PHYSICS PP2 FINAL GAUGE PREDICTION

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THIS EXAM IS DIRECTED TO ALL KENYAN STUDENTS

BECAUSE IT IS TO DETERMIN/PREDICT THE STUDENT FINAL SCORE

THIS EXAM MARKING SCHEME WONT BE FREE USE MARKING SCHEME WELL TO CORRECT YOURSELF WELL AND BE FULL PREPARED TO FACE THE NATIONAL EXAMINATIONS WITHOUT ANY FEAR BUT WITH CONFIDENT

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PHYSICS PP2 GAUGE PREDICTION EXAM

NAME……………………………………………………………ADM…..…………………

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Kenya Certificate of Secondary Education.

232/2 PHYSICS

PAPER 2

TIME: 2 HOURS.

GAUGE 1 PHYSICS PP2 2023 KCSE PREDICTION

INSTRUCTIONS TO CANDIDATES

A) This paper consists of two sections A and B.

B) Answer all the questions in sections A and B in the spaces provided.

C) Non-programmable silent electronic calculators may be used.

D) This paper consists of 9 printed pages.

E) Candidates should check the questions to ascertain that all the pages are printed as indicated and

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SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1-13	25	
B	14	12	
	15	10	
	16	11	
	17	12	
	18	10	
TOTAL		**80**	

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SECTION A: (25MARKS)

1. State one property of image formed by a pinhole camera. (1mk)

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2. Other than density, state another factor that affect the speed of sound in a solid. (1mk)

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3. A radio wave has a frequency of 3MHz and travels with a velocity of 3.0×10^8 m/s. Calculate its wavelength. (2mks)

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4. Draw a circuit diagram to show P-N junction diode in the reverse biased mode. (2mks)

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5. Explain why the walls of studio are padded with woolen materials (1mk)

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6. (a) Define the term ''radioactivity'' (1mk)

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(b)The figure below shows a radioactive element placed in an evacuated glass chamber.
The element produces alpha,beta and gamma emissions. The three emission pass through an electric field
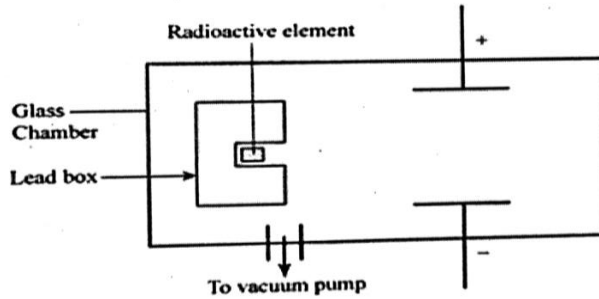
Complete the diagram to show the path of each of the emissions. (3mks)

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7. Explain why radio waves signals are easier to receive in a place surrounded by hills. (2mks)

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8. State two ways of minimizing electrical power losses during transmission of electric power. (2mks)

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Give a reason why convex mirror is preferred to a plane mirror for use as a driving mirror

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9.

10. State two ways of minimizing local action in a simple cell. (2mks)

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11. The figure below shows a defect of vision being corrected by concave lens placed infront of the eye.

Diverging lens
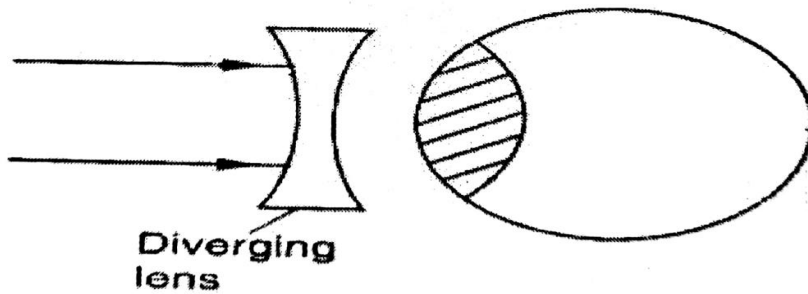
(i)   Name the defect. (1mk)

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(ii)   Complete the rays to show the effect of the lens. (2mks)

12. State one use of microwaves . (1mk)

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13. Determine the speed of light in water given that the speed of light in air is 3.0×10^8 m/s and the refractive index of water is 1.33 (3mks)

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SECTION B (55 MARKS)

Answer all questions in this section.

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14. (a) State the Ohm's law   (1 mk)

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b) Give one factor that affect the resistance of a metallic conductor.   (1mk)

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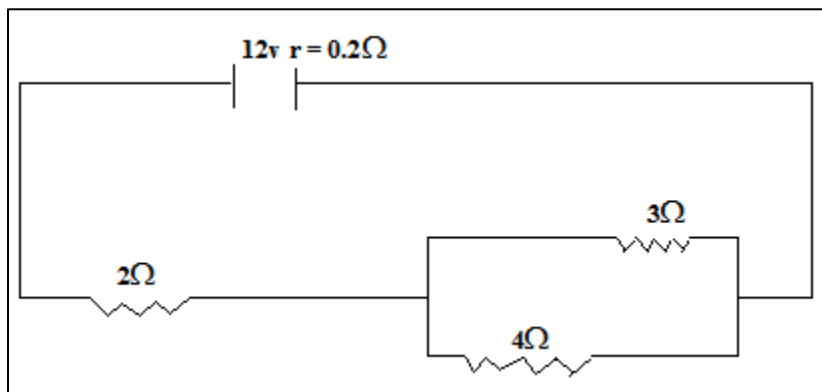..

c)The figure below shows three resistors connected to 12V supply of internal resistance of 0.2Ω.

Calculate

i)   The effective resistance.   (3mks)

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ii) The total current in the circuit.   (2 mks)

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(d) (i) Define the term ' doping' (1 mk)

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(ii) Briefly explain how silicon is used to make an p-type semi-conductor. (3 mks)

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(iii)State one application of a diode. (1mk)

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15.(a) Why is the cap of the gold leaf electroscope circular? (1mk)

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(b)A match stick is lit near the cap of a charged electroscope.State and explain the observation made. (2mks)

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(c)State one factor that affects the capacitance of a parallel plate capacitor.(1mk)

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(d)A 10μF capacitor is charged to potential difference of 300V and isolated.It is then connected in parallel to a 5μF capacitor.Calculate:

(i) The resultant potential difference.   (3mks)

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(ii)The total energy in the two capacitors after connection.   (3mks)

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16.(a)State the Faraday's law of electromagnetic induction.   (1mk)

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(b)Give two factors that affect the magnitude of the induced em.f   (2mks)

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(c)A transformer with primary coil of 400 turns and secondary coil 200 turns is connected to 240 V a.c mains.

(i) Calculate the secondary voltage .   (2mks)

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(ii)If the primary current is 3.0 A and secondary is 5.0A.Calculate the efficiency of the transformer (3mks)

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(d)State how the following are minimized in a transformer .
(2mks)

(i) Hysteresis loss...

(ii)Eddy currents...

(e) Explain why the alternating voltage is used in a transformer. (1mk)

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17(a)Define the term 'work function' (1mk)

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(b)Distinguish between thermionic emission and the photoelectric emission. (1mk)

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(c)State one factor that determines the velocity of photoelectrons produced on the metal surface when light shine on it. (1mk)

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(d)The threshold wavelength of a photoemissive surface is 5.55×10^{-7} m.(Take speed of light C=3.0×10^8 m/s,plancks constant h=6.63×10^{-34} Js and mass of an electron Me=9.1×10^{-31} kg.) Calculate:

(i)Its threshold frequency   (3mks)

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(ii)The workfunction of the surface   (3mks)

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(e)The maximum speed with which a photoelectron is emitted if the frequency of the radiation is 6.2×10^{14} Hz   (3mks)

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18.(a) State one similarity between cathode rays and X-rays.   (1mk)

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(b) Give two uses of X-rays in medicine   (2mks)

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(c)In a T.V set magnetic fields are preferred for use as deflection system instead of the electric field. Explain (1mk)

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(d)The figure below represent a cathode ray oscilloscope (C.R.O).
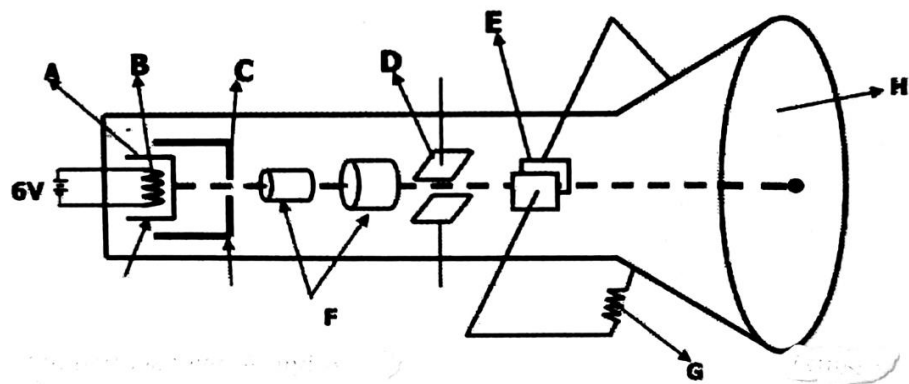
i)Name the parts labelled A and C (2mks)

A...

C...

ii)What is the function of part labelled D (1mk)

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(iii)Explain how electrons are produced in the C.R.O. (1mk)

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(iv) State the reason why the part labelled F has variable potential difference. (1mk)

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(v)Give a reason why the tube is evacuated. (1mk)

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Kenya Certificate of Secondary Education.

232/2 PHYSICS

PAPER 2

TIME: 2 HOURS.

GAUGE 2 PHYSICS PP2 2023 KCSE PREDICTION

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G) Answer all the questions in sections A and B in the spaces provided.

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	18	10	
TOTAL		80	

SECTION A (25 MARKS)

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Answer ALL questions in this sections in the spaces provided.

1.   The figure 1 below shows a positively charged metal plate with an earthing connection.

Using an arrow to show the direction of charges through the earth connection and explain the

final charge of the plate.
(2marks)
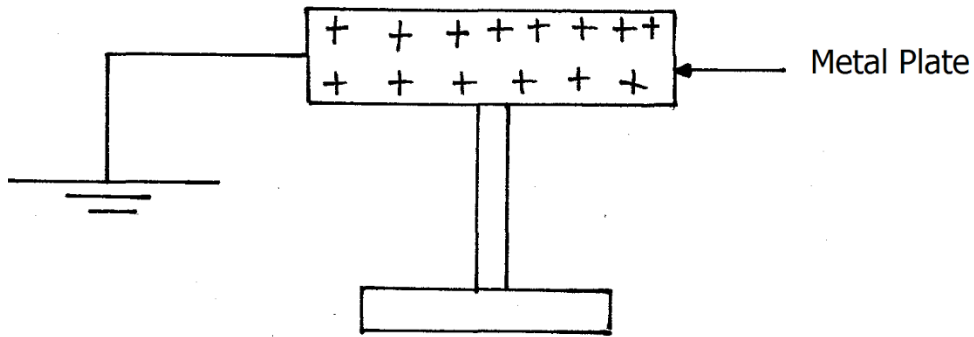
Fig. 1

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2.   Figure 2 below shows a metre rule in equilibrium balanced by the magnet. The iron core is fixed
to the bench
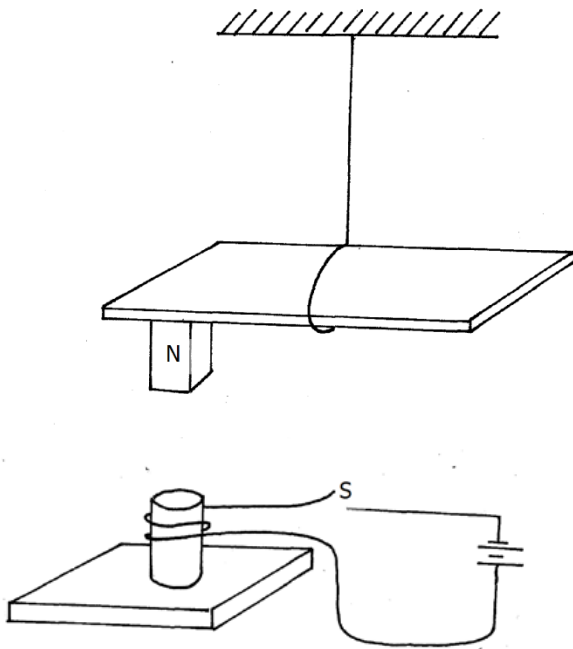
Fig. 2

State and explain the effect on the metre rule when the switch S is closed. (2marks)

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3. State **two** factors affecting the type of shadow formed by an object placed infront of a

   source of light. (2marks)

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4. Distinguish between intrinsic and extrinsic semi – conductors. (1mark)

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5.   Figure 3 shows a galvanometer connected to a coil with a south pole of a permanent magnet approaching the coil.
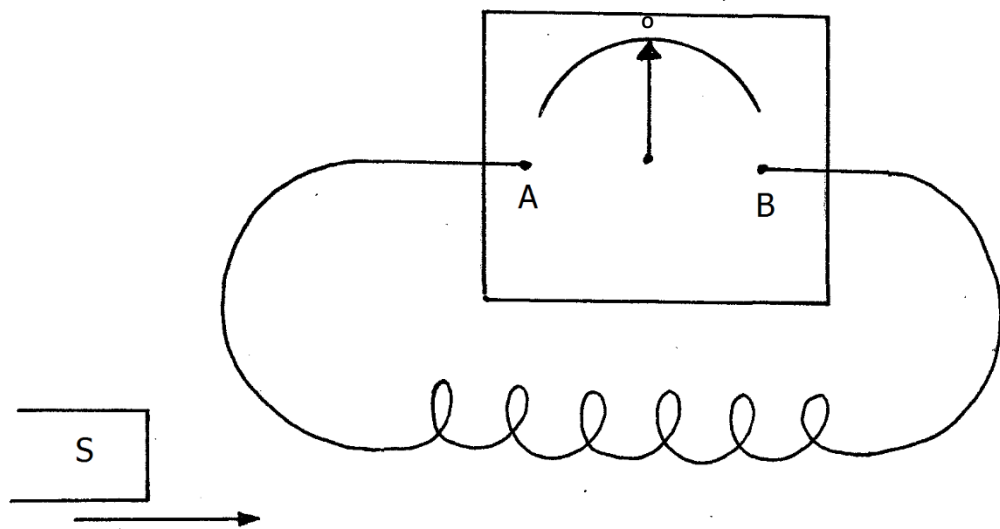
_Fig. 3

Indicate the direction of the pointer on the galvanometer when the bar magnet is moved as

shown.   (1mark)

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6.   What are the characteristics of the image formed when;

a)   An object is placed beyond the centre of curvature of a concave mirror?   (1mark)

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b) An object is placed between the principal focus and the pole of a concave mirror? (1mark)

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7.   a)   A coin is placed beneath a transparent block of thickness 10cm and refractive index 1.50.

Calculate the vertical displacement of the coin.   (3marks)

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b)   Kenya launched the use of optical fibres in communication recently. State why optical fibres are preferred to ordinary cables.   (1mark)

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8.   A radiation of frequency 8.5×10^{14} Hz is incident on a metal emitting photoelectrons.

Determine the threshold wavelength if electrons accelerate to the anode at a velocity of 7.2×10^5 m/s   (3marks)

(Planck's constant $= 6.63 \times 10^{-34}$ Js, $m_e = 9.11 \times 10^{-31}$ Kg)

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9.   Figure 4 shows an electromagnet in an electric circuit.
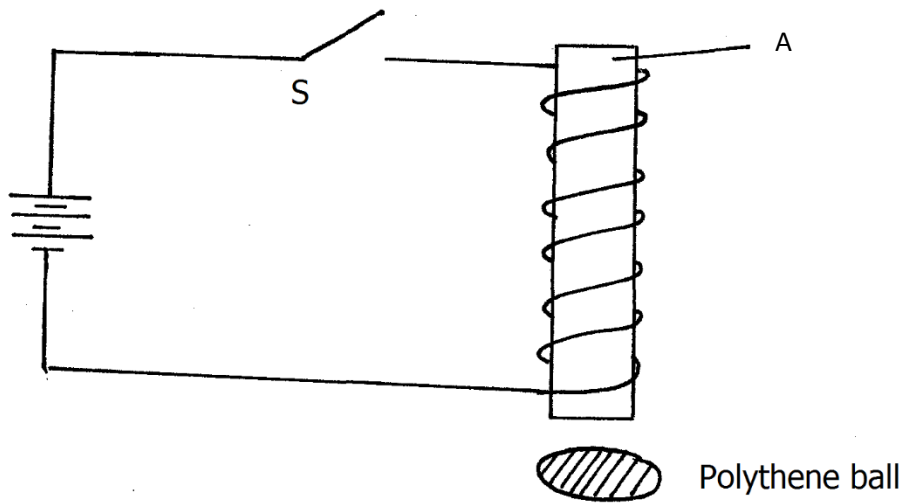
Fig 4

a)   State what happens to the polythene ball when the switch S is closed.   (1mark)

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b)   Why soft iron is preferred for material A than steel?   (1mark)

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10. Explain why the cathode of a CRO is coated with oxides of metals such as barium and strontium. (1mark)

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11. Distinguish between hard and soft X – rays. (2marks)

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12. Figures 5 shows a simple water heater.
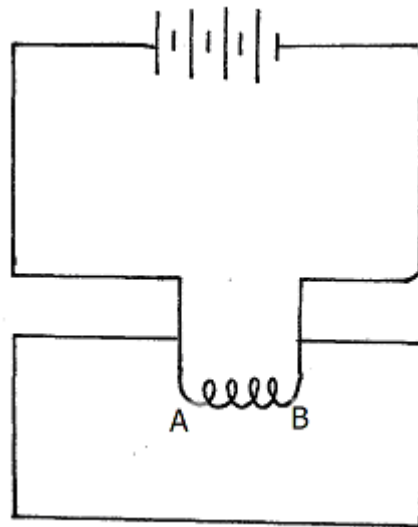
Fig 5

Give a reason why AB is coiled. (1mark)

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13. Arrange the following radiations in order increasing wavelength:

Ultra violet, microwaves, blue light, yellow light. (2mk)

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SECTION B (55 MARKS)

Answer ALL the questions in the spaces provided.

14. a) Some students wish to determine the focal length of a convex lens of thickness

0.6cm using an optical pin and a plane mirror. Figure 6 shows the experimental set up when there is no parallax between the pin and the image.
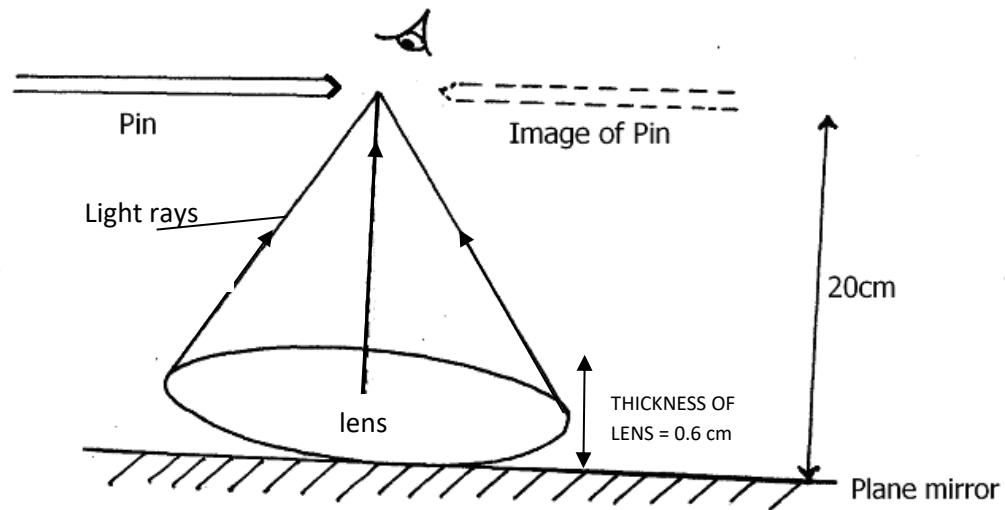
Fig 6

(i) Determine the focal length of the lens. (1mark)

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       (ii)   Explain how you arrive at your answer.   (2marks)

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       b)   An optician in Eldoret Hospital examined an eye of a patient and made the following observations:

                Eye ball too small and the focal length of the eye lens too short.

       (i)   State the eye defect the patient could be having.   (1mark)

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       (ii)   Use a diagram to describe how the defect could be corrected.   (2marks)

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       c)   The graph below shows the variation of $1/v$ and $1/u$ in an experiment to determine the focal length of a lens.
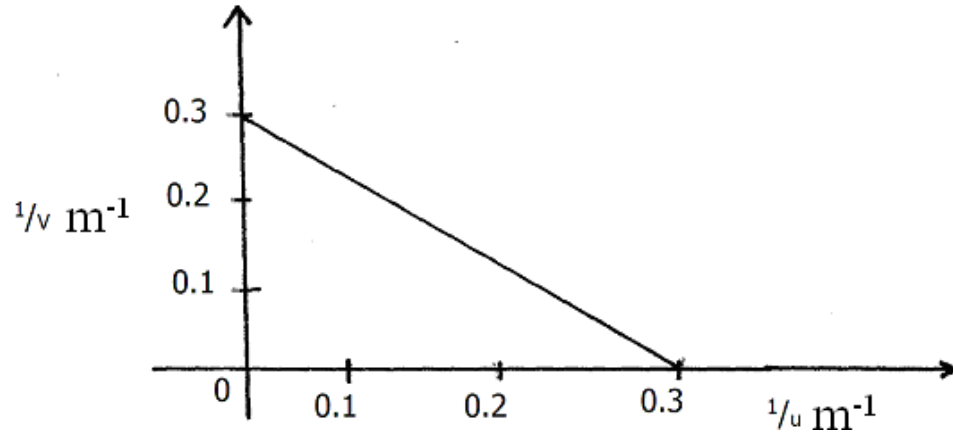
(i)   Use the graph to determine the focal length.   (3marks)

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(ii)   What is the power of the lens used?   (1mark)

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15.   a)   Define electric resistance.   (1mark)

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b)   Figure 7. shows three resistors connected as shown.
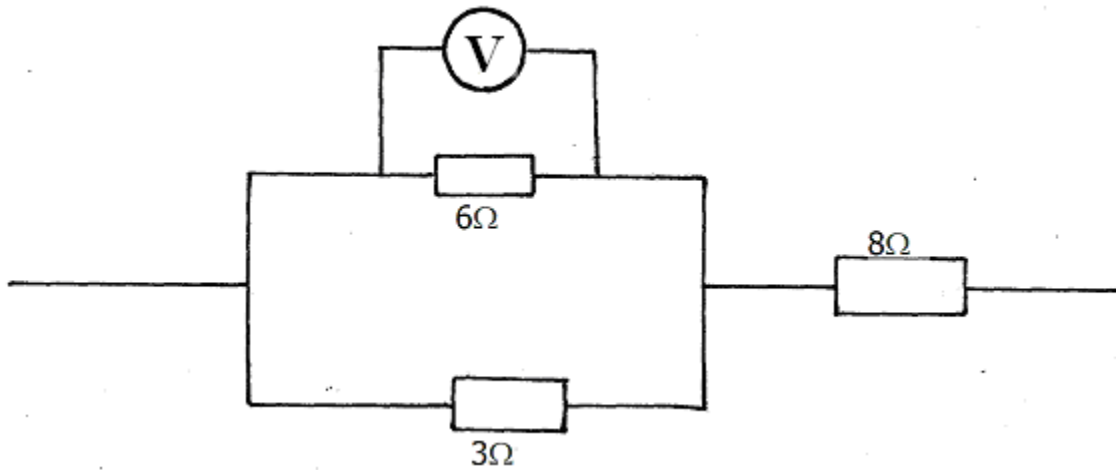
Fig 7

If the voltmeter reads 4V, find the

(i)   Effective resistance.   (2marks)

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(ii)   Current through the 3Ω resistor.   (2marks)

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(iii)   Potential difference across the 8Ω resistor.   (2marks)

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c)i)   What is meant by the term "lost volts"?   (1mark)

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ii)   A cell supplies a current of 0.5A when connected to a 2Ω resistor and 0.25A

       when connected to a 5Ω resistor.

       Find the e.m.f and the internal resistance of the cell.   (4marks)

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16.   a)   On the axes provided below, sketch a graph showing the variation of frequency

             with wavelength at constant velocity.
             (1mark)

Frequency f
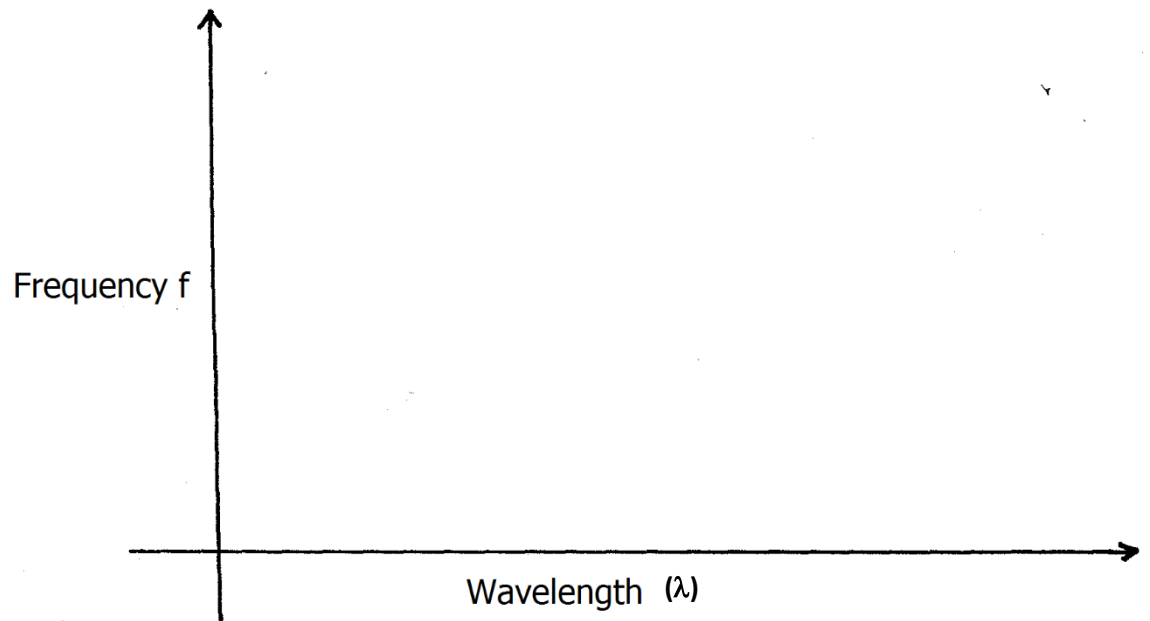
Wavelength (λ)

       b)   Tv waves of frequency 6MHz travels with a speed of 3.0×10^8 m/s.

             What is the wavelength ?.   (2marks)

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c) Figure 8. shows circular waves approaching a concave reflector.
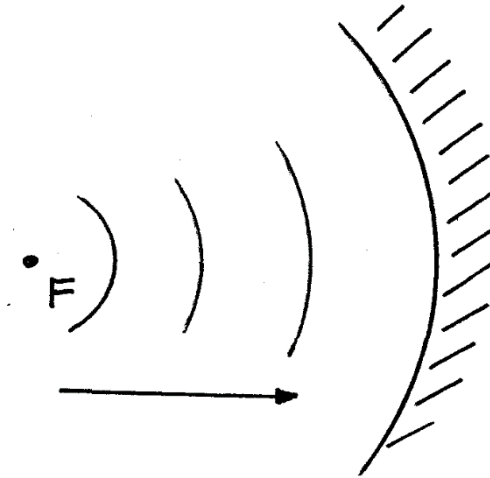
Fig. 8

Show the reflected waves and the missing part of incident wave   (2marks)

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d) State **two** conditions necessary for two progressive waves traveling in opposite

directions to form stationary waves.   (2marks)

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e) Figure 9 shows the set up used to demonstrate interference of sound.
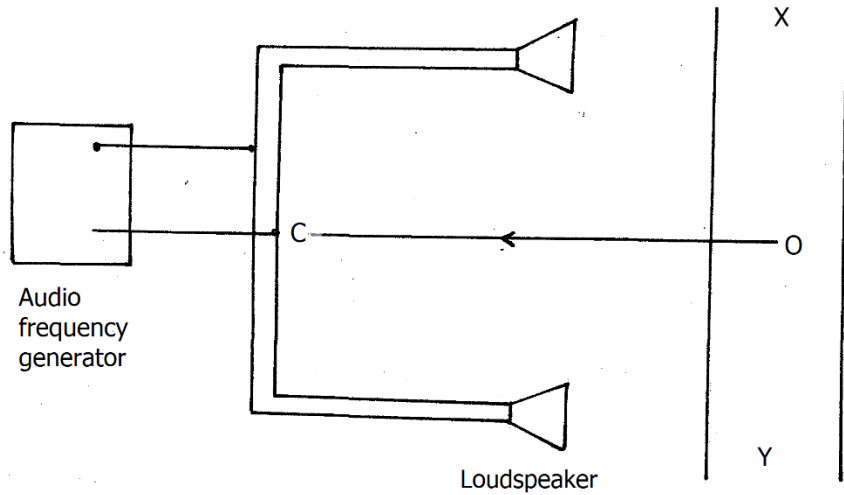
Fig 9

(i) An observer O, moves along XY.

State the observation(s) made. (1mark)

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(iv) State what would be observed if a cathode ray oscilloscope is moved along line XY(2marks)

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(iii) What will a student hear if he moves along the line OC? (1mark)

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(iv)Why are the loudspeakers connected to the same audio – frequency generator? (1mark)

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17.   a)   State **one** factor that affects the capacitance of a capacitor.   mark)

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b)   Figure 10. shows a circuit diagram with three capacitors.
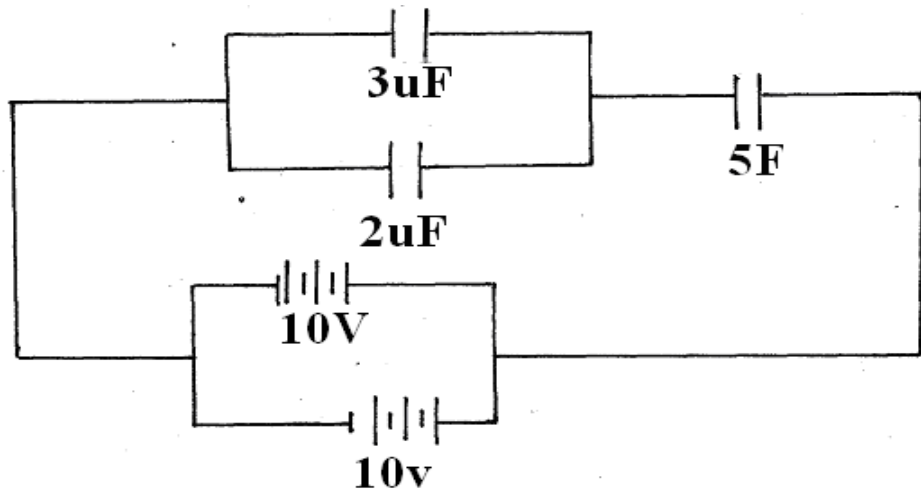
                                                                                                    fig 10

(i)   Determine the effective capacitance of the arrangement.   (2marks)

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(ii)   Find the energy stored in the combinations of capacitors.   (3marks)

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c)   Explain why it is not advisable to shelter under a tree when it is raining.   (1mark)

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18 a)   State **two** dangers of high voltage transmission.   (2marks)

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b)   A generator produces 150KW at a voltage of 5 kV. The voltage is stepped up to 60kV and transmitted through cables of resistance 150Ω to a step – down transformer in a substation. If both transformers are 80% efficient,

Calculate the:-

(i)   Current through the transmission cables.
        (3marks)

(ii)   Power lost during transmission.   (3marks)

19.   a)   The half – life of cobalt – 60 is 5years.

             How long will a sample take for the activity to decrease to $^1/_{16}$ of its original value.

                                                                          (3marks)

       b)   The graph below shows radioactive decay of iodine.
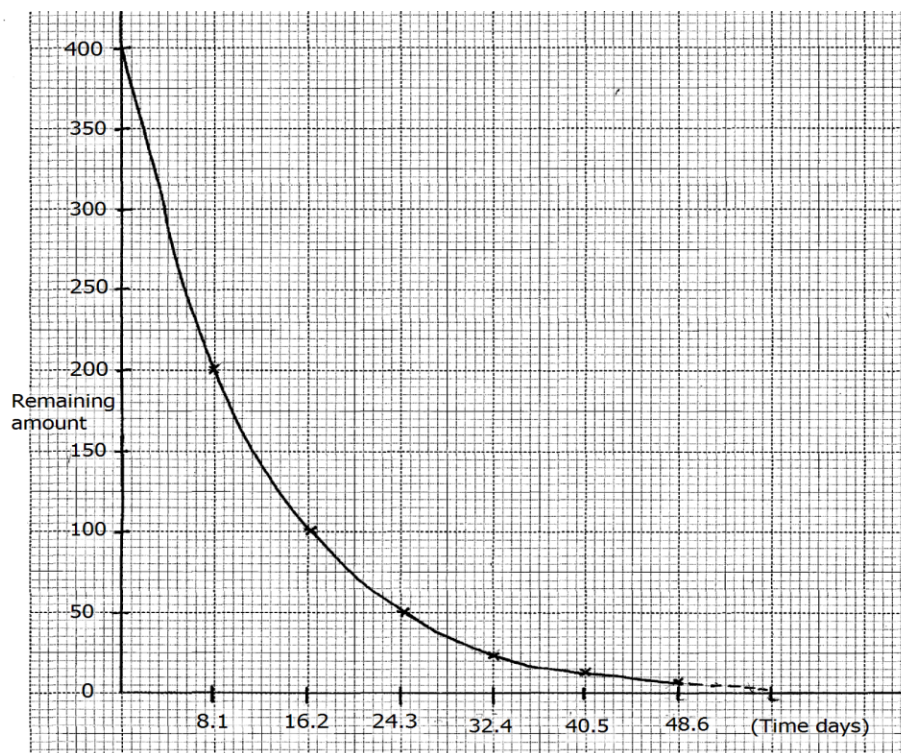
Use the graph to determine the:-

(i)   fraction of the amount remaining after 16.2 days.
(1marks)

(ii)   determine the half – life of iodine.
(1marks)

(iii)   mass remaining after 17 days.   (1mark)

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END

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Kenya Certificate of Secondary Education.

232/2 PHYSICS

PAPER 2

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GAUGE 3 PHYSICS PP2 2023 KCSE PREDICTION

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L) Answer all the questions in sections A and B in the spaces provided.

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TOTAL		**80**	

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SECTION A: (25 MARKS)

1. An incident ray makes an angle of 25^0 to the mirror as shown below.

Fig 1
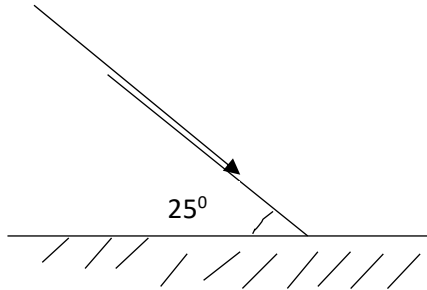
Complete the diagram to show how the ray is reflected after striking the mirror hence calculate angle of reflection. (2 mks)

2. Give the reason why insulators do not conduct electric current. (1 mk)

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3. A positively charged glass rod is brought near the brass cap of a negatively charged electroscope. Explain why the leaf falls. (2 mks)

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4. What causes a freely suspended magnetic needle to always point in the north south direction? (1 mk)

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5. A ray of light travelling towards a concave mirror passes through its centre of curvature. State how the ray is reflected after striking the mirror. (1 mk)

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6. Fig 2 below shows a magnetic compass placed near a conductor in an electric circuit.
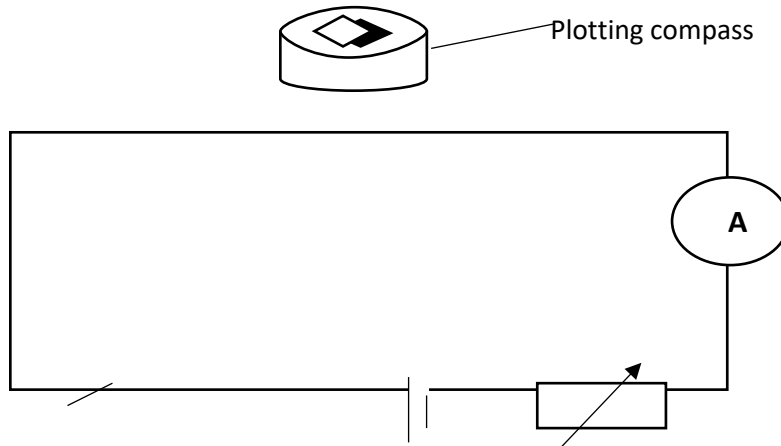
a) State what happens to the magnetic needle when the switch is closed. (1 mk)

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b) Explain why the needle behaves as described in (a) above. (1 mk)

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7. What are longitudinal waves. (1 mk)

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8. An echo sounder in a ship produces a sound pulse of frequency 24.8 KHZ. An echo is received from sea bed at a depth of 175m after 0.25 seconds. Calculate the wave length of sound in water.   (3 mks)

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9. The critical angle of a ray of light travelling from medium A to air is 44^0.

a) Define the term critical angle.   (1 mk)

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b) Calculate the angle of refraction, when the angle of incidence is decreased to 40^0 (give your answer to 3 decimal places.)   (3 mks)

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10. A circular wave is incident on a straight reflector as shown in fig 3 below.
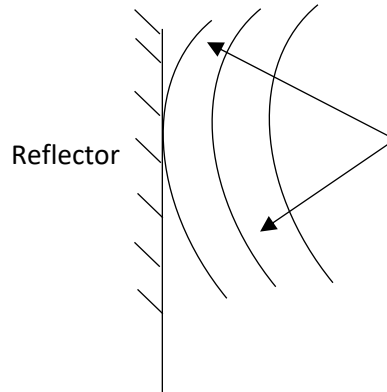
Reflector

Complete the diagram to show how the wave is reflected.   (2 mks)

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11. Fig 4. Below shows a circuit consisting of capacitors and a battery

6V

15μF   25μF
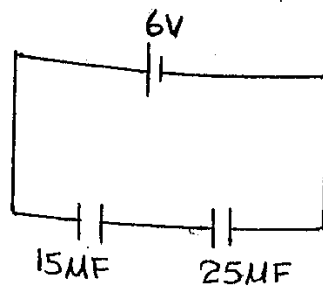
Determine the charge stored in the circuit   (3mk)

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12. a) Sketch a graph to show the variation of the current against time for a discharging capacitor in axi **Current**

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Time
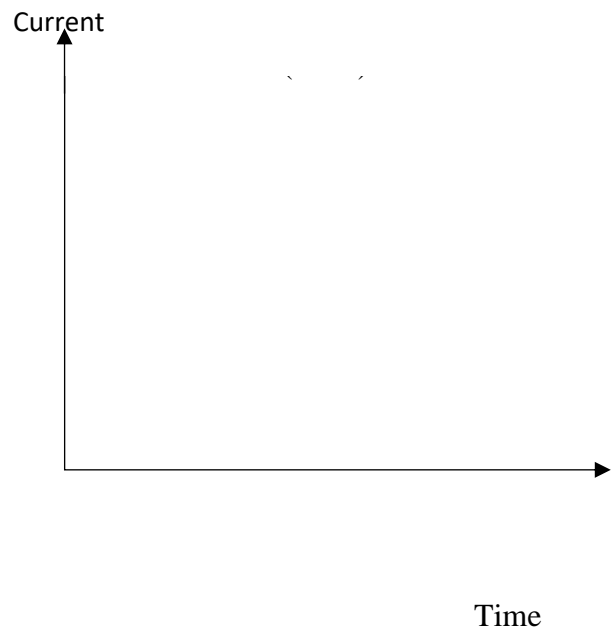
b) State two ways of increasing the capacitance of a capacitor.   (2mk)

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SECTION B (55 MARKS)

13.a) State two factors that determine the heat produced by a conductor when connected to an electric circuit.   (2mks)

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b) The electrical power is given by

      P= V I where V= Pd across a conductor

              I= Current through a conductor.

  Show that electrical power can also be given by

P=V^2/R where R=resistance.   (3 mk)

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c) What property does a fuse wire have that makes it suitable for its use in a circuit.   (1 mk)

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d) An electric heater rated 1.2 KW, 240V supplies 5.5 x 10^5 joules of heat energy to water in an insulated container.

i) For how long is the heater switched on.(Give your answer in minutes and to 2 decimal places) (3 mks)

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ii) Determine the resistance of the heater coil   (2 mks)

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14. a) (i)Using a ray diagram show how a convex lens forms an image when an object is placed between it and its focal point.   (3 mks)

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 (ii)Name one optical device that makes use of the above set up.   (1 mk)

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b) In an experiment to determine the focal length of a converging lens, several values of image distance V and corresponding values of object U were obtained.

Object distance (U) cm	10	15	20	25
Image distance (V) cm	40.0	17.1	13.3	11.8
$1/_U$ x 10^{-2} (cm^{-1})				
$1/_V$ x 10^{-2} (cm^{-1})				

i) Complete the table.   (2 mks)

ii) Plot a graph of $^1/_v$ against $^1/_U$ and produce it to cut both axis

(4
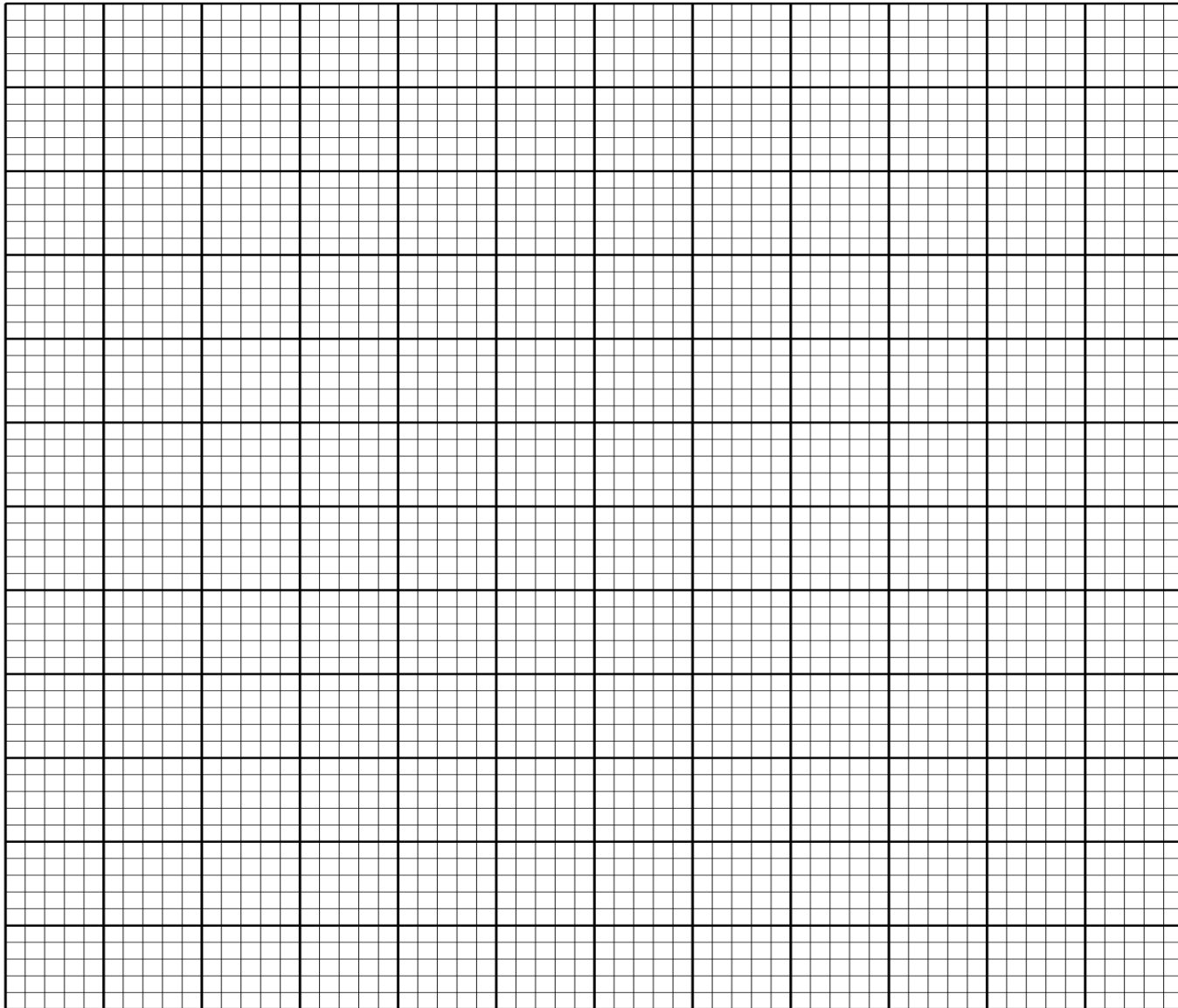
mks)

iii) Find the intercepts at $^1/_{u.} =$ _____ (cm^{-1})
   (1 mk)

   $^1/_v =$ _____ (cm^{-1})
   (1 mk)

iv) Determine the average value of focal length of the lens from the graph (2 mks)

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15. (a) The table below shows an arrangement of electromagnetic spectrum.

Radio waves	Micro waves	A	Visible light	B	X rays	Gamma rays

i) Name the radiation represented by B.
   (1mk)

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ii) Name the human organ that detect radiation A.   (1mk)

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iii) State one application of gamma rays.   (1mk)
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b) Fig 5. Shows a dry cell (the paper that covers the dry cell is not shown)

Mixture of carbon powder and manganese iv oxide

A

B
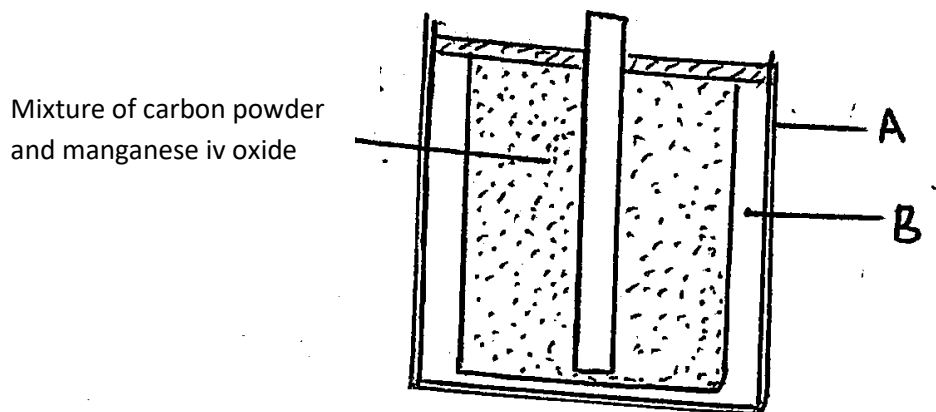
❖ Name the parts labelled A and B

A: …………………………………..
(1mk)

B: ……………………………………
(1mk)

❖ State and explain the importance of manganese (iv) oxide in the cell   (2mks)

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❖ Explain why large currents should not be drawn from the cell for a long time   (2mks)

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c) State with reasons whether the dry cell is classified as primary or secondary type of cell
(2mks)

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16. a) Explain what is meant by non-Ohmic conductors   (2mks)

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b) State the reason why electromotive force of a cell is always higher than the potential
difference (terminal voltage)   (1mk)

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c) Fig 6, below shows three identical bulbs A, B, and C connected in a series – parallel circuit.
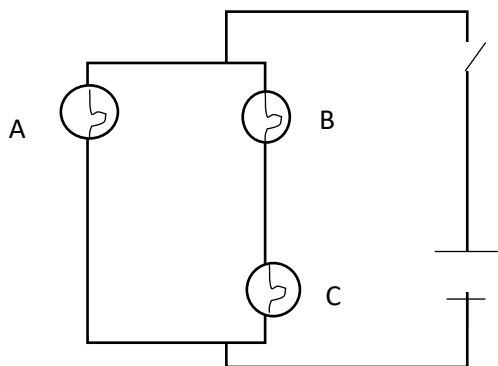
i) State the bulb with the highest potential difference.   (1 mk)

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ii) If current through Bulb B is 0.85A, determine the current through bulb A.   (2 mks)

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d) State two factors that affect a resistance of a metal conductor   (2mks)
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e) i)In the axis provided below sketch a graph to show the relationship between the resistance(
R) and temperature of a thermistor
                (1mk)

Resistance

Temperature
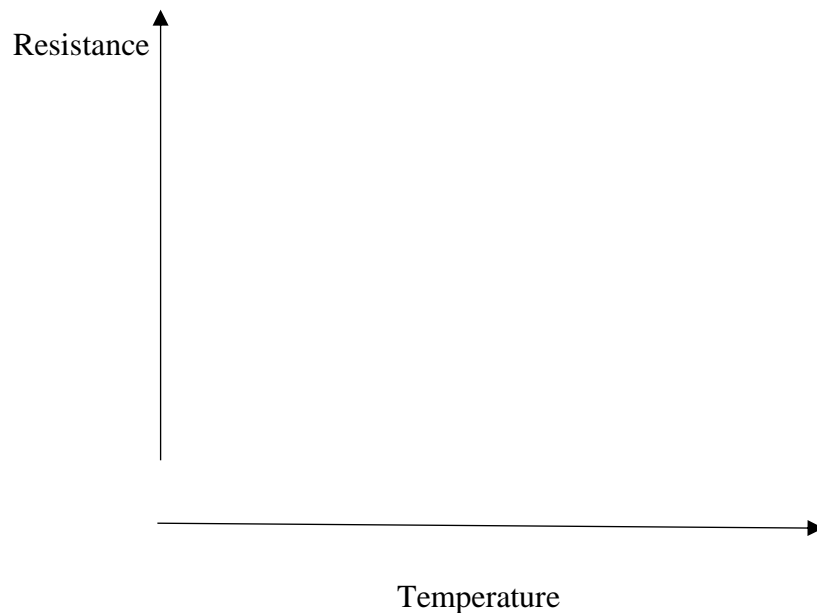
ii) Explain the curve of your graph in (e) (i) above.   (1mk)

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17(a) What is meant by the term diffraction of a wave   (1mk)

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b) State two factors that determine the extent of diffraction of a given wave
(2 mks)

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c) Two identical loudspeakers connected to the same audio-frequency generator are placed some
distance away from each other as shown below.
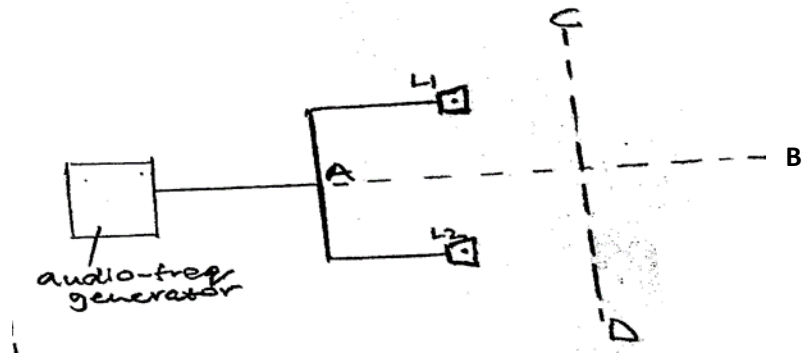
i) Briefly describe the sound experienced by:

a) An observer moving along line AB.   (1mk)

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b) i) An observer moving along CD.   (1mk)

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ii) Explain the sound experienced by the observer in (b (i)) above   (2mks)

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d) i) State with reason the effect of increasing the frequency of the audio generator on the sound heard along line CD   (2mks)

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PHYSICS PP2 GAUGE PREDICTION EXAM

NAME……………………………………………………………ADM…..………………

SCHOOL………………………………………………………..INDEX……………………

DATE………………………SIGN………………………….TARGET…………………….

Kenya Certificate of Secondary Education.

232/2 PHYSICS

PAPER 2

TIME: 2 HOURS.

GAUGE 4 PHYSICS PP2 2023 KCSE PREDICTION

INSTRUCTIONS TO CANDIDATES

P) This paper consists of two sections A and B.

Q) Answer all the questions in sections A and B in the spaces provided.

R) Non-programmable silent electronic calculators may be used.

S) This paper consists of 9 printed pages.

T) Candidates should check the questions to ascertain that all the pages are printed as indicated and that no question is missing.

FOR EXAMINER'S USE ONLY.

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1-13	25	
B	14	12	
	15	10	
	16	11	
	17	12	
	18	10	
TOTAL		**80**	

SECTION A (25 MARKS)

Answer __ALL__ the questions in this section in the spaces provided.

1. The fig. 1 below shows a voltmeter before and after use to take the e.m.f of a cell.
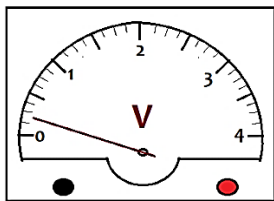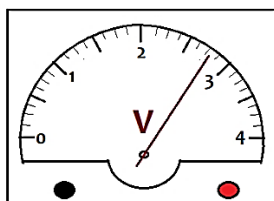
(a)   (b)

Record the value of emf of the cell.   (2marks)

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2.An uncharged metal rod brought close to but not touching the cap of a charged electroscope caused decrease in the divergence of the leaf. Explain this observation.   (1mark)

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3.The figure 4 below shows a magnet and a solenoid in relative motion.
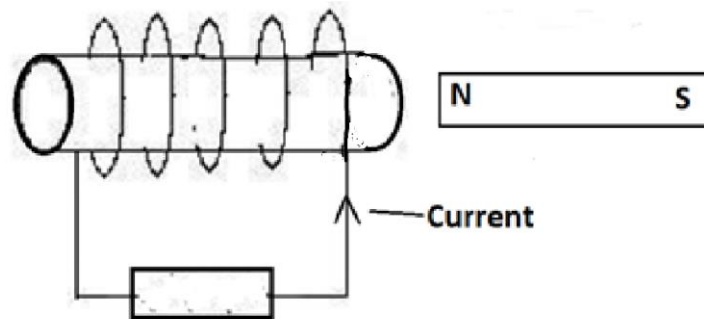
If the current shown was induced current indicate the motion of the magnet.   (1mark)

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4.The following figure shows the path of a ray of light through a transparent material placed in air

FOR MARKING SCHEME CALL SIR ABRAHAM **0729125181**
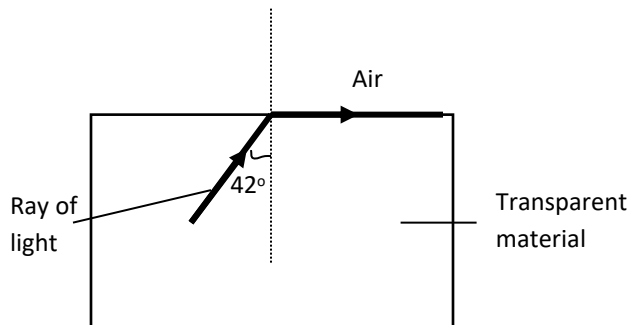
Determine the refractive index of the transparent material. (2 marks)

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5. Give one important use of each of the following waves.

a). X-rays		
b). Infra red		3mks
c). Microwaves		

6. Figure 2 below shows a set-up of a simple cell.
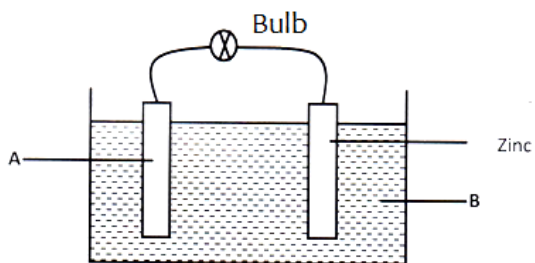
15. Name the material used in part A (1mark)

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16. Name the electrolyte B. (1mark)

FOR MARKING SCHEME CALL SIR ABRAHAM **0729125181**

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7. The fig. 3 below shows a ray incident to a concave lens.

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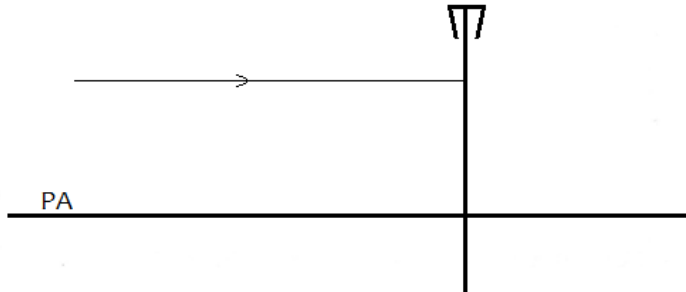
Draw on the diagram to show the resulting ray.   (1mark)

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8.A girl observes a man hammering a post into the ground repeatedly and she hears the sound at the same time as he strikes each blow. If the interval between the blows is 2 seconds and speed of sound in air is 330m/s. How far is she from the man?(3marks)

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9.Figure 5 represents a displacement – time graph for a wave.
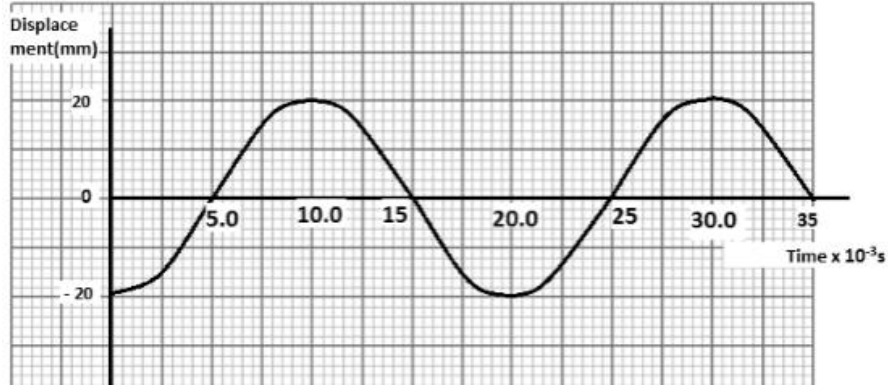
(a) State the amplitude of the wave.   (1 mark)

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(b)Determined:

(i) The periodic time   (2marks)

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(ii) the frequency of the wave.   (1mark)

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10. In an experiment to magnetize an iron bar by single stroke method, the graph below was plotted.

FOR MARKING SCHEME CALL SIR ABRAHAM **0729125181**
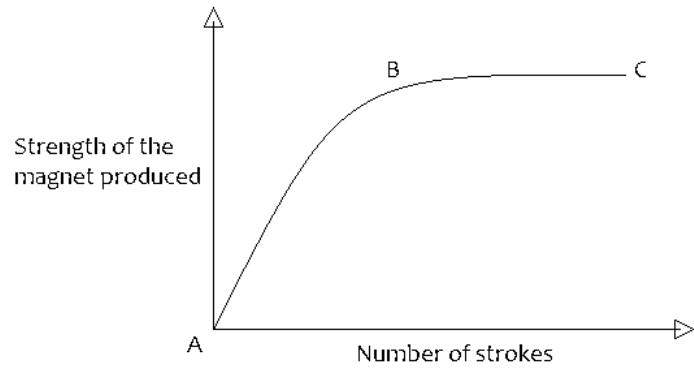
Explain what is happening between points AB and BC.   (2marks)

AB

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BC

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11. Figure 4 shows two plane mirrors placed at an angle of 45° to each other. An incident ray

    strikes mirror 1 at 45°.
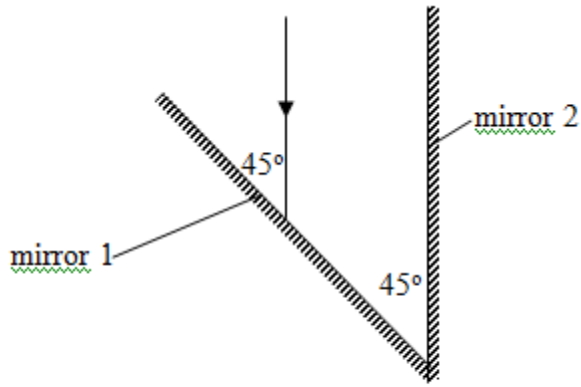
Figure 4

Complete the figure to show the path that is followed by the ray after reflection by the

two mirrors.   (2marks)

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12. Figure 7 below shows a perfectly efficient transformer. The number of turns in the secondary coil S is six times that of the primary coil P.
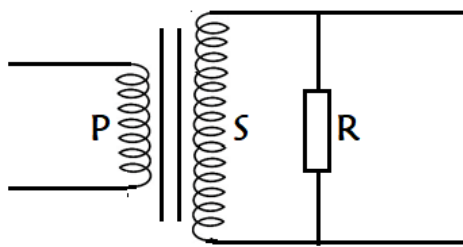
If a supply voltage of 4V d.c is connected across P, state with reason what happens to the voltage across R   (2marks).

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FOR MARKING SCHEME CALL SIR ABRAHAM **0729125181**

Section B (55 marks)

Answer __ALL__ the questions in this section in the spaces provided.

13 (a). State one application of each of the following.

    i.   Convex mirror.   (1mark)

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    ii.   Parabolic mirror.   (1 mark)

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(b)Fig. 9, which is drawn to a scale of 1:5, represents an object O and its image 'I' formed by a concave mirror.
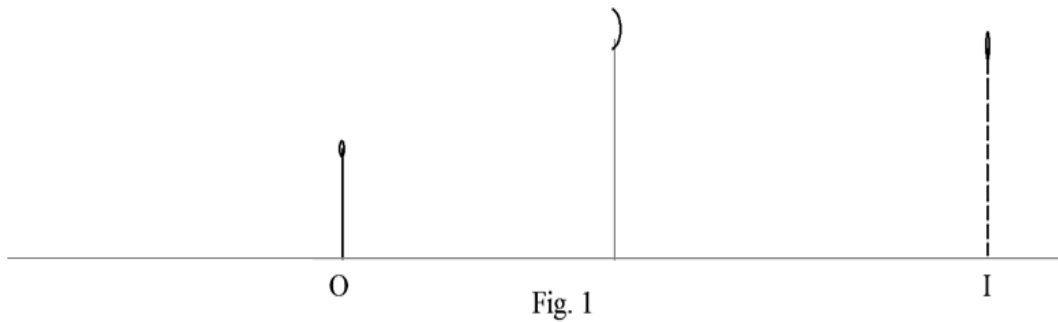
Fig. 1

    By drawing suitable rays, locate and mark on the figure the position of the principal focus 'F' of the mirror. Determine the focal length f.   (3marks)

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(c)The graph in Fig. 10 shows the variation of magnification, M with image distance, V for a concave mirror.

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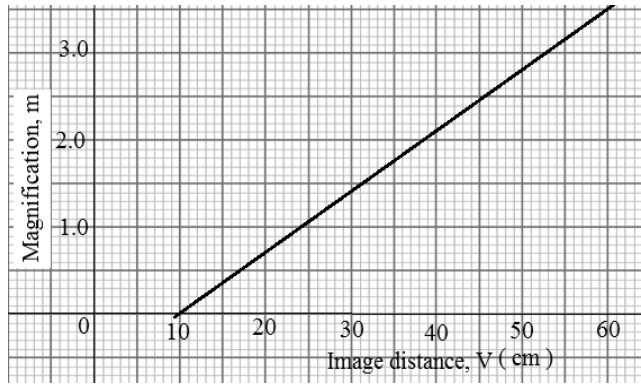
Determine:

❖ The object position when the image position is 45cm.   (3marks)

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❖ The focal length of the mirror.   (1mark)

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d) State **two** reasons why a concave mirror is used as a doctor's dental mirror. (2marks)

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

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(b) A 5μF capacitor is charged to a potential difference of 200V and isolated. It is then connected to a 10μf capacitor.

Find ;

(i) The resultant potential difference across the combination (3marks)

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(ii) Energy stored before connection (3marks)

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(iii) Total energy in the capacitors after connection. (2marks)

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(c) Give two applications of capacitors (2marks)

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15. (a)State two differences between pinhole camera and the human eye. (2marks)

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FOR MARKING SCHEME CALL SIR ABRAHAM **0729125181**

(b) A converging lens forms an image which is three times the object. Determine the focal length of the lens if the distance between the object and the screen is 80 cm.
(3marks)

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c) During physics lesson, the teacher noticed that Peter had to sit behind in order to see the writings on the board clearly.

I. Name the eye defect experienced by Joe. (1mark)

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II. State **one** possible cause of the defect. (1mark)

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III. On the diagram in fig 11 below, draw to show how the defect can be corrected by use of a lens.
(3marks)
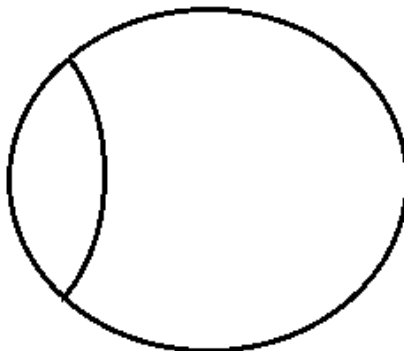
16.a) State Ohm's law. (1mark)

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b) A wire was connected to a battery and was found that the energy converted to heat was 30J when 20C of charge flowed through the wire in 5 seconds. Calculate:

   i)   The potential difference between the ends of the wire.   (2marks)

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   ii) The current flowing through the wire.   (1mark)

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   iii) The resistance of the wire   (2marks)

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   iv) The average power developed in the wire.   (2marks)

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c)The graph below shows result obtained in an experiment. The cell has emf (E) and the internal resistance, r.
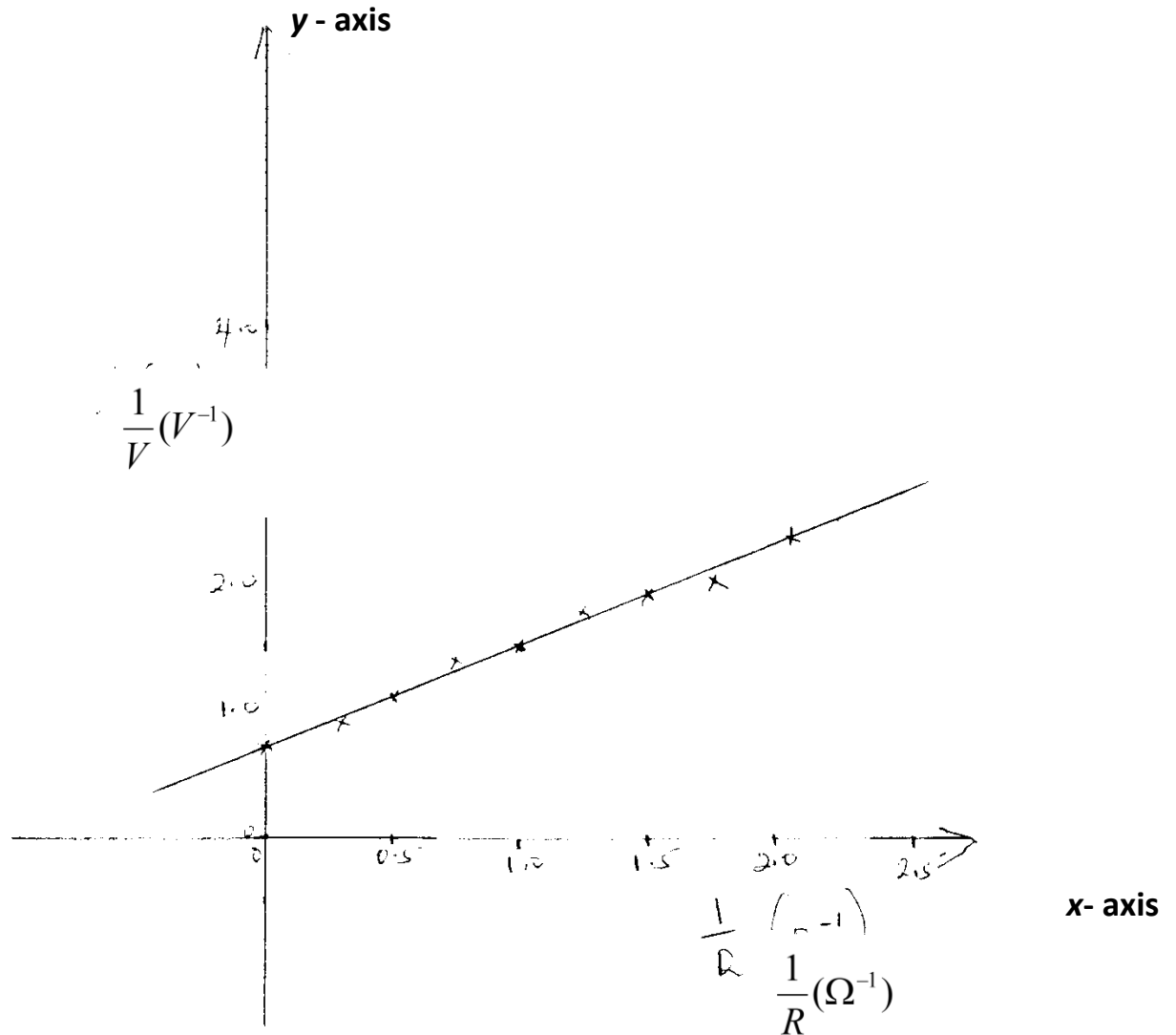
Given that the equation of the graph is $\frac{E}{r} = \frac{r}{R} + 1$. Use the graph to determine the values of:

(ii) E   (2marks)

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(iii) r   (2 marks)

17.(a) The diagram below shows a narrow beam of white light onto a glass prism.
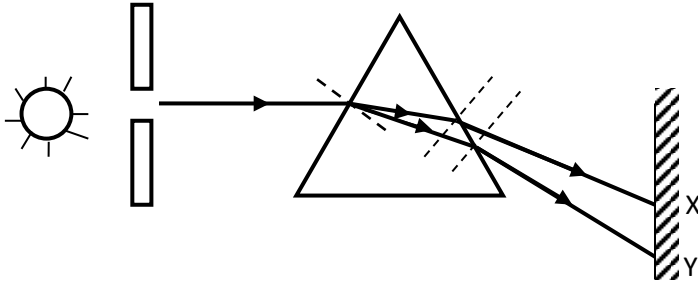
(i) What is the name of the phenomenon represented in the diagram?   (1Mark)

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(ii) Name the colour at X and Y   (2Marks)

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(iv)   Give a reason for your answer in part (ii) above   (1Mark)

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(iv) What is the purpose of the slit   (1Mark)

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(b) The figure below shows the path of ray of yellow light through a glass prism. The speed of yellow light in the prism is 1.8×10^8 m/s
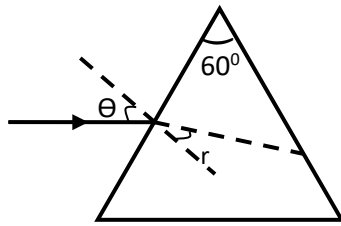
(i)Determine the refractive index of the prism material (Speed of light in vacuum, C = 3.0×10^8 m/s) (2 Marks)

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(ii) Show on the same diagram, the critical angle C and hence determine its value.   (3 Marks)

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PHYSICS PP2 GAUGE PREDICTION EXAM

NAME…………………………………………………………ADM…..…………………

SCHOOL……………………………………………………….INDEX……………………

DATE………………………SIGN……………………………TARGET……………………

Kenya Certificate of Secondary Education.

232/2 PHYSICS

PAPER 2

TIME: 2 HOURS.

GAUGE 5 PHYSICS PP2 2023 KCSE PREDICTION

INSTRUCTIONS TO CANDIDATES

U) This paper consists of two sections A and B.

V) Answer all the questions in sections A and B in the spaces provided.

W) Non-programmable silent electronic calculators may be used.

X) This paper consists of 9 printed pages.

Y) Candidates should check the questions to ascertain that all the pages are printed as indicated and

that no question is missing.

FOR EXAMINER'S USE ONLY.

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1-13	25	
B	14	12	
	15	10	
	16	11	
	17	12	
	18	10	
TOTAL		**80**	

SECTION A (25marks)

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

Z) **Figure 1** below shows the set – up for a simple cell.
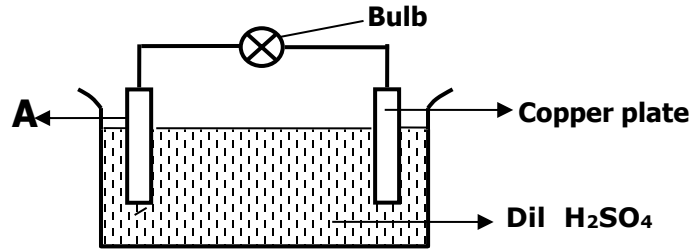
Figure 1.

(i) Explain how electrode **A** becomes negative   (1mk)

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(ii) Explain why the bulb goes off after only a short time.   (1mk)

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AA)   a) **Figure 2** shows an object, a screen and light sources X, Y and Z.
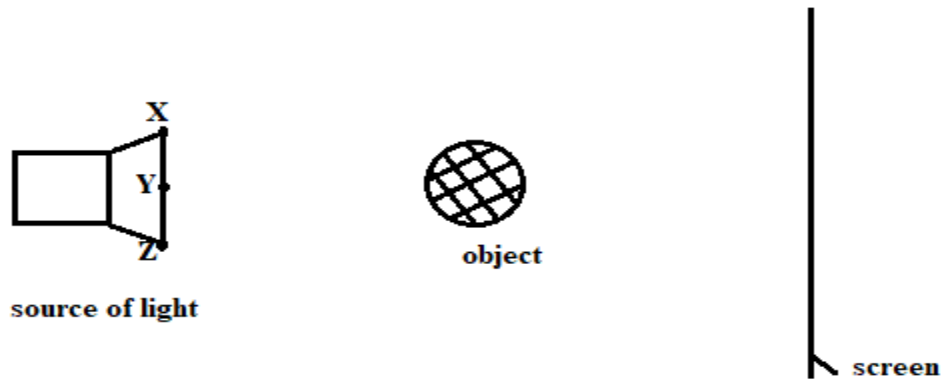
Figure 2.

17.   Complete the diagram to show the formation of a shadow   (2mks)

18.   State one property of the object that makes it possible for its shadow to be formed   (1mk)

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BB)   A highly negatively charged rod is gradually brought close to the cap of a
      positively charged electroscope. It is observed that the leaf collapses initially and then
      diverges. Explain the observation.   (2mks)

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CC)   Distinguish between thermionic emission and photoelectric effect.   (1mk)

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DD)   Explain why mains electricity is transmitted through alternating current and not
      direct Current   (1mk)

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EE)   **Figure 3** shows two mirrors inclined at an angle of 30º to each other. A ray of light
      is incident on mirrorM₁ as shown

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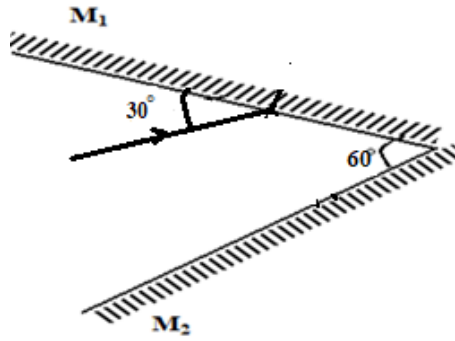
Figure 3.

Sketch the path of the ray to show its reflection (1mk)

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FF) **Figure 4** below shows sound waves in air produced by a vibrating tuning fork. R is an air molecule on the path of the waves.
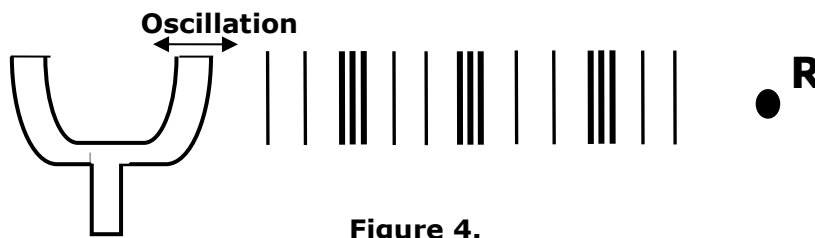
Figure 4.

i) Using a line, indicate on the diagram a distance **d** equal to one wavelength of the wave. (1mk)

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ii) In the space provided below, show with an arrow the direction of motion of the air molecule **R** as the waves pass. (1mk)

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GG) **Figure 5** below shows a bar magnet attracting steel pin as shown
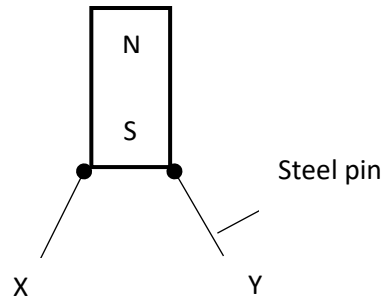
Figure 5

State and explain what would happen when a North pole of a bar magnet is brought near the tips of steel pin X and Y. (2mks)

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HH) **Figure 6** below shows a wave profile for a wave whose frequency is 5Hz.
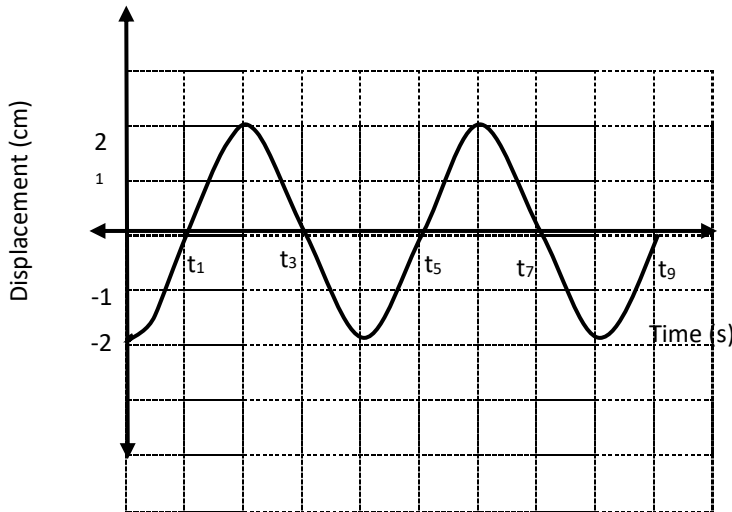
Figure 6

Determine the value of t_8. (2mks)

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II) **Figure 7** below shows circular waves originating from the principal focus F of a concave mirror and moving towards the mirror.
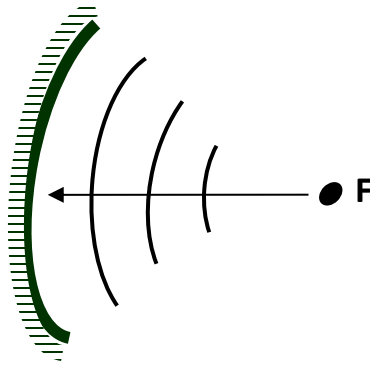
Figure 7

Complete the diagram to show the reflected waves. (1mk)

JJ) Two heating coils A and B connected in parallel in a circuit produces power of 36W and 54W respectively. What is the ratio of the resistance of B to that of A (3mks)

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KK)   **Figure 8** below shows the path of light through a transparent material placed in air.

AIR

139⁰

Transparent

material

**Ray of
light**
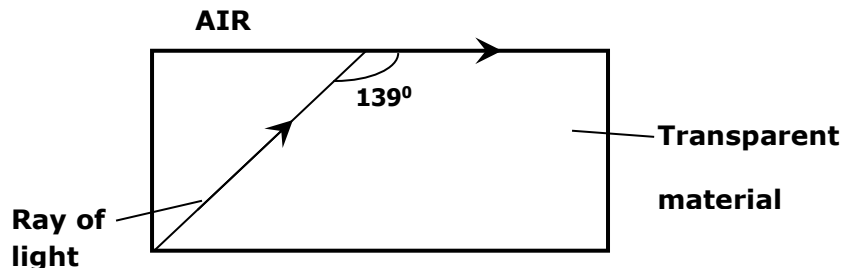
Figure 8.

Calculate the refractive index of the transparent material.   (3mks)

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LL)   **Figure 9** below shows an image; I formed by an object placed in front of a *convex mirror*. On the diagram draw appropriate rays and locate the position of the object.
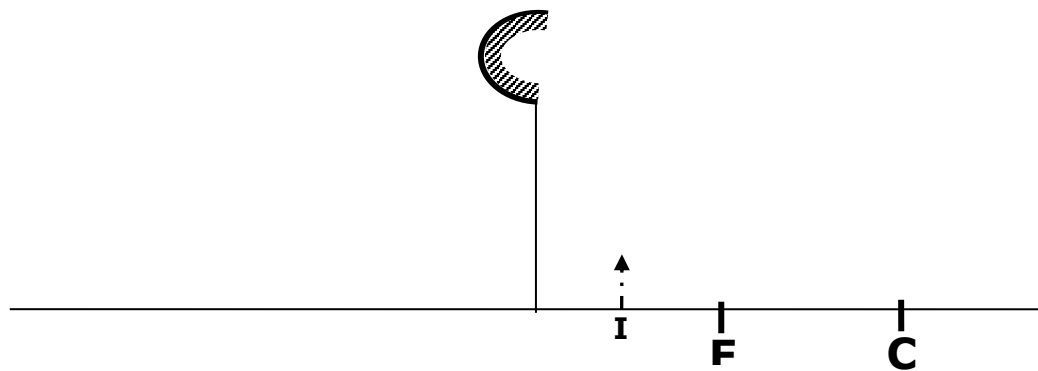
(2mks)

I   F   C

Figure 9.

SECTION B (55 marks)

Answer all the questions in this section in the spaces provided

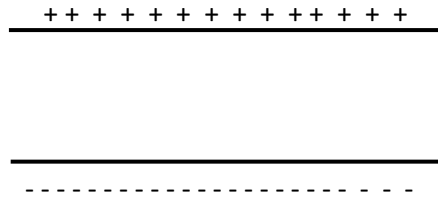14 (a) **Figure 10** below shows two charged plates close to each other

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- - - -   **Figure 10.**

(i) Complete the diagram to show the electric field patterns between the plates (1 mark)

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(ii) Without changing the area of overlap, suggest any one way of increasing the charge stored per unit voltage on the plates   (2 mks)

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(b) **Figure 11** shows two coils P and Q placed close to each other. When the switch **S** is closed, an e.m.f is induced in coil Q. Similarly, an e.m.f is induced in coil Q when the
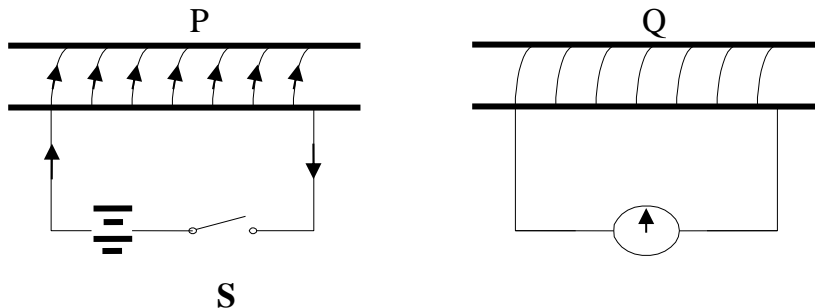 switch **S** is opened.

P   Q

S

Figure 11.

Explain why the induced current in coil Q is higher when the switch **S** in coil P is opened

than when it is closed.   (2 mks)

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(b) The diagram in **Figure 12** below shows an induction coil used to produce sparks.
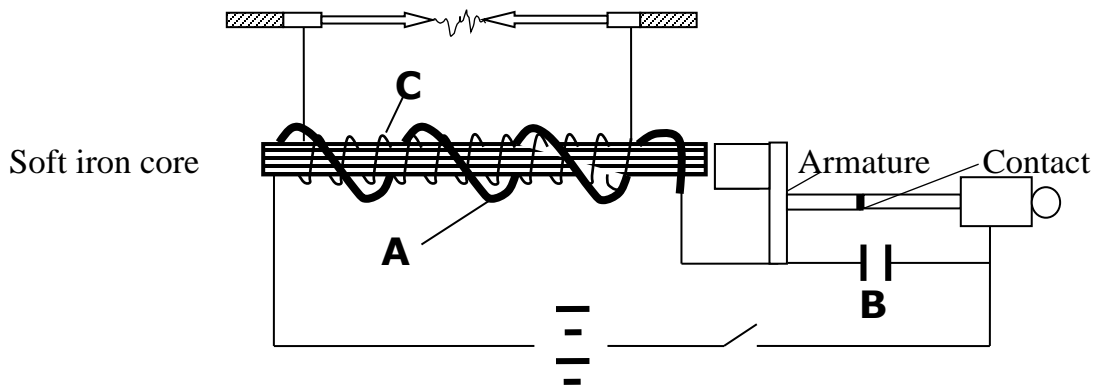
Figure 12.

(i) Name parts labeled **A,** and **C**
    (2mks)

A……………………………………………………………………………………………

C……………………….…………………………………………………………………………

  (ii) Briefly explain how the induction coil works.   (3mks)

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(c) State the function of part B in the diagram.   (1mk)

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15. (a) **Figure 13** below shows a graph of resistance against reciprocal of current. Use it to answer the questions that follow.

$$\frac{1}{I} (A^{-1})$$

Figure 13

2.   Find the internal resistance, r.   (2mks)

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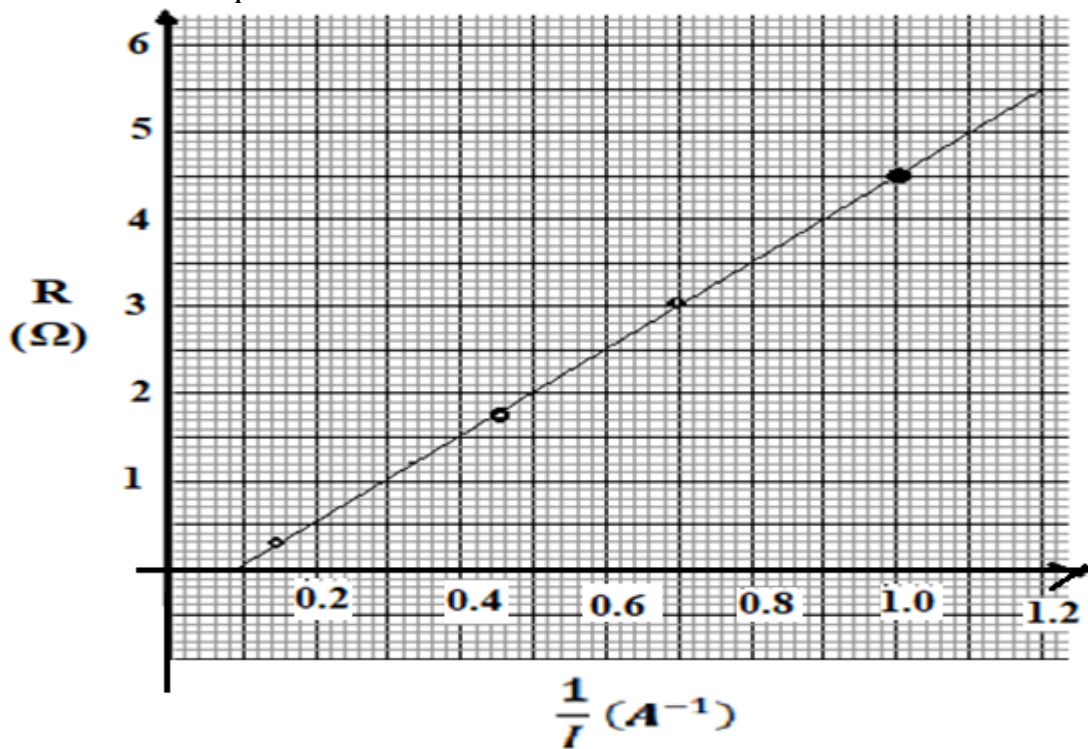
3.   Determine the e.m.f, E of the cell.   (2mks)

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 (b) Three resistors of resistance 2 Ω, 3 Ω and 4 Ω, are to be connected to a cell such
that they have the least effective resistance.

   (i) Draw a circuit to show how they can be connected to achieve this.   (1mk)

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   (ii) Determine the least effective resistance of the three resistors.   (2mks)

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   (c) An electric iron rated 240V, 750w is to be connected to a 240v mains supply
through a 3A fuse. Determine whether the fuse is suitable or not.   (3mks)

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16. (a) (i) Name the metal used to shield X-rays operators from the radiation. Give reasons

why it is used. (2mks)

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(ii) In a television set, magnetic fields are preferred for use as deflection system

instead of electric fields. Explain. (2mks)

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(b) **Figure 14** below show regions of the complete electromagnetic spectrum.

A			Visible Light		B	C

X ———————————————————→ Y

Figure 14. *Decreasing frequency*

❖ Name the colour of light at X and Y

(2mks)

X ………………………………………………

Y ………………………………………………

(ii) Name a suitable detector for radiation B (1mk)

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(c) A student connected a circuit as shown in **Figure 15** below, hoping to produce a rectified output.
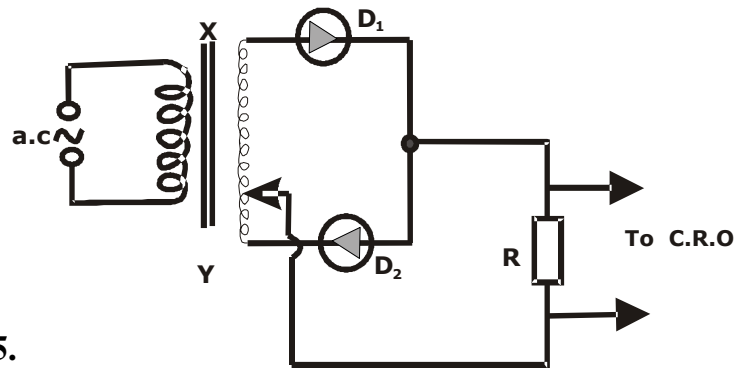
Figure 15.

(i) Sketch the graph of the output on the CRO screen in the space below. (1mk)

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(ii) Explain how this output is produced   (2mks)

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(d) The figure shows a current – carrying conductor in a magnetic field direction of force on the wire is as shown by the arrow.
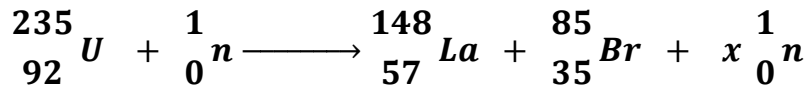
Force

X ⊙ Y
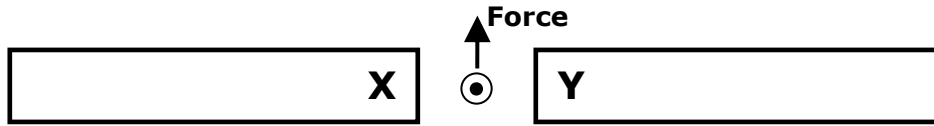
State the polarities of A and B. (2mks)

X …………………………………..………………………………..

Y. ……………………………………….…………………………………

17. (a) A typical nuclear fission reaction in a nuclear reactor is given below.

$$^{235}_{92}U + ^{1}_{0}n \longrightarrow ^{148}_{57}La + ^{85}_{35}Br + x\,^{1}_{0}n$$

(i) What is meant by nuclear fusion? (1mk)

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(ii) Find the value of x. (1mk)

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(iii) How are the neutrons produced used in the reactor? (1mk)

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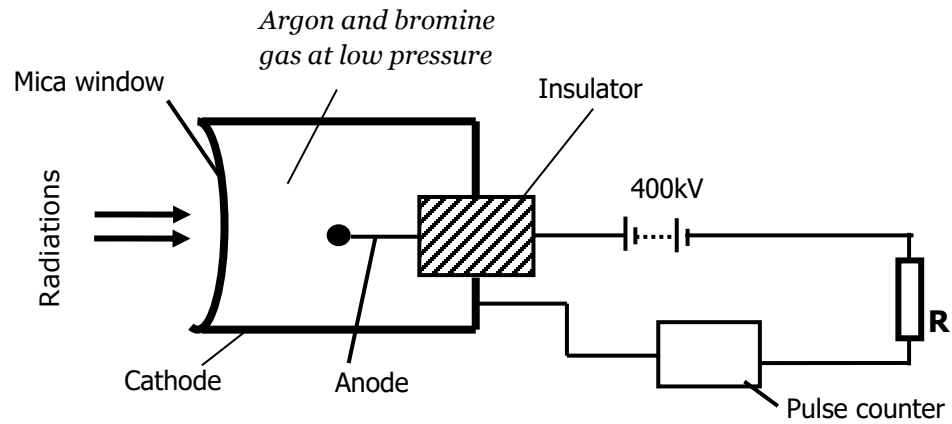**(b) Figure 16** below shows the diagram of a Geiger – Muller tube connected to a power supply and a pulse counter.

Figure 16

(i) Why should the Argon gas be at low pressure? (1mk)

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(ii) State the purpose of the bromine gas in the tube (1mk)

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(iii) Suggest one way of increasing the sensitivity of the tube (1mk)

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(c) **Figure 17** below shows an arrangement used to investigate photoelectric effect
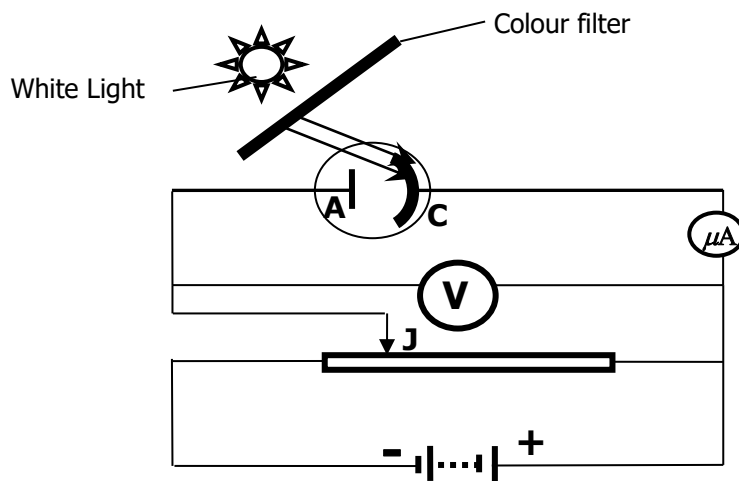
Figure 17

i) What is the purpose of the colour filter?   (1mk)

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ii) State two measurable quantities in this set up   (2mks)

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iii) State how the intensity of light affects photo current   (1mk)

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1. (a) Under what conditions does a converging lens form Virtual images   (1 mk)

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(b) Sketch on a diagram to illustrate how a convex lens is used as a magnifying glass.

   (3mks)

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(c)The diagram in **Figure 18** below shows a three-pin plug.
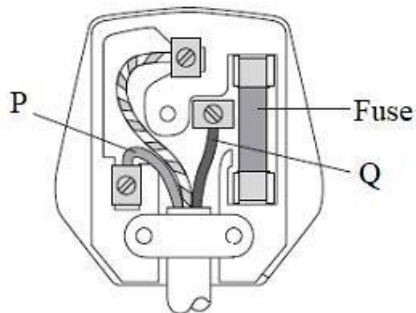
Figure 18.

(i)   Name the colour of conductors P and Q   (2 marks)

P

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…………………………………………………………………………………………………..……………………

Q

………

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(ii)   Why is the earth pin longer than the rest in the three-pin plug shown
         above?

(1 mark)

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(b) **Figure 19** shows the displacement of a practice in progressive wave incident on a
    boundary between deep and shallow regions.

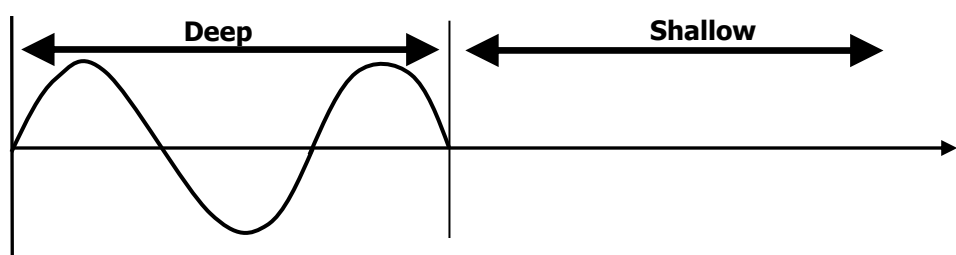**Figure 19.**

(i)   Complete the diagram to show what is observed after boundary.   (1mk)

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(ii)   Explain the observation in (i) above.   (1mk)

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(c) Concave mirrors are used by dentists to examine teeth. By use of a ray diagram show how this is achieved. (3 marks)

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