive index of glass is 1.48, determine the value of θ (2 marks)

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16. The figure below shows the main features of a Cathode Ray Tube (C.R.T) of 2 C.R.O
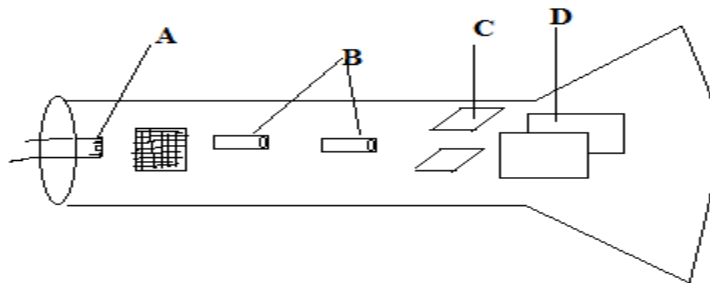
    a) Identify the parts labeled B, and D   (2marks)

        B...D...

    b) State the function of the part labelled A and C   (2marks)

        A...

        D...

    c) Draw on the diagram provided what would be observed on the screen if there is no Y-input and the time base is on at high frequency.

        (1mark)
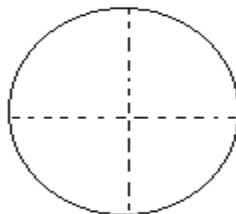
d) Give one reasonwhy it is possible to have a wider screen deflector in the television than on the C.R.O (1mark)

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17.a) Extrinsic semiconductors are made through a process called doping. Explain how doping produces an **n-type** semiconductor (1mark)

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b) The figure bellows shows a **p-n** junction diode.

p	n

Complete the diagram to show the forward bias state (1mark)

c. The figure shows a circuit used for a full wave bridge rectification.
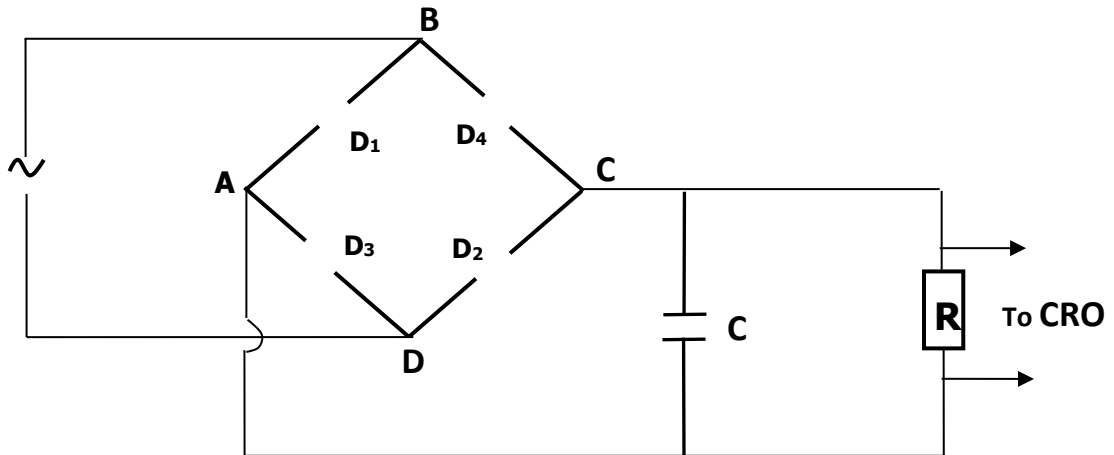
(i)   Insert diodes D1, D2, D3 and D4 to complete the circuit.   (2marks)
(ii)   What is the use of capacitor C?   (1mark)

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(iii)   On the axes below draw a voltage – time display of the rectification observed on the C.R.O.   (2marks)
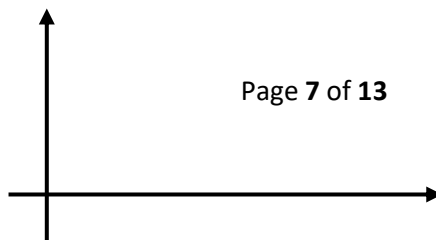
18a) State Lenz's law of electromagnetic induction. (1mark)

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b) The **figure 7** shows two coils of insulated copper wires wound on a single soft iron core. One coil is connected to a battery through a switch and the other is connected to a resister through a galvanometer.
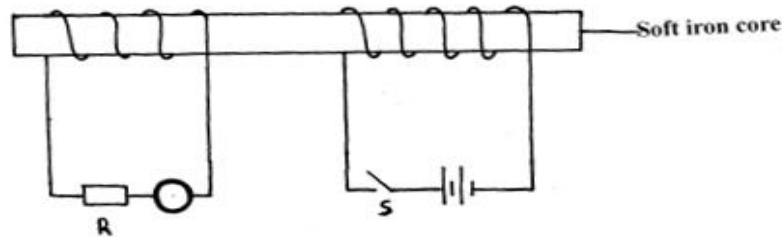
Figure 7

It is observed that as the switch is closed, the pointer of the galvanometer deflects momentarily. The same as when the switch is opened.

i) Explain why the pointer deflects momentarily. (2marks)

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ii) State one way in which the current through R can be increased.(1mark)

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c) i) State one way in which power is lost in a transformer. (1mark)

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ii)   A transformer uses 240V ac supply to deliver 9A at 80V to a heating coil.
        If 10% of the energy taken from the supply is lost in the transformer itself,
        What is the current in the primary winding?   (2marks)

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d) The diagram in the figure below shows a flexible wire in a magnetic field.
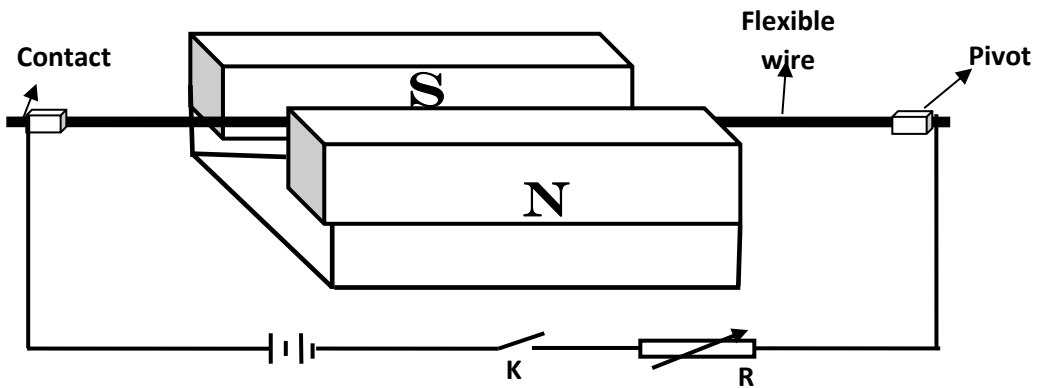
(i)   Explain the behavior of the wire when the switch K is turned on (2marks)

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(ii)   What is the behavior of the wire if R is reduced?   (2marks)

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19 .(a)Define Radio-activity. (1mks)

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(b)State one use of radioactivity in the following; (1mks)

i)   Medicine

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(c)The diagram in the figure below shows paths taken by three radiations **K, L** and **M** from a radioactive isotope through an electric field.
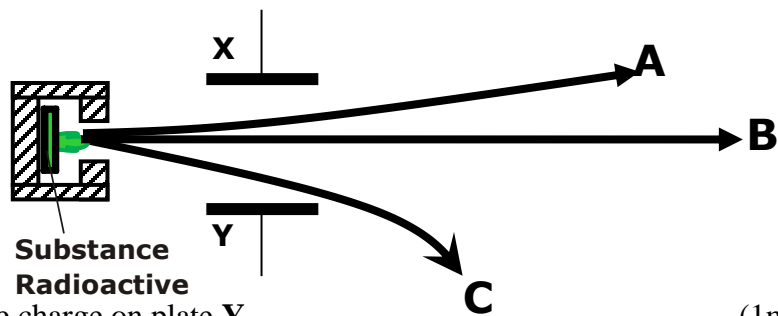
i)   State the charge on plate **Y**. (1mk)

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ii)   Identify the radiations **A** (1mks)

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     iii)   Give a reason why **C** deviates more than **A**.   (1mk)

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(d)Equation below shows a decay series of a radioactive isotope

$$^{319}_{73}P_O \xrightarrow{X} {}^{315}_{71}T \xrightarrow{Y} {}^{315}_{72}K$$
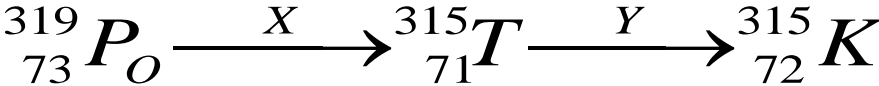
    Identify X and Y   (2mks)

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A radioactive element A of half life 31 days decays to element B. A sample of A of mass 32g is kept in a container. Assuming B is stable; calculate the mass of B that will be in the container after 124 days   (3mks)

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20.a) State **two** factors that determine the capacitance of a parallel plate capacitor. (2marks)

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    b) Three capacitors of capacitance $200\mu f$, $300\mu F$ and $600\mu f$ are connected together in a circuit. Draw a circuit diagram to show the arrangement of the capacitors which gives an effective capacitance of $100\mu f$.   (2marks)

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c) The figure 6 below shows a circuit where a battery of e.m.f 6V , switches X and Y, two capacitors of capacitance 2 µF and 4 µFare connected.
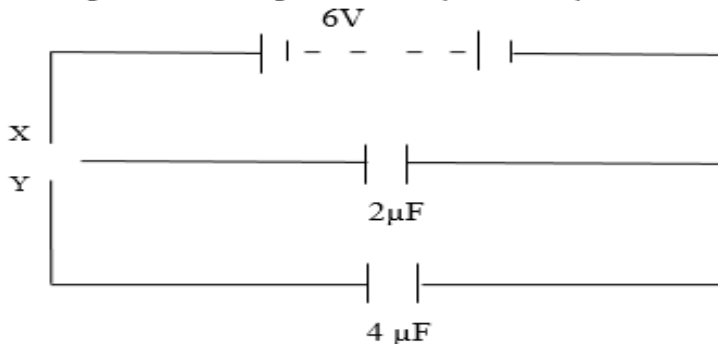
Figure 6

Determine the charge stored in the 2 µF capacitor when switch X is closed and switch Y is open.   (3marks)

i.

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ii.   When switch Y is finally closed and switch X is open, determine the potential difference across each capacitor.   (3marks)

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d) Briefly explain how the lightening arrester works.   (3marks)

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