KCSE 2024 REPLICA

PHYSICS

(PREDICTION EXAMS 1-10)

Confidential set of Possible Questions likely to be examined in the forthcoming Final Examinations. A Projection of what is likely to be tested in the much-awaited KNEC Exams scheduled for November 2024.

The following are Questions to expect in KCSE 2024 EXAMS.

CONFIDENTIAL!

For Marking Schemes
Mr Isaboke 0746 222 000 / 0742 999 000

THE KEY TO SUCCESS!

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 1)

PHYSICS

232/1

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS

- *Write your name and admission number in the space provided*
- *Sign and write the date of the examination in the space provided above*
- *This paper consists of two sections A and B.*
- *Answer all the questions in the spaces provided.*
- *All workings must be clearly shown.*
- *Mathematical tables and silent electronic calculators may be used.*

For examiner's use only

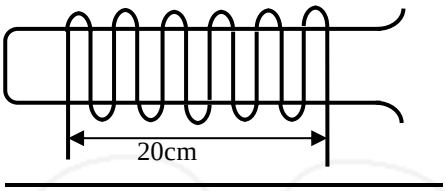
SECTION	QUESTION	TOTAL MARKS	CANDIDATE'S SCORE
A	1-13	25	
B	14	12	
	15	10	
	16	12	
	17	10	
	18	11	
	TOTAL	80	

SECTION A (25 MARKS)

Answer all the questions in this section **(Take g=10N/kg or 10m/s^2)**

1. The figure1 below shows a wire wound on a test tube. The windings just touch each other. If the total number of complete loops was found to be 15, and the distance covered by the windings on the test tube is 20cm; find the radius of the wire. **(2marks)**

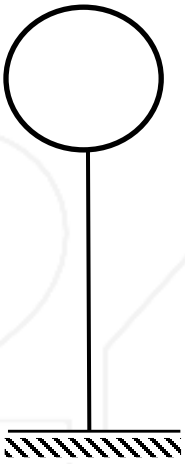
Figure 1



2. A paratrooper flexes his legs when he lands. Explain **(1mark)**

3. A needle may float on clean water but sinks when a detergent is added. Explain. **(1 mark)**

4. The mass of a fabric of a large balloon is 100kg. the balloon is filled with 200 m3 of helium and attached to a cable fixed to the ground as shown below.



Given that the densities of air and helium are 1.3 kg/m^3 and 0.018kg/m^3 respectively, determine the tension in the string. **(3 marks)**

5. Water flows in a pipe of diameter 7cm at a speed of 5m/s. The water then gets to the perforated end which has 20 holes of diameter 0.7cm each.Determine the speed of water jets. **(3 marks)**

6. For an enclosed system with a liquid, a force is applied at one point.

a) Briefly explain how force is transmitted to other parts of the system. **(2 marks)**

b) State one application of such a system. **(1 marks)**

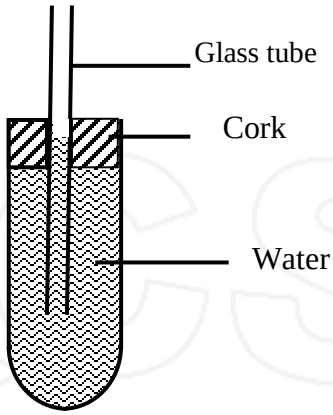
7. A 150g mass tied on a string is whirled in a vertical circle of radius 30cm with a uniform speed. At the lowest position the tension in the string is 9.5N.Calculate the velocity of the mass.

(3 marks)

8. A spring of elastic constant K has its length increased from 4.00m when unloaded to 4.25m when loaded with a 75N weight. Assuming that the elastic limit is not exceeded, determine the value of K. **(2 marks)**

9. The figure 2 below shows a glass tube fitted on to a boiling tube filled with water. State and explain what is observed when the boiling tube is heated. **(2marks)**

Figure 2

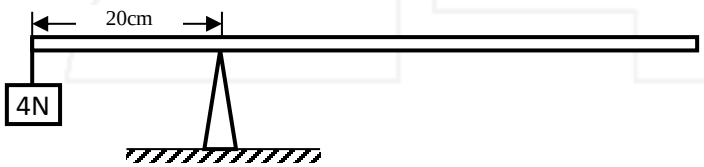


10. A bus that carries goods in the roof carrier is less stable than one that carries goods in the boot. Explain why this is so. **(1 mark)**

11. A rod consists of glass on one part and copper on the other. The rod is wrapped with a piece of paper and then a flame passed below it. It is observed that the paper on the side with glass is charred while that on the side of copper is not. Explain this observation. **(1 mark)**

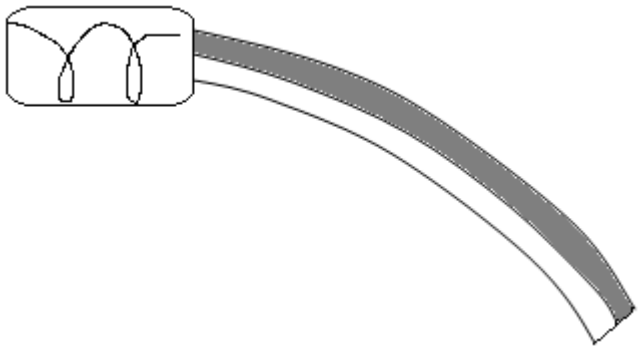
12. The figure 3 below shows a uniform 50cm rod. It is balanced horizontally by a load of 4N on one end. Calculate the weight of the rod. **(2marks)**

fig. 3



13. The figure 4 below shows a bimetallic strip cooled below room temperature. Sketch on the side the bimetallic strip at room temperature. **(1Mark)**

Figure 4.



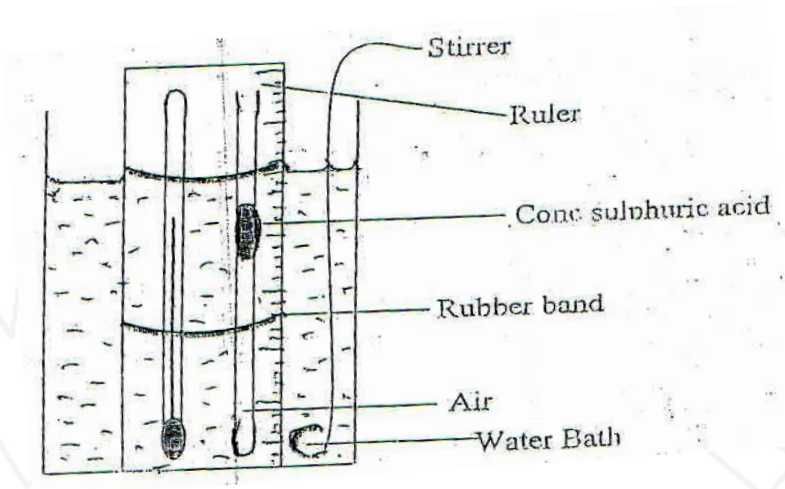
SECTION B (55 Marks)

Answer all questions in this section in the spaces provided.

14. a) Define "absolute zero temperature" for an ideal gas **(1 Mark)**

b) Using kinetic theory, explain Boyle's law for an ideal gas. **(2Marks)**

c) The diagram shows an experiment to investigate the relationship between volume and temperature of a fixed mass of gas at constant pressure.



i) Explain the function of;

(I) Concentrated sulphuric acid **(1 Mark)**

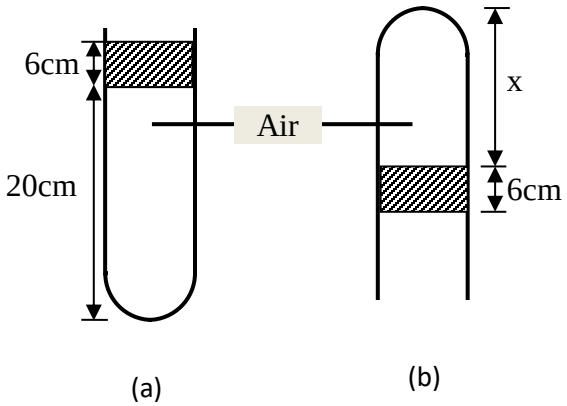
(II) Stirrer **(1 Mark)**

ii). Explain how the set up above can be used to verify Charles law for an ideal gas **(3Marks)**

iii. On the grid below sketch a graph of volume (cm^3) against temperature (^0c). Mark with letterT the absolute zero temperature. **(2 Marks)**

(d)A column of air 20cm long is trapped by mercury thread 6cm long as shown in figure 7 (a) below.

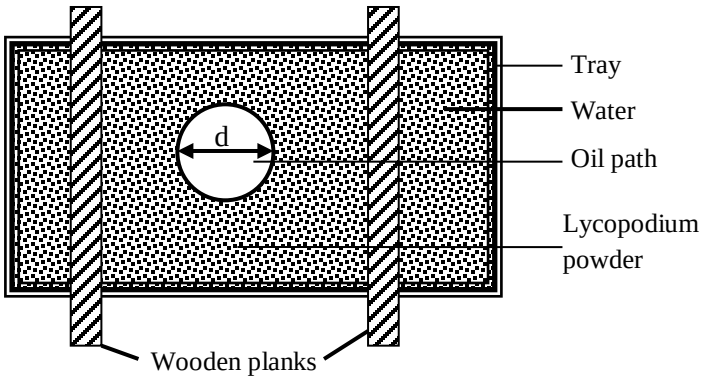
Fig 7



If the tubeis now inverted,determine column X in figure b).Take atmospheric pressure as 76cm of mercury. **(2Marks)**

15. The figure 8 below shows an experimental set up for estimating the diameter of an oil molecule.

Figure 8



i) Describe how the oil patch is formed **(2Marks)**

ii) i)In this experiment the diameter 'd' of the oil patch was measured to be 21cm for an oil drop of radius 0.28mm. Determine the diameter of the oil molecule. **(3Marks)**

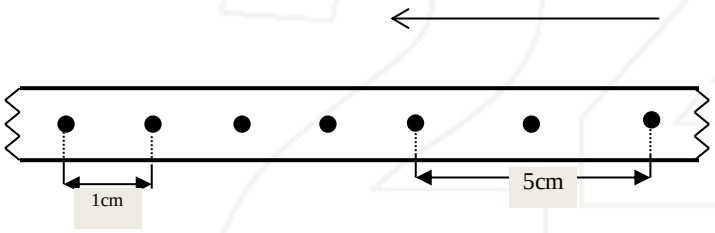
ii)State any two assumptions made in calculating the diameter of the oil molecule. **(2Marks)**

iii) What is the role of the lycopodium powder in this experiment? **(1Mark)**

iv) Describe one method of determining the diameter of an oil drop. **(2Marks)**

16. The figure 9 below shows the pattern formed on a tape in an experiment to determine the acceleration of a trolley.The frequency of the ticker tape used was 50Hz

Figure 9



Calculate

i) The initial velocity of the trolley **(2Marks)**

ii) The final velocity of the trolley **(2Marks)**

iii) The acceleration of the trolley **(2Marks)**

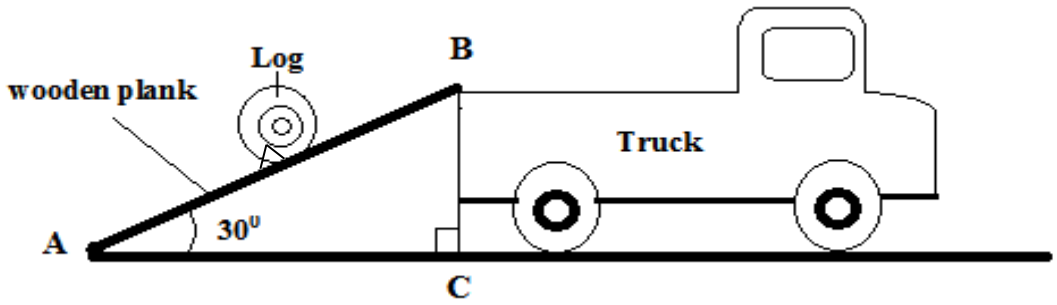
b) A gun is fired vertically upwards from the top of an open truck moving horizontally at a uniform velocity of 50m/s. The bullet attains a maximum height of 45m.Calculate;

1) The time taken by the bullet to reach the maximum height **(3Marks)**

2) The distance covered by the truck just before the bullet reaches the level from which it was fired. **(3Marks)**

17. A man used a wooden plank to lift a wooden log from the ground to a stationary truck as shown in the figure. The wooden plank is inclined at an angle of 30^0 to the ground.

Figure 10



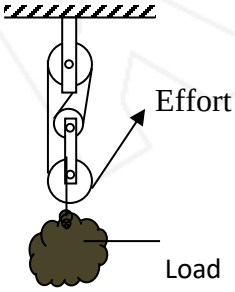
i) Show that the velocity ratio of the system is given as V.R=$\frac{1}{Sin\ 30^0}$ **(3Marks)**

ii) Given that the system is 65% efficient, determine the Mechanical Advantage. **(3 marks)**

iii) Explain why the efficiency of this system cannot be 100%. **(1Mark)**

b) The figure 11 shows a pulley system.

Figure 11



i) State the velocity ratio of the machine. **(1Mark)**

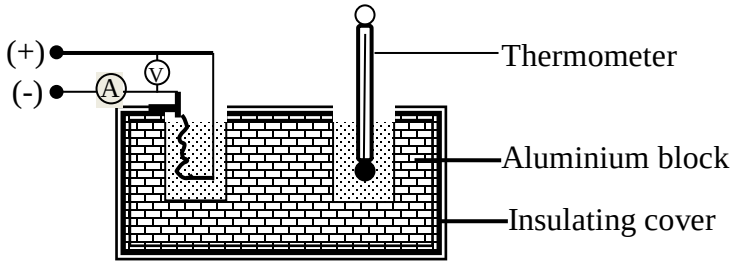
ii) Explain what happens to the Mechanical Advantage of the machine as the load is increased gradually. **(1Mark)**

c) Water drops from a waterfall to the bottom. The temperature of the water is found to be higher at the bottom than at the top.State the energy transformations. **(1Mark)**

18. a) Define "specific heat capacity" of a substance **(1Mark)**

b) In an experiment an aluminium block of mass 2kg was heated using an immersion heater as shown in figure 12 below

Figure 12



The temperature of the block was recorded every minute for exactly five minutes and then the heater was switched off. A graph of temperature in ^{0}c against time in minutes for the experiment is shown below.

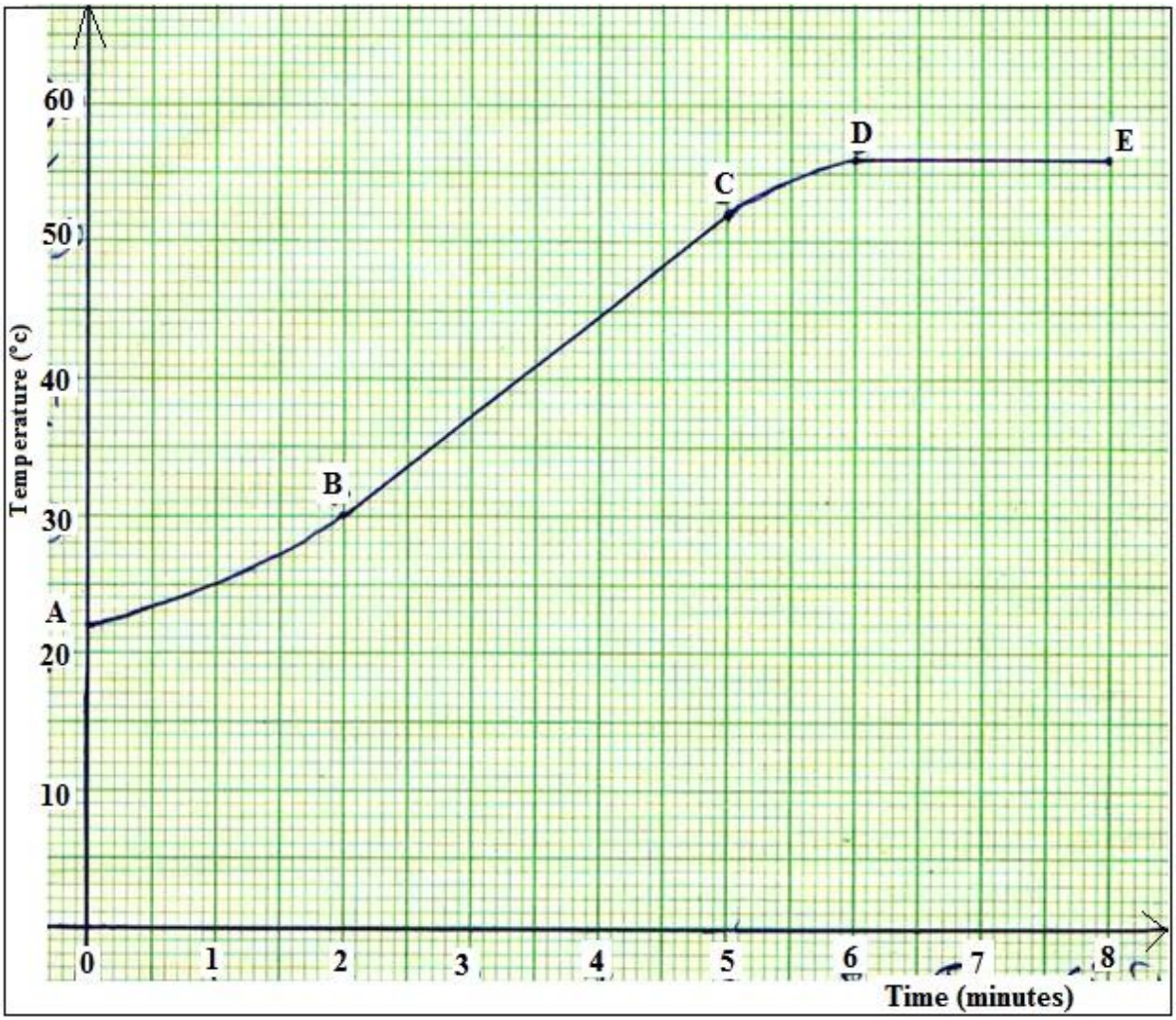


Figure 13

Study the graph above and answer the questions that follow.

Suggest why;

i) The reading in the thermometer rose relatively slowly between point A and B. **(1Mark)**

ii) The temperature continued to rise after the heater was switched off **(1Mark)**

iii) Use the straight portion of the graph (Bto C)to calculate the specific heat capacity of the aluminium given that the voltmeter read 22.00V and ammeter 10A throughout the course of the experiment. **(3Marks)**

a) Explain the two reasons why the value calculated in b) iii) will not be accurate. **(2Marks)**

b) A temperature scale X has an ice point of 40^0 and a steam point of 240^0 .What is the temperature in X^0 when the Celsius temperature is 50^0C. **(3Marks)**

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 1)

PHYSICS

232/2

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

Instructions

a) *Write your name, index number and name of your school in the spaces provided above.*

b) *This paper consists of two sections, section I and II. Answer all the questions in both sections.*

c) *Mathematical tables and silent non – programmable calculators may be used.*

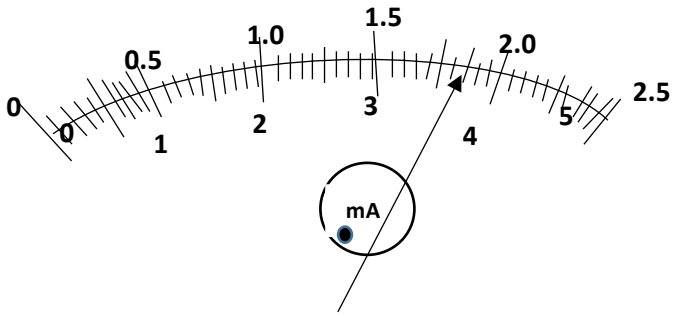
For examiners' use only

section	Question	Maximum score	Candidate's score
I	1 – 11	25	
II	12	11	
	13	11	
	14	11	
	15	12	
	16	10	
Total		80	

Section I (25 marks)

Answer all the questions in this section

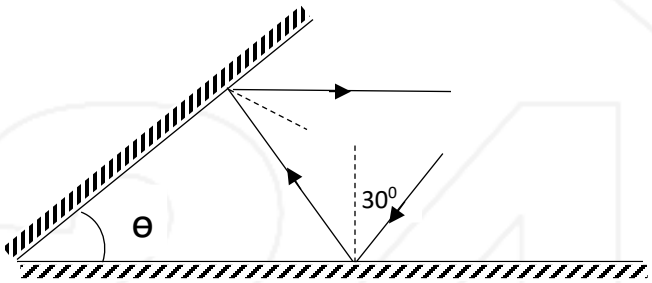
3) What is the reading shown by the pointer in the figure below, if the full scale range is;



a. 0 - 2.5 **(1 mark)**

b. 0 – 5 **(1 mark)**

4) The following diagram shows two mirrors inclined at an angle θ to each other. A ray of light is incident on one of the mirrors and finally reflected from the second mirror parallel to the first mirror find the angle between the mirrors. **(2 marks)**



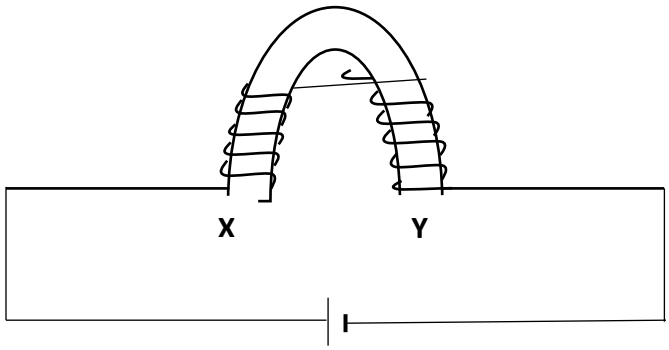
5) It is not possible to charge an electroscope by contact method using a metal rod. Explain **(2 marks)**

6) A car battery is rated 40 Ah and it is expected to supply a constant current for 120 minutes.

a. What is the strength of the current delivered? **(2 marks)**

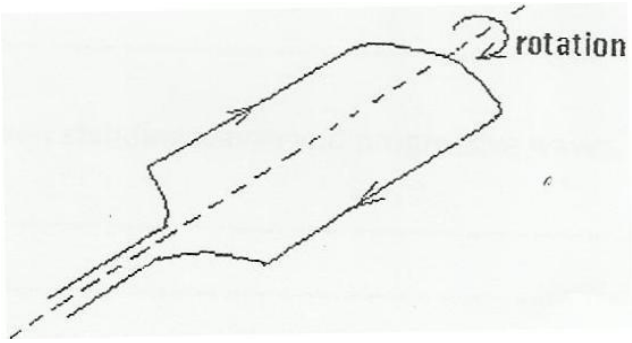
b. Explain why eight dry cells in series cannot be used to start a car engine even though they have the same e.m.f. **(1 mark)**

7) A coil of insulated wire is wound around a u – shaped soft iron core X Y and connected to a battery as shown below.



State the polarities of the ends X and Y**.** **(2 marks)**

8) The figure below shows a coil carrying a current flowing in the direction shown in a magnetic field.



On the same diagram draw the magnetic field lines across the coil. **(1 mark)**

9) An object of height 5 cm is placed 25 cm from a convex mirror of focal length 15 cm. determine the image distance and hence state the nature of the image formed**.** **(3 marks)**

10) Loudspeaker placed between two wall A and B is sending out constant wave pulses. Determine how far the loudspeaker is from wall B if it is 100m from wall A, and the time between the two echoes received is o.2 seconds (speed of sound is 340m/s) **(3 marks)**

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

Ultraviolet rays	
Microwaves	
X-rays	
Visible light	

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

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

i. Ultraviolet rays:

ii. Microwaves:

12)A 4Ω resistor is connected in series to a battery of e.m.f 6V and negligible internal resistance. Determine the power dissipated by the resistor**.** **(2 marks)**

13) State any two laboratory safety rules that deal with electrical safety in the lab. **(2 marks)**

Section II (55 marks)

Answer all the questions in this section.

14)a) Define term focal length as used in thin **lenses** **(1 mark)**

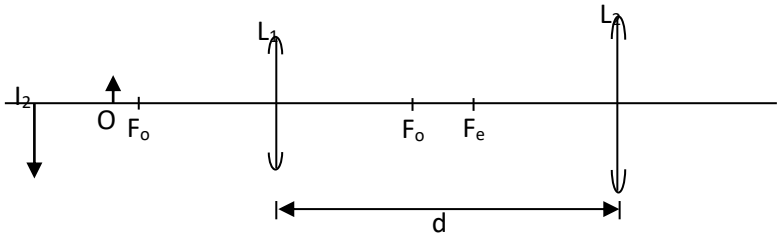
c) Give the functions of the following parts of a lens camera. **(3 marks)**

i. Shutter: ……...

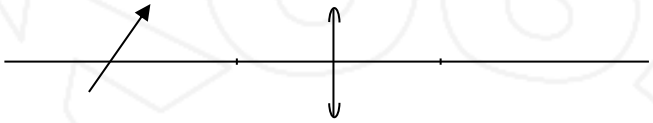
ii. Film: ……

iii. Diaphragm: ……

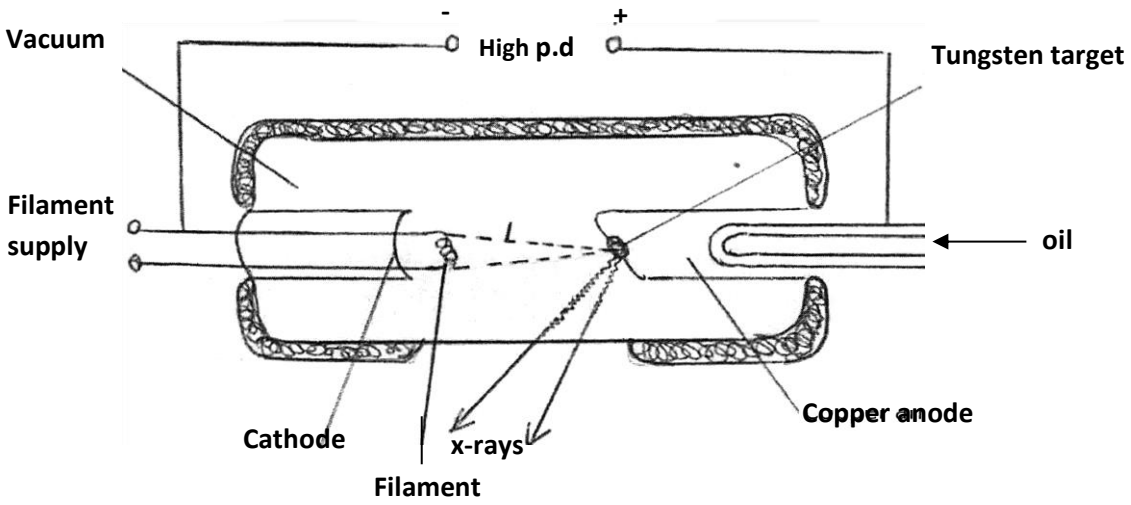
d) A compound microscope with objective lens L_1 of focal length 0.8cm and an eyepiece lens L_2 of focal length 2.5cm is shown in figure below. An object O is placed in front of the objective lens at a distance u_1 of 1.2cm. The system forms a final image I_2 at a distance of 10cm from L_2. Determine the distance of separation of lenses L_1 and L_2. **(4 marks)**



e) The figure below (figure 9) shows an object placed in front of a convex lens. Complete the ray diagram to show the position of the image. **(3 marks)**



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



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

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

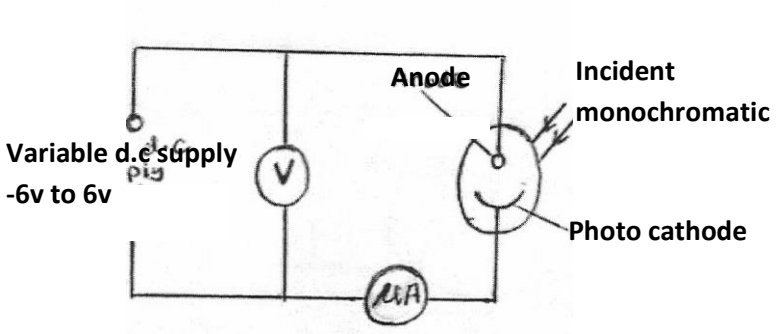
(b)An X-ray tube operates with a potential difference of 100kv and filament current is 20mA. Calculate;

d) The power transferred to the target of X-ray tube **(2mks)**

e) The number of electrons hitting the target per second **(2mks)**

f) The maximum kinetic energy of emitted electrons (*Take charge of an electron=1.6x10^{-19}C, mass of an electron =9.1x10^{-31}kg*) **(2mks)**

(c) The diagram shows monochromatic radiation falling on a photocell connected to a circuit



The incident radiation has a wavelength of 2.15×10^{-7}m. The metal surface of the photocell has a work function of 2.26 eV.

i. Calculate the energy in eV of a photon of the incident radiation *(Take $c=3.0 \times 10^{8}$m/s, $h=6.63 \times 10^{-34}$Js and $e=1.6 \times 10^{-19}$C)* **(3mks)**

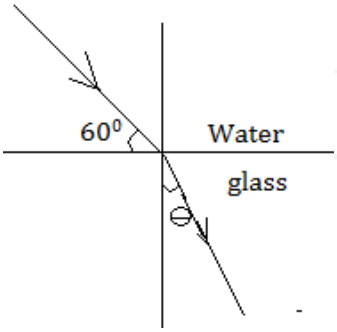
ii. What is the maximum kinetic energy of the emitted **electrons** **(2mks)**

iii. Write down the value of the stopping potential **(1mk)**

16)a) State Snell's law **(1 mark)**

b) A student prepares to swim to the bottom of a pool to pick a coin on the bed. It is only while under the water that she realizes the presence of a sharp object beside the coin that she had not seen. Explain a possible reason why it was not visible in clear swimming pool water**. (1 mark)**

c) The figure below shows a ray of light travelling



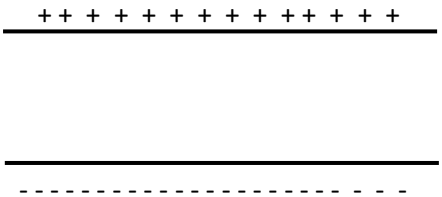
i.Calculate the refractive index of water with respect to glass given the refractive index of glass and water are $^{3}/_{2}$ and $^{4}/_{3}$ respectively. **(2 marks)**

ii. Calculate the angle Θ **(2 marks)**

d) Using a well-labeled diagram, describe how optic fibers are used for communication. (**3 marks)**

17)a) Define the term capacitance**.** **(1 mark)**

b) The figure below shows two charged plates close to each other



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

ii) Without changing the area of overlap, suggest any two ways of increasing the capacitance of a parallel plate capacitor. **(2 marks)**

c) You have been provided with **THREE** identical capacitors each of capacitance 12 μF. State and show how you would combine them to get the following effective capacitance

i. 36µF **(2marks)**

ii. 4µF **(2marks)**

iii. 8µF **(2marks)**

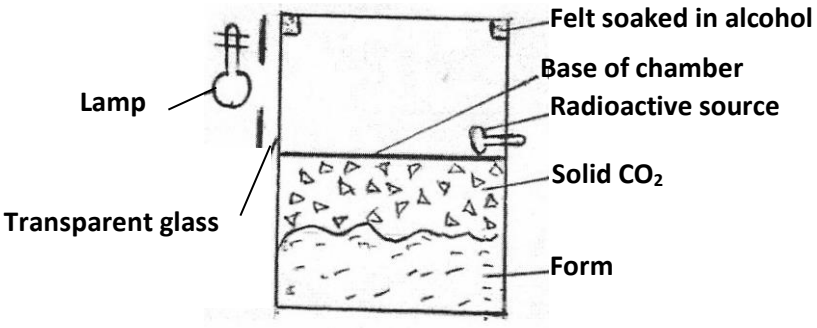
18)(a) (i) The following nuclear reaction is part of a radioactive series

$$^{210}_{82}A \xrightarrow{\beta} {}^{210}_{x}B \xrightarrow{r} {}^{210}_{84}C \xrightarrow{s} {}^{206}_{y}D$$

I. Name the radiation represented by **r** and **s** **(1mk)**

II. Determine the number represented by **x** and **y** **(1mk)**

(ii) The figure below shows the features of diffusion cloud chamber used for detecting radiations from radioactive sources



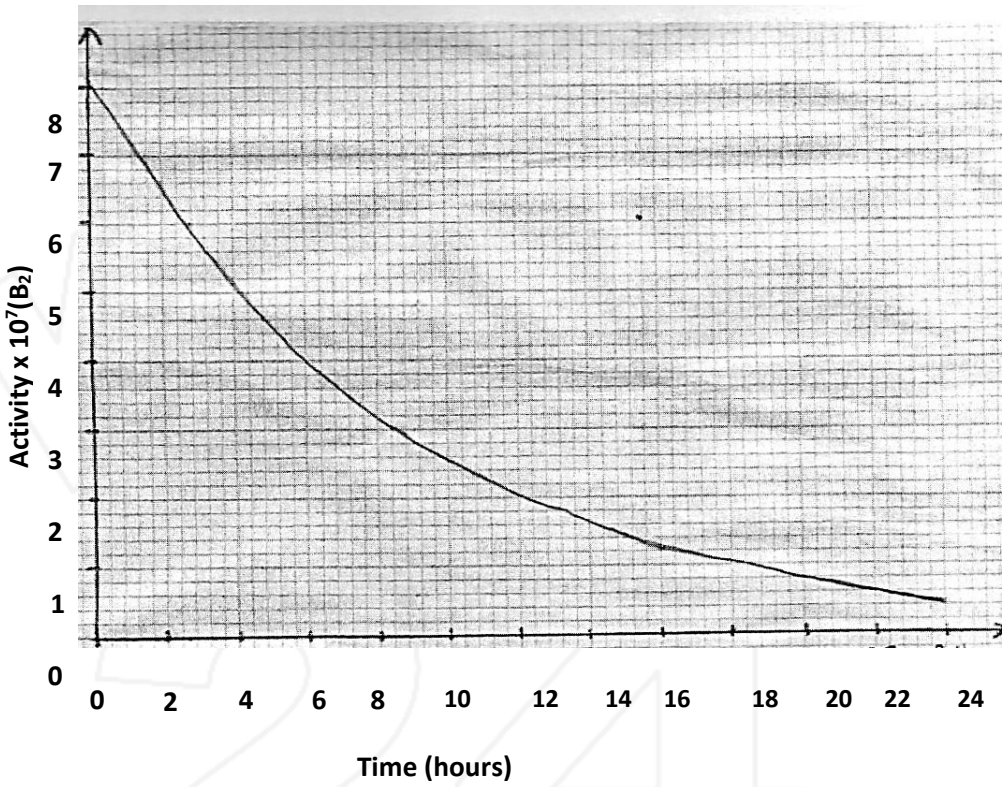
i) State the property of alcohol that makes it suitable for use in the chamber **(1mk)**

ii) What is the purpose of the solid CO_2? **(1mk)**

iii) Explain how the radiation from the radioactive source is detected in the chamber. **(2mks)**

IV. State one advantage of the cold chamber over a charged gold leaf electroscope when used as detectors of radiation **(1mk)**

(b) The graph below shows how the activity of a sample of the radioisotope technetium which is used extensively in medicine, varies with time



I. Use the graph to determine the half-life. T ½ of technetium **(1mk)**

II. Hence calculate the decay constant for technetium given that $T_{1/2} = \frac{0.6931}{\lambda}$ where λ is the decay constant. **(1mk)**

III. Determine the number of technetium atoms remaining in the sample after 24 hours **(1mk)**

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 2)

PHYSICS

232/1

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:-

- *Write your **Name**, **Index number, Admission number** and **school** in the spaces provided above.*
- *This paper consists of **two** sections; **A** and **B***
- *Answer **all** the questions in section **A** and **B** in the spaces provided*
- *All working **must** be clearly shown.*
- *Mathematical tables and electronic calculators may be used*
- *Take the earth's gravitational field strength $g = 10\ m/s^2$.*

FOR EXAMINER'S USE ONLY:

SECTION	QUESTION	TOTAL SCORE	CANDIDATES SCORE
A	1 – 11	25	
B	12	11	
	13	12	
	14	12	
	15	10	
	16	10	
TOTAL		80	

SECTION A (25 MARKS)

Answer all questions in this section in the spaces provided.

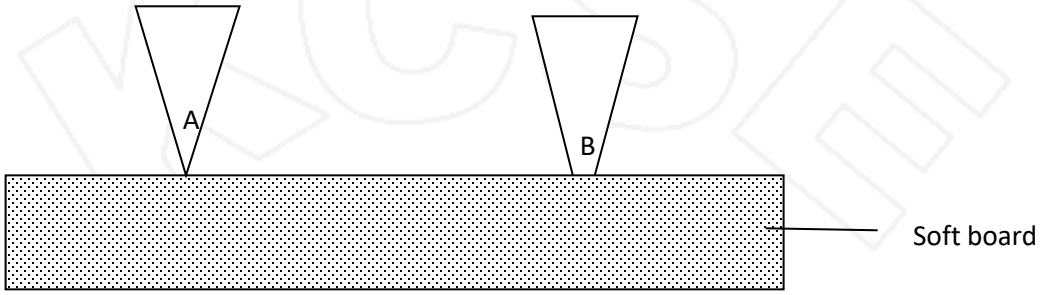
1. The figure below shows part of scales of a vernier caliper with a negative error of 0.04cm. It was used to measure the length of a wooden block whose actual length is 7.57cm.



Insert the vernier scale to show how the reading was. **(3mks)**

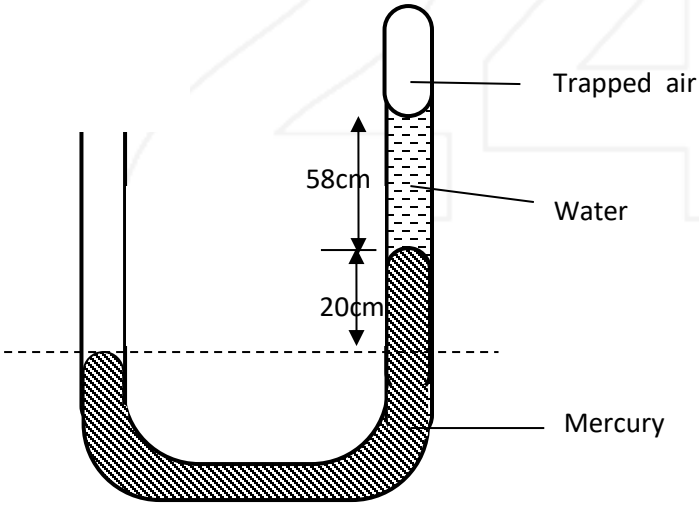
2.

a) The figure below shows two pins of the same mass and both pressed into a soft board by equal amount of force.



State and explain which pin penetrates the least into the soft board. **(2mks)**

b) The figure below shows a uniform manometer that is closed at one end.

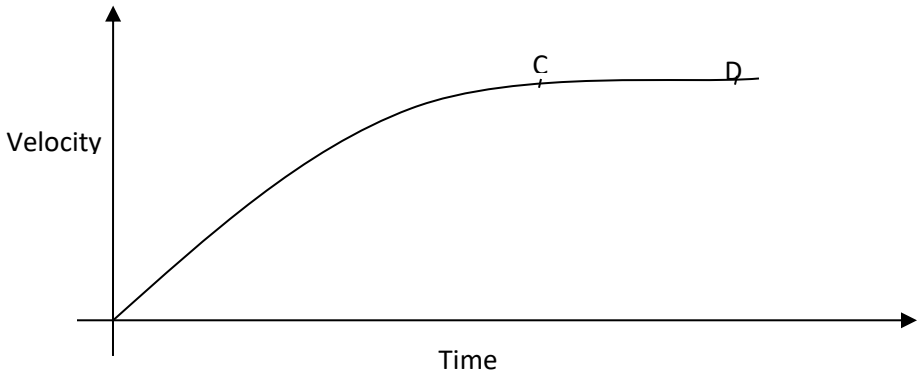


Determine the pressure of the trapped air. (Take atmospheric pressure as 75cmHg, density of mercury = 13600kg/m^3 and density of water = 1000 kg/m^3) **(3mks)**

3. The displacement S of a body at time t moving with acceleration a is given by $\boldsymbol{S = ut + \frac{1}{2}at^2}$.

State the condition for this equation to apply. **(2mks)**

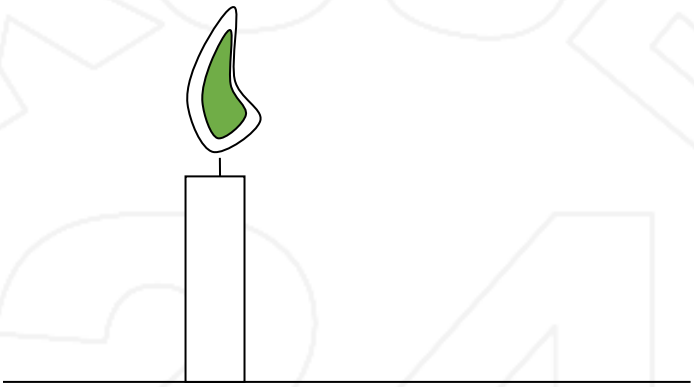
4. The figure below shows a sketch of a velocity-time graph for a body falling through a liquid.



Explain the motion between C and D. **(2mks)**

5. Using the kinetic theory of gases, explain how an increase in temperature causes increase in pressure of an enclosed gas. **(2mks)**

6. A dripless candle is lit and placed on a level bench as shown.

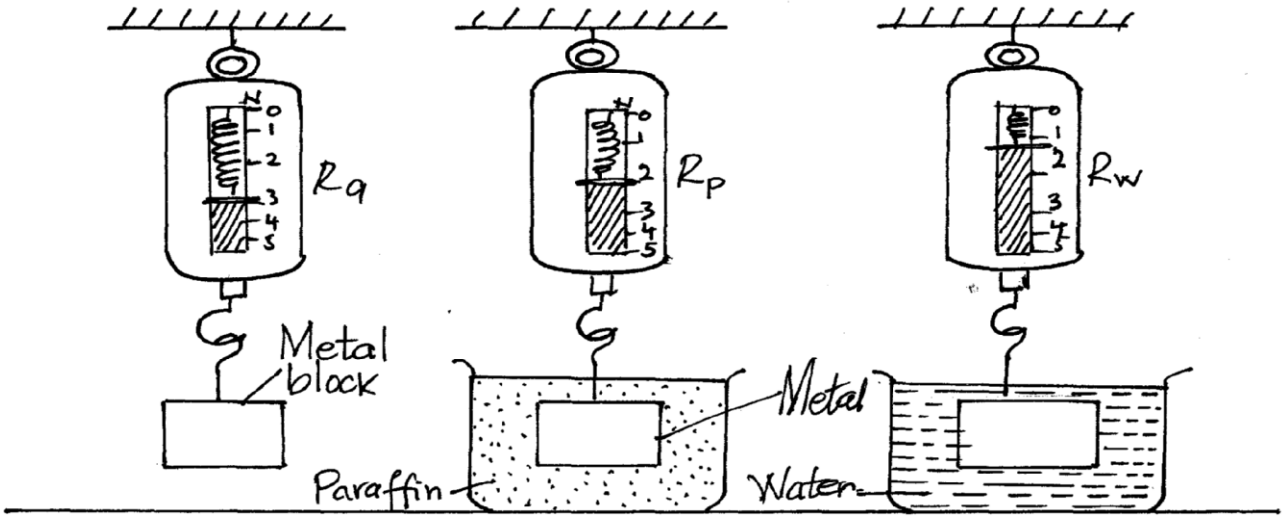


State and explain the changes in stability of the candle as it continues to burn. **(2mks)**

7. Give a reason why diffusion is an evidence that matter is made up of tiny particles. **(1mk)**

8. Explain the cause of surface tension on the surface of a liquid. **(2mks)**

9. A metal block is weighed in air and then in paraffin and water as shown in the Figure below.



Calculate the density of paraffin given that the density of water is 1000kg/m^3.(Take g = 10 m/s^2)

(3mks)

10. The figure below shows two sheets of paper tolled into tubes. one has holes on it.



A stream of air is blown into each tube as shown. State with reason the tube that collapses. **(2mks)**

11. Differentiate between conduction and convection modes of heat transfer in terms of molecules.

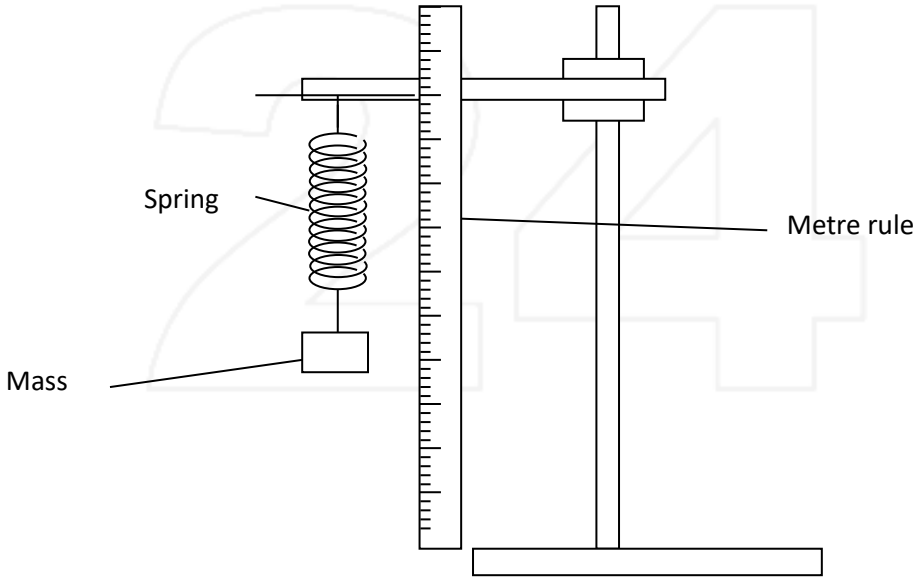
(1mk)

SECTION B (55 MARKS)

Answer all questions in this section in the spaces provided.

12.

a) A form Two student wanted to carry out an experiment to verify Hooke's law. the student assembled the apparatus as shown.



If the student had access to several other masses;

i. State what was missing in the set up. **(1mk)**

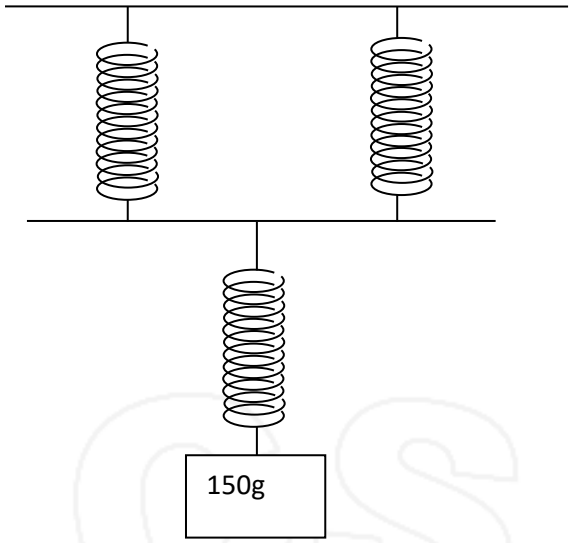
ii. Outline how the extension of the above spring is determined. **(3mks)**

iii. Other than extension of the spring, state one other measurement that should be determined.

(1mk)

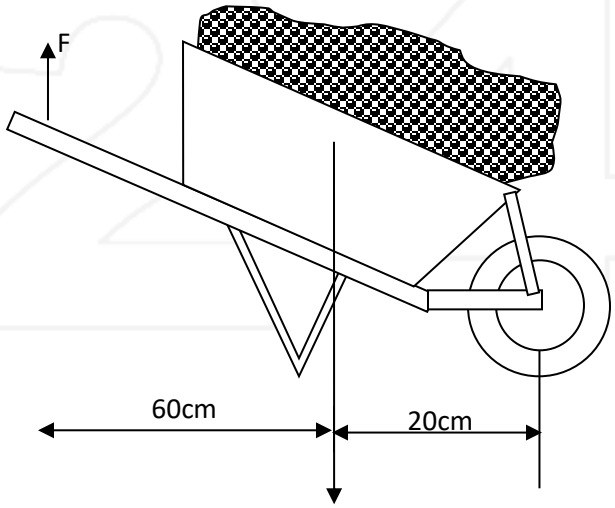
iv. Considering the measurements above, describe how the above set up can be used to verify Hooke's law. **(3mks)**

b) Three identical springs are joined together as shown below to support a mass of 150g.



Assuming that the springs have negligible weight and if the total weight of the above set up is 3cm, Determine the spring constant of one spring used in the set up. **(3mks)**

13. The diagram below shows a wheelbarrow used to raise a 90kg sack of potatoes. The wheelbarrow has a mass of 20kg.



a) Using the principle of moments, determine the effort that need to be applied at F in order to lift the load. **(3mks)**

b) What is the velocity ratio of the wheelbarrow? **(3mks)**

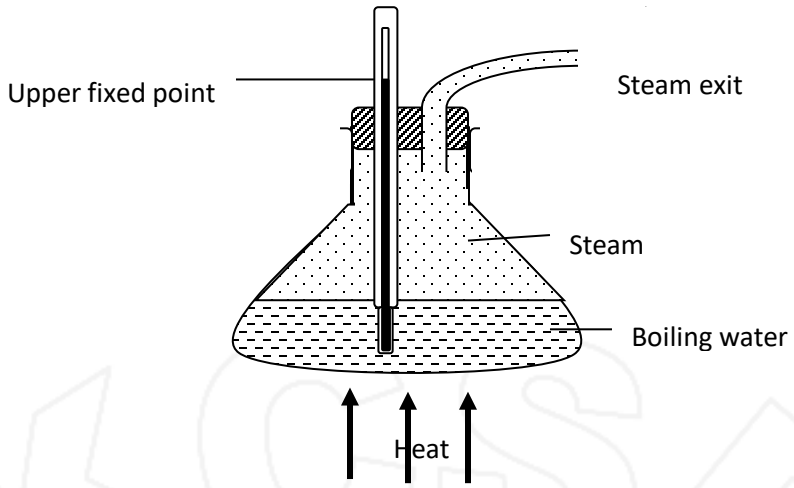
c) Determine the mechanical advantage of this machine. **(2mks)**

d) Determine the efficiency of the machine. **(3mks)**

e) Why is the efficiency of this particular machine less than 100%? **(1mk)**

14.

a) The diagram below shows a set up that is used in determining the upper fixed point of a thermometer.



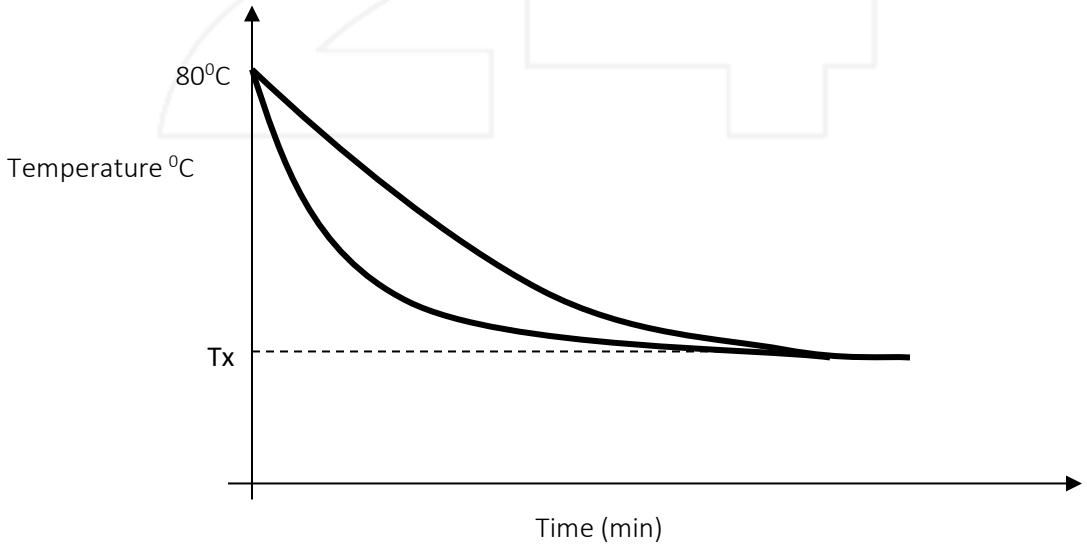
i. Identify the mistake in the set up. **(1mk)**

ii. Explain how the mistake would affect the value obtained as the upper fixed point. **(2mks)**

iii. What is the purpose of the steam exit. **(1mk)**

b) When marking the fixed points of a thermometer, it is observed that at 0^0C, the mercury thread is of length 3cm and 11cm at 100^0C. What would be the length of the thread if the bulb of the thermometer is dipped in oil whose temperature is 80^0C? **(2mks)**

c) The graphs below show the cooling curves obtained when water at 800C was poured into two identical cans A and B painted silverly and black on their outside respectively.



i. On the graph, name the curve T_B for the can B. **(1mk)**

ii. Identify the temperature Tx. **(1mk)**

iii. Name the mode of heart of heat Transfer tested above. **(1mk)**

iv. Apart from length of the material and its cross section area, name two other factors on which conduction depends. **(2mks)**

v. Why are gases generally poor conductors of heat? **(1mk)**

15.

a) Define specific latent heat of fusion of ice. **(1mk)**

b) Ice cube of mass **m** at 0^0 float in water of mass 100 g at 0^0 contained in a copper calorimeter of mass $50g$. Steam of mass $60g$ at 100^0 is passed through the mixture until a temperature 40^0 is attained. (Specific latent heat of vaporization of water is $2.26 \times 10^6\ J/kg$, specific latent heat of fusion of ice is $3.34 \times 10^5\ J/kg$, specific heat capacity of water is $4.2 \times 10^3\ J/kg$/K and specific heat capacity of copper is 400 J/kg/K).

Determine the;

i. Quantity of heat lost by steam to condense to water and cool to 40^0. **(3 mks)**

ii. Quantity of heat absorbed by ice, water and calorimeter to raise its temperature to 40^0. **(3 mks)**

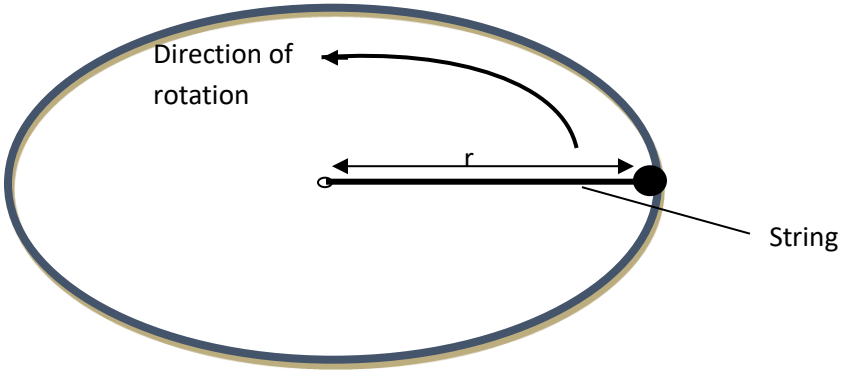
iii. Mass **m** of ice that melted at 0^0. **(3 mks)**

16.

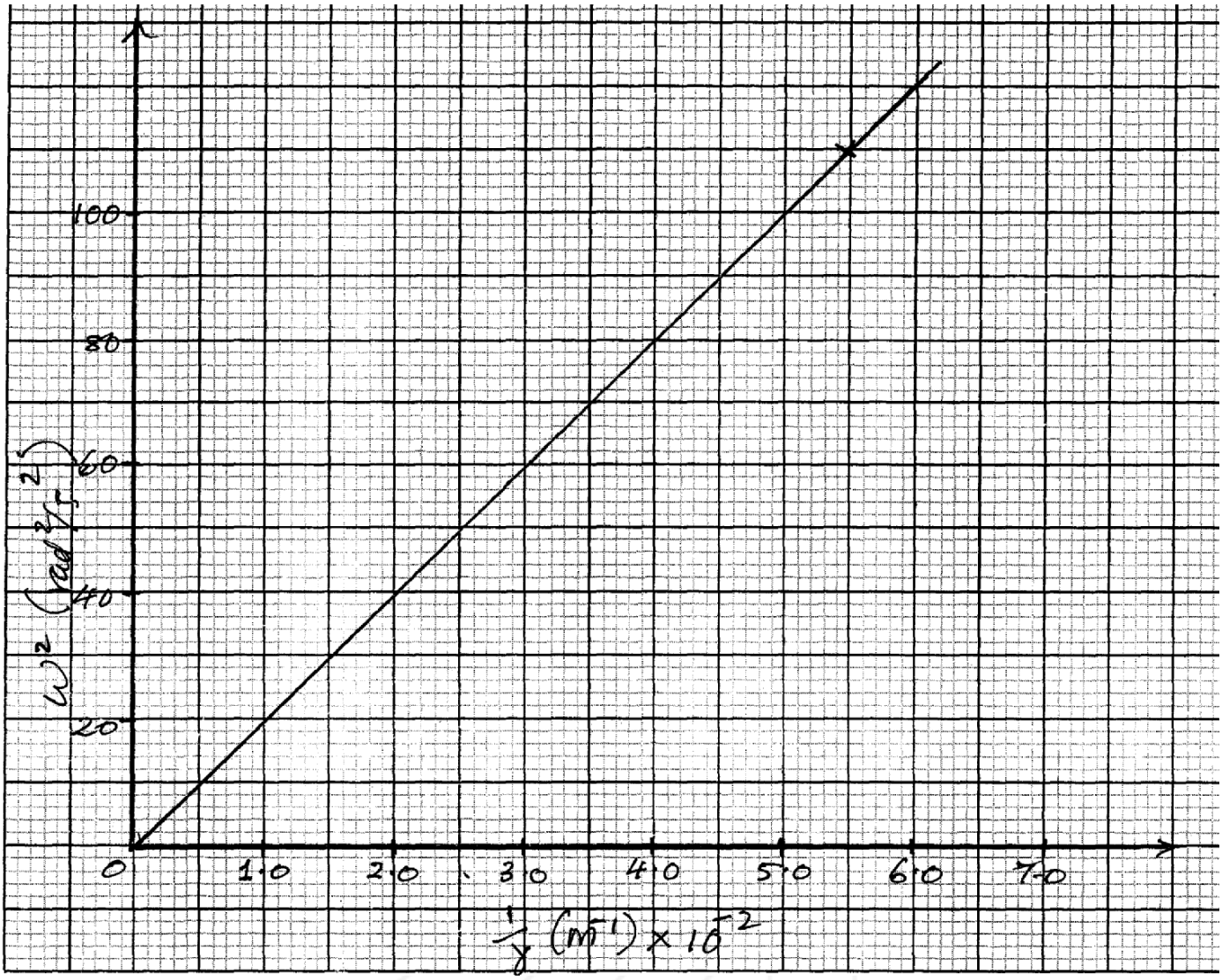
a) The moon goes round the earth at constant speed. Explain why it is true to say that the moon is accelerating. **(1mk)**

b) A string of negligible mass has a bucket tied at the end. The string is 60m long and the bucket has a mass of 45g. The bucket is swung horizontally making 6 revolutions per second. Calculate the centripetal acceleration of the bucket. **(3mks)**

c) The figure below shows a body of mass m = 200g attached to the centre of a rotating table with a string. The radius of the string was varied and different values of angular velocity recorded. the mass of the body remained constant throughout the experiment.



The results obtained for angular velocity and radius were used to plot the following graph.



From the above graph.

i. Calculate the value of the slope. **(2mks)**

ii. If $\boldsymbol{\omega^2 and \frac{1}{r}}$ are related by the equation $\boldsymbol{\omega^2 = \frac{P}{r} \times \frac{1}{m}}$, find the value of P. **(3mks)**

iii. State the significance of P. **(1mk)**

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 2)

PHYSICS

232/2

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:-

- *Write your **Name**, **Index number, Admission number** and **school** in the spaces provided above.*
- *This paper consists of **two** sections; **A** and **B***
- *Answer **all** the questions in section **A** and **B** in the spaces provided*
- *All working **must** be clearly shown.*
- *Mathematical tables and electronic calculators may be used.*
- *Take the earth's gravitational field strength g = 10 m/s^2.*

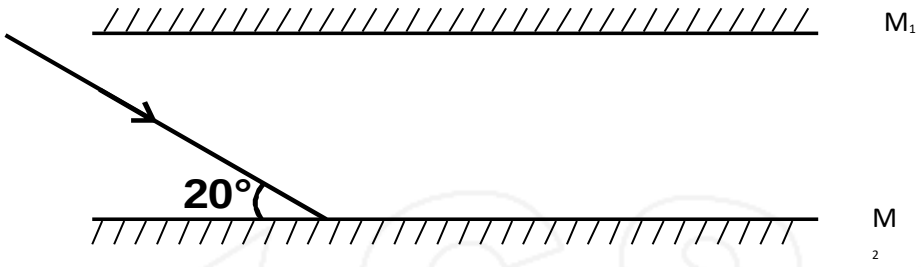
For Examiner's Use Only:

SECTION	QUESTION	TOTAL SCORE	SCORE
A	1 – 12	25	
B	13	10	
	14	9	
	15	8	
	16	9	
	17	9	
	18	10	
TOTAL		80	

SECTION A (25 MARKS)

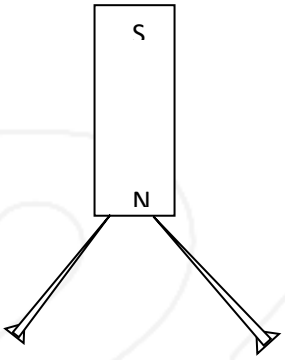
Answer all questions in this section in the spaces provided.

1. The diagram below shows two parallel mirrors M_1 and M_2 and a ray of light being incident on one of the mirrors as shown.



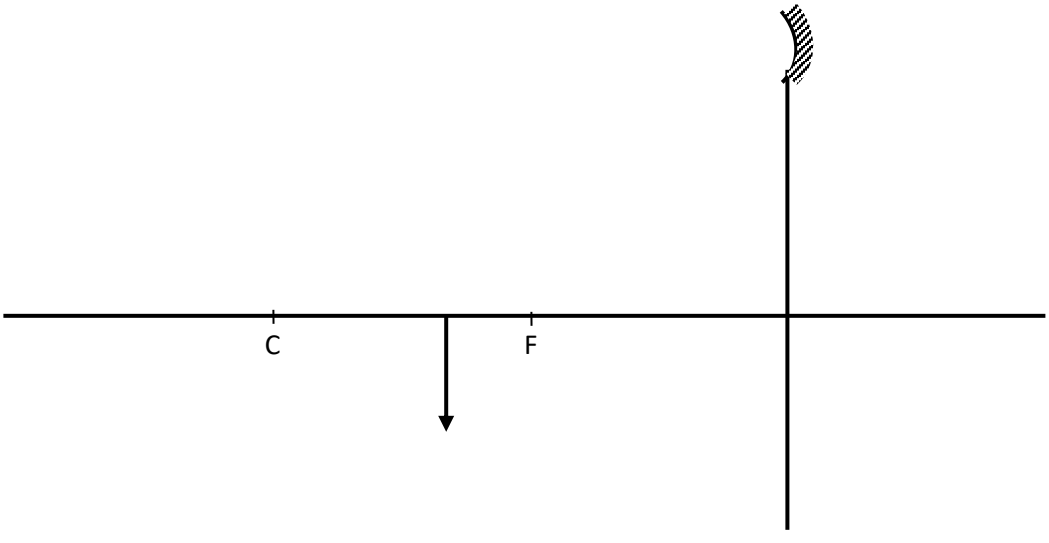
Trace the ray of light through the mirrors and indicate the angle of incidence on M1 **(2 mks)**

2. Two pins are hanging from a magnet as shown in the diagram below.

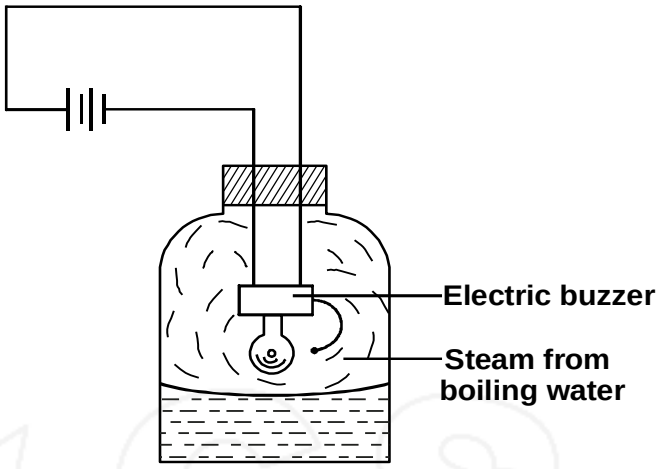


Explain why the pins spread as shown in the diagram. **(2mks)**

3. An image I is formed infront of a concave mirror and on the principal axis as shown in the figure below.



4. The figure below shows a set up by a student.

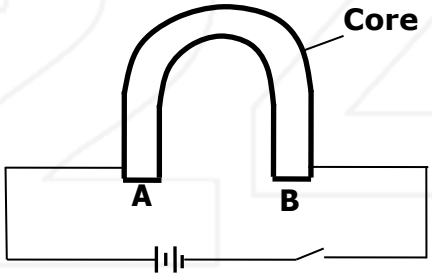


State and explain what happens to the sound from the buzzer as the bottle and its contents are cooled to 0°C. **(2 mks)**

5. Arrange the following waves in order of decreasing wavelength. **(1mk)**

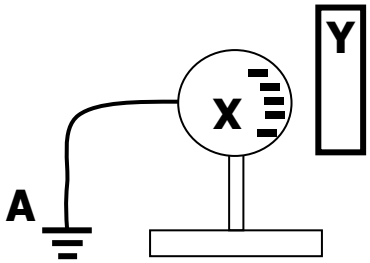
Infrared, X-rays, Microwaves, Radio waves, Red light.

6. Figure below shows an incomplete circuit of an electromagnet.



Complete the circuit by drawing the windings on the two arms of the core such that A and B are both North poles when the switch is closed. **(1mk)**

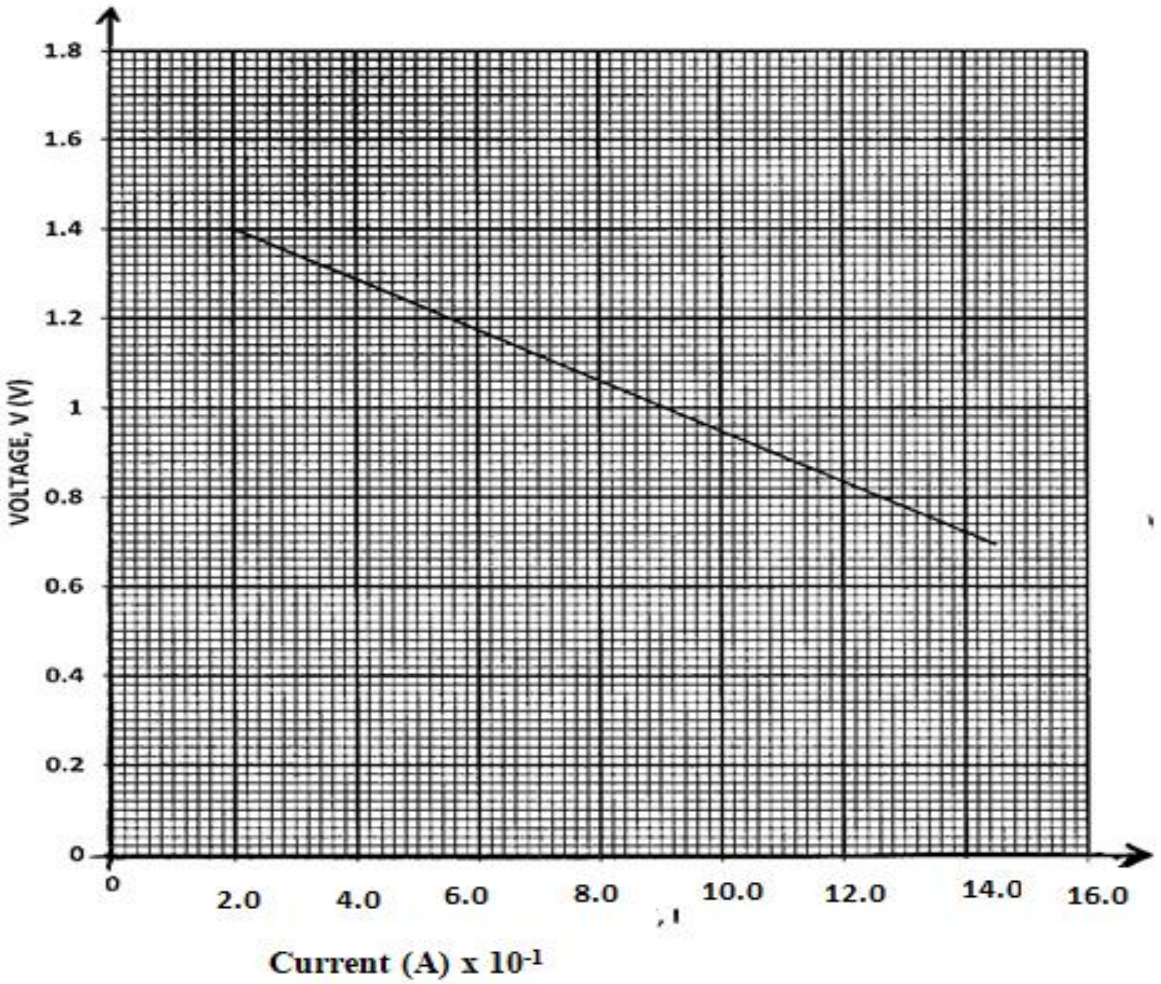
7. Figure represents a step in charging a material **B** negatively by induction.



(i) What is the charge on **Y**? **(1mk)**

(ii) Explain what happens at **A**. **(1mk)**

8. The graph below shows the variation of p.d. (V) across the terminals of a cell and current drawn from the cell.

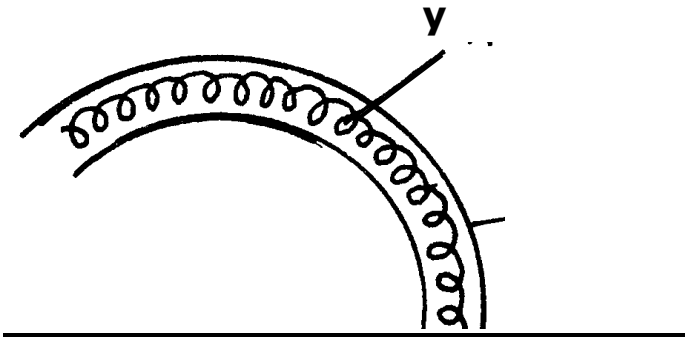


a) Use the graph to determine the electromotive force (emf) of the cell. **(1mk)**

b) Draw a circuit diagram that may be used to obtain the values plotted in the graph. **(2mk)**

9. A vibrator is sending out eight ripples per second across a water tank. The ripples are observed to be 4cm apart. Calculate the velocity of the ripples. **(3mks)**

10. The figure below shows part of electric cooker coil.

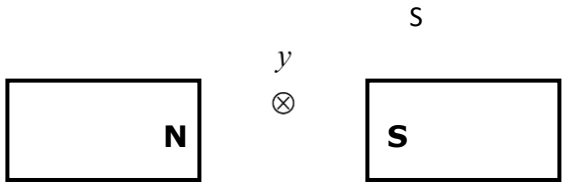


i. Why is the material labeled Y coiled? **(1mk)**

ii. State the property of material Y that makes it suitable for its use. **(1mk)**

11. An immersion heater rated 1500W is used continuously for 30 minutes per hour per day. Calculate the cost of electricity per week if the rate is Ksh. 6.70 per unit. **(2mks)**

12. Fig below shows a conductor y placed in a magnetic field. The conductor carries a current flowing into the paper.



(i) Sketch the resultant magnetic field between the poles of the bar-magnet. **(1mk)**

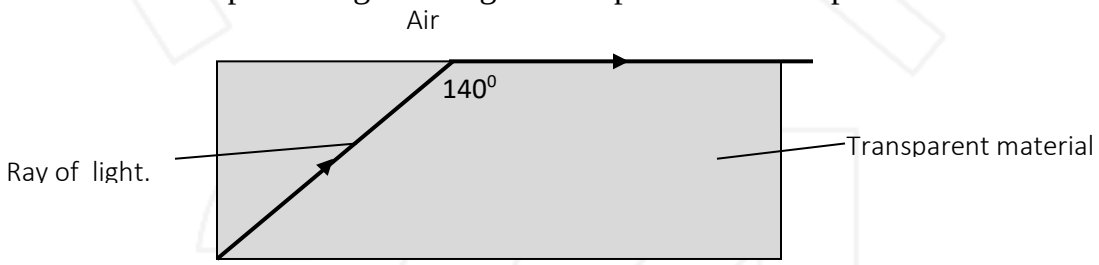
(ii) Show on the diagram the direction of the force, F acting on the conductor **(1mk)**

SECTION B (55 MARKS)

Answer all questions in this section in the spaces provided.

13.

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



i. Give a reason why the above ray is not refracted at the interface of air and the transparent material as shown in the diagram. **(1mk)**

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

b) An image is formed 10cm in front of a concave lens of focal length 15cm. calculate the position of the object in respect to the lens. **(3mks)**

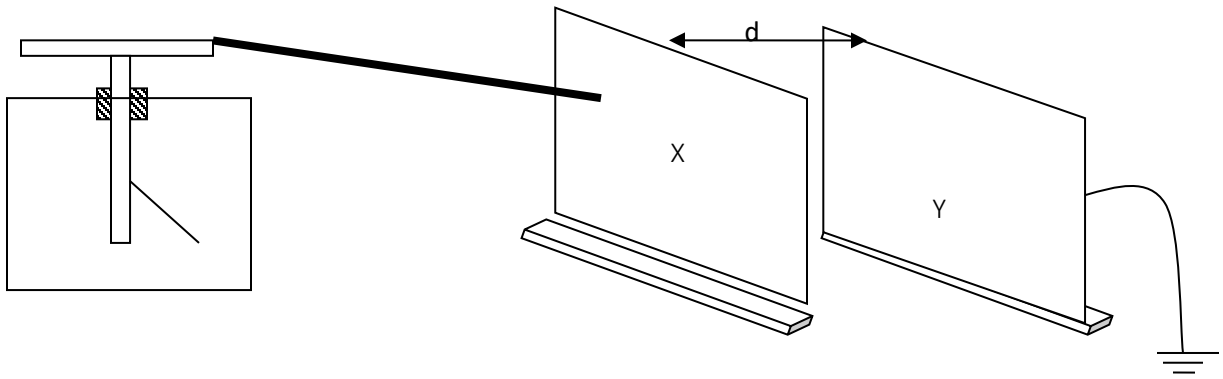
c) You are provided with the following apparatus to determine the focal length of a lens.

- A lit candle.
- A white screen.
- A metre rule.

With a aid of a labelled diagram, describe the procedure you would follow to determine the focal length of the lens. **(3mks)**

14.

a) The figure below shows metal plates X and Y each fixed to an insulated stand. X is charged and Y is earthed. X is connected to an uncharged electroscope with a conductor.

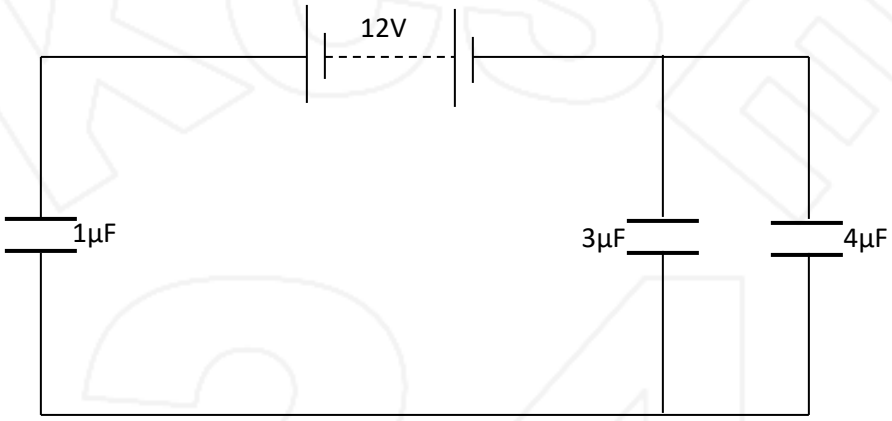


If plate Y is moved away from plate X,

i. State what happens to the amount of charge on the plates. **(1mk)**

ii. State and explain the observation made. **(3mks)**

b) The figure below shows an arrangement of capacitors connected to a 12V dc supply.



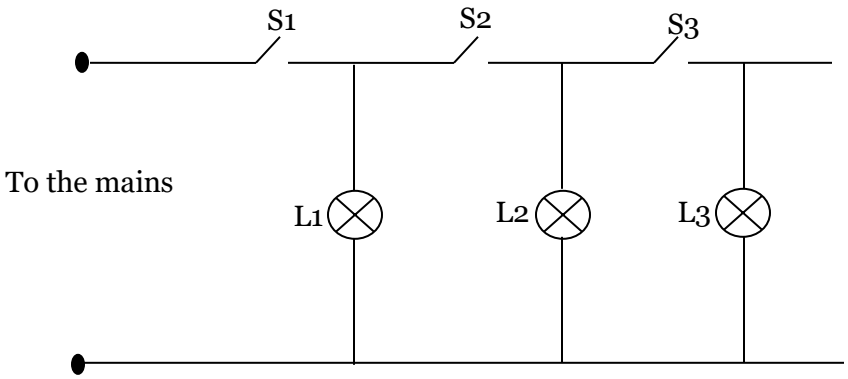
Determine:

i. The total capacitance of the arrangement. **(2mks)**

ii. The voltage across the 3μF capacitor. **(3mks)**

15.

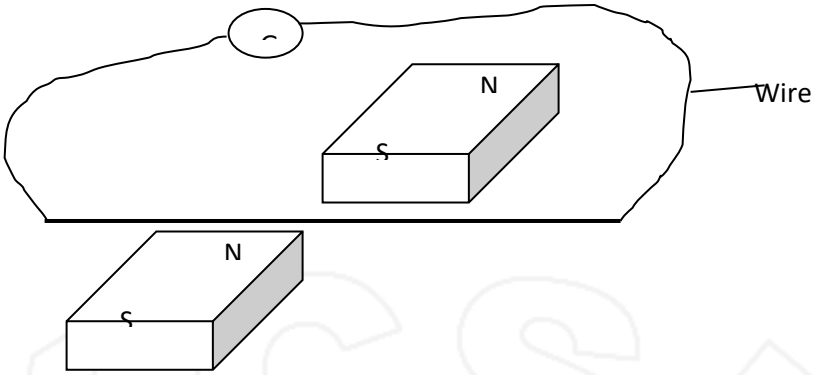
a) The figure below shows an attempt to supply each of the three lamps L1, L2 and L3 with a switch.



i. Give a reason why this is a poor connection. **(1mk)**

ii. Redraw the diagram to show the correct positioning of the switches. **(1mk)**

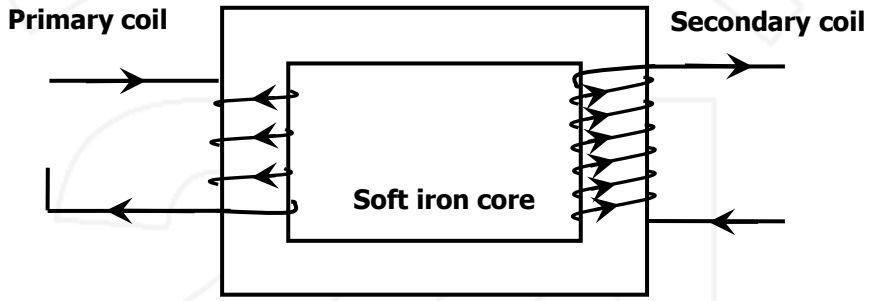
b) A wire placed between the pole of two permanent magnets is connected to a galvanometer as shown below.



i. State what is observed when the wire is moved up and down. **(2mks)**

ii. Suggest two ways of increasing the magnitude of the effect you have stated in (i) above. **(2mks)**

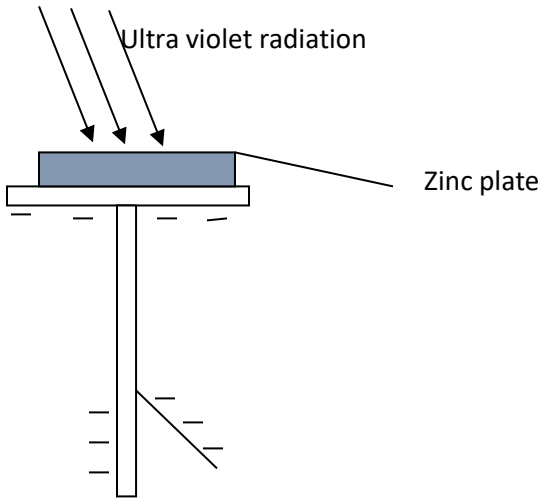
iii. The figure below shows a simple transformer. Study it and answer the questions that follow.



State and explain which coils are thicker. **(2mks)**

16.

a) The figure below shows Zinc plate placed on the cap of a negatively charged electroscope.

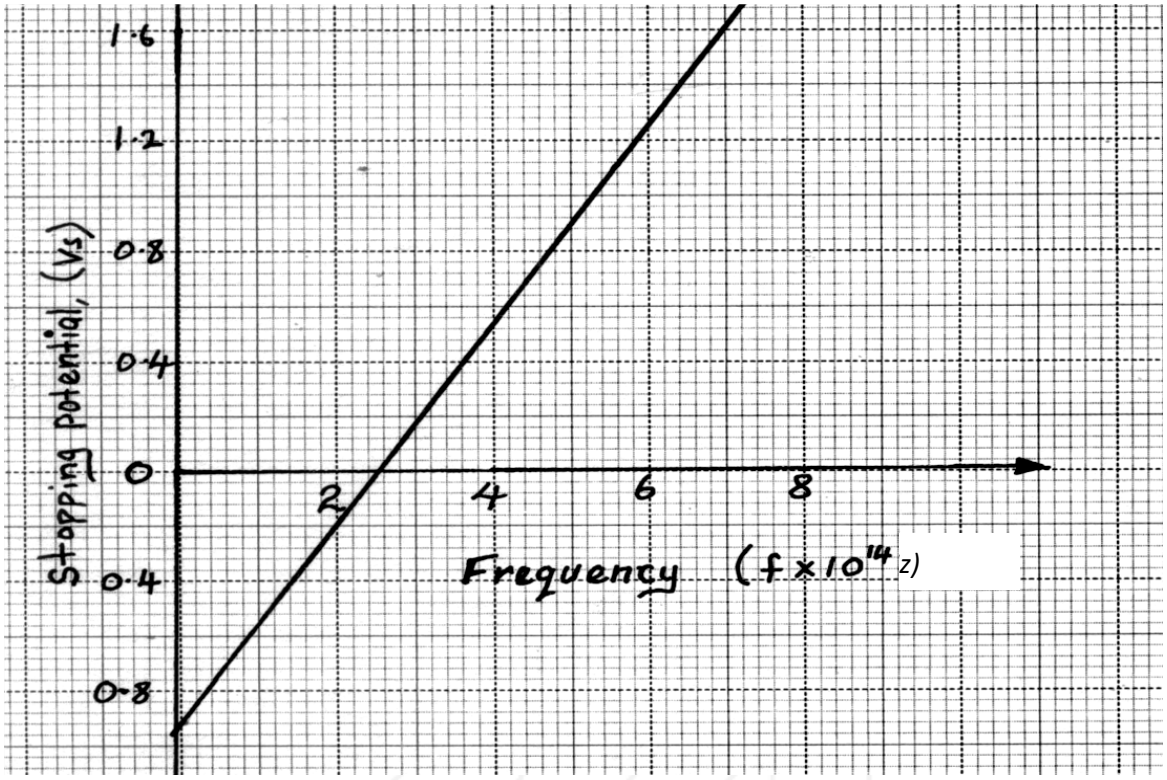


Ultraviolet radiation is made to fall on the plate as shown on the diagram.

i. What happens to the leaf of the electroscope? **(1mk)**

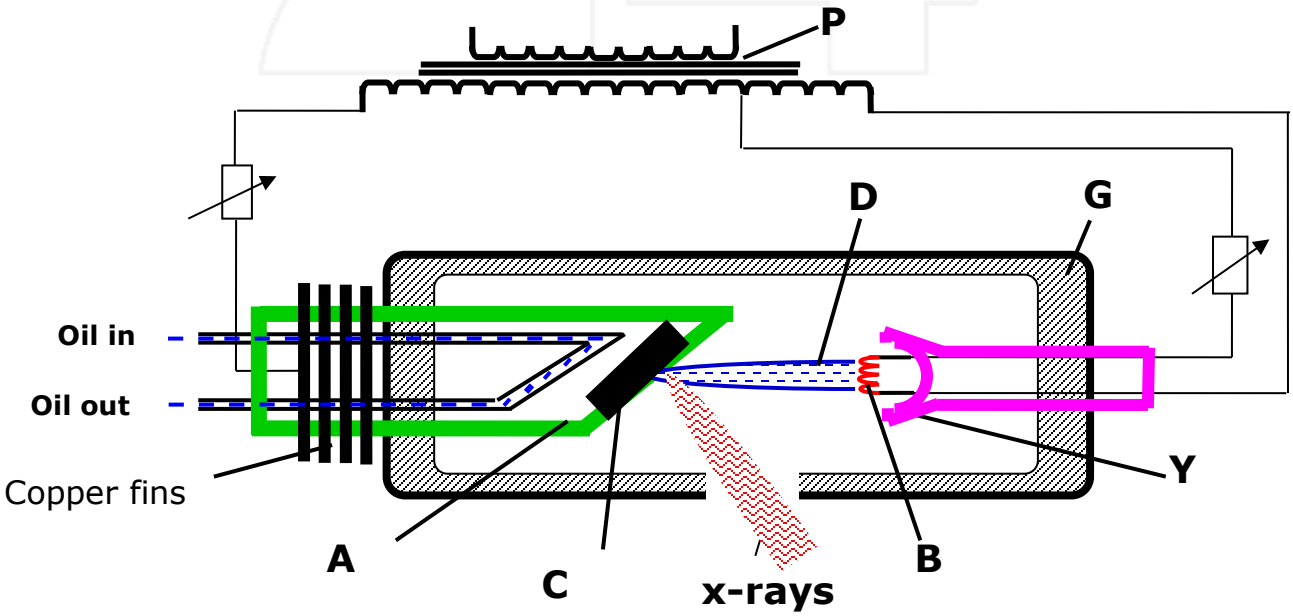
ii. What would happen if radiation was red light? **(1mk)**

b) In an experiment to find the relationship between frequency of a radiation and kinetic energy of the photoelectrons in a photoelectric device, the following graph was obtained.



Use the graph to determine the Planck's constant h. **(3mks)**

c) Figure below shows the features of an X-ray tube.



i. Explain the function of part labelled P. **(1mk)**

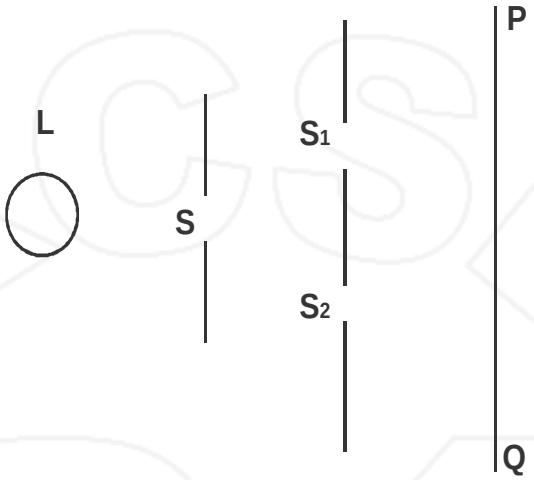
ii. Explain why the part labelled C gets very hot during production of X-rays. **(2mks)**

iii. Explain what is done to produce X-rays of shorter wavelength using the above X-ray tube.

(1mk)

17.

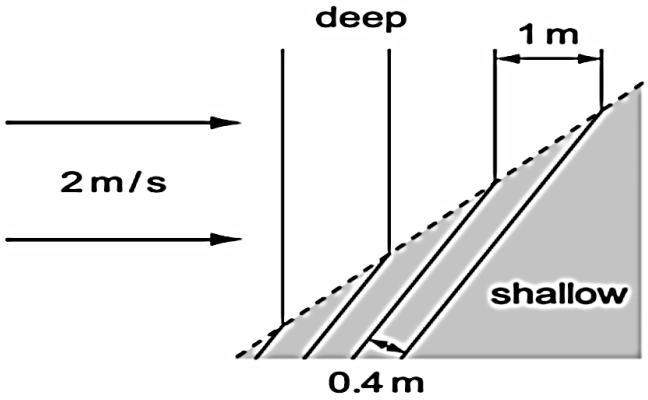
a) The figure below shows monochromatic source of light L behind a barrier with a single slit S placed behind another barrier with two identical slits S_1 and S_2. A screen PQ is placed in position as shown.



i) What is the significance of S_1 and S_2? **(1 mk)**

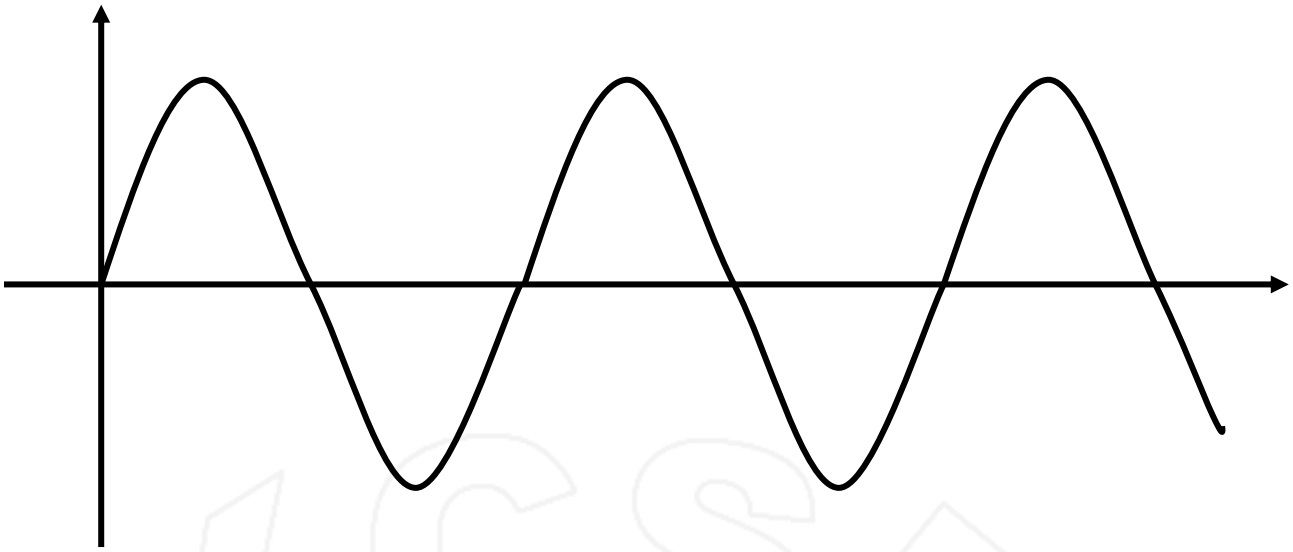
ii) Explain what is observed on screen PQ. **(2 mks)**

b) Waves pass from deep water to shallow water and refraction occurs.



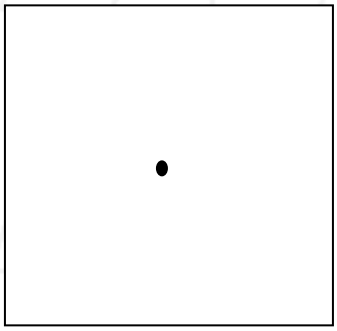
Calculate the speed of the waves in the shallow water. **(2 mks)**

c) The figure below shows an a.c. signal on the screen of a Cathode Ray Oscilloscope.



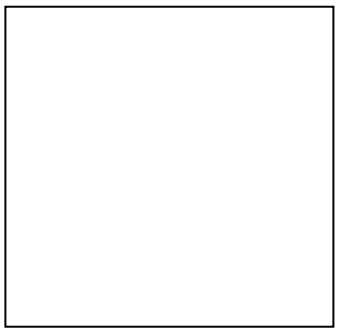
Determine the frequency of the signal given that the time base is set at 10ms/division. **(2mks**

d) Diagram (a) below shows the position of the bright spot on the screen of a C.R.O. when there is no signal on both Y and X plates.

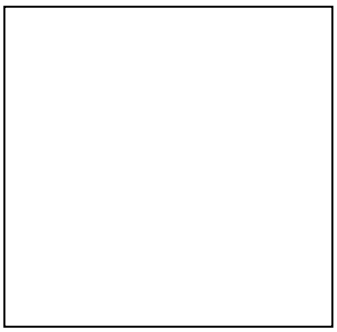


(a)

Indicate on the diagram (b) below what is observed on the display screen when the Y-plate is connected to a.c. signal and for (c) when X-plate is connected to a d.c. signal. **(2mks)**



(b)



(c)

18.

a) The following reaction is part of a radioactive series.

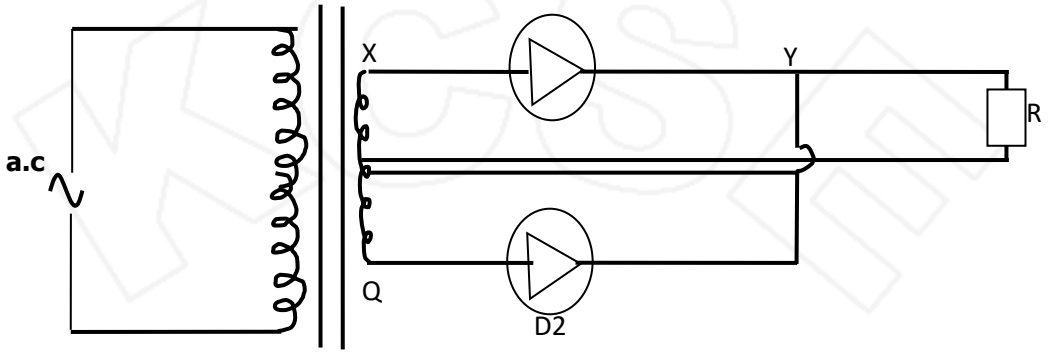
$$^{210}_{83}X \xrightarrow{r} {}^{210}_{84}Y \xrightarrow{\alpha} {}^{c}_{b}Z$$

i. Identify the radiation r. **(1mk)**

ii. Determine the value of c. **(1mk)**

b) At a certain instant the corrected count-rate registered on a detector placed close to an α-particle emitter is 200 per second and this falls to 50 per second in 12 minutes. Determine the half life of the source. **(3mks)**

c) Study the rectification circuit below and use it to answer questions that follow.



i. Briefly explain how the circuit works to rectify the alternating current. **(3mks)**

ii. Show on the diagram how a capacitor should be connected to smooth the output voltage. **(1mk)**

iii. In the grid provided, sketch a curve of smoothed output voltage against time. **(1mk)**



KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 3)

PHYSICS

232/1

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

a) *Write your **name, admission number, school, stream and signature** in the spaces provided above. This paper consists of **TWO** sections.*

b) *Answer **ALL** the questions in sections **A** and **B** in the spaces provided.*

c) ***ALL** working **MUST** be clearly shown.*

d) *Non-programmable silent electronic calculators and KNEC mathematical tables may be used.*

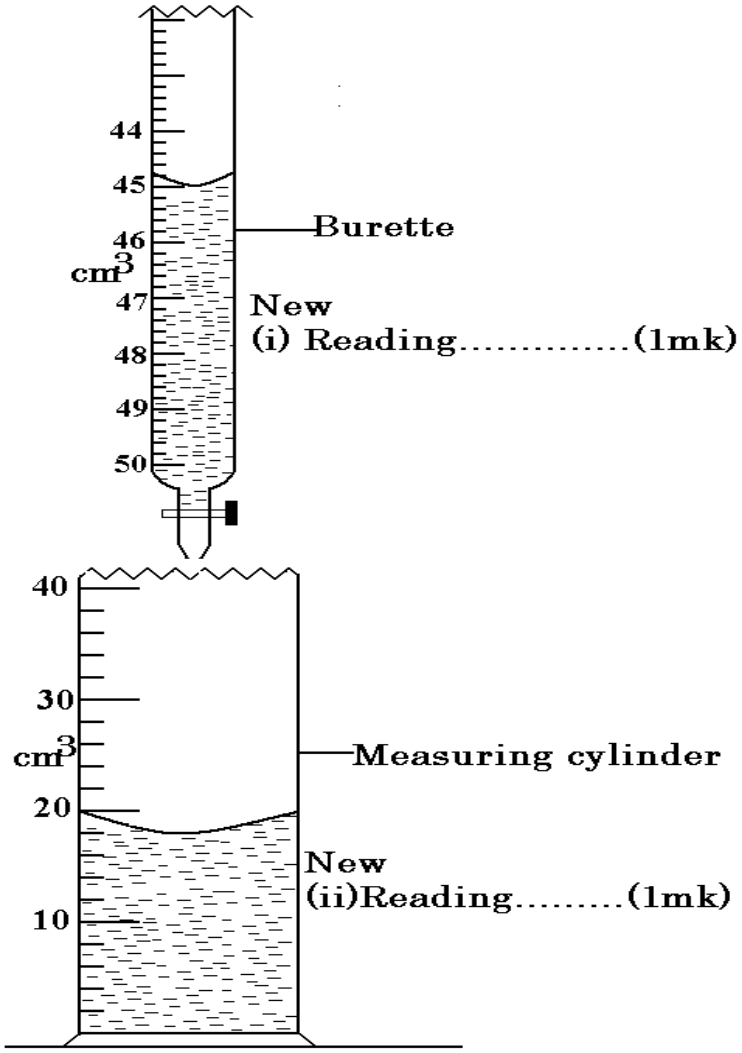
For Examiner's Use Only

Section	Question	Maximum Score	andidate's Score
A	1 – 11	25	
B	12	10	
	13	12	
	14	12	
	15	10	
	16	11	
	Total Score	80	

SECTION A (25 MARKS)

Answer questions in the spaces provided

1. The figure 1 shows a measuring cylinder containing some water.



Another 3cm^{3}of water was added in to the cylinder from a burette delivering volumes from 0cm^3 to 50 cm ^{3}. Record in the spaces provided the **new reading** indicated on each vessel. **(2 marks)**

2. Sketch a Vernier calipers scale reading 3.41 cm. **(2 marks)**

3. The system in figure 2 is in equilibrium

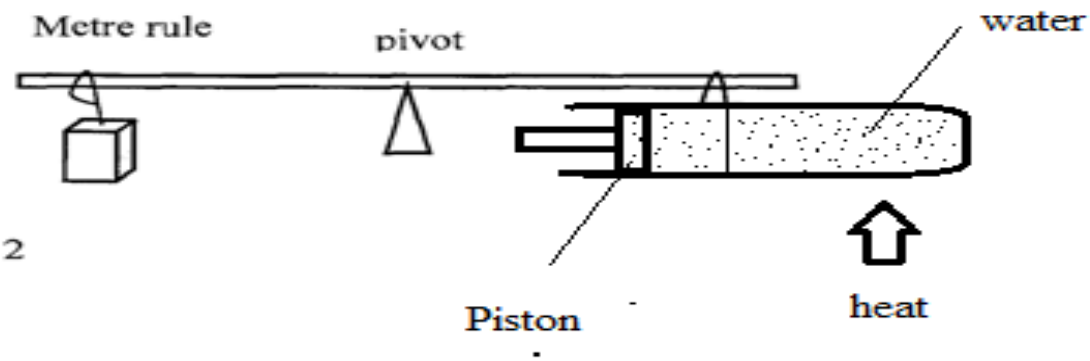


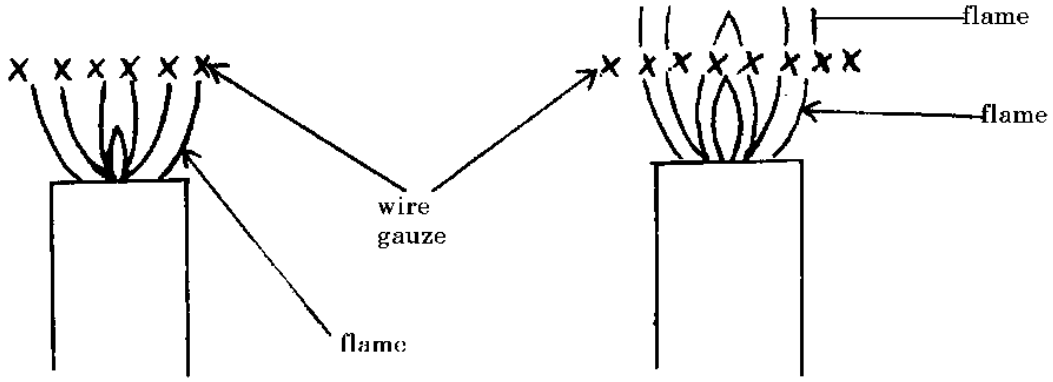
Figure 2

When the temperature of the water is raised the system is observed to tilt to the left, explain this observation **(2 marks)**

4. The reading on a mercury barometer at a certain town is 760mm. Calculate the pressure at the town.(density of mercury is $1.36 \times 10^4 Kgm^{-3}$) **(3 marks)**

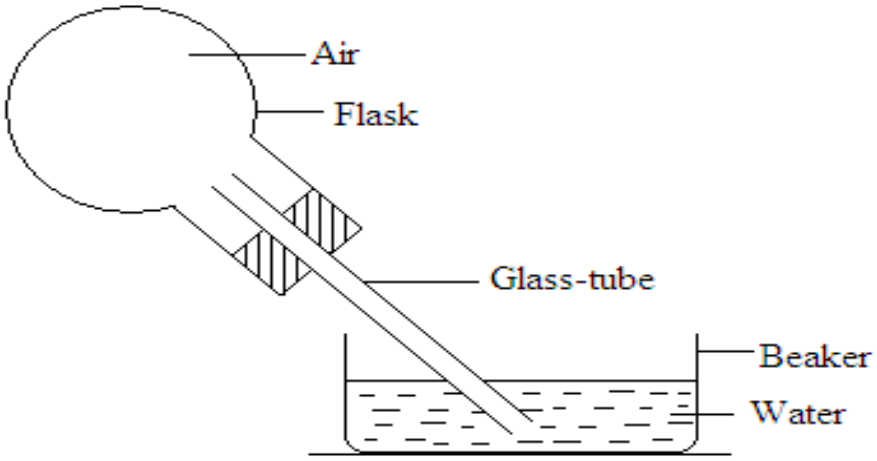
5. Explain the cause of random motion of smoke particles as observed in Brownian motion experiment using a smoke cell. **(1 mark)**

6. When a Bunsen burner is lit below a wire gauze, it is noted that the flame initially burns below the gauze as shown in the figure below. After sometime the flame burns below as well as above the gauze.



Explain this observation **(2 marks)**

7. The diagram below shows a flask fitted with a glass tube dipped into a beaker containing water at room temperature. The cork fixing the glass tube is tight.

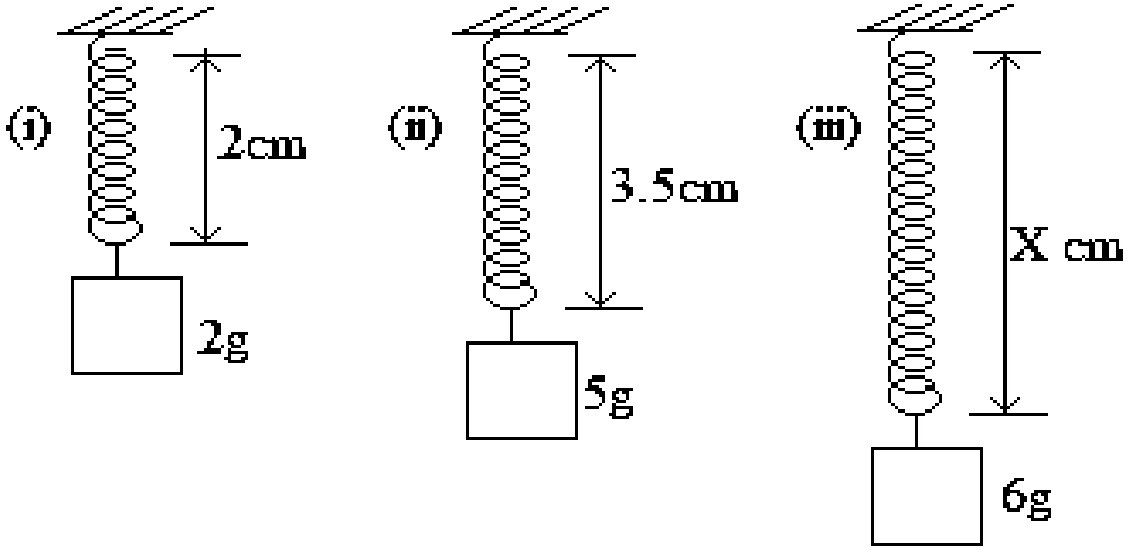


State with reason what would be observed if cold water is poured on to the flask. **(2marks)**

8. A resultant force F acts on a body of mass 'm' causing an acceleration of a_1 on the body. When the same force acts on a body of mass 2m, it causes an acceleration of a_2.Expressa_2 in terms of a_1.

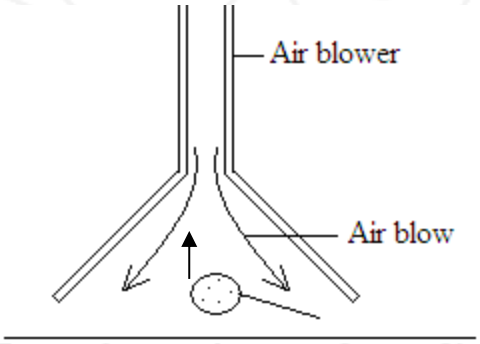
(3 marks)

9. The diagram below shows three identical springs which obey Hooke's law.



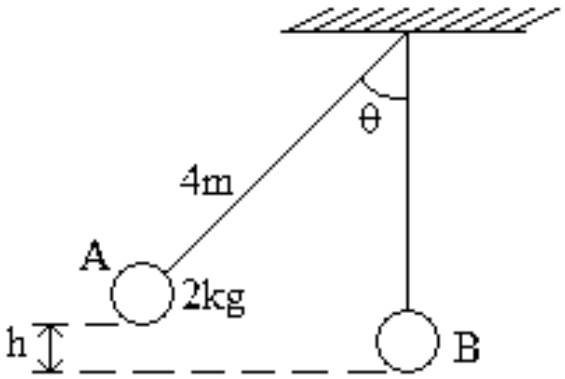
Determine the length X. **(3 marks)**

10. The figure below shows a pith ball being lifted in to a funnel end of a blower.



Explain this observation **(2 marks)**

11. A metal ball suspended vertically with a wire is displaced through an angle θ as shown in the diagram below. The body is released from A and swings back to 'B'.



Given that the maximum velocity at the lowest point B is 2.5 m/s. Find the height h from which the ball is released $(g = 10m/s^2)$ **(3 marks)**

SECTION B (55 MARKS)

Answer questions in the spaces provided.

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

(1 mark)

(b) In an experiment to estimate the diameter of an oil molecule, an oil drop of diameter 0.05 spreads over a circular patch whose diameter is 20cm

Determine

(i) The volume of the oil drop **(2 marks)**

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

(iii) The diameter of the oil molecule **(2 marks)**

(c) State;

(i) Any assumption made in (b) (iii) above **(1 mark)**

(ii) Two possible sources of errors in this experiment **(2 marks)**

13. (a) (I)State what is meant by centripetal acceleration **(1 mark)**

(**II)** A block of mass 200g is placed on a frictionless rotating table while fixed to the centre of the table by a thin thread. The distance from the centre of the table to the block is 15cm. if the maximum tension the thread can withstand is 5.6N. Determine the maximum angular velocity the table can attain before the thread cuts. (**4mks)**

(b) Define the term velocity ratio as used in machines **(1 mark)**

(c) Figure 6 shows a block and tackle pulley system lifting a load of 500N

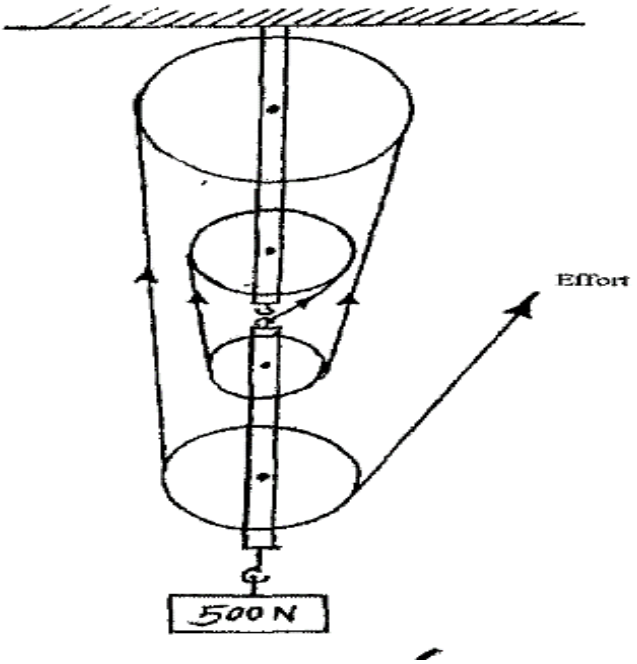


Fig 6

(i) Determine the velocity ratio of the machine **(1 mark)**

(ii) If an effort of 120N is required to lift the load using the machines determine the efficiency of the pulley system **(3 marks)**

(iii) In the space provided below, sketch a graph of efficiency against load for the system.

(2 marks)

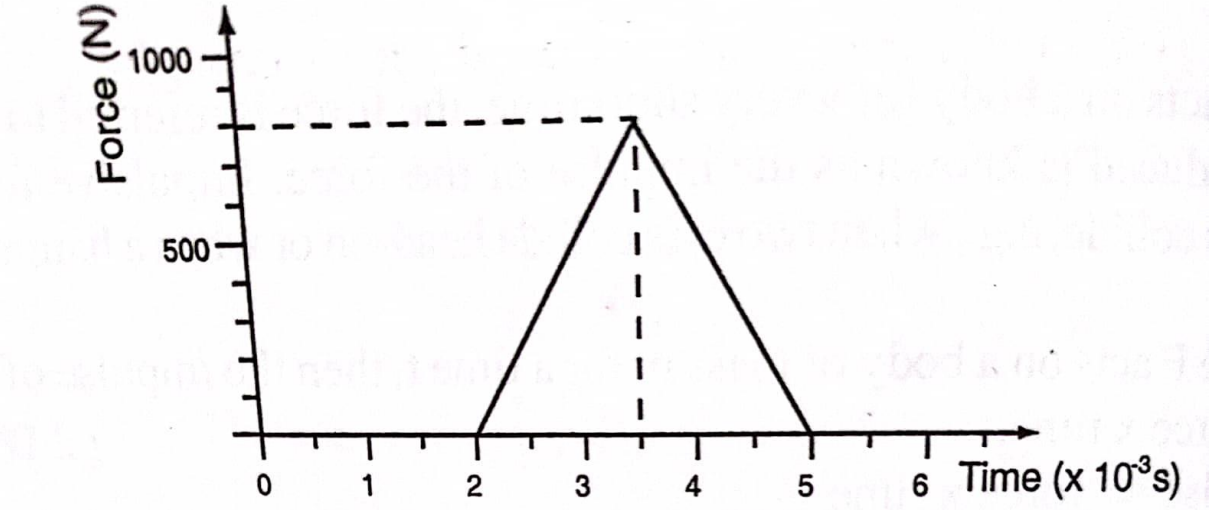
14. A car of mass 2000kg travelling at 5m/s collides with a minibus of mass 5000kg travelling in the opposite direction at 7m/s, the vehicles stick and move together after collision. If the collision lasts 0.1 seconds

(a) Determine the velocity of the system after collision to 3 decimal places **(3 marks)**

(b) Calculate the impulsive force on the minibus **(3 marks)**

(c) (i) Calculate the change in kinetic energy of the system to 5 significant figures **(3 marks)**

(d) The graph below shows the force on a tennis ball when served during a game.



Determine the mass of the racket with a velocity of $40ms^{-1}$ (assume the ball was stationary before being struck) **(3 marks)**

15. a) Define specific heat capacity. **(1 marrk)**

b) In an experiment to determine the specific latent heat of water, steam at 100^0C was passed into water contained in a well lagged copper calorimeter.

The following measurements were made

- Mass of colorimeter = 60g
- Initial mass of water = 80g
- Initial room temperature of water = 15^0c
- Final temperature of the mixture 45^0c
- Final mass of water + calorimeter + condensed steam =160g
- Specific heat capacity of water = $4200Jkg^{-1}k^{-1}$ and specific heat capacity of copper = $390Jkg^{-1}k^{-1}$

i). Determine

a) Mass of condensed steam **(1 mark)**

b) Heat gained by the calorimeter and water. **(4 marks)**

ii) Given that Lv is the specific latent heat of evaporation of steam,

a). Write an expression for the latent heat of vaporization of steam. **(2 marks)**

b) Determine the value of Lv. **(2 marks)**

16. (a) State Charles law. **(1 mark)**

b) Describe an experiment to verify Charles law. **(5 marks)**

c) Using kinetic theory explains how temperature affects the volume of a gas. **(2 marks)**

d) The volume of mass of air at temperature 27^0 C is $300cm^3$. Find the volume of the air at $-73\ ^0$ C. **(3 marks)**

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 3)

PHYSICS

232/2

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

(a) Write your name, Index number and School in the spaces provided above
(b) Sign and write the date of the examination in the spaces provided above
(c) This paper consists of two sections; A and B
(d) Answer all the questions in section A and B in the spaces provided
(e) All workings must be clearly shown in the spaces provided below each question
(f) Non programmable silent electronic calculators may be used.

FOR EXAMINER'S USE ONLY

Section	Question	Maximum Score	Candidate's Score
A	1 - 13	25	
B	14	10	
	15	9	
	16	8	
	17	9	
	18	10	
	19	9	
Total Score		80	

SECTION A (25marks)

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

1. (a) **Figure 1** below shows a plan view of an object **O** in front of a plane mirror

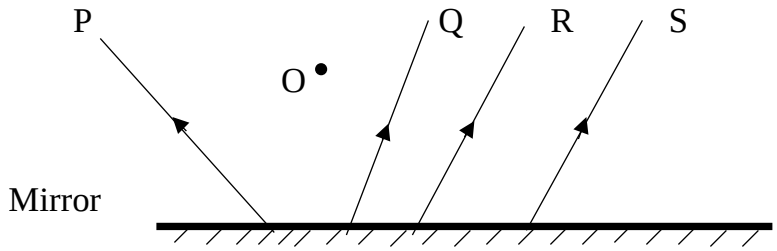


Figure 1

Which one of the reflected rays of light **P, Q, R** and **S** appears to come from the image of **O (1 mrk)**

2. **Figure 2** below shows an uncharged pith ball **A** under the attraction of a charged ball **B**.

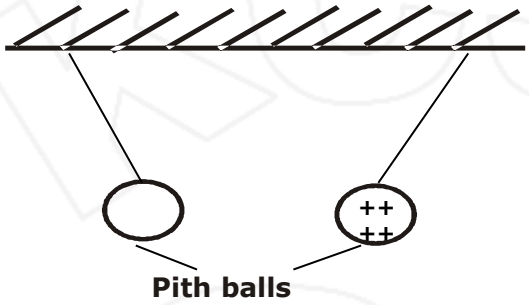
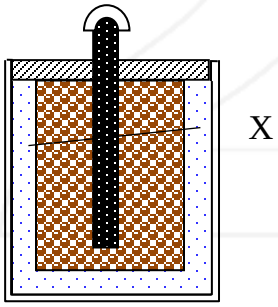


Figure 2

State and explain what would be observed after the two pith ball touch each other **(2 marks)**

3. **Figure 3** below shows the features of a dry Leclanche cell.



State the function of the part labelled **X** **(1 mark)**

4. What is meant by the term **"lost volts"** as used in cells **(1 mark)**

5. **Figure 4** below shows a longitudinal wave that takes 0.5s to move from point A to B and at a speed of 36m/s.



Figure 4

Calculate the frequency of the wave **(2 marks)**

6. Figure 5 represents an object **O** and the image **I** formed by a concave mirror.

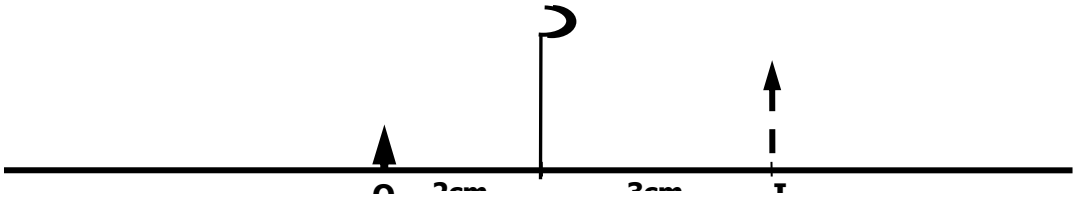
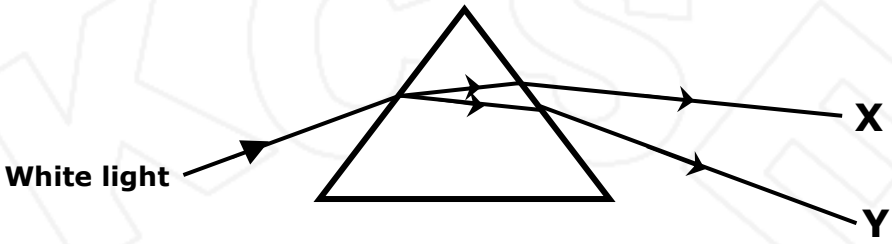


Figure 5

By suitable rays, determine the focal length of the mirror. (**2 marks)**

7. Figure 6 shows white light falling on a prism as indicated.



a) Name the colour at **X** and **Y** **(2 marks)**

X ……..

Y ……..

b) What measurable quantity is associated with colour of light? **(1 mark)**

8. Explain how hammering demagnetizes a magnetized iron bar **(2 marks)**

9. Figure 7 shows a standing wave on a string, fixed at both ends.

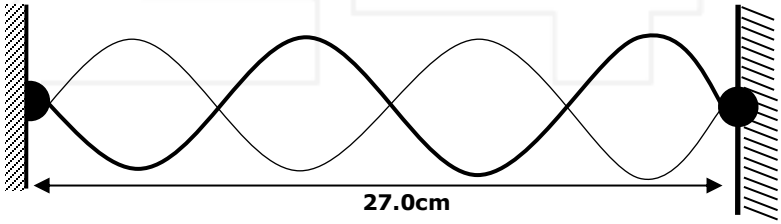


Figure 7

Explain how the standing wave is generated. **(3 marks)**

10. Figure 8 below shows a positive charge near a plate carrying negative charge.

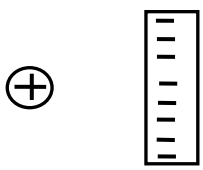


Figure 8

Draw the electric field between them. **(2 marks)**

11. **Figure 9** represents part of electric cooker coil.

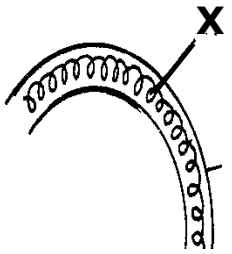


Figure 7

(i) Why is the material labeled X is coiled? **(1 mark)**

(ii) State the property of material X that makes it suitable for its use. **(1 mark)**

12. State **two** factors affecting the type of shadow formed by an object placed in front of a source of light. **(2 marks)**

13. The graph below shows radioactive decay of iodine.

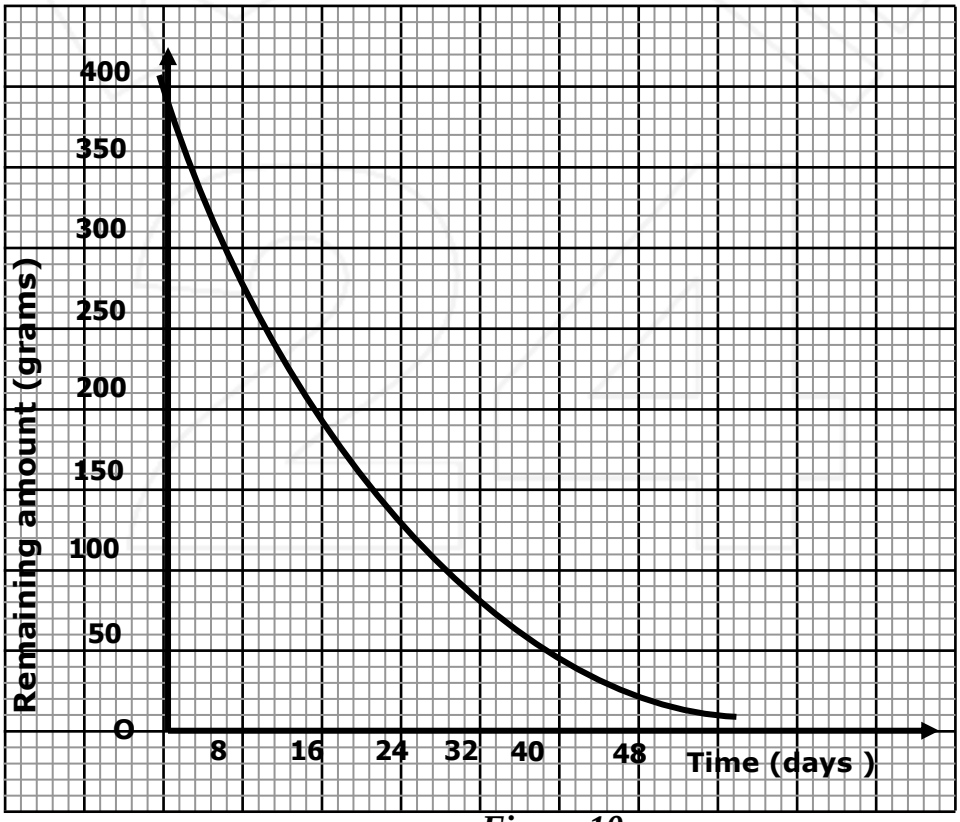


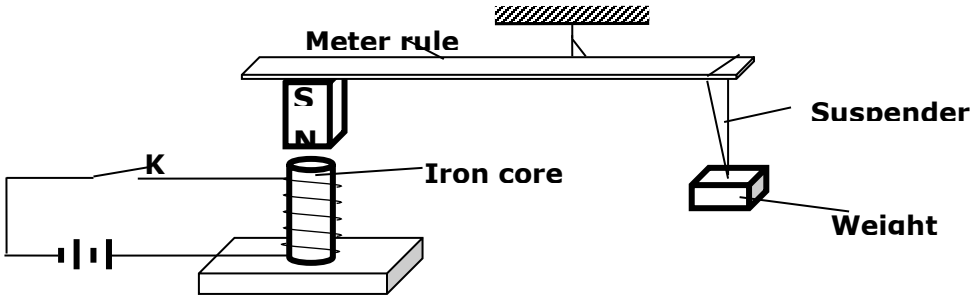
Figure 10

Use the graph to determine the fraction of the amount remaining after 16 days. **(2 marks)**

SECTION B (55 marks)

Answer all the questions in this section in the spaces provided

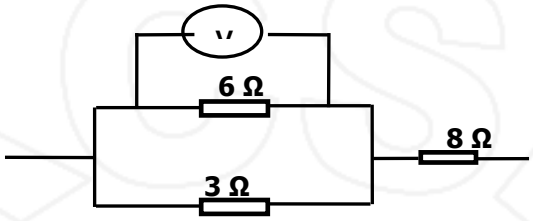
14. (a) In the setup below, the suspended meter rule is in equilibrium balanced by the magnet and the weight shown. The iron core is fixed to the bench.



(i) State and explain the effect on the meter rule when the switch **K** is closed. **(3 marks)**

(ii) What would be the effect of reversing the battery terminals? **(1 mark)**

(b) **Figure 12** shows three resistors connected as shown.



If the voltmeter, V reads **4V**, find the Potential difference across the 8Ω resistor. **(3marks)**

(c) A student stands some distance from a high wall and claps her hands.

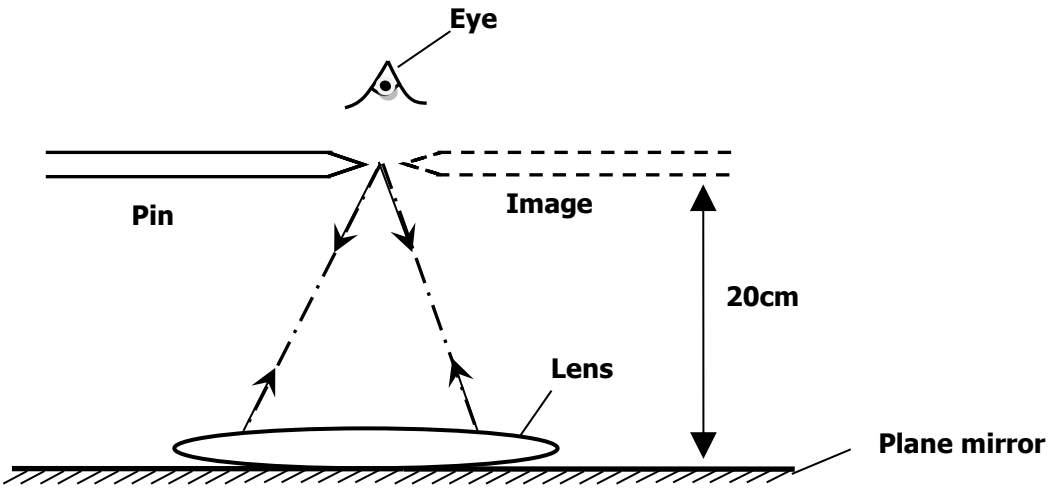
(i) What two measurements would he need to make in order to determine the speed of sound?

(2 marks)

(ii) **Show** how you would make use of these measurements to determine the speed of sound in air

(1 mark)

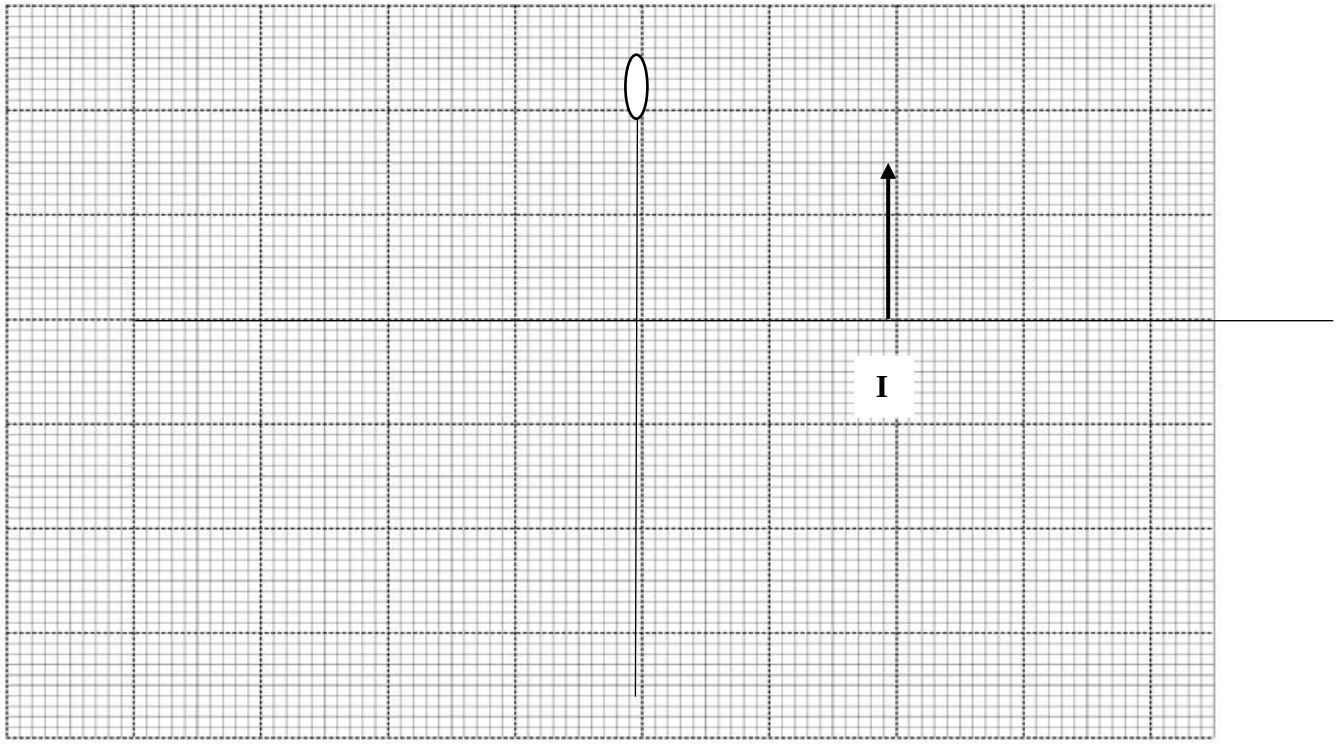
15. (a) Students wanted to determine the focal length of a convex lens of thickness 0.6cm using an optical pin and a plane mirror. **Figure 13** shows the experimental set up used when there was no parallax between the pin and the image.



(i) Use the setup to determine the focal length of the lens. **(2 marks)**

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

(b) An Image, **I** 15cm tall stands vertically on the principal axis of a convex lens of focal length 10cm and at a distance of 20cm from the lens as shown in **figure 14** below. ***(the graph is drawn to scale)***

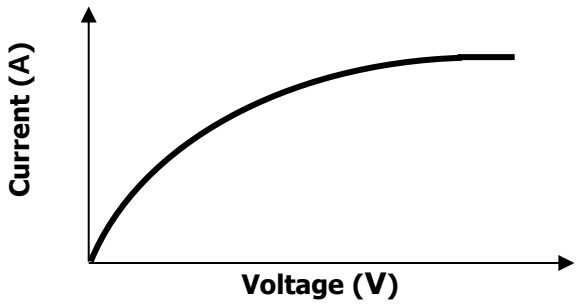


(i) By ray construction, complete the diagram to show the position of the object **(3 marks)**

(ii) Determine the size of the object **(1 mark)**

(iii) Determine the object distance **(1 mark)**

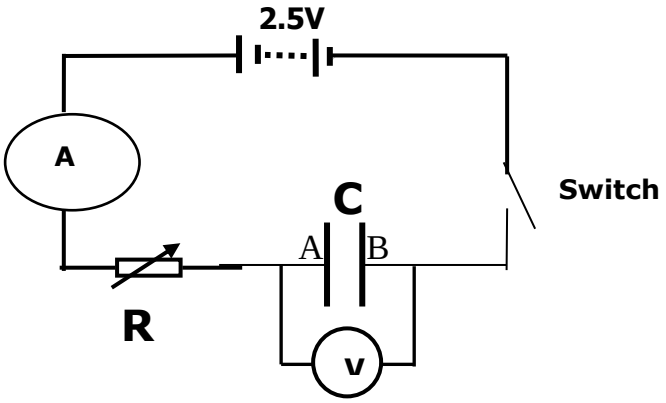
16. (a) For a particular bulb, a series of readings of the current through the bulb for different potential differences across it is taken and plotted as shown in **figure 15** below.



(i) Draw the circuit diagram you would use for the experiment. **(3 marks)**

(ii) Explain how the resistance of the bulb changes **(1 mark)**

(b) The **figure 16** below shows a capacitor **C** being charged.



(i) State what would be observed on the ammeter when the switch is closed: **(1 mark)**

(ii) Explain how the capacitor is charged. **(3 marks)**

17. (a) What is meant by donor impurity in a semiconductor? **(1 mark)**

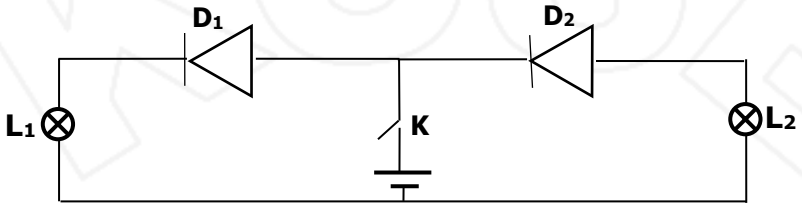


Figure 17

(i) State the observation made on L_1 and L_2 when switch **K** is closed. **(1 mark)**

(ii) Account for the observation made above. **(1 mark)**

(c) You are provided with ***a diode, a resistor R, an a.c source of low voltage*** and ***connecting wires.*** In the space provided, sketch the circuit diagram for a half-wave rectifier and indicate the terminals where the output voltage v_0 may be connected. **(2 marks)**

(d) (i) Alpha particles ($\propto$) are more ionizing than Beta (β) particles. Give **two** reasons for this.

(2 marks)

(ii) Fig shows the path of radiation from a radioactive source after entering a magnetic field.

The magnetic field is directed into the paper and is perpendicular to the place of the paper shown in the figure.

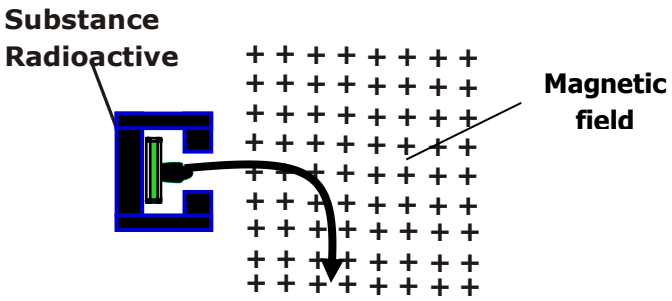


Figure 18

I) Identify the radiation. **(1 mark)**

II) Give a reason for your answer. **(1 mark)**

18. (a) A surface whose work function θ is 2.46eV is illuminated by light of frequency $3x10^{15}$ Hz. Calculate the maximum kinetic energy of the ejected photoelectrons.

($h = 6.63 \times 10^{-34}$ js and $e = 1.6 \times 10^{-19}$C). **(3 marks)**

(b) A monochromatic beam of radiation is directed on a clean metal surface so as to produce photoelectrons. Give a reason why some of the ejected photoelectrons have more kinetic energy than others. **(1 mark)**

(c)(i) Figure below shows an electric generator. The points P and Q are connected to a cathode Ray oscilloscope (C.R.O)

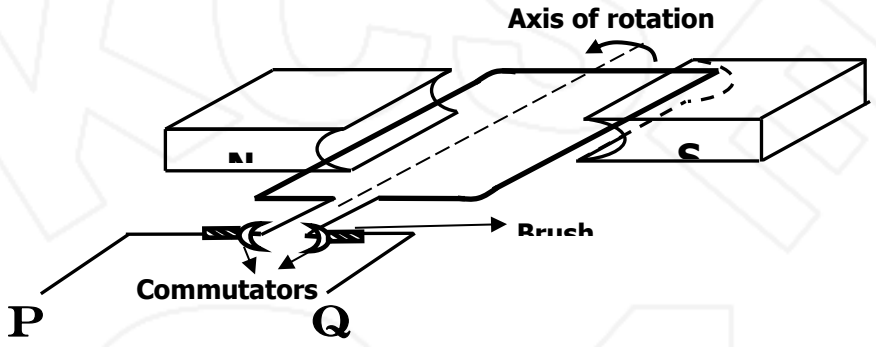
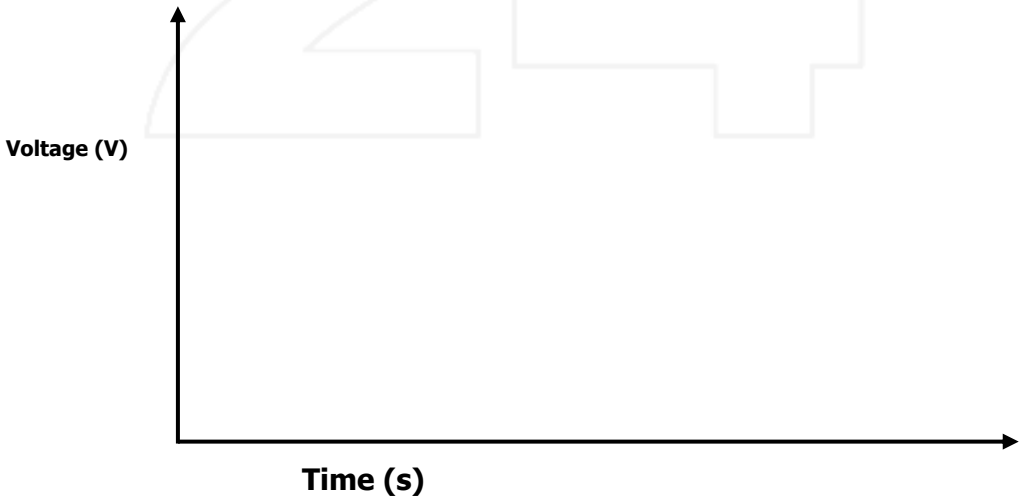


Figure 19

Sketch on the Axis provided the graph of the voltage output as seen on the C.R.O, given that when t= o, the coil is at the position shown in the figure **(1 mark)**



(ii) The emf generated by **a.c** generator is represented in the graph in **Figure 20**.

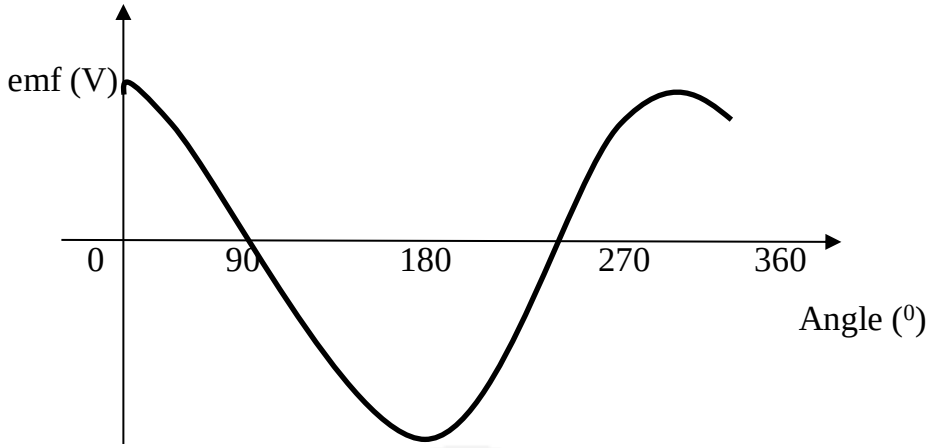


Figure 20

Give reasons for the changes in the emf as the coil rotates from 0^0 to 90^0 and 90^0 to 180^0.

(3 marks)

(d) An immersion heater rated 3000W is used continuously for 45 minutes per day. Calculate the cost per week at 60cts per unit. **(2 marks)**

19. (a) **Figure 21** shows the electric wiring of an electric cooker. X, Y and Z are main wires.

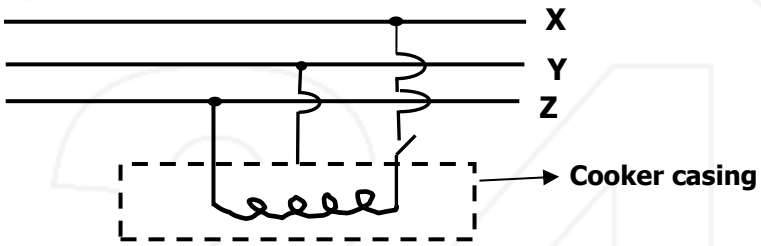


Figure 21

Identify the wires **Y** and **X** **(2 marks)**

(b) What adjustment on the x-ray tube will;

(i) Increase the hardness of the x-**rays** **(1 mark)**

(ii) Reduce the intensity of the x-rays**.** **(1 mark)**

(c) A CRO screen with 1cm squares displays the trace in **figure 22** below.

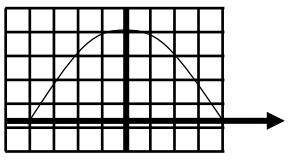


Figure 22

The Y- gain is set 0.5v/cm and the time base is set at 5ms/cm. **Determine**

(i) the voltage **(1 mark)**

(ii) the frequency of the signal **(3 marks)**

(d) Figure 23 shows as simple form of cathode ray tube, which produces a sharp shadow of a Maltese cross on a screen.

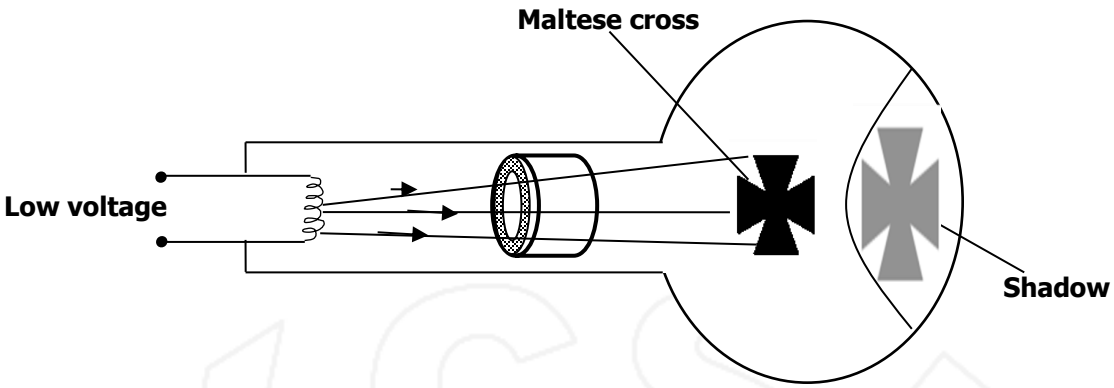


Figure 22

(ii) What property of cathode rays does the **figure 23** above illustrate **(1 mark)**

THIS IS LAST PINTED PAGE

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 4)

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME…… ADM NO; ……

CLASS…… DATE……

SIGN: ……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

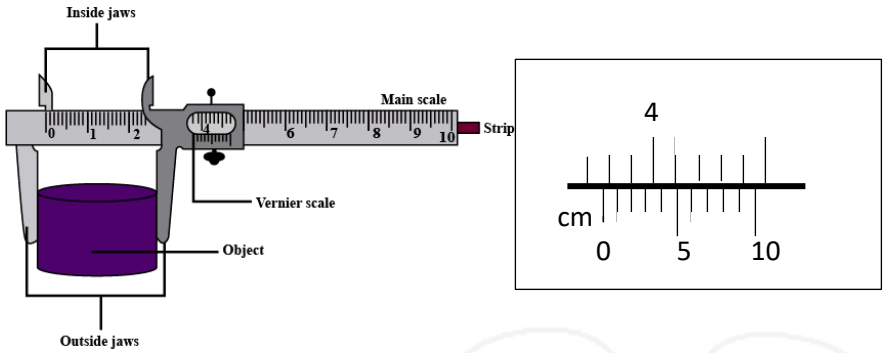
- This paper consists of two sections ***A*** and ***B***.
- Answer **all** the questions in the two sections in the spaces provided after each question
- All working **must** be clearly shown.
- Electronic calculators, mathematical tables may be used.
- All numerical answers **should be expressed** in the **decimal** notations.
- You may use 'g' as $10m/s^2$

For Examiner use only

SECTION	QUESTION	MAX MARKS	SCORE
A	1 – 13	25	
B	14	13	
	15	13	
	16	14	
	17	07	
	18	08	
	TOTAL	80	

SECTION A (25 MARKS)

1. Figure 1, shows a Vernier caliper of zero error 0.02 cm being used for measuring the diameter of a cylindrical container of height 10 cm. The scale reading of the Vernier is as shown alongside.

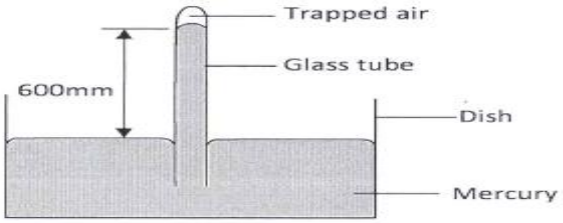


a. Determine the diameter of the container **(2 marks)**

b. Estimate the volume of a liquid which can completely fill the container **(2 marks)**

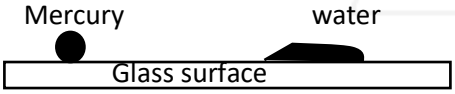
2. State **one** factor that affects the turning effect of a force on a body**.** **(1 mark)**

3. **Figure 2** shows some air trapped by mercury in a glass tube. The tube is inverted in a dish containing mercury.



Given that the atmospheric pressure is 760 mmHg and the height of mercury column in the tube is 600 mm, determine the pressure of the air trapped in the tube in mmHg. **(2 marks)**

4. Figure 3 shows drops of mercury and water on a glass surface, Explain the difference in the shapes of the drops. **(2marks)**



5. A ball is thrown from the top of a cliff 20m high with a horizontal velocity of $10ms^{-1}$. Calculate the distance from the foot of the cliff to where the ball strikes the ground. **(3 marks)**

6. Explain o**n**e advantage of mercury over alcohol as a thermometric liquid**.** **(1mark)**

7. A body of mass **M** is allowed to slide down an inclined plane. State **two** factors that affect its final velocity at the bottom of the inclined plane. **(2marks)**

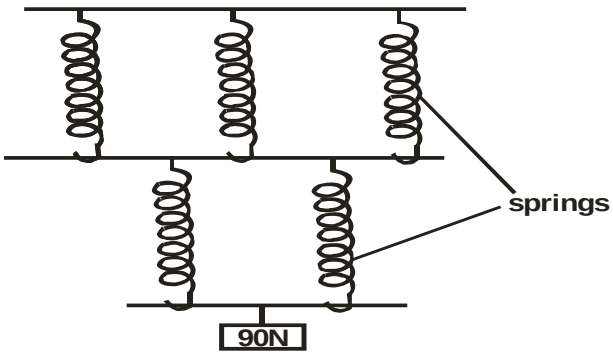
8. A stopwatch reads 08:10:84 and 09:10: 90 before and after an experiment respectively. Determine the duration of the event in SI units. **(2marks)**

9. Explain the meaning of thermodynamics as a branch of physics. **(1 mark)**

10.

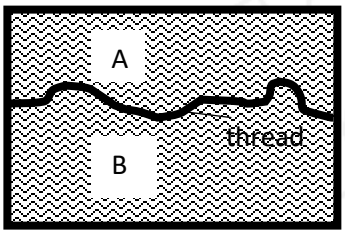
a. State the Hooke's Law. **(1mark)**

b. **Figure 4** shows identical spiral springs supporting a load of 90N. Each spring has a spring constant k = 200N/m



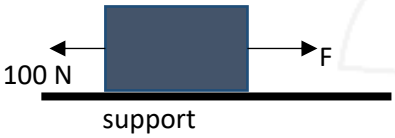
Determine the total extension of the system (take the weight of the cross bars and springs to be negligible) **(2 marks)**

11. **Figure 5** shows a rectangular loop with a thin thread loosely tied and dipped into a soap solution.



Draw on the space provided what is observed when point **A** is punctured. **(1mark)**

12. Two horizontal strings are attached to a block, resting on a frictionless surface, as shown in figure 6.



A force of 100N pulls on one string. The block does not move. Find the value of the force, F on the other string. **(1 mark)**

13. A wooden bench feels neither warm nor cold when touched by your bare hands. Explain this observation. **(2 marks)**

SECTION B (55 MARKS)

14.

a) Explain why bodies in circular motion undergo acceleration even when their speed is constant. **(1mark)**

b) A particle moving along a circular path of radius 5cm describes an arc of length 2cm every second. Determine:

i. Its angular velocity. **(1mark)**

ii. Its periodic time. **(2marks)**

c) A stone of mass 150g is tied to the end of a string 80cm long and whirled in a vertical circle at 2rev/s. Determine the maximum tension in the string. **(3marks)**

d) State **one** factor affecting centripetal force **(1mark)**

e) State the principle of conservation of linear momentum **(1 mark)**

f) A bullet of mass 60g is fired horizontally with a velocity of 200 m/s into a suspended stationary wooden block of mass 2940g. Determine:

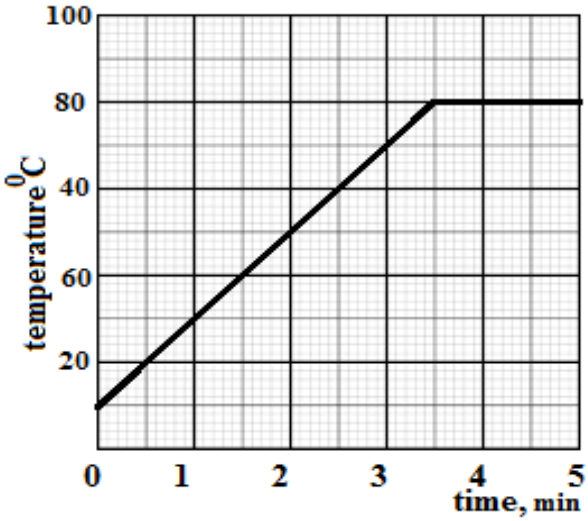
i. Common velocity of both the bullet and the block, if the bullet embedded into the block. **(2 marks)**

ii. Height to which the block rises. **(2 marks)**

15.

a) State two factors that affect the boiling point of a liquid **(2 marks)**

b) 100g of a liquid at a temperature of 10^0 C is poured into a well lagged calorimeter. An electric heater rated 50W is used to heat the liquid. The graph in figure 7 shows the variation of the temperature of the liquid with time.



(i) From the graph, determine the boiling point of the liquid **(1 mark)**

(ii) Determine the heat given out the by the heater between the times t = 0.5 minutes and t = 5.0 minutes **(3 marks)**

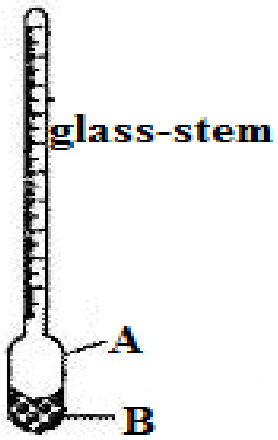
c) From the graph determine the temperature change between the times t = 0.5 minutes and t = 5.0 minutes, hence determine the specific heat capacity of the liquid **(3 marks)**

d) 1.8 g of vapor was collected from above the liquid between the times t= 3.5 minutes and t= 4.5 minutes. Determine the specific latent heat of vaporization of the liquid **(4 marks)**

16.

a) State the law of floatation **(1 mark)**

b) Figure 8 below shows a simple hydrometer



A ……

B ……

i. Identify the parts labelled A and B **(2 marks)**

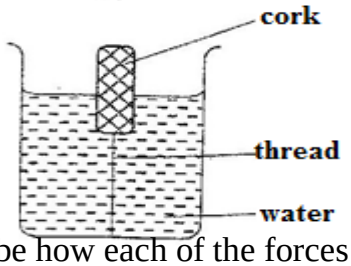
ii. State the purpose of the part labelled B **(1 mark)**

c) How would the hydrometer be made more sensitive? **(1 mark)**

d) Describe how the hydrometer is calibrated to measure relative density **(3 marks)**

e) Figure 9 shows a cork floating on water and held to the bottom of the beaker by a thin thread.

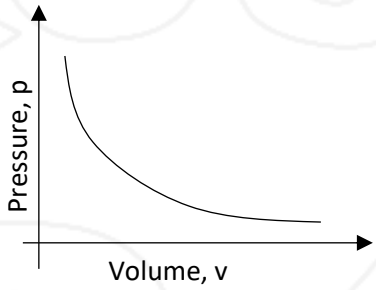
i. Name the forces acting on the cork **(3 marks)**



ii. Describe how each of the forces mentioned in (i) above changes when water is added until the container is completely filled **(3 marks)**

17.

a) Figure 10 shows a graph of pressure against volume for a fixed mass of a gas at constant temperature.



In the space provided, sketch a graph of pressure, p against $\frac{1}{v}$ **(1 mark)**

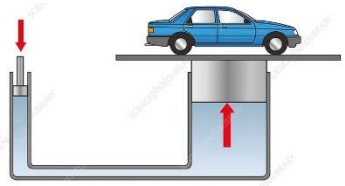
b) Explain the pressure law using the kinetic theory of matter **(3 marks)**

c) $20cm^3$ of a gas exerts a pressure of 760mmHg at 25^0C. Determine the temperature of the gas when the pressure increases to 900mmHg and the volume decreases to 15 cm^3. **(3 marks)**

18.

a) Define the term velocity ratio of a machine **(1 mark)**

b) The figure 11, below shows part of the hydraulic lift system. State any **one** property of the liquid under which the hydraulic system works **(1 mark)**



c) The hydraulic lift machine above has velocity ratio 45 and it overcomes a load of 4500 N when an effort of 135 N is applied. Determine:

i. The mechanical advantage of the machine **(2 marks)**

ii. Efficiency of the machine **(3 marks)**

iii. The percentage of work that goes to waste **(1 mark)**

This is the last printed page

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 4)

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME…… ADM NO; ……

CLASS…… DATE……

SIGN: ……

Kenya Certificate of Secondary Education.

INSTRUCTION TO CANDIDATES

(a) *Write your name, index number in the spaces provided above.*

(b) *Sign and write the date of examination in the spaces provided above.*

(c) *This paper consists of* **two** *sections:* **A** *and* **B**.

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

(e) ***All*** *working* **must** *be clearly shown.*

(f) *Silent non-programmable electronic calculators may be used.*

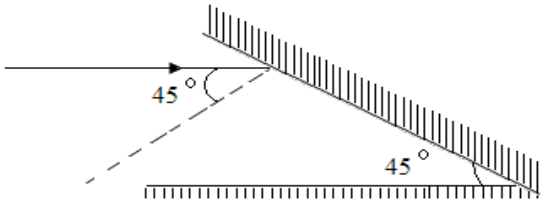
FOR EXAMINERS USE ONLY

Section	Question	Maximum Score	Score
A	1 – 11	25	
B	12	12	
	13	12	
	14	12	
	15	9	
	16	10	
Total Score		**80**	

SECTION A 25 MARKS

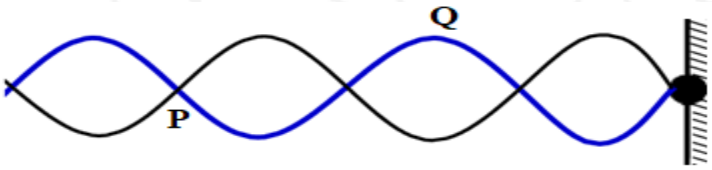
Answer all the questions in the spaces provided.

1. The figure below shows a ray of light incident on a mirror at an angle of 45°. Another mirror is placed at an angle of 45° to the first one as shown. Sketch the path of the ray until it emerges. **(2 marks)**



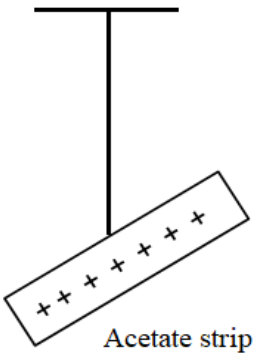
2. State any two ways of reducing the magnetic force of attraction of a magnet **(2 marks)**

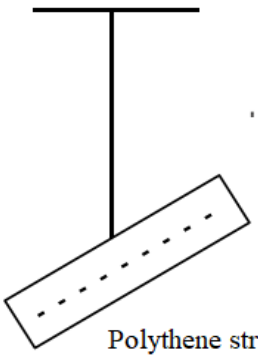
3. The figure below shows a transverse stationary wave along a string.



Name P and Q and explain how each is formed. **(3 marks)**

4. The diagrams below show a positively charged acetate strip and a negatively charged polythene strip freely suspended and isolated.



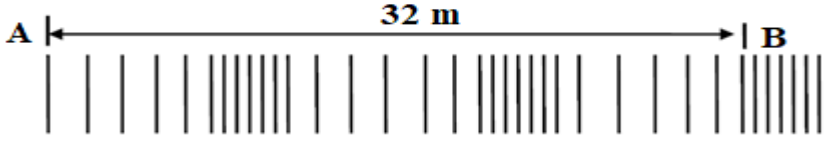


Two rods X and Y are brought up in turn to these strips. X attracts the acetate strip but repels the polythene strip. Rod Y does not repel either the acetate or the polythene. State the type of charge on each rod.

X ..... **(1 mark)**

Y ..... **(1 mark)**

5. The diagram below shows waves generated from a tuning fork. If the wave takes 0.1 second to move from point A to B. determine the frequency of the wave. **(4 marks)**

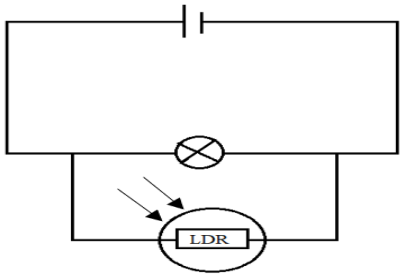


6. Name two detectors of **microwave** **(2 marks)**

7. Other than current state two other factors that affect the magnitude of force on a current carrying conductor placed in a magnetic field. **(2 marks)**

8. Give a reason why a concave mirror is not preferred as a driving mirror. **(1 mark)**

9. A student connected the set up below in the laboratory. Explain the observation made on the bulb when the set-up below is taken to a dark room **(2 marks)**



10. A person standing 110 m from the foot of a cliff claps his hands and hears a sound 0.75 seconds later. Find the speed of sound in air. **(3 marks)**

11. The figure below is part of electromagnetic spectrum.

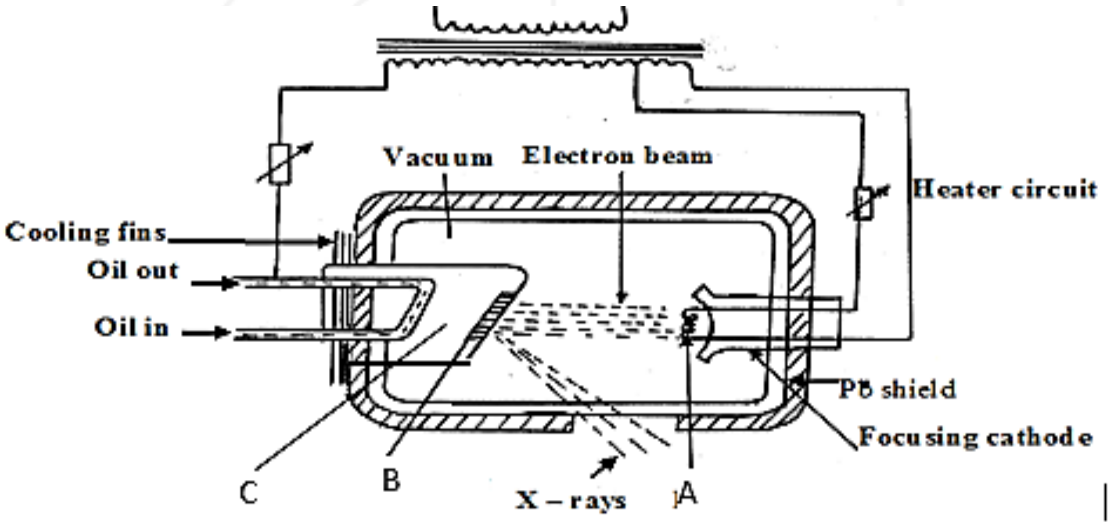
A		Visible light	UV	

Identify radiation A and state its source. **(2 marks)**

SECTION B 55 MARKS

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

12. (a) The figure below shows a X-ray tube.



(i) Name the part labelled C **(1 mark)**

(ii) State the property of the material labelled B on the diagram which makes it suitable for use in the X-ray tube. **(1 marks)**

(iii) Why is C inclined at an angle of 45^o? **(1 mark)**

(iv) State the adjustment that can be made to vary

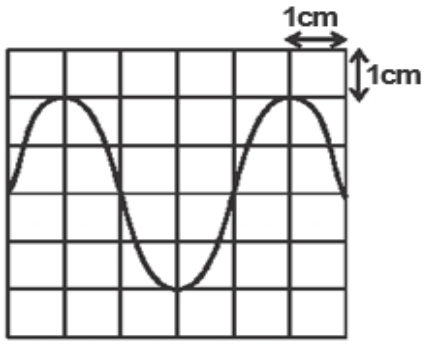
I. The quality of X-rays **(1 mark)**

II. The quantity of the X-rays. **(1 mark)**

(v) An x-ray tube has an accelerating potential of 100KV. Determine the maximum frequency of the x-rays produced.

(Plank's constant = 6.63×10^{-34} Js, $e = 1.6 \times 10^{-19}$C) **(3 marks)**

(b) In a CRO, waveform given below was displayed on the screen when the sensitivity at the Y plate was10V/cm and time base set at 20 milliseconds/cm.



Determine:

(i) peak voltage **(2 marks)**

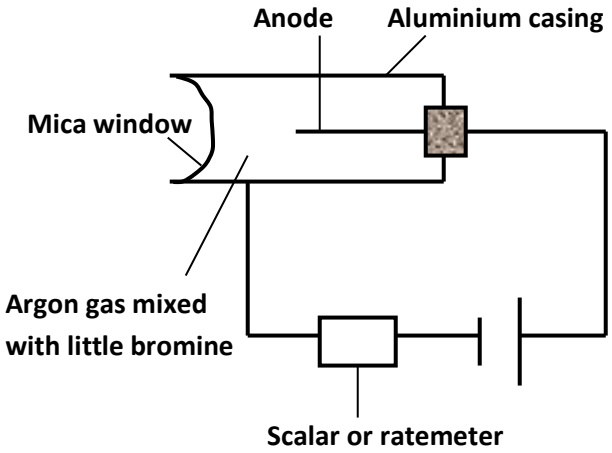
(ii) frequency of the signal **(2 marks)**

13. a) $^{226}_{88}Ra$ decays into $^{222}_{86}Rn$ by emission of an alpha particle. Write a nuclear equation for the decay **(1 marks)**

b) i) What do you understand by the term half-life of a radioactive substance? **(1 mark)**

ii) A G.M tube registers 20 counts. When a radioactive source is brought close to it, it registers 3220 counts and 120 counts 30 hours later. What is the half-life of this substance? **(3 marks)**

c) The figure below shows a G.M tube.



i) What is the purpose of the mica window? **(1 mark)**

ii) Explain the purpose of the bromine **(2 mark)**

iii) Why should argon gas be kept at low pressure **(1 mark)**

iv) What is meant by the term "*dead time"* as used in GM tube **(1 mark)**

v) Briefly explain how GM tube works. **(2 marks)**

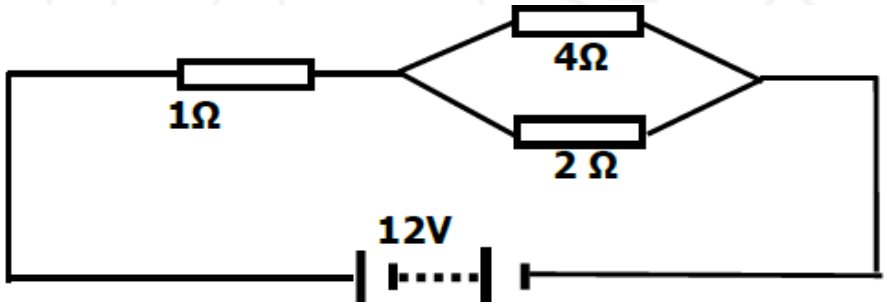
14. (a) State the Ohm's Law **(1 mark)**

(b) You are provided a rheostat, 2 cells, a voltmeter, an ammeter, a switch and a fixed resistor.

i) Draw a circuit diagram that can be used to verify Ohm's law. **(2 marks)**

ii) Describe how the above set up can be used to determine Ohms law. **(4 marks)**

(b) Study the circuit diagram below and answer the questions that follow.



Calculate

(i) Determine the total resistance in the circuit. **(2 marks)**

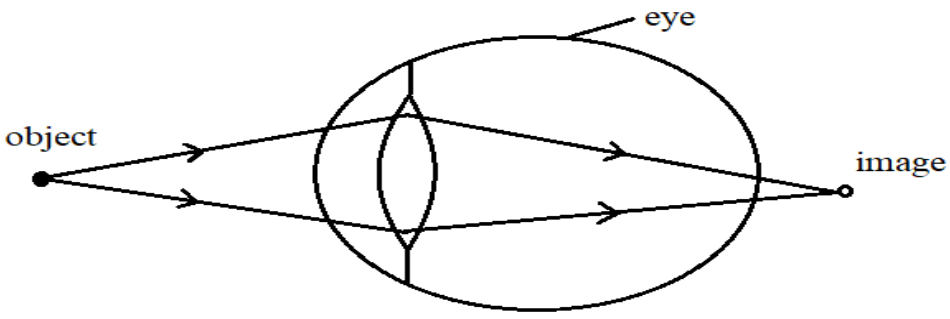
(ii) The current through the 4Ω resistor **(3 marks)**

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

b) A ray of light travelling from water to glass makes an angle of incident of 30^0. Find the angle of refraction in the glass. Refractive index of water $= \frac{4}{3}$. Refractive index of glass $= \frac{3}{2}$ **(3 marks)**

c) State the necessary and sufficient conditions for total internal reflection to occur. **(2 marks)**

d) The figure below shows a human eye defect.

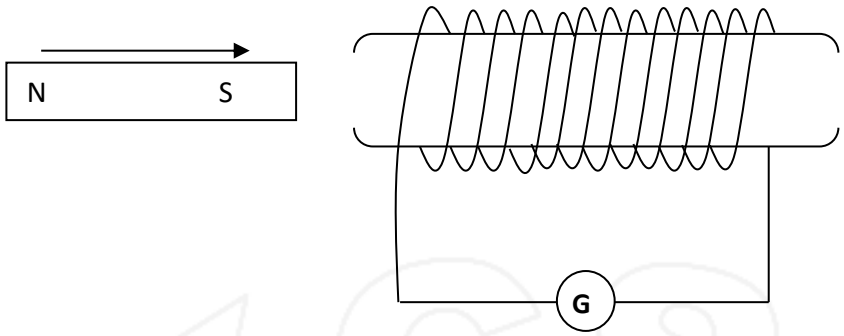


(i) State one possible cause of this defect. **(1 mark)**

(ii) On the diagram, show how the defect is corrected. **(2 mark)**

16. (a) State the Lenz's law of electromagnetic induction. **(1 mark)**

(b) A bar magnet is moved into a coil of an insulated copper wire connected to a zero centre galvanometer as shown below

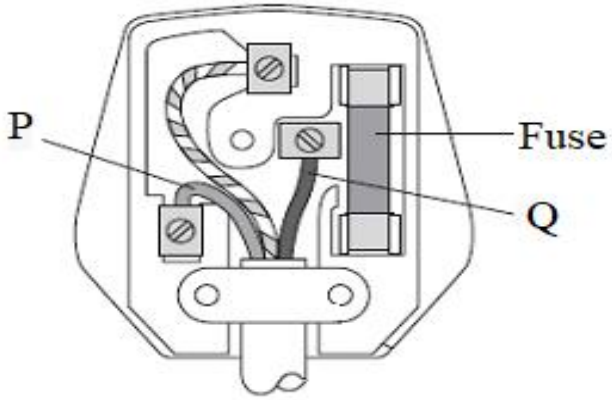


(i) Show on the figure above the direction of the induced current in the coil **(1 mark)**

(ii) State and explain what is observed on the galvanometer when the south pole of the magnet is moved into and then withdrawn from the coil. **(2 marks)**

(c) A transformer has 800 turns in the primary and 40 turns in the secondary winding. The alternating voltage connected to the primary is 240V and current of 0.5.A. If 10% of the power is dissipated as heat within the transformer, determine the current in the secondary coil. **(3 marks)**

(d) The diagram below shows a three-pin plug.



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

(ii) Why is the earth pin longer than the rest in the three-pin plug shown above? **(1 mark)**

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 5)

PHYSICS

232/1

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

a) *Write your name, admission number and index number in the space provided*
b) *Write the date of the examination in the space provided above*
c) *This paper consists of two sections A and B.*
d) *Answer all the questions in the spaces provided below each question*
e) *All workings must be clearly shown.*
f) *Mathematical tables and silent electronic calculators may be used.*

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	TOTAL MARKS	CANDIDATE'S SCORE
A	1-12	25	
B	13	13	
	14	11	
	15	12	
	16	10	
	17	9	
	TOTAL	**80**	

SECTION A (25 MARKS)

Answer all the questions in this section in the spaces provided

1. The figure 1 below shows a section of a micrometer screw gauge when used to measure the diameter of a cylindrical rod of mass 2.5g.

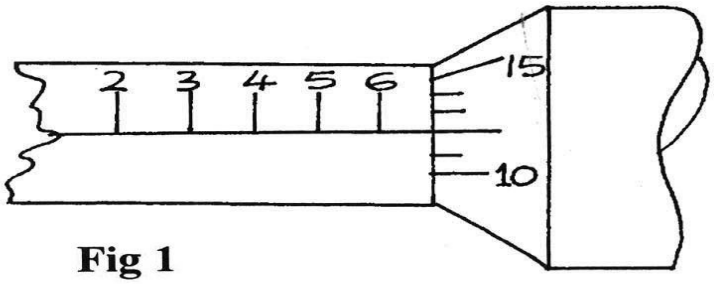


Fig 1

a) What is the diameter of the rod? **(1mark)**

b) If the length of the rod is 14cm, determine its density. **(3marks)**

2. The density of a solid decreases after heating. Explain. **(2marks)**

3. When a drop of oil is placed on the surface of water it spreads out forming a circular patch. Explain this observation. **(2marks)**

4. A uniform meter rule is balanced as shown in the figure 2 below.

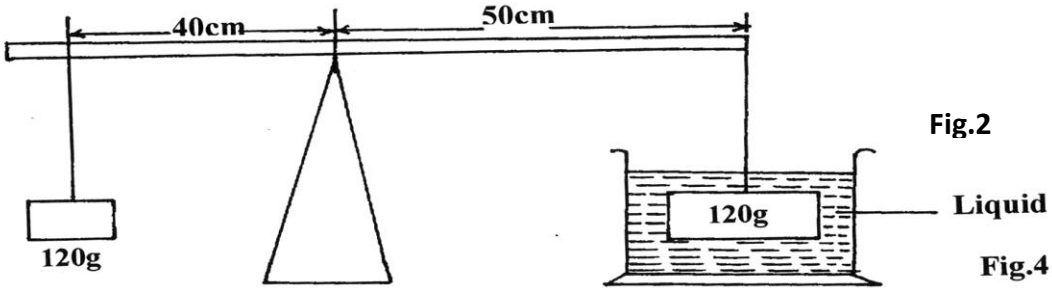


Fig.2

Fig.4

The volume of the immersed object is 13. 5cm^3. Determine the relative density of the liquid. **(3marks)**

5. Give a reason why a person may nose bleed after ascending a high mountain. **(1mark)**

6. A turntable of radius 10cm is rotating at 42 revolutions per second. Determine the linear speed of a point on the circumference of the turntable. **(3marks)**

7. Figure 3 below shows a glass filled with hot liquid placed on a table immediately after wiping with water. State and explain what is observed when one tries to lift the glass after a few minutes. **(2marks)**

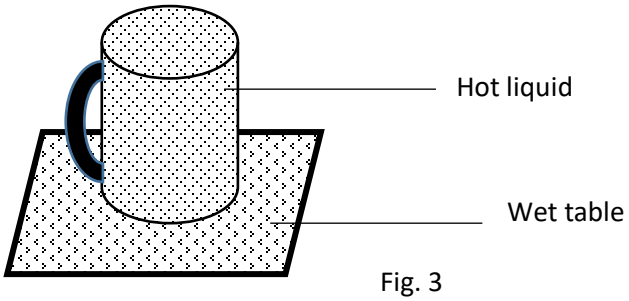


Fig. 3

8. In using the lift pump to raise water from a bore hole. It is observed that practically the height the water is raised cannot be 10m and more. Give two reasons for this observation. **(2marks)**

9. When a mass of 2kg is hang from a single spring, the spring extends by a distance 10cm. Determine the total extension in the set up in Figure 4 below given that the springs are identical **(2marks)**

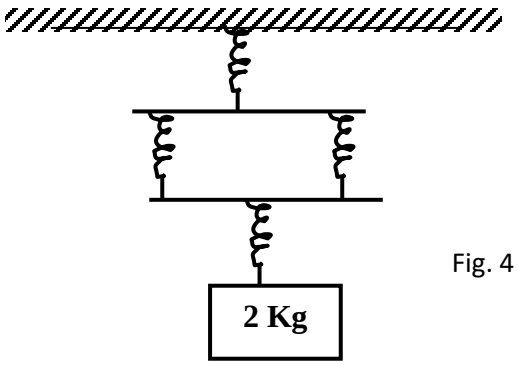


Fig. 4

10. Define the term viscosity. **(1mark)**

11. State one reason why the efficiency of a machine is always less than 100% **(1mark)**

12. State two factors that determine the critical speed for a car moving along a curved road. **(2marks)**

SECTION B (55 MARKS)

Answer all the questions in this section in the spaces provided

13. (a) State the law of Floatation. **(1mark)**

(b) A submarine made of iron was observed to float in water while a piece of iron rod sinks in water. Explain this observation **(2marks)**

(c) A solid displaces 5.0cm^3 of liquid when floating and 20cm^3 when fully immersed in it. Given that the density of the solid is 1.2g/cm^3. Calculate

i) The weight of the solid **(2marks)**

ii) Upthrust on the solid when floating **(1mark)**

iii) The density of the liquid **(3marks)**

iv) The upthrust when the body is fully submerged **(3marks)**

(d) Define the term relative density as used in liquids **(1mark)**

14. (a) Define specific latent heat of fusion of a substance **(1mark)**

(b) Water of mass 400g at a temperature of 60^{o}C is put in a well lagged copper calorimeter of mass 160g. A piece of ice at 0^{o}C and mass 40g is placed in the calorimeter and the mixture stirred gently until all the ice melts. The final temperature, T, of the mixture is then measured. (*Specific latent heat of fusion of ice = 334000J/kg, specific heat capacity of water = 4200J/kgK specific heat capacity of copper = 400J/kgK*)

Determine:

(i) The heat absorbed by the ice during melting. **(2marks)**

(ii) Total heat gained by the melted ice (*Give your answer in terms of T*) **(2marks)**

(iii) Total Heat lost by the water and Calorimeter **(3marks)**

(iv) The final temperature T of the mixture. **(2marks)**

c) Figure 5 below shows a block of ice with two heavy weights hanging such that the copper wire connecting them passes over the block of ice block resting on wooden support.

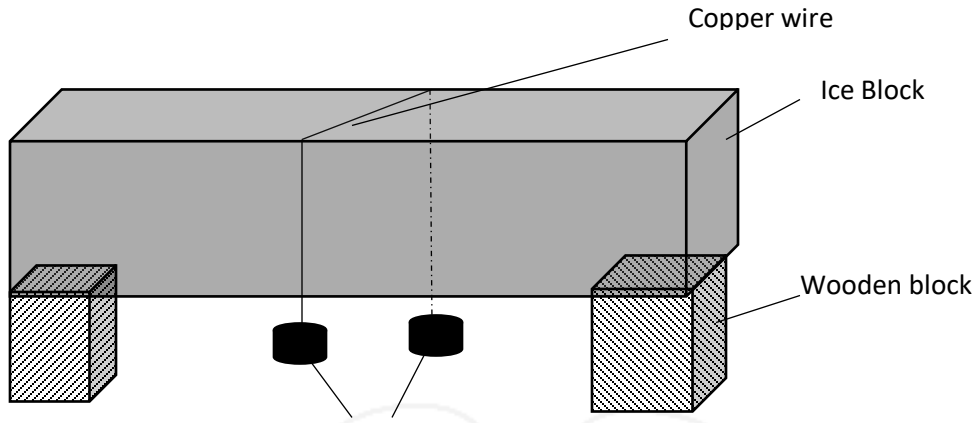


Fig. 5

It is observed that the wire gradually cuts its way through the ice block, but the ice is left as one piece. State the factor behind the observation. **(1mark)**

15. (a) (i)Define the Impulsive force in terms of momentum. **(1mark)**

(ii) A striker kicks a ball of mass 250g initially at rest with a force of 75N. If the foot was in contact with the ball for 0.10sec. Calculate the take-off velocity of the ball. **3marks)**

(**b)** A bullet of mass 20g moving at 400 m/s strikes a block of wood of mass 3.5kg initially at rest. The bullet sticks into the block and the two move off together on a horizontal surface, where a frictional force of 4N is acting between the block and surface.

(i) Determine the initial common velocity of bullet and wooden block. **(3marks)**

(ii) What distance does the block move before coming to rest? **(3marks)**

(c) Explain why a paratrooper flexes his legs as he lands. **(2marks)**

16. The figure 6 **below** shows an inclined plane, a trolley of mass 30kg is pulled up a slope by a force of 100N, parallel to the slope. The trolley moves so that the centre of mass C travels from points A to B.

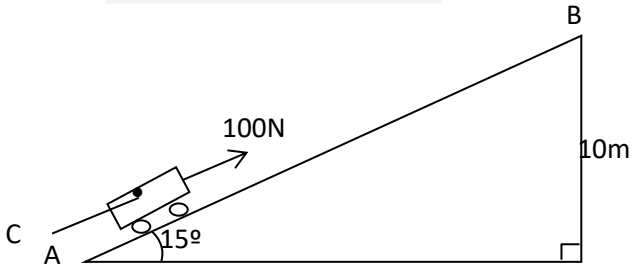


Fig. 6

(i) What is the work done on the trolley against the gravitational force in moving from **A** to **B**.? **(2marks)**

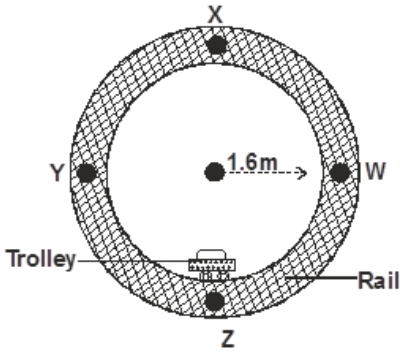
(ii) Determine the work done by the force in moving the trolley from **A** to **B**. **(2marks)**

(iii) Determine the efficiency of the system. **(3marks)**

(iv) Determine the work done in overcoming the frictional force. **(1mark)**

(v) Determine the mechanical advantage of the system. **(2marks)**

17. Figure 7 below shows a trolley moving on a circular rail with a vertical plane, given that the mass of the trolley is 250g and the radius of the rail is 1.6m.



i) Determine the minimum velocity at which trolley passes point X. **(3marks)**

ii) Find the angular velocity at point Z **(2marks)**

iii) The force exerted on the rail at this point Z. **(3marks)**

iv) State one application of circular motion in daily life**.** **(1mark)**

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 5)

PHYSICS

232/2

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

- *Write your name, class and admission number in the spaces provided above*
- *Attempt **ALL** questions in sections A and B.*
- *All your answers must be written in the spaces provided in this question paper.*
- *All working must be clearly shown*
- *Non programmable silent electronic calculators and KNEC mathematics table may be used except where stated otherwise*

FOR EXAMINERS USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 – 13	25	
B	14	10	
	15	12	
	16	12	
	17	07	
	18	08	
	19	06	
	TOTAL MARKS	80	

SECTION A (25 MARKS)

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)**

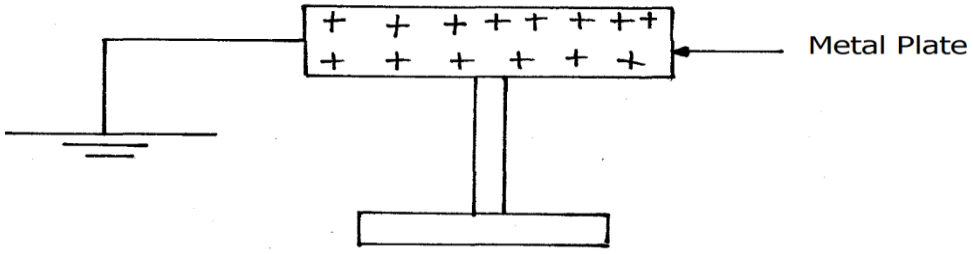


Fig. 1

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

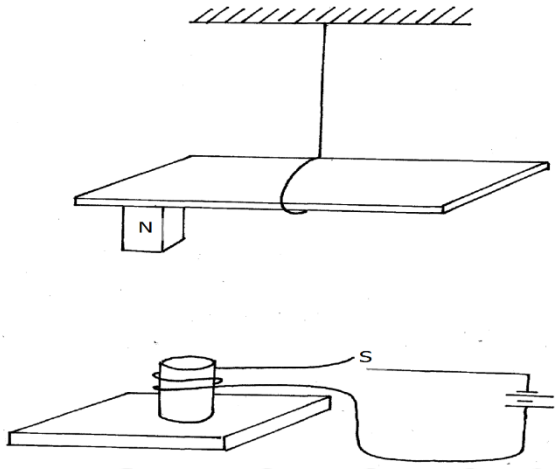


Fig. 2

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

3. State **two** factors affecting the type of shadow formed by an object placed infront of a source of light. **(2marks)**

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

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

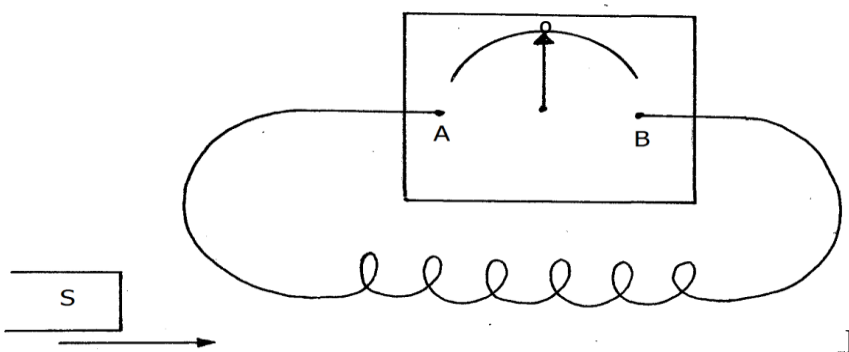


Fig. 3

Indicate the direction of the pointer on the galvanometer when the bar magnet is moved as shown. **(1mark)**

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)**

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

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)**

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

8.A radiation of frequency 8.5 x 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 x 10^{5} m/s **(3marks)**

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

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

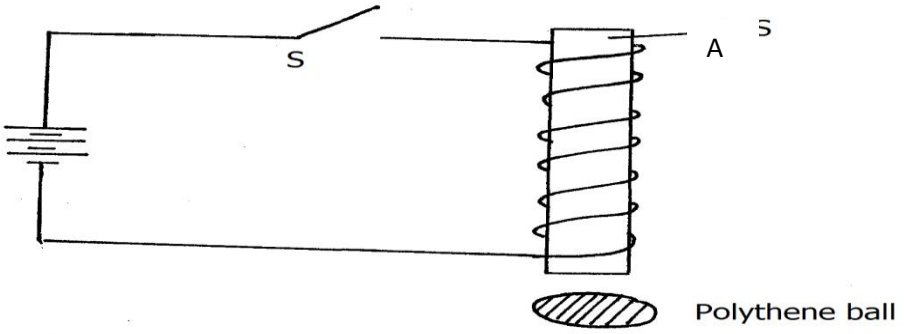


Fig 4

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

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

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

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

12. Figures 5 shows a simple water heater.

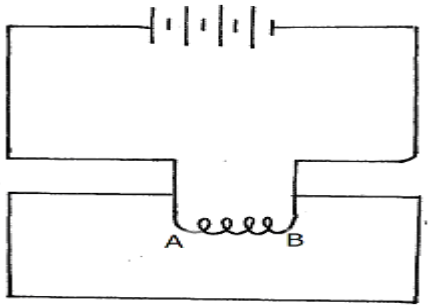


Fig 5

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

13. Arrange the following radiations in order increasing wavelength:

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

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.

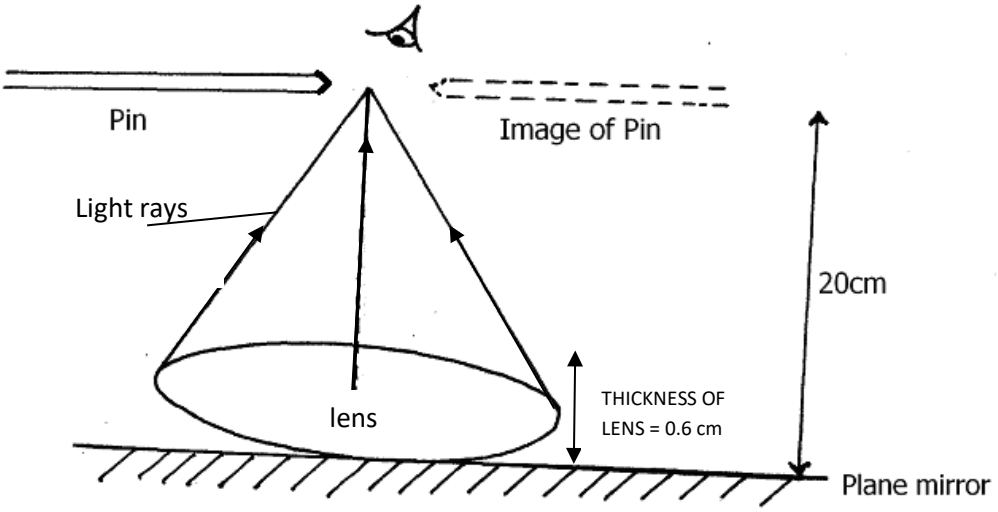


Fig 6

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

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

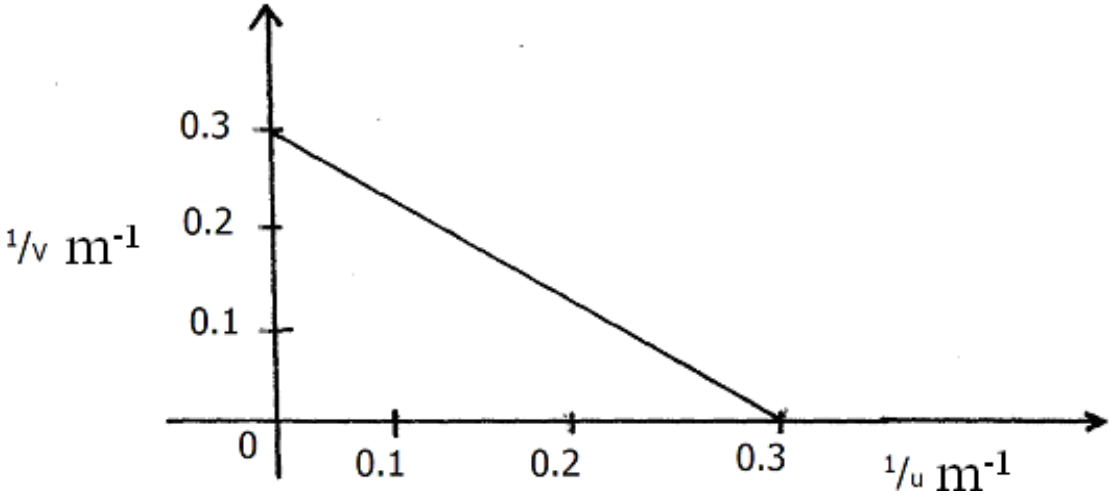
b) An optician in Eldoret Hospital examined an eye of a patient and made the following observations:

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)**

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

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)**

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

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

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

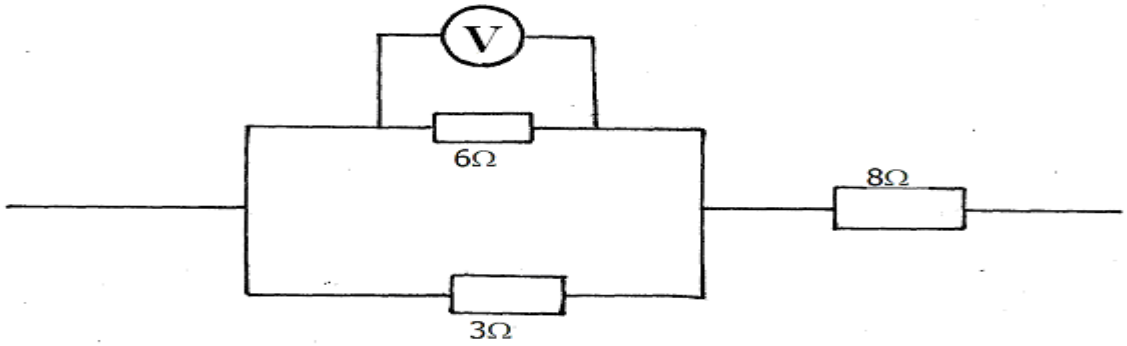


Fig 7

If the voltmeter reads 4V, find the

(i) Effective resistance. **(2marks)**

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

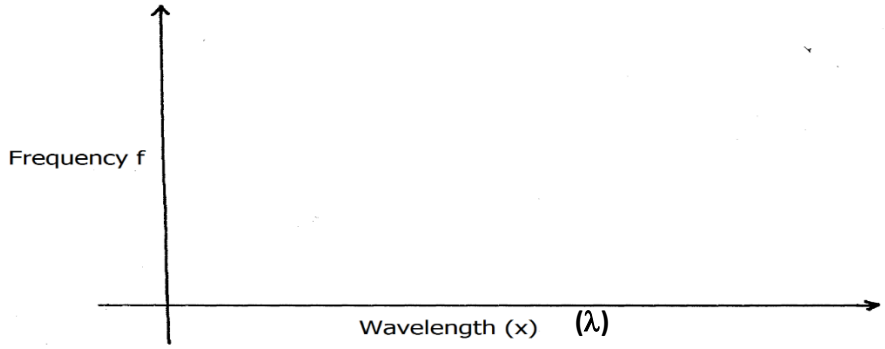
(iii) Potential difference across the 8Ω resistor. **(2marks)**

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

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)**

16. a) On the axes provided below, sketch a graph showing the variation of frequency with wavelength at constant velocity. **(1mark)**



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

What is the wavelength ?. **(2marks)**

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

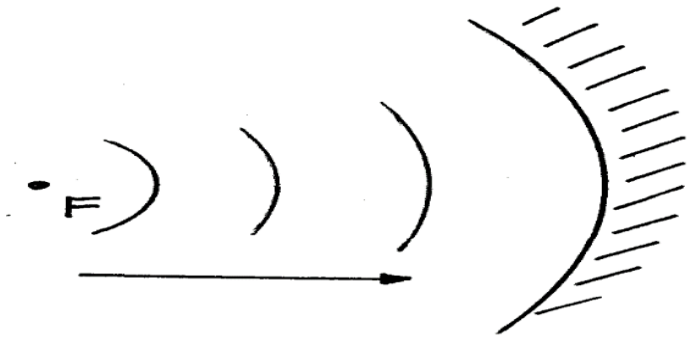


Fig. 8

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

d) State **two** conditions necessary for two progressive waves traveling in opposite directions to form stationary waves. **(2marks)**

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

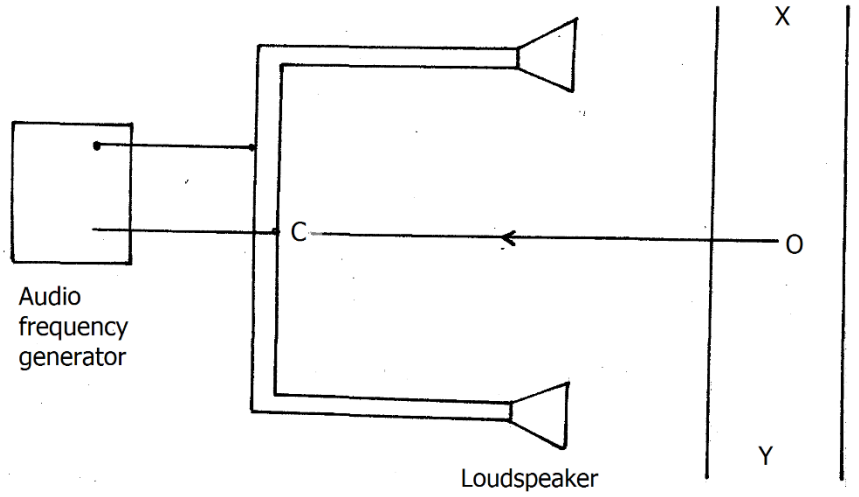


Fig 9

(i) An observer O, moves along XY.

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

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

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

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

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

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

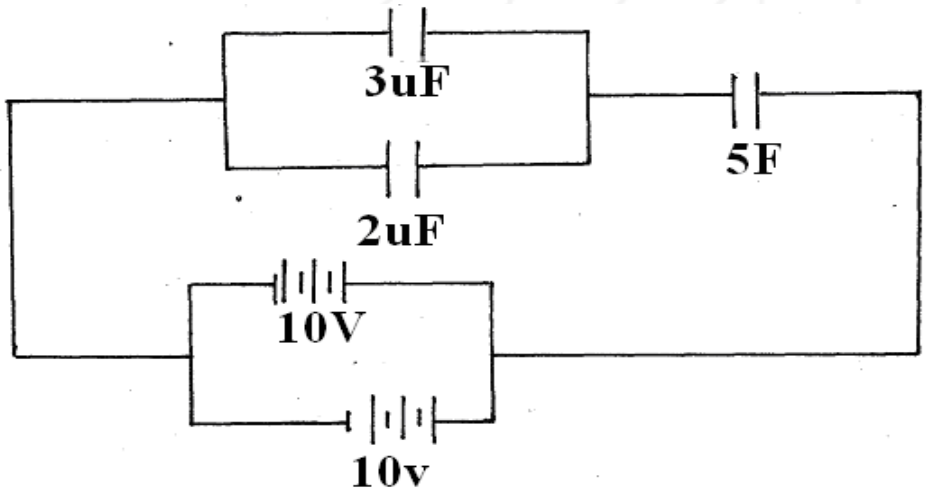


fig 10

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

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

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

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

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:-

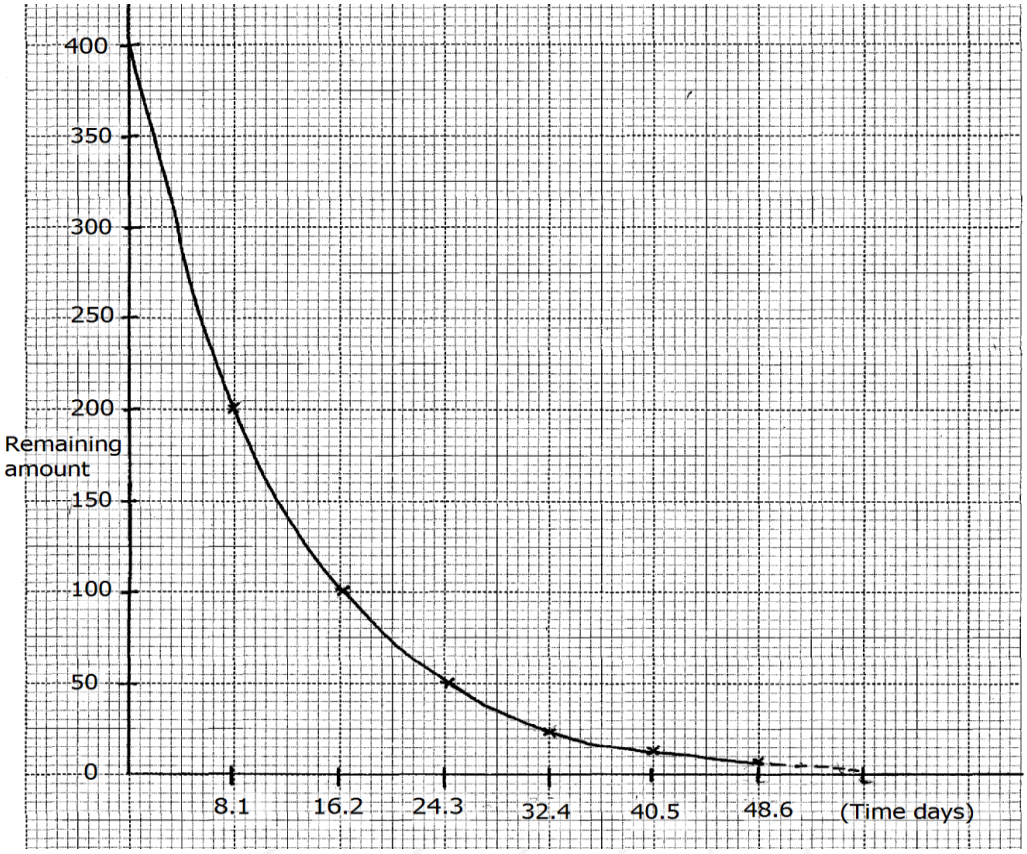
(i) Current through the transmission cables. **(3marks)**

(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**

THIS IS THE LAST PRINTED PAGE

END

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 6)

PHYSICS

232/1

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

Instruction to The Candidates

a) *Write your* ***name*** *and* ***ADM number*** *in the spaces provided above.*
b) *Sign and write the* ***date*** *of examination in the spaces provided above.*
c) *This paper consists of* ***two*** *Sections* ***A*** *and* ***B****.*
d) *There are 14 printed pages, with 18 questions check to confirm that your paper is complete.*
e) *Answer* ***all*** *the questions in sections* ***A*** *and* ***B*** *in the spaces provided.*
f) *All working must be clearly shown in the spaces provided.*
g) *Mathematical tables and electronic calculators* ***may be*** *used.*

For Examiners Use Only

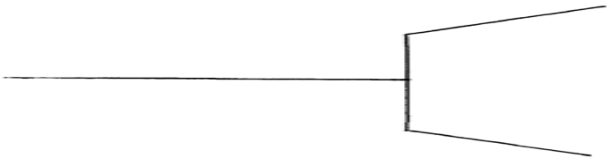
Section	Question	Total Score	Candidates Score
A	1-13	25	
B	14	08	
	15	09	
	16	08	
	17	09	
	18	06	
	19	07	
	20	08	
Total		80	

SECTION A (25 MARKS)

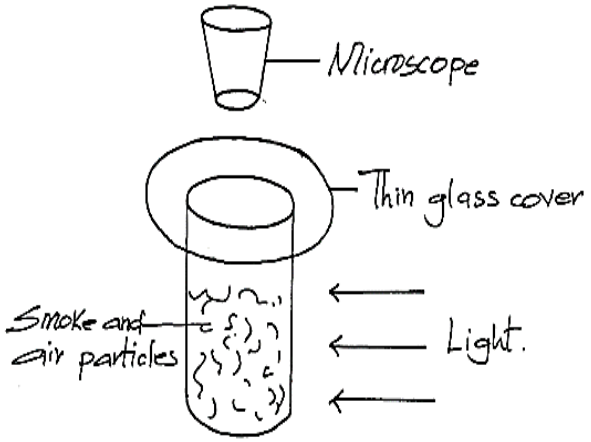
Answer all Questions in the space provided

1. State the branch of physics applied by a soldier when firing a gun. **(1mrk)**

2. The figure bellow shows part of micrometer screw gauge with 100 divisions on the thimble scale. Complete the diagram to show a reading of 5.79mm **(2mks)**



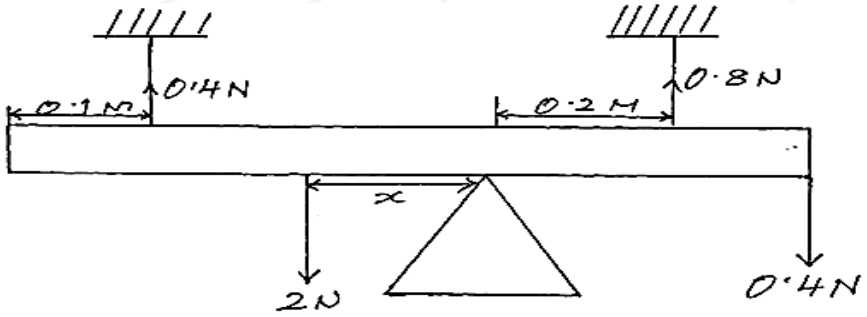
3. The diagram bellow shows apparatus used to observe the behavior of smoke particles in air.



i) Why are smoke particles suitable for use in this experiment? **(1mk)**

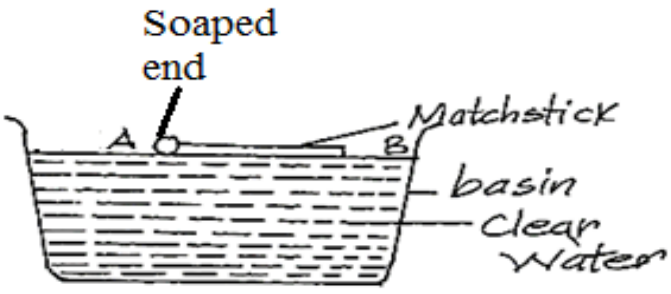
ii) What difference if any would be seen in the motion of the smoke particles if a source of light of weaker energy was used **(1mk)**

4. The diagram bellow shows a uniform meter rule pivoted at its center and balanced bay the forces shown. **(3mks)**



Determine the value of ***x*.**

5.a) The Figure below shows a matchstick soaped on one end and placed on the surface of water as shown below. If soap solution is poured at A



The matchstick is observed to move in a certain direction.

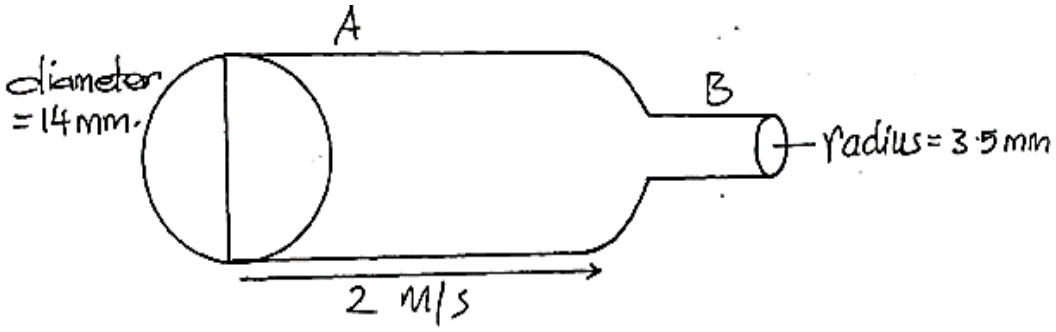
i) State the direction (A or B) **(1mk)**

ii) Explain your answer in (i) above. **(1mk)**

b) A physics teacher writing on a board uses a piece of chalk or white board marker. Explain why any ink or chalk particles sticks on the board. **(1mk)**

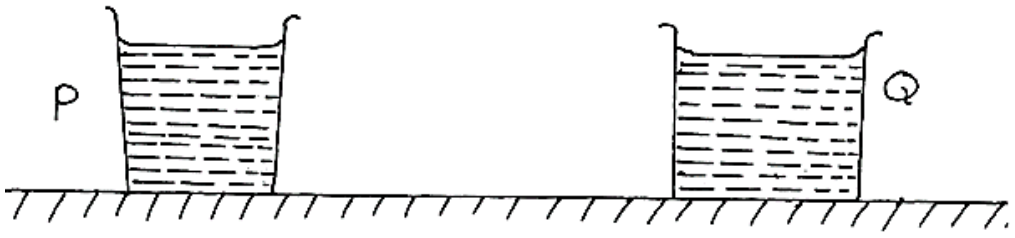
6. A student pulls a block of wood along a horizontal surface by applying a constant force. State the reason why the block moves at a constant velocity. **(1mk)**

7. Water moves through a horizontal pipe of varying crossection area as shown below.

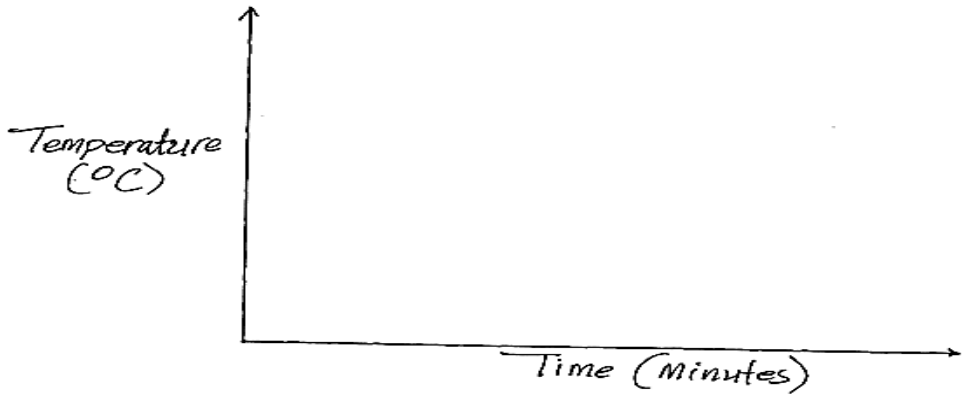


Determine the velocity of the water in pipe B given the velocity of A is 2m/s **(3mks)**

8. Equal amount of hot water at 100°C is poured in to vessels P and Q as shown below and left to cool up to the room temperature. P is painted black and Q is polished.

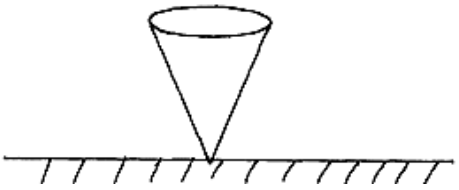


The readings of the thermometer are taken at interval of five minutes. On the axes below, sketch a graph of temperature against time for P and Q **(2mks)**

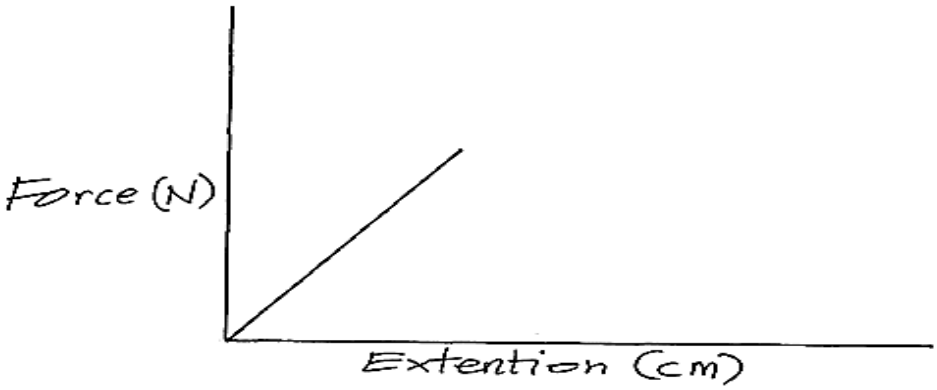


9. In a ball and ring experiment the ball goes through the ring at room temperature. When it is heated it does not go through the ring but when left on the ring for some time it goes through. Explain this observation. **(2mks)**

10) State the type of stability shown below **(1mk)**



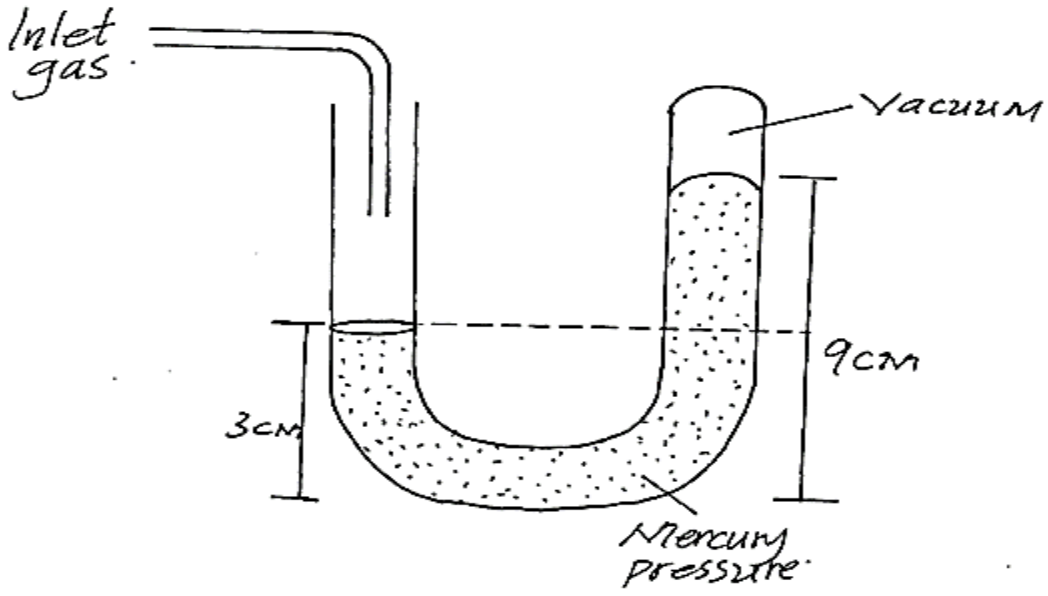
11) The graph below shows Force against extension of the spring. **(1mk)**



On the same axes sketch a graph of force against extension for a spring double the length same thickness and same material as the given spring.

12. A small stone in your shoes is painful when you step on it but does not hurt you when removed from the shoe and placed in on the hand.Explain **(2mks)**

13. Consider the Figure below.



Mercury ρ = (13.6gcm^{-3}) and Pa=760mmHg

Calculate the pressure of the gas in cm Hg. **(2mks)**

EXPLAIN B (55 MARKS)

Answer all question in the space provided

14.i) Define the term momentum. **(1mk)**

ii) Explain why high jumpers flexes their knees when landing on the ground. **(2mks)**

b) **A** body of mass 150Kg travelling at a constant velocity of 72km/h collides with a stationary object of mass 90kg. If the impact takes 3s before the two moves together at a constant velocity for 20s. Find

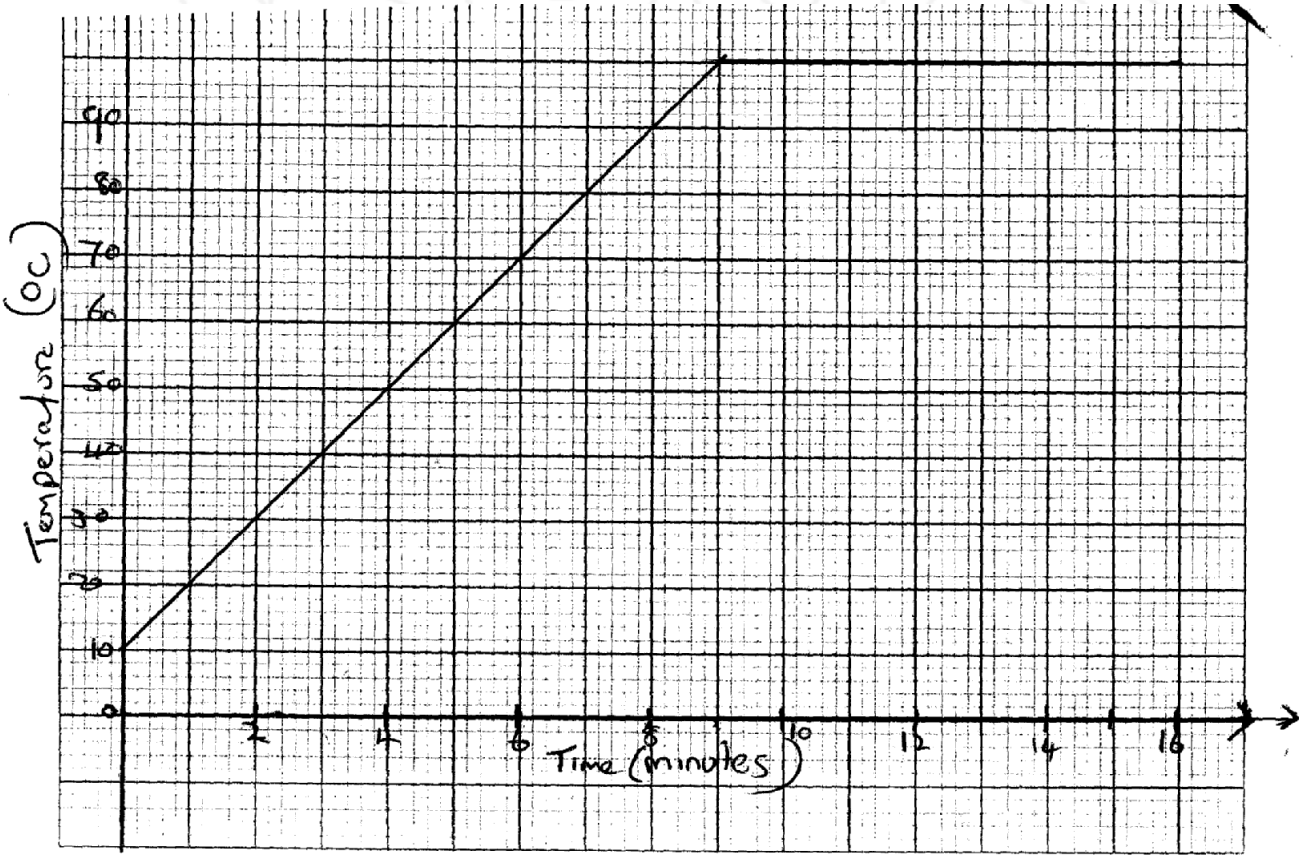
i) Their common velocity **(2mks)**

ii) Impulsive Force. **(3mks)**

15.i) State one similarity between boiling and evaporation. **(1mk)**

ii) Explain why pieces of ice at 0^oC added to a drink at room temperature are more effective in cooling the drink than equal mass of water at 0^oC. **(2mks)**

b)i) 200g of a liquid at a temperature of 10^oC is poured into a well lagged calorimeter. An electric heater rated 1500W is used to heat the liquid. The graph below shows a variation of temperature of the liquid with time.



From the graph determine the specified latent heat of vaporization assuming that the liquid evaporates. **(3mks)**

c)i) A small electric heater rated 20W 240V is immersed in crushed ice in a funnel. Before the heat is switched on, the water drops from the funnel at a rate of 0.5g/min and when the heater is working the water drop at the rate of 4g/min.

Calculate the specified latent heat of fusion. **(3mks)**

16.a) A ball is thrown verticality upwards from hands at 125m/s and the thrower receives it back.

i) Calculate the time of flight. **(2mks)**

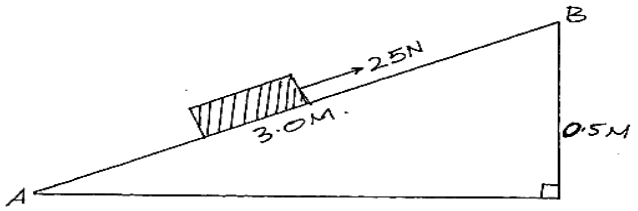
ii) Calculate how high the ball rises **(2mks)**

b)i) A bullet is fired horizontal at a target. Neglecting air resistance, give a reason why the horizontal acceleration of the bullet is zero. **(1mk)**

ii) **A** bullet is fired horizontally from a flat form 15m high. If initial speed is 300m/s determine maximum horizontal distance covered g=10m/s^2 **(3mks)**

17.a)i) Name the device that is used to convert electrical energy to light energy **(1mk)**

b) The figure below shows a load of 100N being raised by pulling it along a incline plane of length 3m.



i) Calculate the efficiency of the system **(3mks)**

ii) Calculate the work done against the friction when moving the body from point A to B. **(2mks)**

c)i) Assuming that you know your weight, Explain how you can calculate your own power given the following:

Tape measure, stopwatch, A partner to record the time, Flight of stairs. **(3mks)**

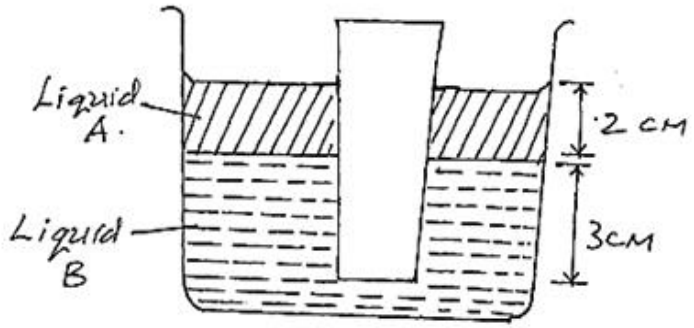
18.a) Define the term "Absolute zero temperature" as applied in gas laws. **(1mk)**

b) **State** two assumptions used in gas laws. **(2mks)**

c) An air pump is taking in air at 1.01×10^5Pa and supplies it into a rigid container of volume 2 liters. The barrel of the pump has a volume of 0.2 liters. If the pressure in the receiver is initially at 101×10^5Pa what is the pressure in the receiver after five strokes of the pump. Assuming temperature is constant. **(3mks)**

19.a) State the Archimedes principle **(1mk)**

b)i) The figure below shows a rectangular block of height 6cm floating. Vertically in a beaker containing two immiscible liquids A and B. The density of the liquid is 800kgm^3 and 1200kgm^3 respectively.



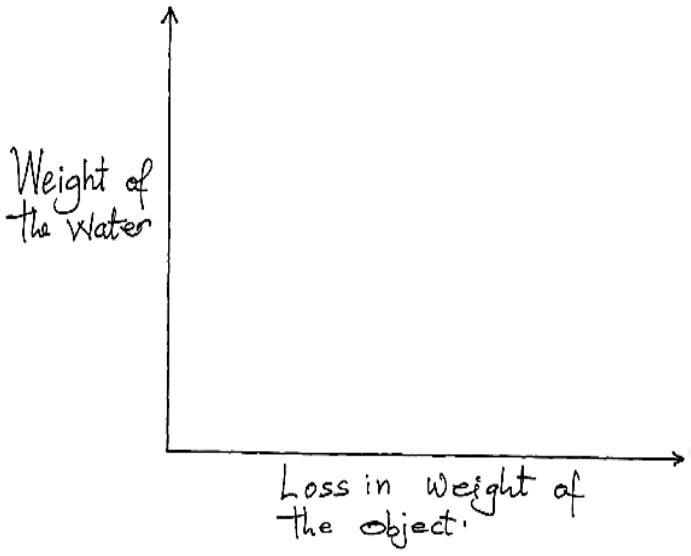
The cross-section area of the block is 2cm^2

Determine:

i) The total weight of the liquid displaced by both liquids A and B. **(3mks)**

ii) Density of the block **(2mks)**

c) In the space provided sketch a graph of the weight of the water displaced against the lost in weight of the object when the object is lowered in the water until it is fully submerged. **(1mk)**



20.a) State two parts of the earth which have zero angular velocity of linear velocity as it completely one rotation. **(1mk)**

b) **A** particle moving along a circular path of radius 5cm describes an arch length of 2cm every 2 seconds. Determine:

i) Its Angular velocity **(2mks)**

ii) Its periodic time **(2mks)**

c) A car of mass 1500kg negotiates a bend of radius 45m on horizontal road. If the friction force between the road and the tires is 7200N, calculate the maximum speed at which the car can be driven at the bend without skidding. **(3mks)**

THIS IS THE LAST PRINTED PAGE!

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 6)

PHYSICS

232/2

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

INSTRUCTION TO THE CANDIDATES

a) *Write your* ***name*** *and* ***ADM number*** *in the spaces provided above.*

b) *Sign and write the* ***date*** *of examination in the spaces provided above.*

c) *This paper consists of* ***two*** *Sections* ***A*** *and* ***B****.*

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

e) *All working must be clearly shown in the spaces provided.*

f) *Mathematical tables and electronic calculators* ***may be*** *used.*

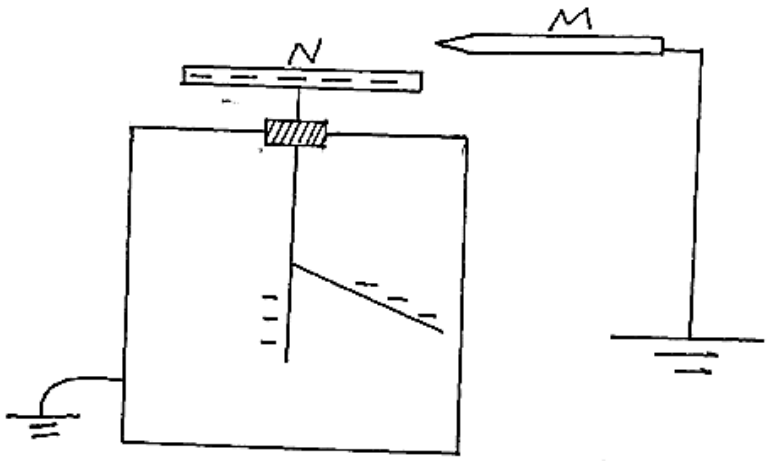
FOR EXAMINERS USE ONLY

Section	Question	Total Score	Candidates Score
A	1-13	25	
B	14	8	
	15	9	
	16	11	
	17	14	
	18	13	
Total		80	

SECTION I (25 MARKS)

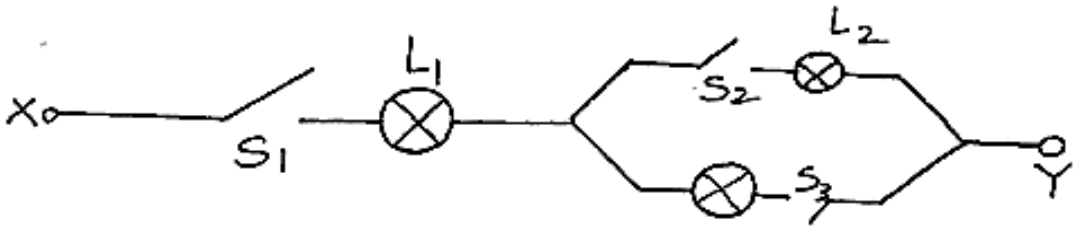
1. State the number of images formed when three objects are placed between two plane mirrors which parallel to each to each other. **(1mk)**

2. The figure shows a highly negatively charged electroscope. A pointed pin M which is earthed is brought closer to the metal cap N as shown.



State and explain the observations that will be made. **(3mks)**

3. The figure below shows an electric circuit. S_1, S_2 and S_3 are switched and L_1,L_2 and L_3 are lamps. A constant potential difference is applied across X and Y.



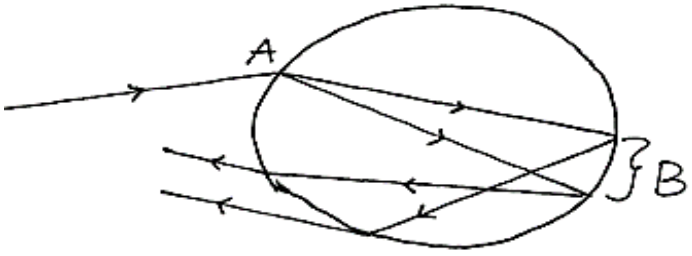
i) Other than L_1 state the lamp that will light when S_1 and S_2 are closed. **(1mk)**

ii) How does the brightness in L_1in (i) above compared with its brightness when all the switches are closed. **(1mk)**

4. One method of magnetization is by single stroking. State the disadvantage of this method.**(1mk)**

5) A pendulum bob takes 0.5seconds to move from its mean position to maximum displacement. Calculate its frequency. **(2mks)**

6. The figure below shows part of a rainbow.



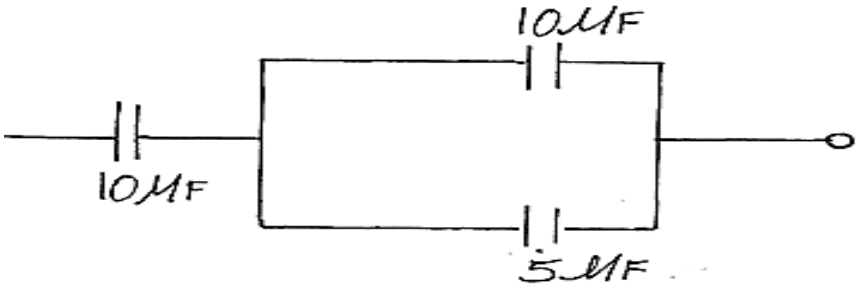
State what happens at part

A …… **(1mk)**

B …… **(1mk)**

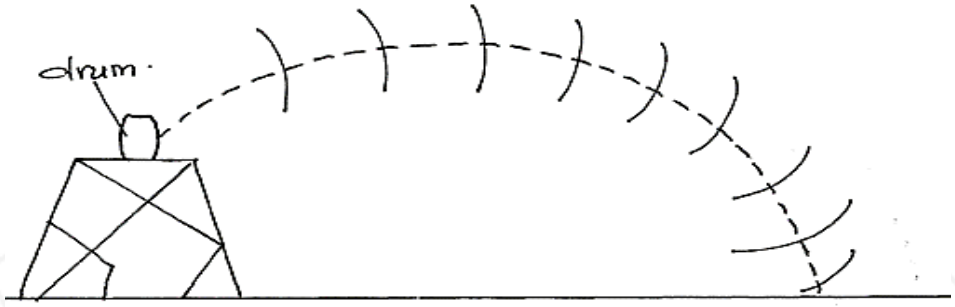
7. State one factor that affects resistance of metal conductor other than temperature. **(1mk)**

8. The figure shown a network of three capacitors



Determine the effective capacitance. **(2mks)**

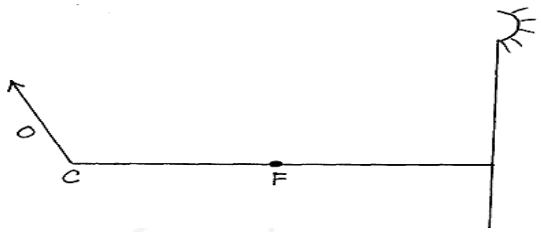
9. The figure shows sound waves emitted by a drum stick.



Explain way the wave fronts are directed to the ground **(2mks)**

10. Write a nuclear equation of a radioactive cobalt $^{60}_{26}Co$ which undergoes a β decay to form element W. **(2mks)**

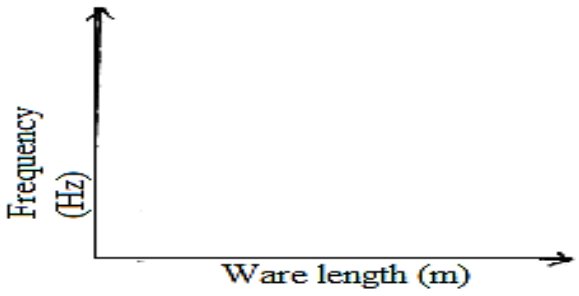
11. The figure below show an object O placed in front of concave mirror.



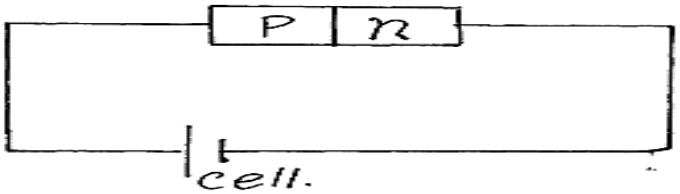
On the same figure construct a ray diagram to locate the image of the object. **(3mks)**

12.a) State one property common to all electromagnetic waves. **(1mk)**

b) On the axis provided, sketch a frequency wavelength graph for electromagnetic waves. **(1mk)**

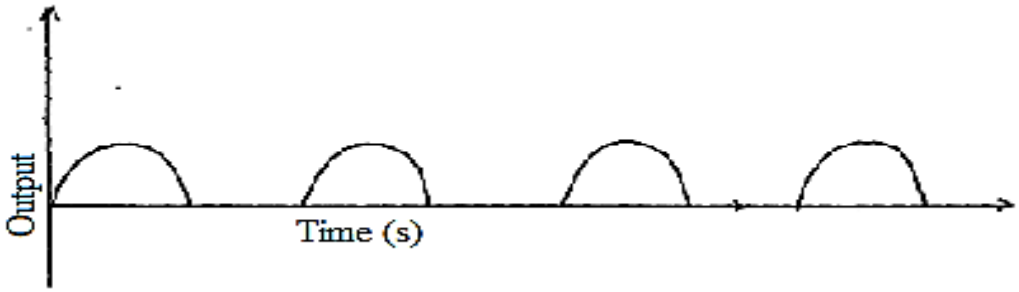


13.a) The figure below shows a p-n junction connected to a cell.



What type of biasing will occur if the terminals of the cell are interchanged **(1mk)**

b) The graph below shows the output obtained with time during rectification process



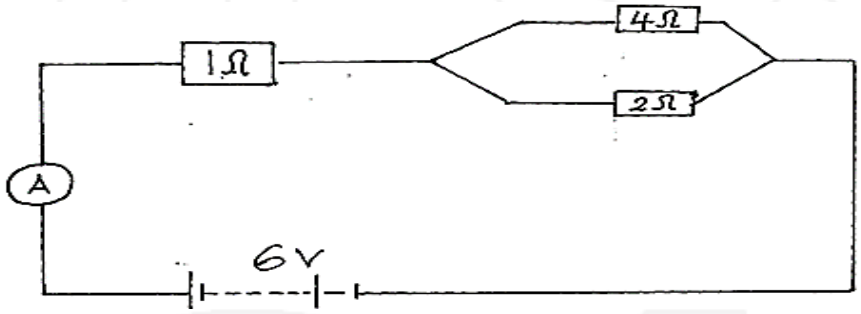
State the number of diode used in this process. **(1mk)**

SCTION II (55 MARKS)

Answer all the question in the space provided

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

b) Study the circuit diagram below and answer the question that follows.



Calculate

i) The effective resistance **(2mks)**

ii) Current flowing through the ammeter **(2mks)**

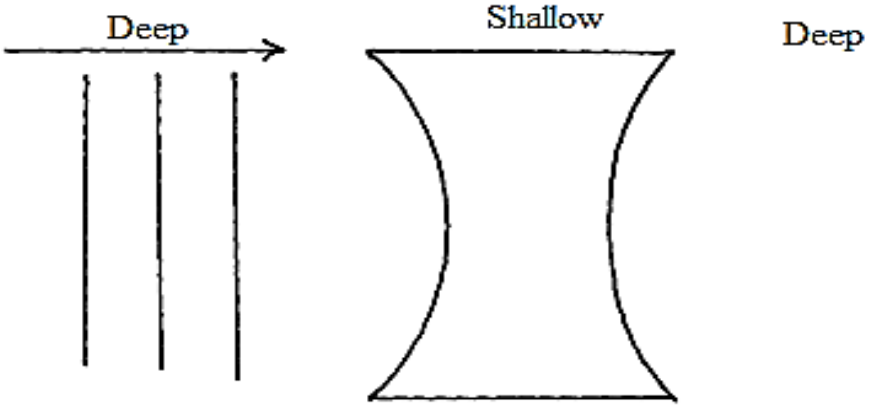
iii) Current flowing through the 4Ω resister. **(3mks)**

15.a) State one use of echoes **(1mk)**

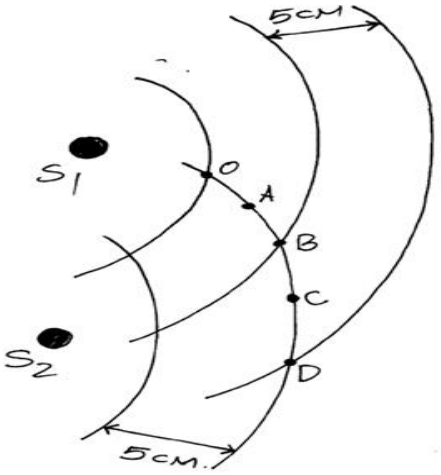
b) Explain why there is gradual decrease in amplitude of a progressive wave **(1mrk)**

c)i) Distinguish between Refraction and reflection of waves **(1mk)**

ii) In the figure below complete the diagram to show how plane wave move in the shallow and deep region there after **(2mks)**



iii) The figure below shows how water wave interferes in a ripple tank. The amplitude and wavelength of each wave is 8cm and 5cm respectively.



Determine the amplitude of the water wave at point

A **(1mk)**

B **(1mk)**

iv) If the Vibrator at S_1 and S_2 in part (iii) above produce coherent waves of frequency 40Hz, determine the speed of the water wave. **(2mks)**

16.a)Determine the term principal focus for a convex lens. **(1mk)**

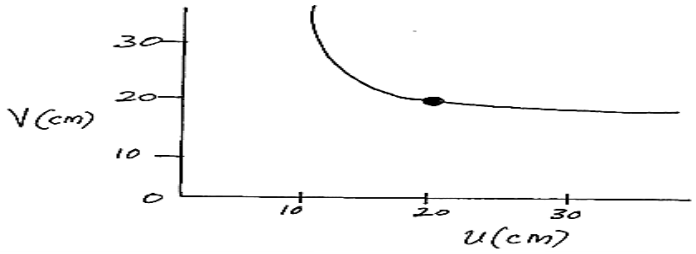
b) A certain student accommodates objects situated at a distance greater than 80.0cm from the eye.

i) Define the term accommodation in reference to eye vision. **(1mk)**

ii) State with a reason this type of eye defect **(2mks)**

iii) Identify the type of lens that would enable the student to see. **(1mk)**

c) The graph below is a plot of image distance (v) against object distance (u) for a convex lens.



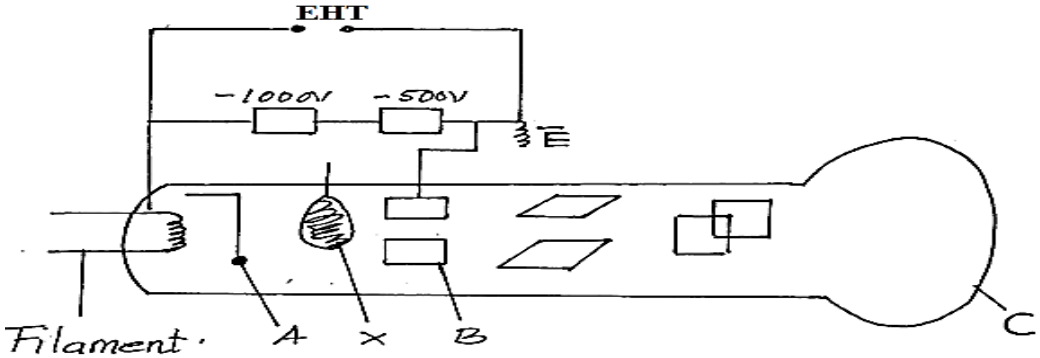
From the graph determine the focal length of the convex lens. **(2mks)**

d) An object of height 4cm is placed 2cm from a diverging lens of focal length 3cm calculate:

i) The image distance. **(2mks)**

ii) The height of the image **(2mks)**

17.a) The figure below shows a cathode ray oscilloscope (CRO)



i) State the function of the component labeled: **(3mks)**

A ……

B ……

C ……

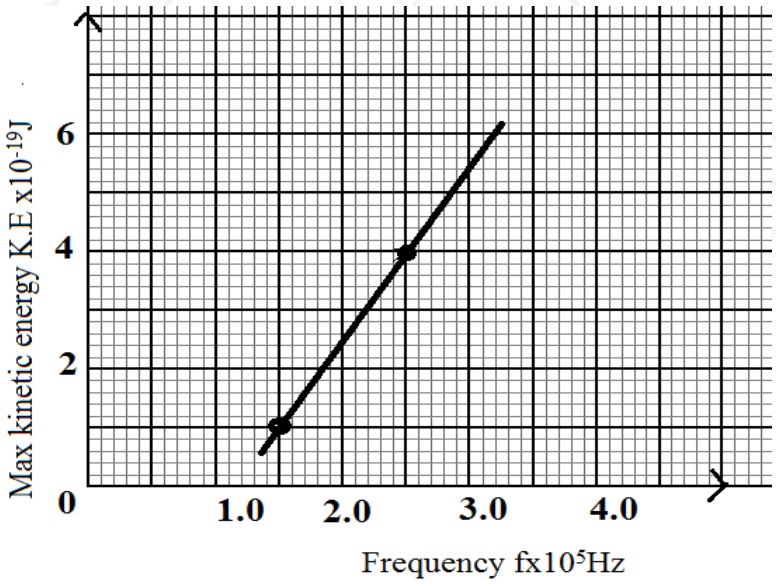
ii) What would be the effect on the CRO if the temperature of the filament of the electron gun was raised. **(1mk)**

iii) Name and state the function of the part labeled X. **(2mks)**

b) Apart from thermionic emission name the other method of emitting electrons from a metal surface. **(1mk)**

c) State two factors that affect photoelectric effect on a metal surface. **(2mks)**

d) The graph below shows how kinetic energy varies with frequency *f* in an experiment using a photocell.



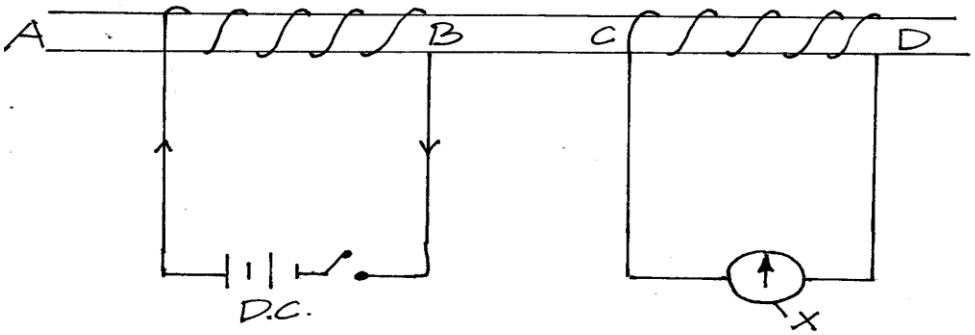
Given the k.e *max=hf-Ø* determine from the graph :

i) Plank constant h **(3mks)**

ii) The Constant Ø **(2mks)**

18.a) State the Lenz's low of electromagnetic induction. **(1mk)**

b) The figure below shows two coil connected using a soft iron core



i) Name the part labeled X **(1mk)**

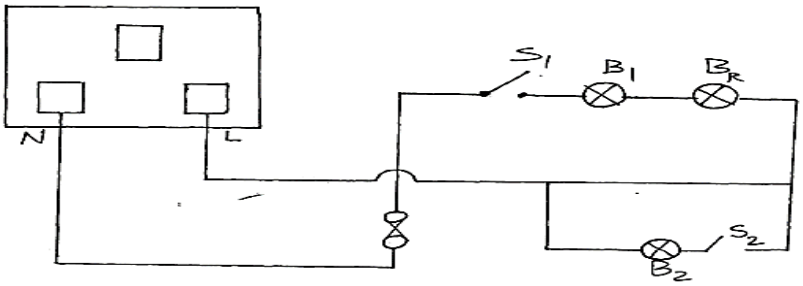
ii) State and explain what happens when the switch is closed **(3mks)**

ii) State the observation made on X when the D.C supply is replaced with A.C **(1mk)**

c) A generator produces 250kW is connected to a factory by a cable which has a total resistance of 10 Ω. Determine the voltage at which the generator produces power if the maximum current in the cable is 8.0A **(2mks)**

d)i) State two ways through which power loss is minimized in a transmission cables. **(2mks)**

ii) The figure below shows part of a wiring circuit for a house.



Identify three faults made in the wiring. **(3mks)**

KCSE 24

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 7)

PHYSICS

232/1

PAPER 1 (Theory)

TIME: 2 HRS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

INSTRUCTION TO CANDIDATES

i) This paper consists of two sections: **A** and **B**

ii) Answer all questions in section **A** and **B** in the spaces provided

iii) All workings **must** be clearly shown, and Use the **CONSTANTS** given.

✓ **Gravitational acceleration, 'g' = 10m/s^2** **Atmospheric pressure = 76mmHg**

✓ **density of water = 1000kg/m^3** **density of mercury = 13600kg/m^3**

- Silent, non-programmable calculator may be used

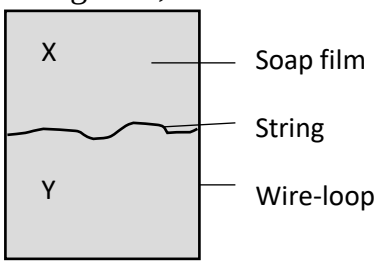
FOR EXAMINER'S USE ONLY:

QUESTION	MARKS	CANDIDATES' SCORE
1-12	25	
13	13	
14	14	
15	15	
16	13	
TOTAL	80	

SECTION A (25 MARKS)

1. Distinguish between density and relative density of a substance **(1 mark)**

2. Figure 1, below shows a wire loop with a string that has been dipped into soap solution.

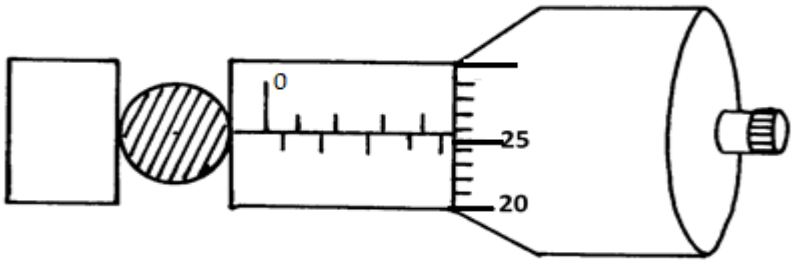


(i) On the space alongside figure 1, Sketch a similar diagram to show the observed effect if the soap film is punctured at X **(1 mark)**

(ii) Explain the observations made in **(i)** above **(2 marks)**

3. State **two** reasons why gas particles diffuse faster than liquid particles **(2 marks)**

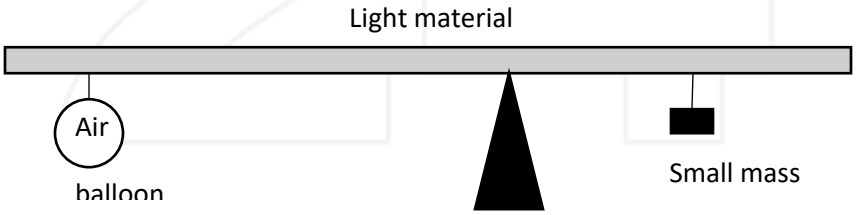
4. A ball-bearing of mass 0.250 kg is held between the anvil and spindle of a micrometer screw gauge as shown in figure 2. The reading on the gauge when the jaws are closed without anything in between is 0.011cm. Use this information to answer the questions **(a)** and **(b)** below:



(a) What is the diameter of the ball bearing? **(2 marks)**

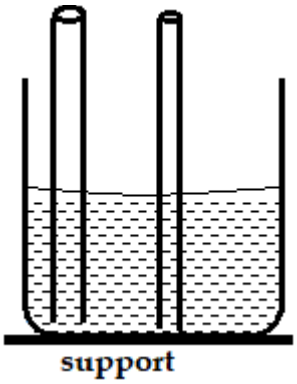
(b) Determine the density of the ball bearing **(3 marks)**

5. The diagram in figure 3, shows a system in equilibrium and at room temperature.



State and explain what is observed when the temperature of the room is raised by 25^0c. **(2 marks)**

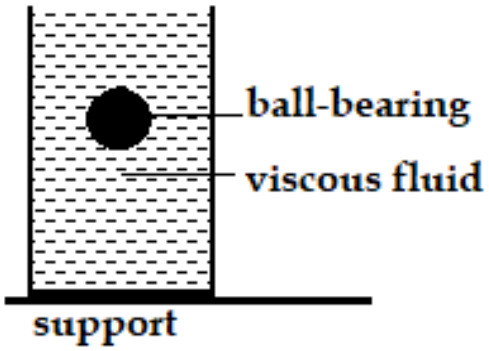
6. ***Figure 4,*** shows two glass tubes of different diameters, dipped in a glass beaker half full of water



Complete the diagram to show how water will rise up in the two glass tubes **(1 mark)**

7. State the conditions necessary for the law of conservation of linear momentum to hold **(1 mark)**

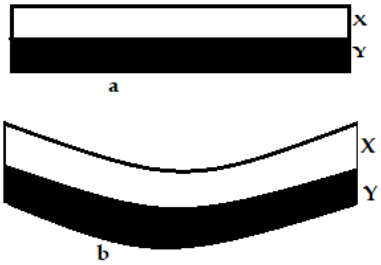
8. The diagram in ***figure 5,*** below shows a steel ball bearing gently falling down through a viscous liquid contained in a tall cylinder



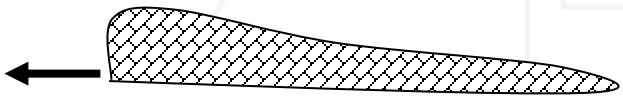
Label on the diagram (giving direction), the forces acting on the ball bearing as it moves down the cylinder **(3 marks)**

9. A string vest keeps a person warm though it is a collection of holes bounded by strings. Explain **(2marks)**

10. The figure 6, below represents a bimetallic strip of metals **X** and **Y** at room temperature (a) and when dipped into crushed ice (b) respectively. Sketch a diagram in the space alongside, to show the shape when the strip is heated to a temperature above the room temperature **(1 mark)**

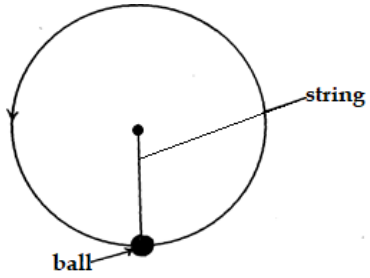


11. Figure 7, below shows the cross-section of an aero-foil, with the aero-plane moving in the direction shown by the arrow.



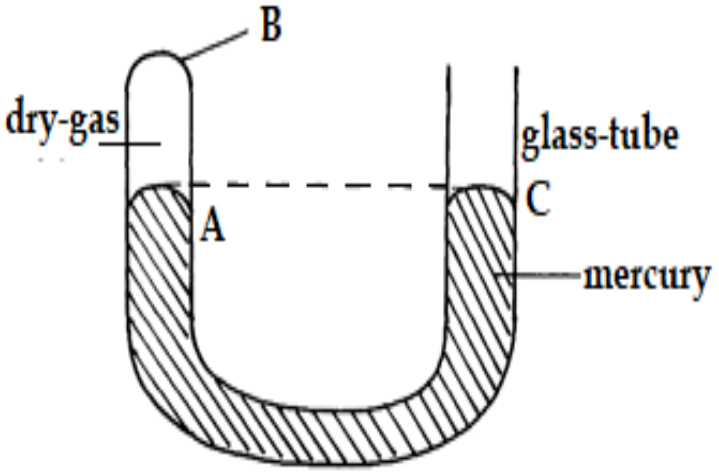
Using a sketch of the streamlines showing how air flows past the wing as the aero-plane moves, explain how the aero-plane achieves the dynamic lift **(3 marks)**

12. The diagram in figure 8, below shows a ball being whirled in a vertical plane at a uniform speed of 20m/s. If the maximum tension on the string is exceeded, suggest, by drawing on the diagram, the path which is likely to be taken by the ball. **(1 mark)**



SECTION B (55 MARKS)

13. The diagram below represents a u-shaped glass tube sealed at one end and containing mercury.



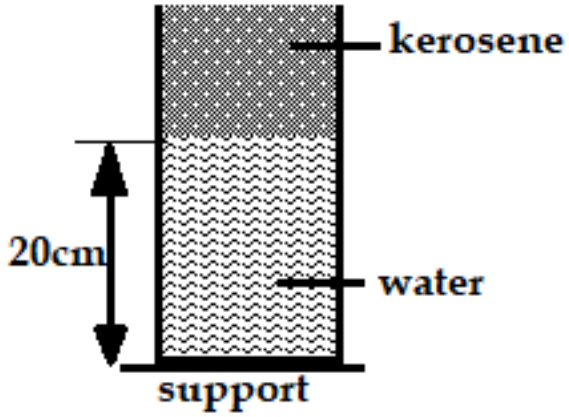
(a) Determine the pressure (in N/m^2) of the dry gas as shown in the diagram above **(2 marks)**

(b) Explain why the gas should be dry if it is to be used to verify a gas law **(1 mark)**

(c) Describe how the arrangement can be used to verify Boyle's law. **(4 marks)**

(d) Using the kinetic theory of gases, explain why the pressure of a gas increases with temperature increase **(3 marks)**

(e) Figure 10 below shows a measuring cylinder of height 30cm filled to a height of 20cm with water and the rest occupied by kerosene.

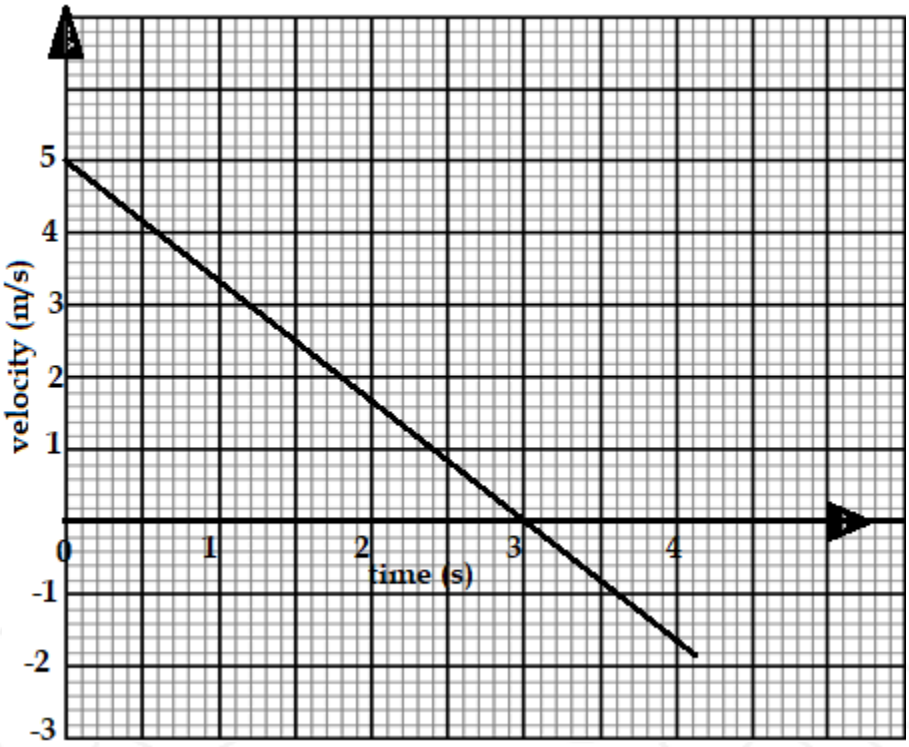


Given that density of water = $1000Kgm^{-3}$, density of kerosene = $800Kgm^{-3}$ and atmospheric pressure = $1.03x10^5$ Pascal, determine the total pressure acting on the base of the container **(3 marks)**

14.

(a) Distinguish between uniform velocity and instantaneous velocity **(1 mark)**

(b) The velocity-time graph in the figure 11, below illustrates the motion of a ball which has been projected vertically upwards from the surface of the moon. The weight of the object on earth's surface is 20N.



i. State why the velocity becomes negative after 3seconds. **(1 mark)**

ii. Determine the acceleration of gravity on the moon showing clearly your work **(3 marks)**

iii. Determine the total distance travelled by the ball in 4.0seconds **(3 marks)**

iv. Find the weight of the ball on the moon **(2 marks)**

(c) A body starts from rest and attains a velocity of 10m/s after 4 seconds. Use the axes provided below to represent this motion **(2 marks)**

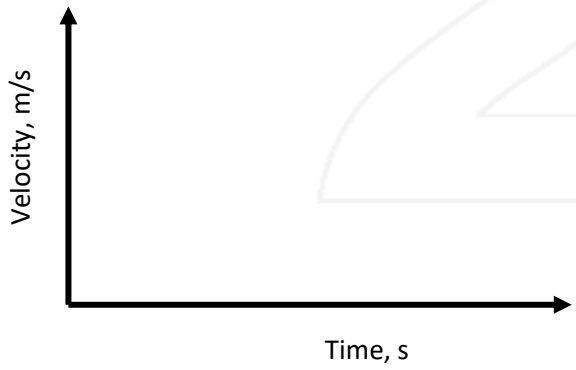


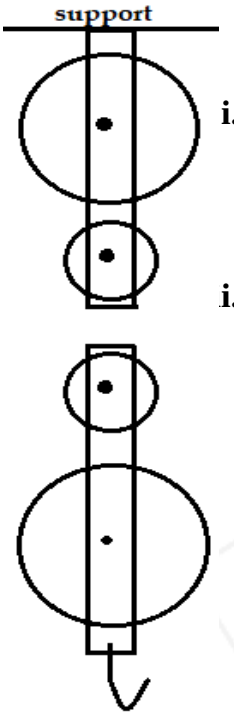
Figure 1

(d) Define angular velocity and state its SI unit **(2 marks)**

15.

(a) Define the term "velocity ratio" as used in the working of machines **(1 mark)**

(b) A civil engineer wanted to raise sand from the ground to the third floor of a house he was working on. He began by assembling the following pulley system in figure 13.



i. Complete the diagram in figure 13, by threading the pulley so that it can be used to raise the load **L** by applying an effort **E** from the third floor.

(2 marks)

i. The pulley system has a mechanical advantage of 3. Calculate the total work done when a load of 600N is raised through a height of 9m **(3 marks)**

(c) On the axes provided, sketch a graph of mechanical advantage against load for the pulley system

(2 mark)



(d) The graph below shows the potential energy against displacements for a body of mass 80g.

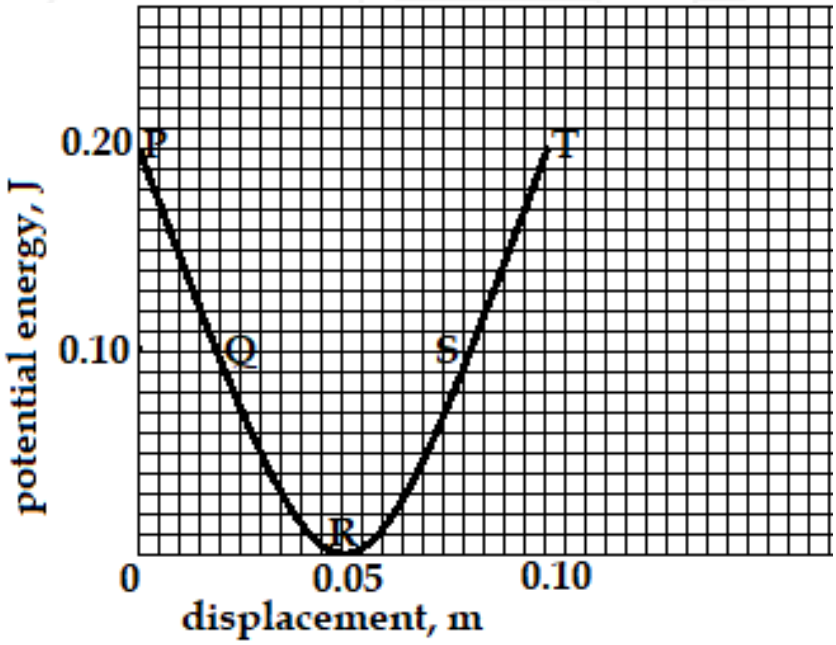


Figure 3

The body oscillates about point **R**. Calculate the velocity of the body at:

i. **P** and **T** **(3 marks)**

ii. **Q** and **S** **(2 marks)**

iii. at **R** **(2 marks)**

16.

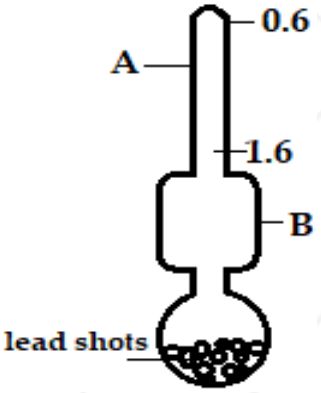
(a) State Archimedes' principle **(1 mark)**

(b) A rectangular brick of mass 10kg is suspended from the lower end of a spring balance and gradually lowered into water until its upper end is some distance below the surface.

i. State and explain the changes observed in the reading of the spring balance during the process **(2 marks)**

ii. If the spring reads 80N when the brick is totally immersed, determine the volume of the brick. **(3 marks)**

(c) The figure below shows a hydrometer.

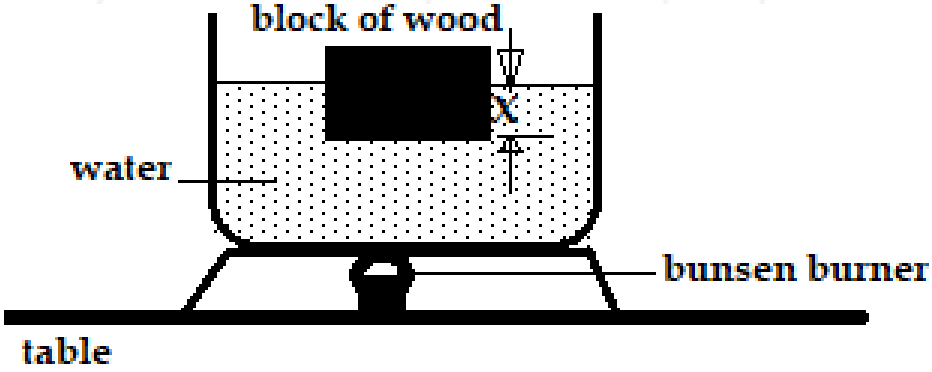


i. Identify the parts labelled A and B **(2 marks)**

ii. Explain why the bulb should be made wide **(2 marks)**

iii. State the function of the lead-shots **(1 mark)**

(d) The diagram, ***figure 16,*** shows a block of wood floating on water in a beaker. The set-up is at room temperature before the Bunsen burner is lit. State and explain the changes that are likely to occur in depth **X** when the Bunsen burner is lit. **(2 marks)**



THIS IS THE LAST PRINTED PAGE

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 7)

PHYSICS

232/2

PAPER 2 (Theory)

TIME: 2 HRS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

(a) Write your name, index number in the spaces provided above.

(b) Sign and write the date of the examination in the spaces provided

*(c) This paper consists of **TWO** Sections: **A** and **B**.*

*(d) Answer **ALL** the questions in section **A** and **B** in the spaces provided.*

***(e)** All working **MUST** be clearly shown.*

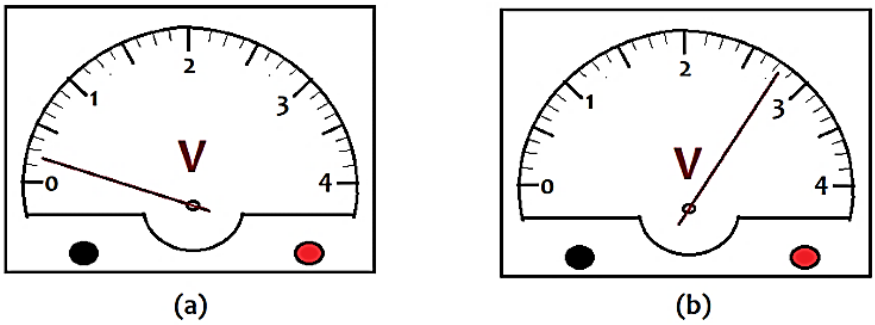
(f) KNEC mathematical tables and silent non-programmable electronic calculators may be used.

FOR EXAMINERS USE ONLY

Section	Question	Maximum score	Candidates score
A	1-15	25	
B	16	11	
	17	11	
	18	10	
	19	11	
	20	12	
TOTAL SCORE		80	

SECTION A (25 MARKS)

1. The fig. 1 below shows a voltmeter before and after use to take the emf of a cell.



(a) (b)

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

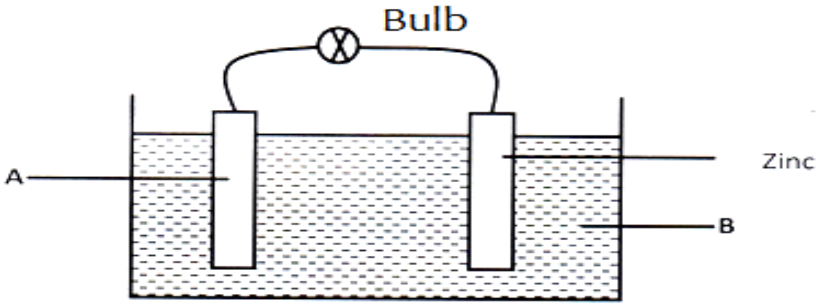
2. The chart below shows an arrangement of different parts of the electromagnetic spectrum.

Radio wave	**A**	**B**	Visible light	**C**	**D**	Gamma Rays

(i) Name the radiation represented by **C**. **(1 mark)**

(ii) Name a device that can be used to detect radiation **A**. **(1 mark)**

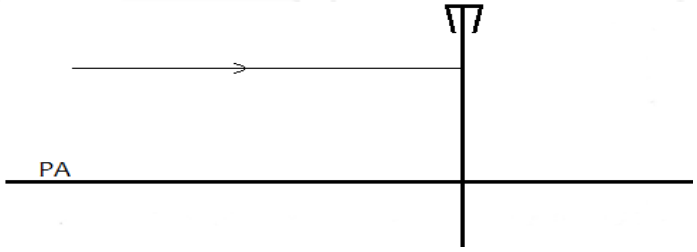
3. Figure 2 below shows a set-up of a simple cell.



(a) Name the material used in part A **(1 marks)**

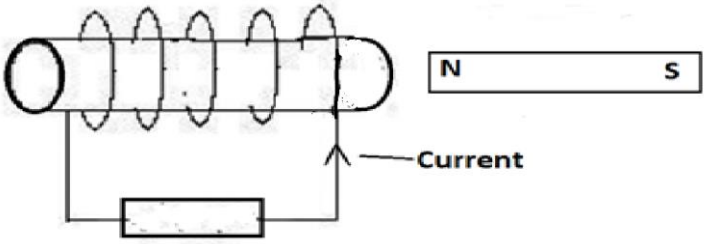
(b) Name the electrolyte B. **(1 mark)**

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



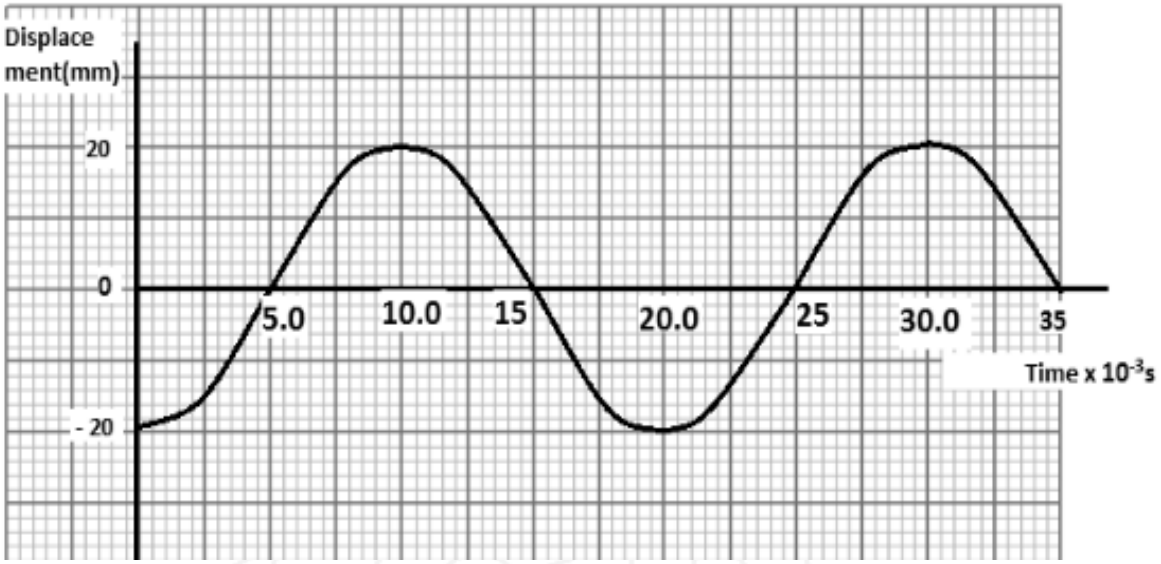
Draw on the diagram to show the resulting ray. **(1mark)**

5. 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)**

6. Figure 5 represents a displacement – time graph for a wave.



Determined the frequency of the wave. **(2marks)**

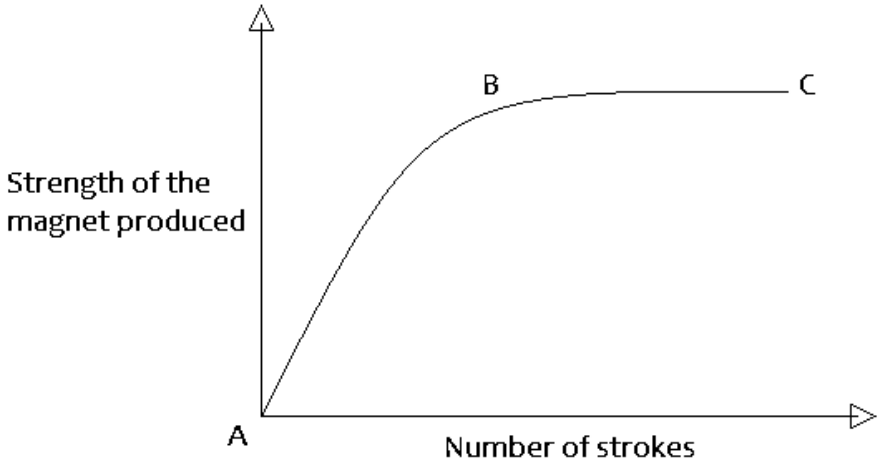
7. State the reasons for the following in the filament bulb:

a) Inside is filled with inert gas at low pressure. **(1 mark)**

b) The filament is coiled. **(1 mark)**

8. A girl standing at a distance claps her hands and hears an echo from a tall building 2 seconds later. If the speed of sound in air is 340m/s, determine how far the building is. **(3marks)**

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



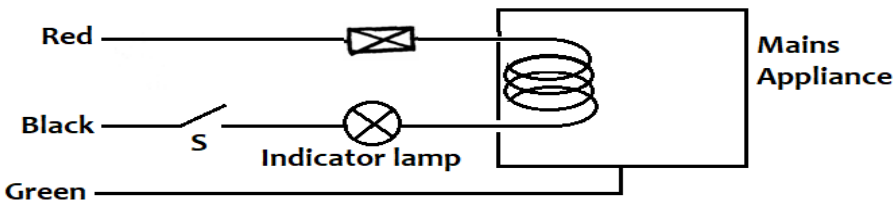
Explain what is happening between points AB and BC. **(2marks)**

AB

BC

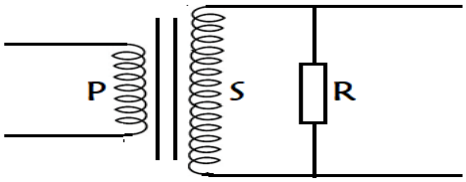
10. State two ways of confirming that an accumulator is fully charged. **(2marks)**

11. The fig. 6 below shows an electrical appliance with leads labelled Red, Black and Green.



Identify one mistake in the connection. **(1 mark)**

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 **(2 marks).**

13. Explain what is meant by radioactive decay. **(1 mark)**

14. A part from the field, state two ways of increasing the magnitude of current generated. **(2 marks)**

15. State one structural difference between a.c and d.c generators. **(1 mark)**

SECTION B (55 MARKS)

16. a. State one application of each of the following. **(2marks)**

i. Convex mirror

ii. Parabolic mirror

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.

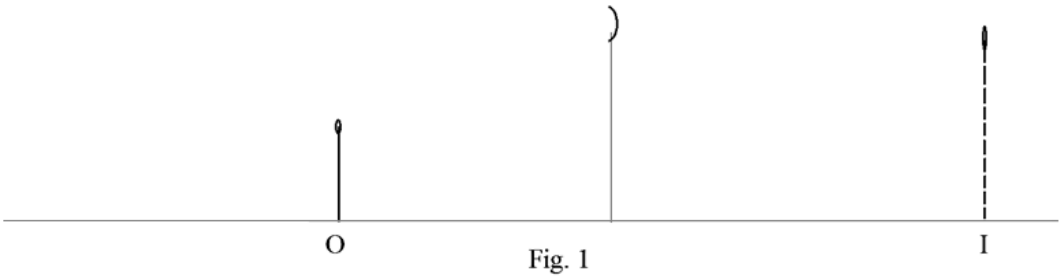
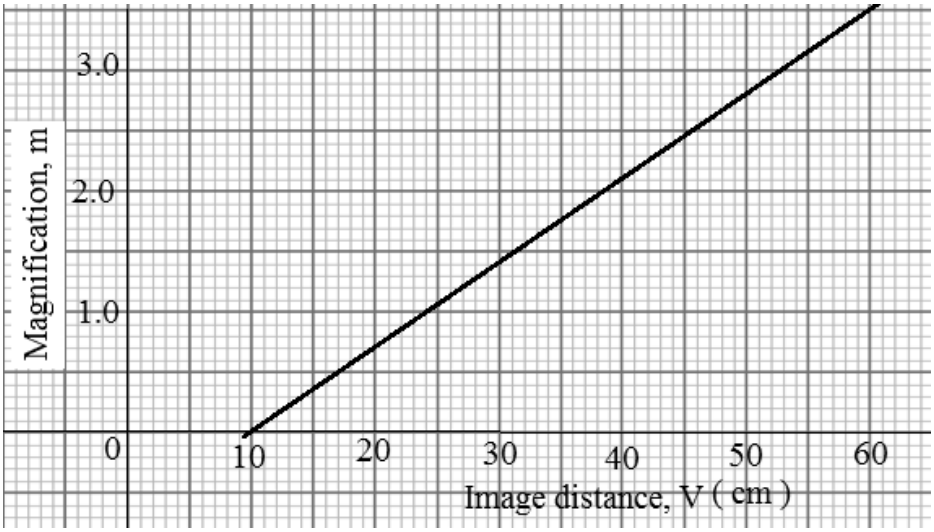


Fig. 1

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. **(3 marks)**

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



Determine:

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

II. The focal length of the mirror. **(1mark)**

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

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

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

Find ;

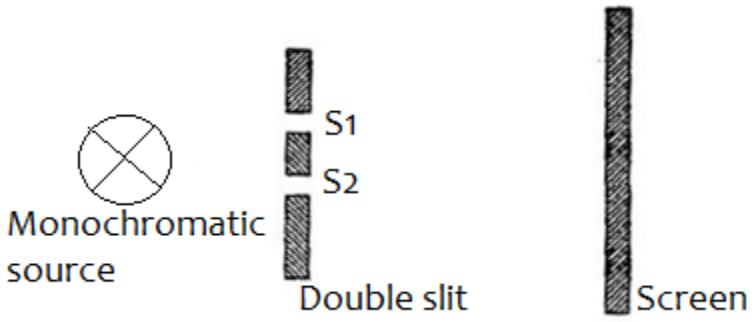
(i) The resultant potential difference across the combination **(3marks)**

(ii) Energy stored before connection **(3marks)**

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

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

18. a) In an experiment to observe interference of light waves a double slit is placed close to the source. See figure 12



(i) What is a monochromatic source of light. **(1 mark)**

(ii) State the function of the double slit **(1 mark)**

(iii) Describe what is observed on the screen **(1marks)**

(iii) State what is observed on the screen when

I. The slit separation S_1S_2 is reduced **(1 mark)**

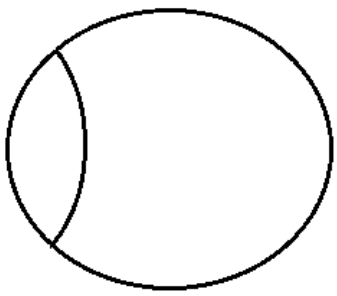
II. White light source is used in place of monochromatic source **(1 mark)**

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

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

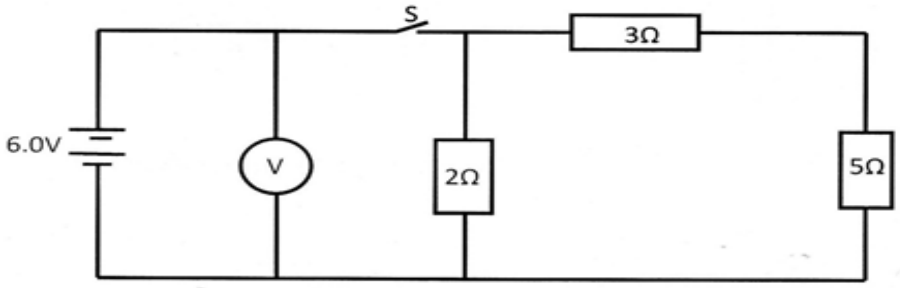
II. State one possible cause of the defect. **(1 mark)**

III. On the diagram in fig 11 below, draw to show how the defect can be corrected by use of a lens. **(3 marks)**



19. (a) Distinguish between an ohmic and non-ohmic conductors. **(1 mark)**

(b) Figure 16 shows a circuit with resistors and voltmeter connected to a battery



i). If each cell has an internal resistance of 0.7Ω, determine the total resistance in the circuit. **(3 marks)**

ii). Calculate the value of current flowing through the 3Ω resistor when the switch is closed? **(2 marks)**

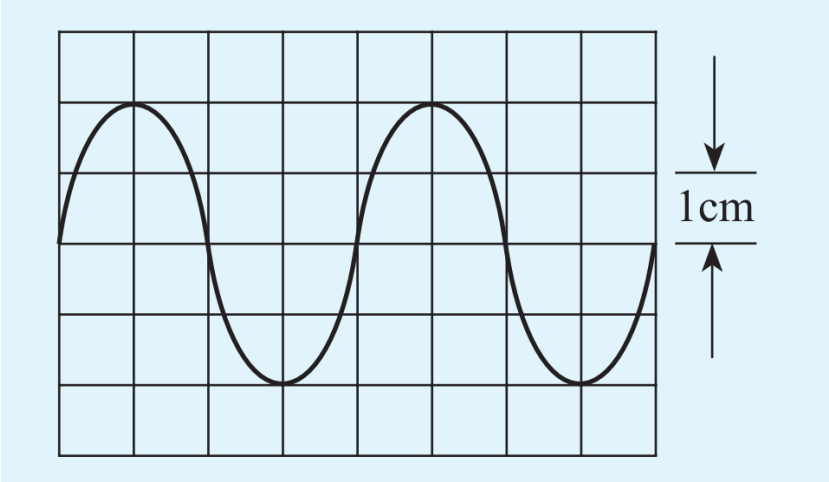
iii). What is the reading of the voltmeter when the switch S is

I. Open **(1 mark)**

II. Closed **(3 mark)**

iv). Account for the difference between the answers in (I) and (II) above **(1 mark)**

20. (a) The figure below shows a waveform on a CRO screen: Given that the Y-gain control is set at 20 V/cm and the time-base set to 10 ms/ cm,



Calculate the:

(i) Periodic time of the wave**.** **(2 marks)**

(ii) Frequency of the wave**.** **(2 marks)**

(iii) Peak voltage **(2 marks)**

(b) Calculate the frequency of X-rays produced by an X-ray tube operating at 20 kV, assuming that no energy is dissipated as heat. (Planck's constant h = 6.63 x10^{-34} Js, and the electronic charge is 1.6 x10^{-19} C**)** **(3 marks)**

(c) Calculate the energy of photons associated with radiation of frequency 4.8 × 10^{14} Hz, stating your answer in **eV** **(3 marks)**

THE LAST PRINTED PAGE

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 8)

PHYSICS

232/1

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

INSTRUCTIONS TO CANDIDATES

1. *Write your **name, admission number and index number** in the spaces provided*
2. *Sign and write the date of examination in the spaces provided*
3. *This paper consists of **TWO** sections **A** and **B***
4. *Answer **ALL** questions in the spaces provided*
5. *Answers must be in ink and English*
5. *Mathematical table and electronic calculators may be used.*
6. ***ALL** working **MUST** be shown clearly where necessary.*

Take: acceleration due to gravity g = 10m/s²

FOR OFFICIAL USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORES
A	1 - 12	25	
B	13	11	
	14	11	
	15	13	
	16	09	
	17	11	
	TOTAL SCORE	80	

SECTION A (25 MARKS)

Attempt ALL questions in this section.

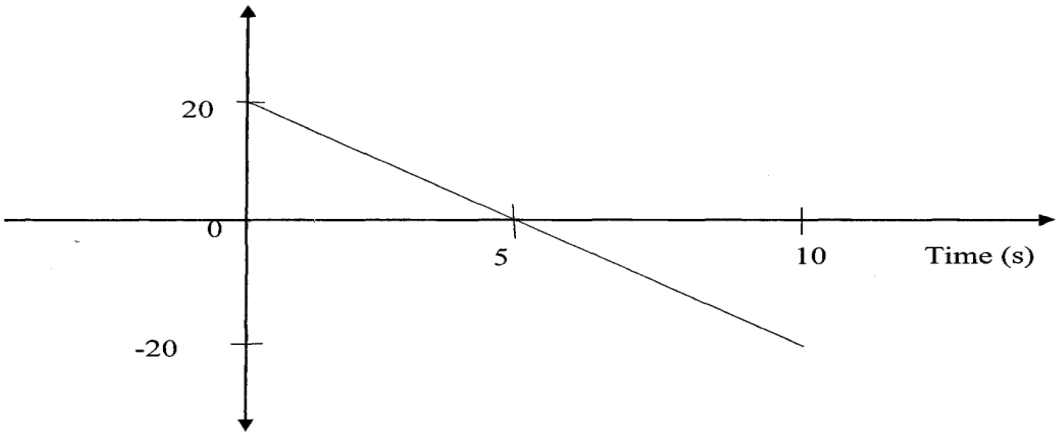
1. Name the branch of physics that deals with solar water heating system. **(1 mark)**

2. Define the term "Ideal gas" as used in gas laws **(1 mark)**

3. At Thompson falls water, falls through a height of 30m. Calculate the final temperature if the temperature at the top is 14°C (**Take g = 10 N/kg and s.h.c of water = 4200 J/kgK) (3 marks)**

4. State two conditions that must be fulfilled for a body to be in equilibrium **(2 marks)**

5. The figure below shows a graph of velocity against time for a moving body.



Determine the distance covered by the body during the 10 seconds **(3 marks)**

6. Smoke is enclosed in smoke cell and sealed. When illuminated and viewed under a microscope, it is observed to be moving in continuous random motion. State and explain the observation when cold water is poured on the smoke cell. **(2 marks)**

7. The pressure inside a submarine is maintained at 500m of mercury(500mHg). Determine the depth at which the submarine will be safe from implosion taking the density of water as $1.025 g/cm^3$ and atmospheric pressure = 760cmHg. (Take the density of mercury as 13600 Kg/m^3) **(3 marks)**

8. Explain why two cars are likely to crush as they travel at high velocities sideways**. (2 marks)**

9. When a body of mass 0.25kg is acted on by a force, its velocity changes from 5.0 m/s to 7.5m/s, determine the impulse of the force**. (2 marks)**

10. State two factors that affect the spring constant of springs made from the same wire. **(2mks)**

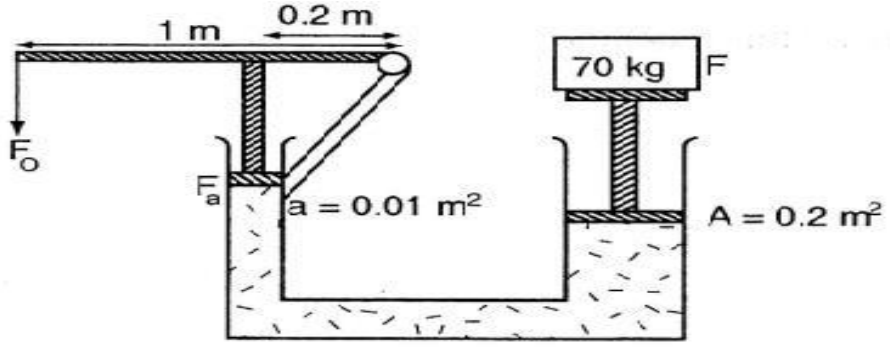
11. Draw a well labeled diagram of a clinical thermometer. **(3 marks)**

12. Differentiate between solids, liquids and gases in terms of thermal conductivity. **(1 mark)**

SECTION B (55 MARKS)

Attempt ALL questions in this section.

13. The figure below shows a hydraulic press supporting a load F.



a) What properties of oils make them suitable for use in hydraulic machines such as the one above? **(2marks)**

b) If A and a are areas of cross-section of the pistons, and the lengths of the arm are as given, find: **i.** The force F_a **(2 marks)**

ii. The force F_0 **(2 marks)**

c) The mechanical advantage of the machine **(1mark)**

d) The velocity ratio of the machine **(3 marks)**

e) State one reason why the efficiency of a pulley system is always less than 100**%** **(1 mark)**

14. a) State Newton's third law of motion. **(1 mark)**

b) Distinguish between elastic and inelastic collision. **(2 marks)**

c) A mini bus of mass 2000kg travelling at a constant velocity of 20m/s collides with a stationary car of mass 1000kg. The impact takes 2 seconds before the two moves together at a constant velocity for half a minute. Calculate.

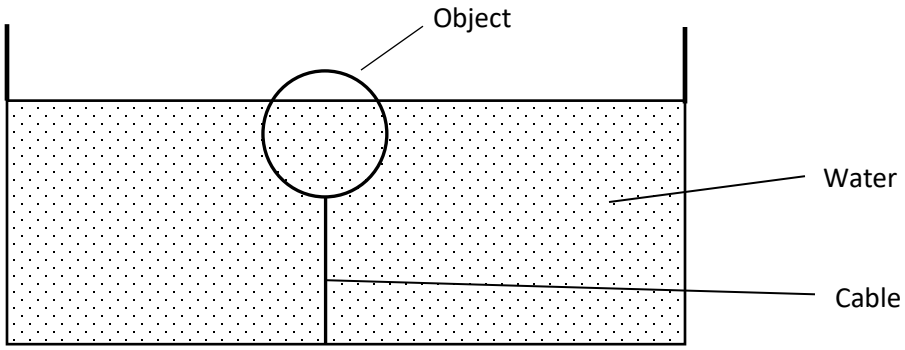
i) The common velocity **(3 marks)**

ii) The distance moved after impact. **(2 marks)**

iii) The change in Kinetic energy. **(3 marks)**

15. a) State the law of floatation. **(1 mark)**

b) The figure below shows a floating object of volume 4000cm^3 and mass 10g. It is held as shown in water of density 1.25g/cm^3 by a light cable at the bottom so that ¾ of the volume of the object is below the water surface (Assume the upthrust due to air is negligible).



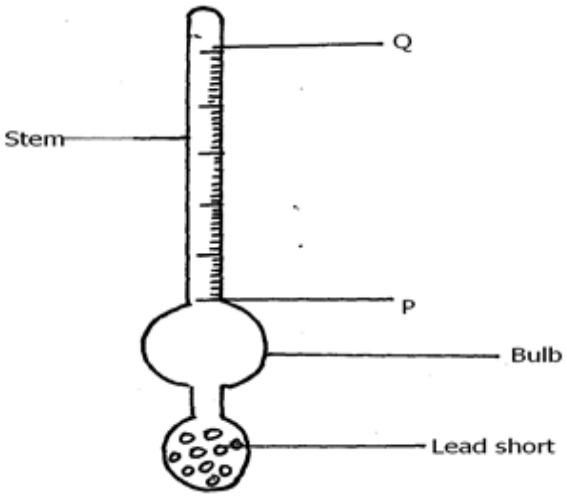
i) Calculate the volume of the object under water**.** **(2 marks)**

ii) Calculate the weight of water displaced. **(3 marks)**

iii) Determine the tension in the cable. **(2 marks)**

iv) Calculate the density of the object. **(2 marks)**

c) The diagram below shows a car acid hydrometer.



(i) Indicate on the diagram above the minimum and the maximum measurement to be taken.

(1 mark)

(ii) State the reason why

I. The bulb is wide**.** **(1 mark)**

II. Lead shots are used **(1 mark)**

16. (a) State what is meant by the term 'specific latent heat of vaporization' **(1mark)**

b) In an experiment to determine the specific latent heat of vaporization of water, steam at 100°C was passed into water at 5°C contained in a well-lagged copper calorimeter. The following measurements were made;

Mass of calorimeter 50g
Initial mass of water 70g
Final mass of calorimeter + water + condensed steam = 123g
Final temperature of mixture = 30°C
(Specific heat capacity of water =4200 Jkg^{-1} K^{-1}, specific heat capacity for copper =390 Jkg^{-1} K^{-1})

(i) Determine the:

I. Mass of condensed steam **(2 marks)**

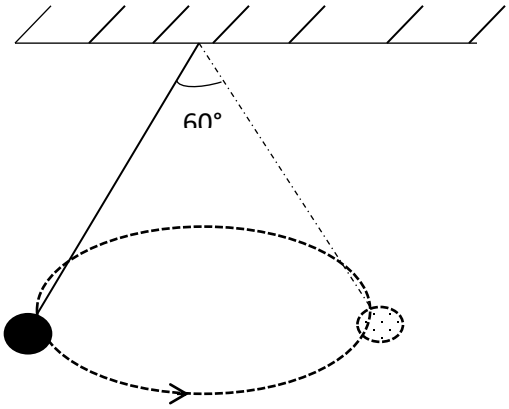
II. Heat gained by the calorimeter and water **(3 marks)**

(ii) Given that L is the specific latent heat of vaporization of steam, determine the value of L.

(3 marks)

17. a) Define the term angular velocity. **(1 mark)**

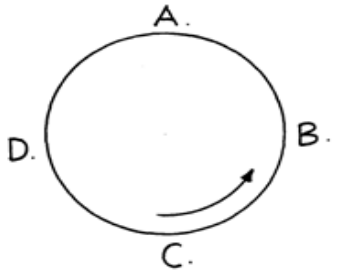
b) A body of mass 5 kg is whirled horizontally making a conical pendulum as shown in the diagram below



i.State what happens when the speed of whirling is increased **(1 mark)**

ii. If the radius of the path is 50cm and the centripetal force is 285N. Determine the linear velocity of the **mass** **(3 marks)**

c) A stone is whirled in a vertical circle as shown in the figure below using a string of length 40 cm. A, B, C and D are various positions of the stone in its motion. The stone makes 2 revolutions per second and has a mass of 100g.



i) Calculate:

I. The angular velocity **(2 marks)**

II. The tension on the string at position **A** **(3 marks)**

(ii) At C where the stone has acquired a constant angular speed, the string cuts. What is the name given to the path followed by the stone**?** **(1 mark)**

----------THIS IS THE LAST PRINTED PAGE----------

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 8)

PHYSICS

232/2

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

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.*

FOR EXAMINER'S USE ONLY.

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

SECTION A: (25MARKS)

1. What is observed when the hole of a pinhole camera is enlarged? **(1mk)**

2. State one use of a charged electroscope **(1mk)**

3. The chart below shows an arrangement of a section of the electromagnetic spectrum

P	Q	R	UV Light	S	Gamma rays

Name the radiation represented by letter Q **(1mk)**

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

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

6. (a) Define half- life as used in radioactivity **(1mk)**

(b) The initial mass of a radioactive substance is 20g.The substance has half-life of 5yrs.Detemine the mass remaining after 20yrs. **(2mks)**

7. Give a reason why it is necessary to leave the caps of the cells open when charging lead-acid accumulator **(1mk)**

8. (a) State one property of soft iron that makes it suitable for use as a transformer core. **(1mk)**

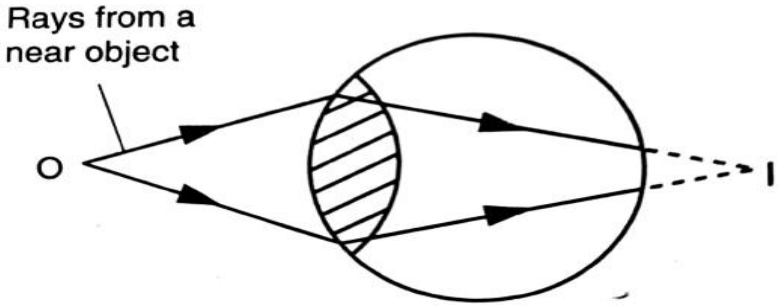
(b) The primary coil of a transformer has 1200 turns and the secondary coil has 60 turns. The transformer is connected to a 240V a.c source. Determine the output voltage. **(3mks)**

9. State two ways of minimizing electrical power losses during transmission **(2mks)**

10. A convex mirror is preferred to a plane mirror for use as a driving mirror. Explain why. **(1mk)**

11. An electric bulb is rated 60W, 240V. Determine the current that flows through it when it is connected to a 240v supply **(2mks**

12. The figure below shows a defect of vision



(i) Name the defect**.** **(1mk)**

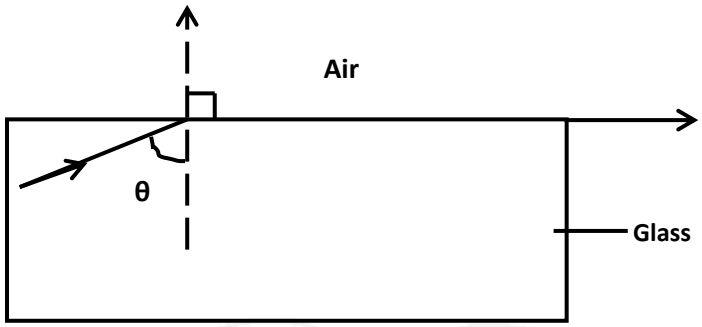
(ii) List two possible causes of the defect. **(2mks)**

13. A broadcasting station produces radio waves of wavelength 600m. Determine their frequency in MHz (speed of air is $3X10^8$m/s**)** **(3mks)**

SECTION B (55MARKS)

14. (a) Define the refractive index of a **medium** **(1mk)**

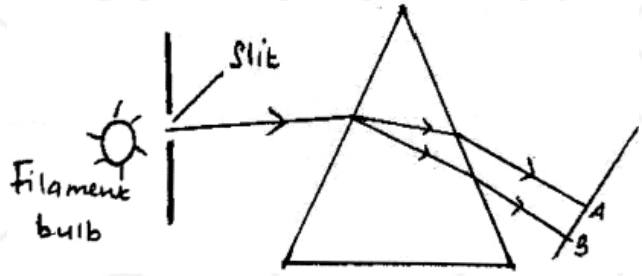
(b) The figure below shows a ray of light incident on a glass-air interface



Given that the refractive index of the glass is 1.5, determine angle θ ` **(3mks)**

(c) State one condition for total internal reflection to occur **(1mk)**

(d) The diagram below shows a narrow beam of white light shone onto a glass prism



(i) What is the phenomena represented in the diagram? **(1mk)**

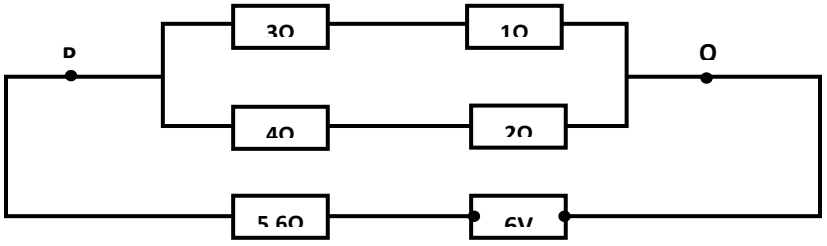
(ii) Name the colours at A and at B **(2mks)**

(iii) Explain the reason for your suggestion of the colours named above. **(1mk)**

(iv) What is the purpose of the slit. **(1mk)**

15. (a) State one factor that affect the resistance of a metallic conductor (**1mk)**

(b) The figure below shows resistors in a circuit. The internal resistance of the battery is negligible



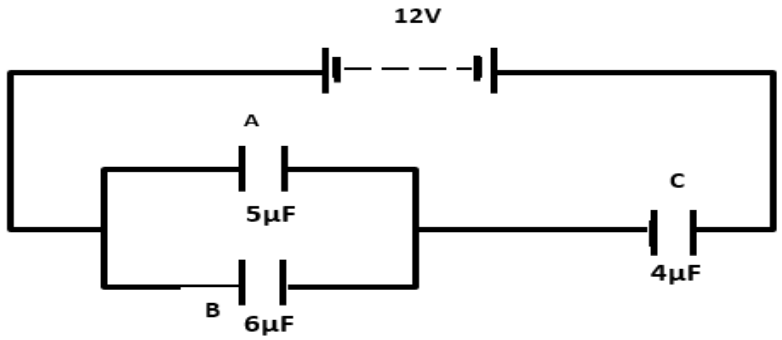
(i) Calculate the effective resistance of the **circuit** **(2mks)**

(ii) Find the total current in the **circuit** **(2mks)**

(iii) Find the P.d between P and **Q** **(2mks)**

(c) What is the effect of decreasing the distance between the plates of a parallel plate capacitor on the capacitance **(1mk)**

(d) The figure below shows electrical circuit with three capacitors A, B and C of capacitance 5μF, 6μF and 4μF respectively connected to a 12V battery



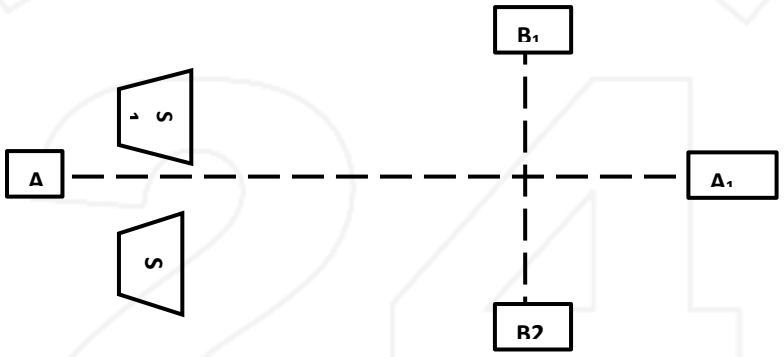
Determine

(i) The combined capacitance of the three capacitors **(2mks)**

(ii) The potential difference across the capacitor B **(3mks)**

16. (a) Name two factors which determine the frequency of sound from a stretched wire at room temperature **(2mks)**

(b) The figure below shows two loud speakers S_1 and S_2 connected to a signal generator

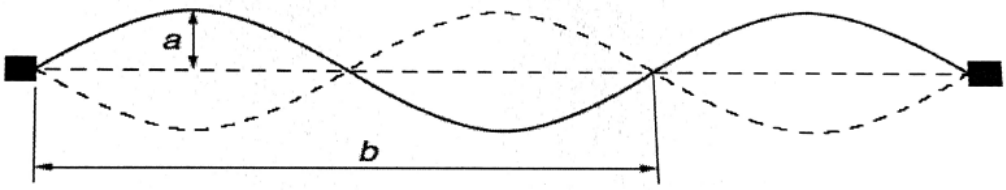


(i) An observer walks along B_1B_2. State what is observed. **(1mk)**

(ii) Give reasons for observation above **(2mks)**

(iii) Another observer walks along AA_1, state and explain what he observed **(2mks)**

(c) A stretched string is vibrating between two fixed ends. The figure shows how the string is vibrating



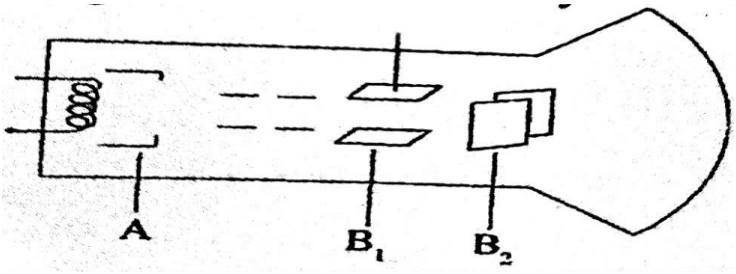
(i) State the name of: **(2mks)**

[I] Distance a:

[I] Distance b:

(ii) On the diagram, label the node and the antinode **(2mks)**

17. The figure below shows a block diagram of a cathode ray oscilloscope(CRO)



(a)(i) State the names of the parts labelled B_1 and B_2 **(2mks)**

(ii)State and explain the function of the part marked A **(2mks)**

(**ii)**Why is the tube highly evacuated? **(1mk)**

(b)Give a reason why the target in an X-ray tube is made of tungsten or molebdnum **(1mk)**

(c) X-rays are used for detecting cracks inside metal beams.State with a reason which type of X-rays is used. **(2mks)**

(d) In a certain X-ray tube the electrons are accelerated by a p.d of 12kV.Assuming all the energy goes to produce X-rays, determine the frequency of the X-rays produced .(Planks constant $h=6.62\times10^{-34}$ Js and charge of an electron $=1.6\times10^{-19}$C) **(2mks)**

18.(a) state two factors that affect photoelectric emission **(2mks)**

(b) Light of wavelength 4.0×10^{-7} m is incident on two different metal surfaces ,nickel and potassium (Take speed of light as 3.0×10^{8} m/s and planks constant $h=6.63\times10^{-34}$Js)

(i)Determine the energy of the incident radiation **(3mks)**

(ii)If the work function of nickel is 8.0×10^{-19} J and that of potassium metal is 3.68×10^{-19}J,state with a reason which of the two metals given light will eject electrons **(2mks)**

(**iii)Determine** the velocity of the emitted electrons from the metal surface in b(ii).(Take mass of an electron as 9.1×10^{-31} kg) **(3mks)**

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 9)

PHYSICS

232/1

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES:

a) *Write your **name and index number** in the spaces provided above.*

b) *Write the date of the examination and your SIGNATURE in the spaces provided above.*

c) *This paper consists of **TWO** sections; **A** and **B.***

d) *Answer **ALL** the questions both in section **A** and **B** in the spaces provided below each question.*

e) ***ALL** workings **MUST** be clearly shown.*

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

For Examiners' Use Only

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

SECTION A (25 MARKS)

Answer All Questions In This Section In The Spaces Provided

1. Figure 1 shows part of the scales of a micrometer screw gauge when it is completely closed.

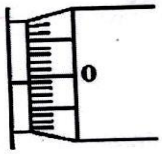


Figure 1

Find the zero error of this micrometer screw gauge. **(1 mark)**

2. A barometer reads 760mmHg at sea level. Find it's reading at an altitude of 2500m above sea level. (Density of mercury = 13600kgm^{-3} and density of air 1.25kgm^{-3}) **(3 marks)**

3. Figure 4 shows a velocity-time graph of a small metal sphere falling through water in a tall jar.

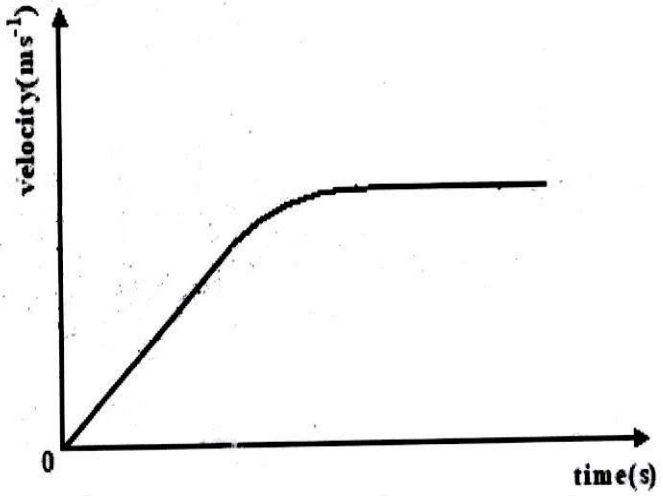


Figure 4

On the same axes, draw a velocity-time graph for the same metal sphere falling through air.

(1 mark)

4. Figure 5 shows the tension, T on a pendulum bob suspended from a support.

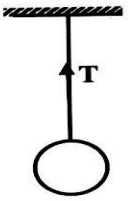


Figure 5

Indicate on the diagram the other force acting on the pendulum bob. **(1 mark)**

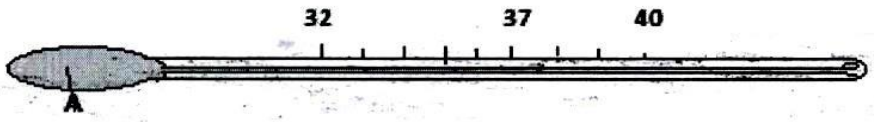
5. A stone and a feather are dropped from rest from a building 20m tall. If they reach the ground at the same time,

a) State the condition under which they fall. **(1 mark)**

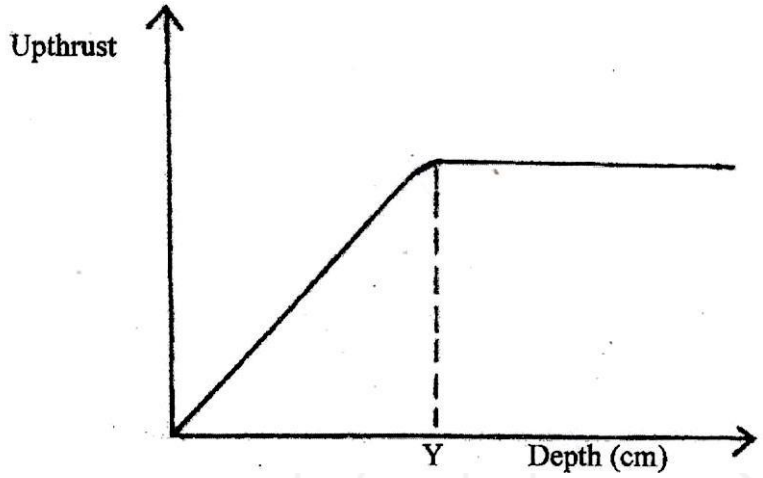
b) Find the velocity with which they reach the ground. (take g = 10m/s^2) **(2 marks)**

6. Define a radian as applied in circular motion. **(1 mark)**

7. The figure below shows a thermometer used by a doctor to determine the temperature of a patient. Why is it difficult to work with this thermometer? **(2 marks)**



8. A glass block is suspended from a spring balance and held inside a beaker without touching the beaker. Water is added gradually into the beaker. The figure below shows the variation of the upthrust on the block with depth of water in the beaker.

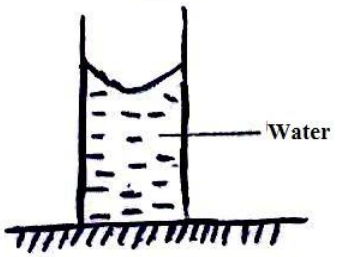


State the reasons for the observation at Y **(2 marks)**

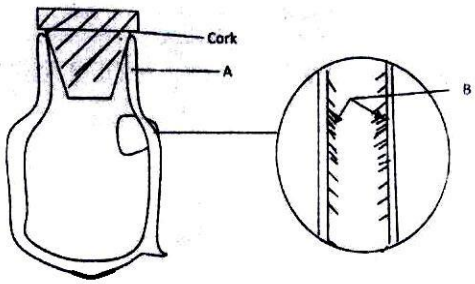
9. Which branch of Physics deals with kinetic energy within matter? **(1 mark)**

10. The figure 2 below shows a beaker containing water placed on a flat bench. State and explain the changes in stability of the beaker when the water freezes to ice. **(2 marks)**

Fig 2



11. Figure 5 is a simple diagram of a vacuum flask with an enlarged view of the part of it in the circle. Use it to answer question (a) and (b).



a) Name the material in A and B.

A: …… (1 mark)

B: …… (1 mark)

b) What type of energy losses are minimized or prevented by the parts A and B?

A: …… (1 mark)

B: …… (1 mark)

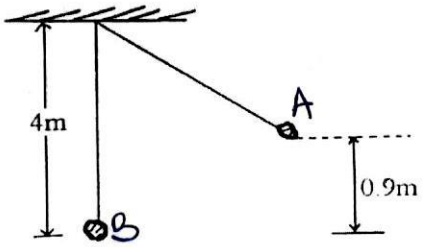
12. (a) State Newton's Third Law of Motion **(1 mark)**

(b) A car of mass 900kg is initially moving at 20m/s. Calculate the force required to bring the car to rest over a distance of 15m. **(3 marks)**

SECTION B – 55 MARKS

Answer All the Questions

13. (a) A body of mass 20Kg hangs 4m and swings through a vertical height of 0.9m as shown in the figure below.



Determine;

(i) The potential energy at position, A **(2 marks)**

(ii) The speed of the body when passing through the lowest point**, B** **(2 marks)**

(b) A Crane lifts a load of 2000kg through a vertical distance of 3.0m in 6 seconds.

Determine the:

(i) Work done by the crane. (Take g= 10N/Kg) **(2 marks)**

(ii) Power developed by the crane. **(2 marks)**

(iii) Efficiency of the crane given that it is operated by an electric motor rated 12.5kW **(3 marks)**

14. (a) Figure 9 shows a suspended copper solid immersed in a fluid.

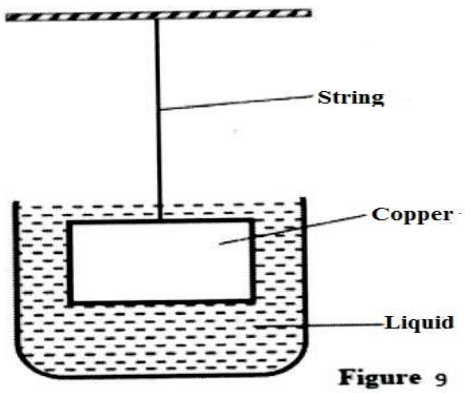
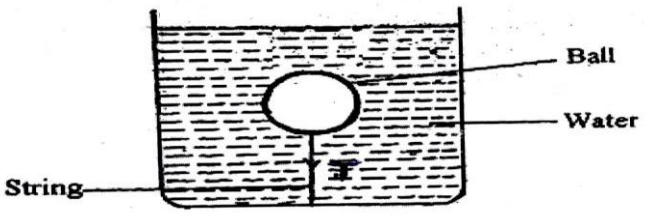


Figure 9

Explain what will happen to the tension in the string if a liquid of higher density is used. **(2 marks)(b)** Figure 10 below shows a ball fully immersed in water and held with a string attached at the bottom.



(i) If the mass of the ball is 0.5kg, calculate the weight of the ball. **(1 mark)**

(ii) The volume of the water displaced by the immersed ball is 8.0×10^{-4} m³. Calculate the up thrust on the ball. (ρ water = 1000 kg m^{-3}) **(3 marks)**

(iii) Determine the tension T on the string **(2 marks)**

(c) An object weighs 5.0N in air, 3.0N when fully immersed in water and 4.0N when fully immersed in a certain liquid. Determine the density of the liquid. **(3 marks)**

15. a) Define the term 'heat capacity' **(1 mark)**

b) A block of metal of mass 150g at 100^0C is dropped into a well lagged calorimeter of mass 215g and specific heat capacity of 400J/Kg/K containing 100g of water at 25°C. The temperature of the resulting mixture is 34°C (Specific heat capacity water is 4200J/Kg/K).Determine;

(i) Heat gained by calorimeter. **(2 marks)**

(ii) Heat gained by water. **(3 marks)**

(iii) Specific heat capacity of the metal block **(3 marks)**

c) A copper block of mass 500g is electrically heated with a heater rated 5W.The heater is on for 8 minutes. Calculate the temperature rise in the block. (Specific heat capacity of copper is 460J/Kg/K) **(3 marks)**

16. a) A car negotiating a corner at a constant speed is said have a change of momentum. Explain this observation. **(1 mark)**

b) Figure 15 shows the overview of a turn table on which glass blocks A and B are placed at different radii from the centre along a straight line. The radius **r1** is 50cm while that of **r2** is 120cm. The mass of A is 300g that of B is 900g.

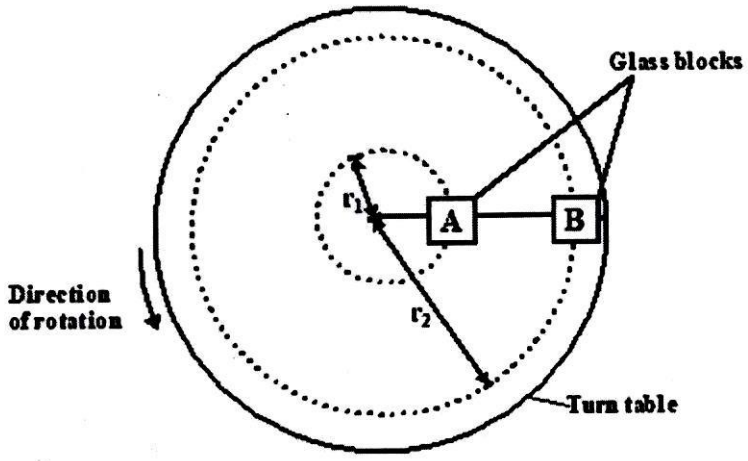


Figure 15

Both blocks maintain the same straight line as the turn table moves in uniform circular motion. Block A has a linear velocity of 40ms^{-1}.

I. Determine the:

(i) Centripetal force on block A. **(3 marks)**

(ii) Linear velocity of block B. **(3 marks)**

II. (i) State which block is likely to slide off the turn table. **(1 mark)**

(ii) Explain your answer in (II) (i) above. **(2 marks)**

17. (a) Figure 8 shows a sealed glass syringe that contains smoke particles suspended in air.

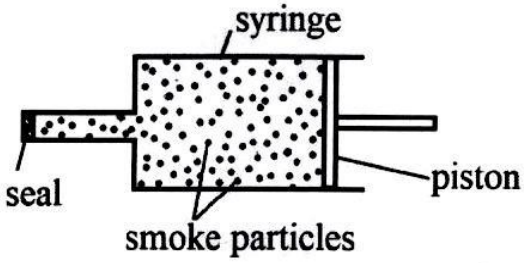


Figure 8

(i) Explain why the smoke particles are suspended in the air and do not settle to the bottom. **(2 marks)**

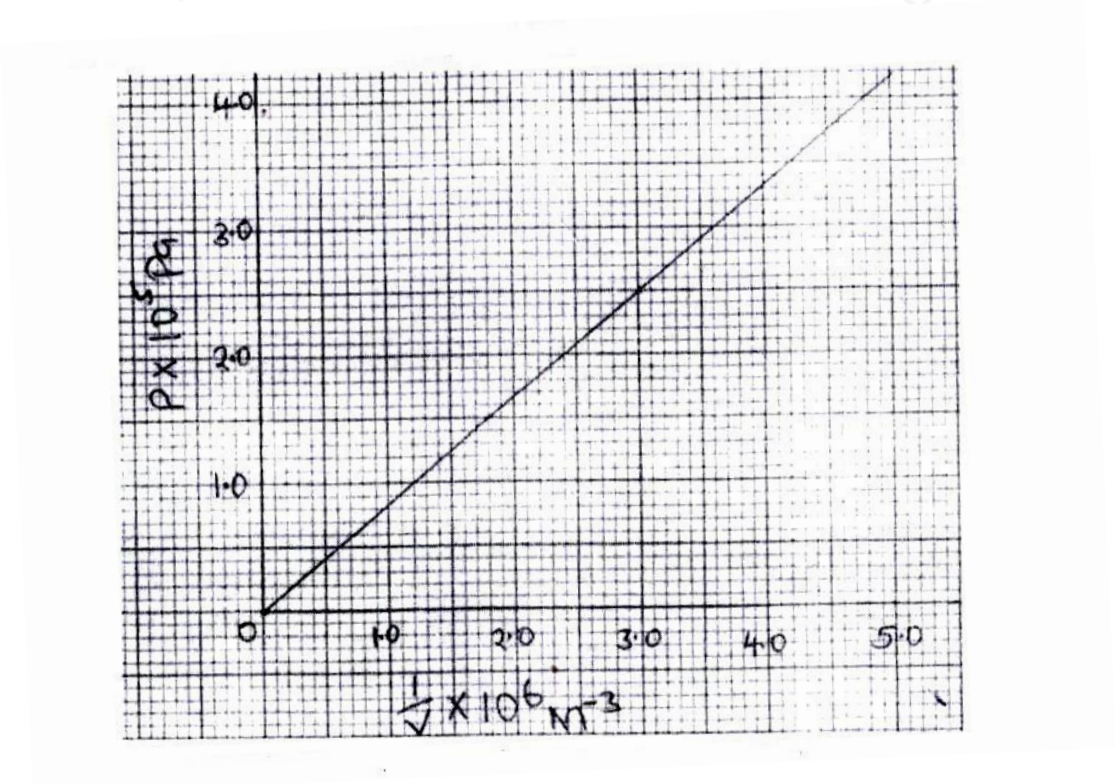
(ii) The air in the syringe is at a pressure of 2.0×10^5 Nm^{-2}. The piston is slowly moved into the syringe until the volume of the air is reduced from 80 cm^3 to 25 cm^3.

i. State why the piston must be moved slowly. **(1 mark)**

ii. Calculate the final pressure of the air in the syringe. **(3 marks)**

b) State what is meant by an ideal gas. **(1 mark)**

c) The pressure acting in a gas in a container was changed steadily while the temperature of the gas was maintained constant. The value of volume, V, of the gas was measured for various values of pressure. The graph in the figure A shows the relation between the pressure. P_1 and the reciprocal of volume, I/V.



(i) Given that the relation between the pressure P and the volume V of the gas is given by PV=k, where k is a constant use the graph to determine the value of k**.** **(3 marks)**

(ii) What physical quantity does k represent? **(1 mark)**

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 9)

PHYSICS

232/2

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… SIGN……

INDEX NO…… ADM NO……

Kenya Certificate of Secondary Education.

INSTRUCTIONS

a) *Write your name, index number and name of your school in the spaces provided above.*

b) *This paper consists of two sections, section I and II. Answer all the questions in both sections.*

c) *Mathematical tables and silent non – programmable calculators may be used.*

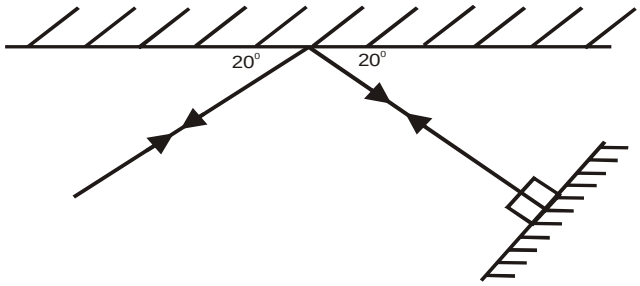
For examiners' use only

section	Question	Maximum score	Candidate's score
I	1 – 13	25	
II	14		
	15		
	16		
	17		
	18		
Total		80	

SECTION A (25 Marks)

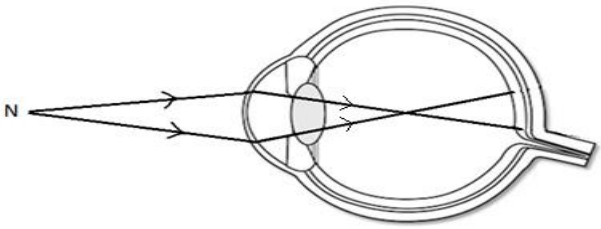
Answer all the questions in this section in the spaces provided

1. The following diagram shows the path of light after striking two mirrors at an angle.



Determine the angle between the two mirrors. **(2marks)**

2. The figure shows the eye defect



(a) Name the defect **(1mark)**

(b) State how the defect can be corrected. **(1mark)**

3. Explain why a plain sheet of paper and a plane mirror both reflect light yet only the plane mirror forms images while paper cannot form images. **(2 marks)**

4. What property of light is suggested by the formation of shadows? **(1 mark)**

5. An object placed **15 cm** from a convex lens forms an upright image which is magnified two times. Determine the focal length of the lens. **(3 marks)**

6. State **one** advantage of a lead-acid accumulator over a nickel-iron accumulator. **(1 mark)**

7. An electric bulb rated, **40W** is operating on **240 V** mains. Determine the resistance of its filament. **(3 marks)**

8. Explain why earthing is necessary in the domestic wiring circuit. **(1 mark)**

9. A positively charged rod is brought near the cap of a leaf electroscope. The cap is the earthed momentarily by touching with the finger. Finally, the rod is withdrawn. The electroscope is found to be negatively charged. Explain how this charge is acquired. **(2 marks)**

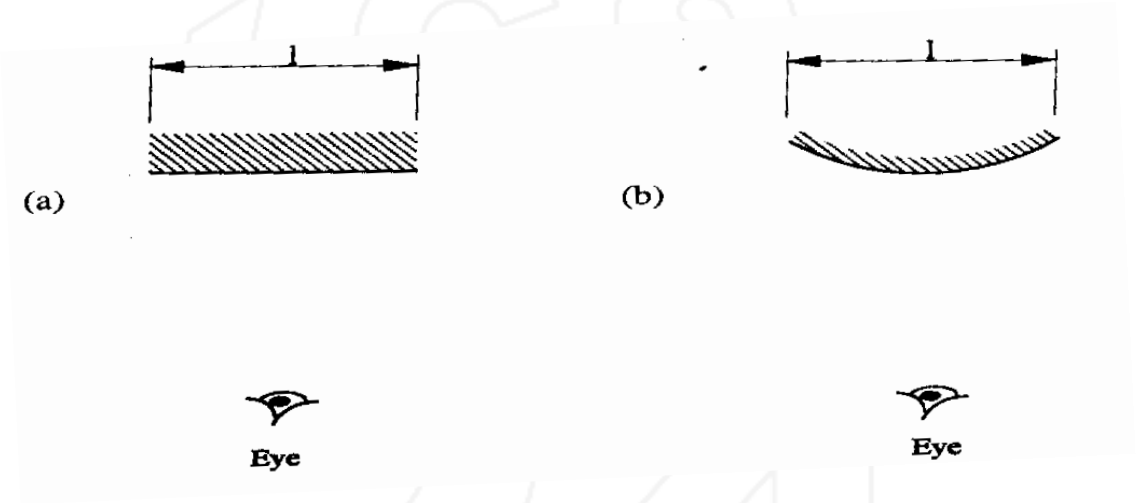
10. The force on a conductor carrying a current in a magnetic field can be varied by changing, among others, the magnitude of the current and the magnetic field strength. Name any other factor that can be changed to vary the force. **(1 mark)**

11. The table below carries information on the type of radiation, detector and use for some of the electromagnetic radiations.

Type of radiation	**Detector**	**Use**
Microwave	Crystal detector, solid state diodes	.....
.....	Thermopile, blackened bulb thermometer	Warmth sensation

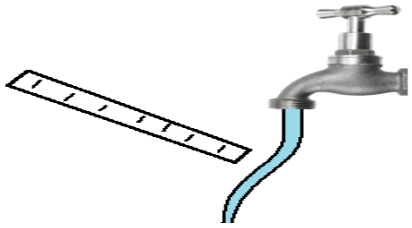
Fill in the blank spaces. **(2 mark)**

12. The figures below show a convex mirror and a plane mirror of equal aperture



By sketching a pair of incident and reflected rays for each(a) and (b) show how the convex mirror provides to the eye, a wider field of view than a plane mirror. **(2marks)**

13. Water is flowing in a very narrow stream from a water tap (faucet). A negatively-charged plastic strip is held close to the stream of water, as shown in the figure below.



The stream of water moves towards the plastic strip. Explain why this observation. **(2marks)**

SECTION B (55 MARKS)

14. a) Distinguish between transverse waves and longitudinal waves. **(2 marks)**

b) Plane water waves travels from a deep end into a shallow end in a swimming pool at a velocity of 4m/s. if the wavelength of these waves in deep end is 6cm and in the shallow end is 1.5cm, determine the velocity of these waves in the shallow end. **(3 marks)**

c) State one factor that affects the velocity of sound in a solid. **(1mark)**

d) A disc siren with 200 holes is rotated at constant speed making 0.5 revolutions per second. If air is blown towards the holes, calculate:

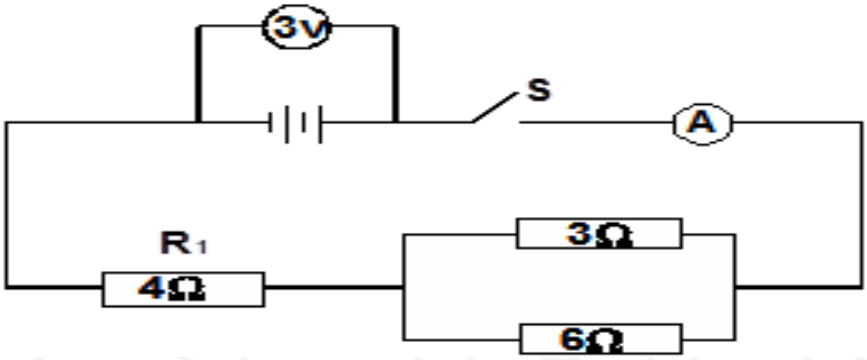
i) The frequency of sound produced. **(3marks)**

ii) The wavelength of the sound produced if velocity of sound in air is $340ms^{-1}$ **(2 marks)**

c). State one way of reducing echoes in a room? **(1 mark)**

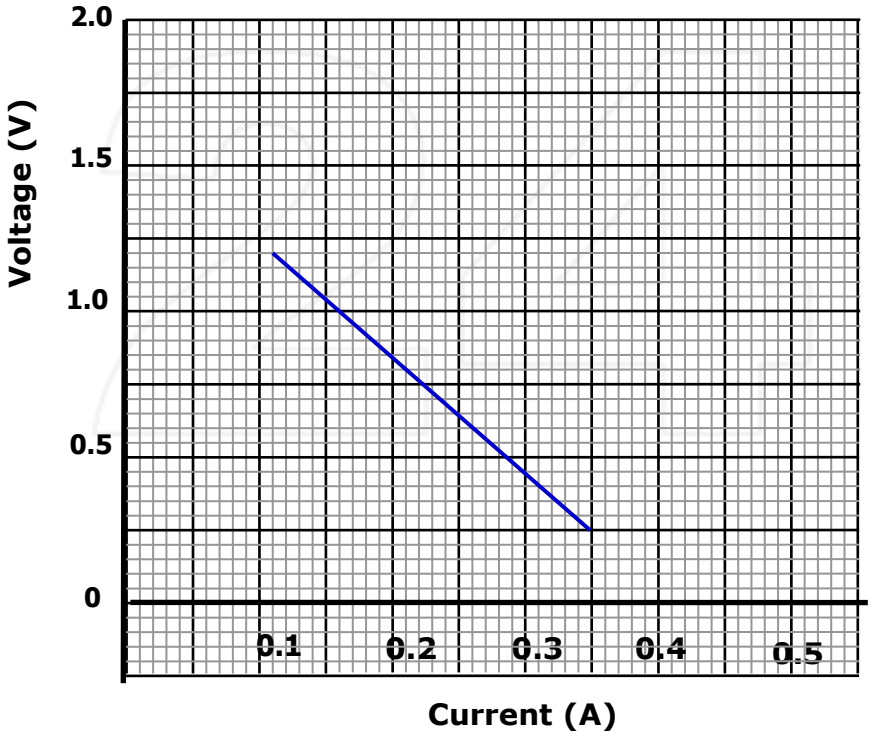
15. a) State one advantage of an alkaline accumulator over lead acid accumulator. **(1 mark)**

b) Figure below shows resistors in a circuit.



Calculate Current through the 4 Ω resistor. **(3 marks)**

c) The graph below shows the Voltage current relationship for a certain battery.

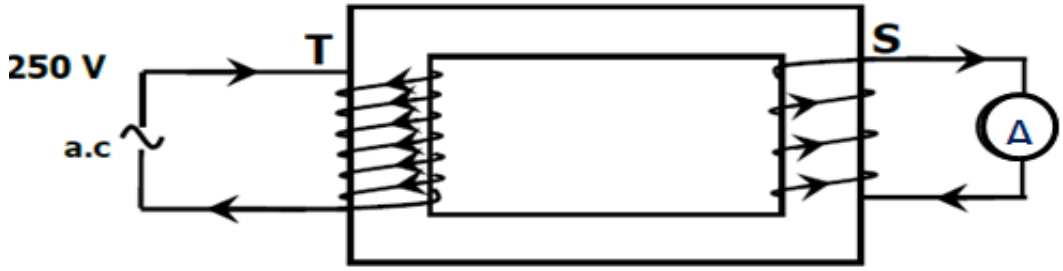


Determine:

(i) The e.m.f of the cell. **(1mark)**

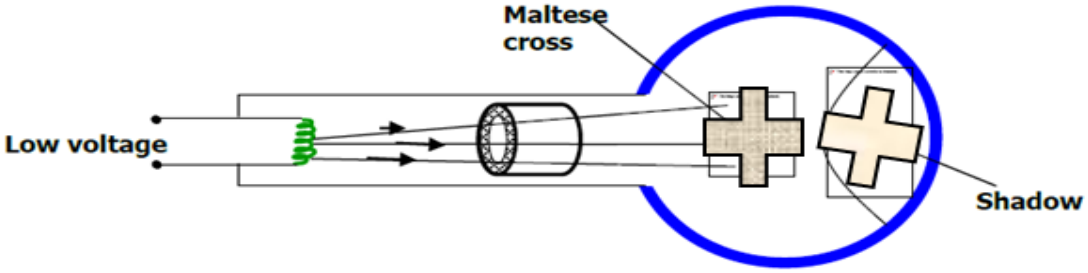
(ii) The internal resistance of the cell. **(3marks)**

(e) Two coils T and S are wound on a soft iron core as shown. T has 1000 turns while S has 600 turns and resistance of 100Ω



Calculate the maximum current measured by the ammeter. **(3marks)**

16. (a) The fig. shows as simple form of cathode ray tube, which produces a sharp shadow of a Maltese cross on a fluorescent screen.

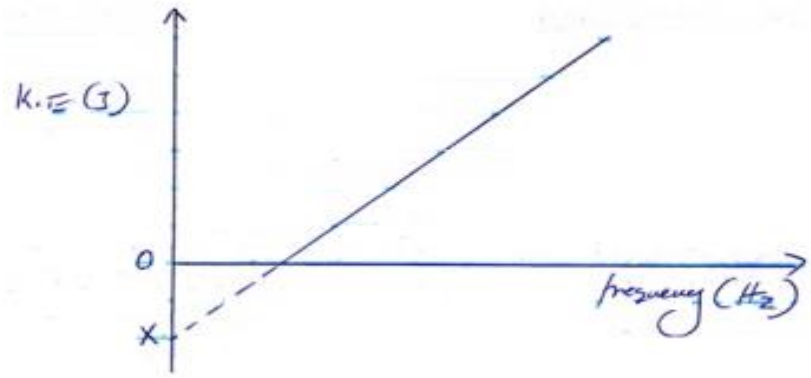


(i) Explain what is meant by cathode rays. **(1mark)**

(ii) What property of cathode rays does the fig. above illustrate **(1mark)**

(b) State one factor that affects photoelectric emission from a given metal surface. **(1mark)**

c). A graph of K.E of photoelectrons emitted by metal surface A against the frequency of radiation used is as shown below



From the graph;

i) What is the significance of the gradient of the graph? **(1mark)**

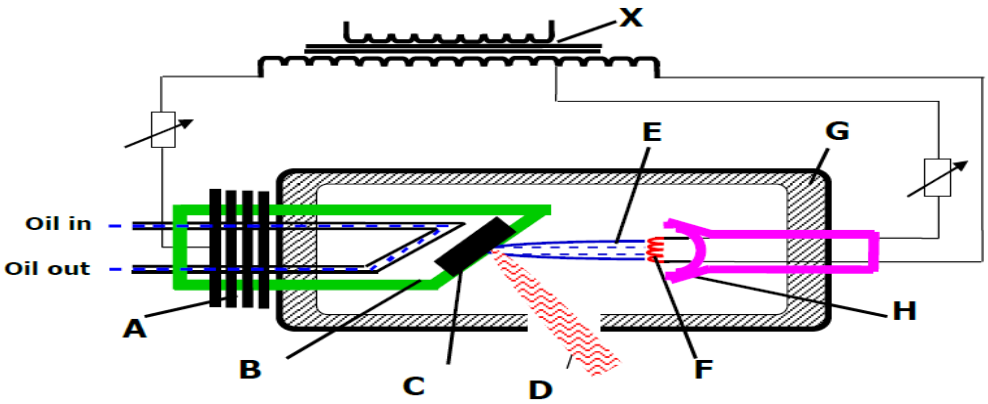
ii) What is the significance of OX **(1mark)**

d) The threshold frequency for potassium is 5.37 x 10^{14}Hz. When the surface of potassium is illuminated by incident radiation from a source, photoelectrons are emitted with the speed of 7.9 x10^{5}m/s. Given that h=*6.62 x 10^{-34} JS and m_e=9 x 10^{-31}kg, c*alculate:

i) The work function for potassium **(2marks)**

ii) The frequency of the incident radiation from the second source. **(3marks)**

17. Figure below shows the features of an X-ray tube.



a) Name the parts marked with letters **A** and **H** **(2marks)**

b) Why is tungsten or Molybdenum metal most suitable materials for making part **C** **(1mark)**

c) Why is part **B** made of thick copper metal **(1mark)**

d) Why should the machine should be surrounded by material **G**? **(1mark)**

e) Why is the tube evacuated? **(1mark)**

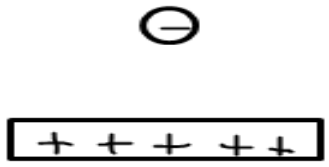
f) What effect will increasing current at **F** have on x-ray produced? **(1mark))**

g) What effect will increasing the p.d. between at **B** and **F** have on the x-rays produced **(1mark)**

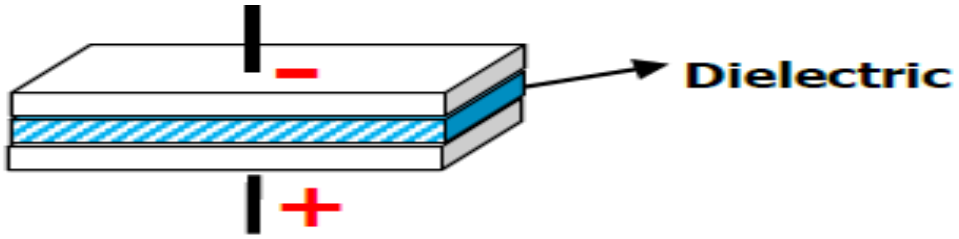
h) State **one** way in which cooling is achieved in this X-ray machine. **(1mark)**

18. .(a) State one difference between a capacitor and a cell. **(1mark)**

(b) Sketch the electrostatic field pattern due to the arrangement of the charges shown **(1mark)**



(c) The diagram shows a parallel plate capacitor with a dielectric material in between the plate.



State how each of the following quantities are affected when the dielectric material is pulled out of the parallel plates.

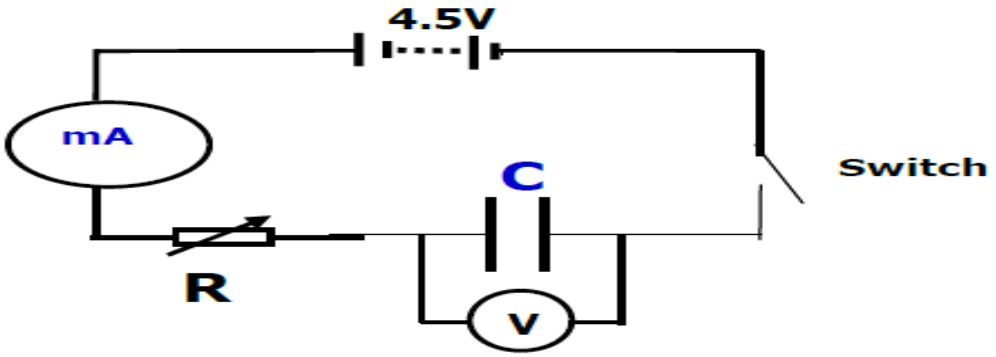
(i) The p.d across the plates. **(1mark)**

(ii) The charge on the plates. **(1mark)**

(iii) The capacitance of the system. **(1mark)**

(d) Three capacitors of 1.5μF, 2.0 μF and 3.0 μF are connected in series to p.d. of 12V. Find the total charge stored in the arrangement **(3marks)**

(e) The figure below shows a capacitor **C** being charged.



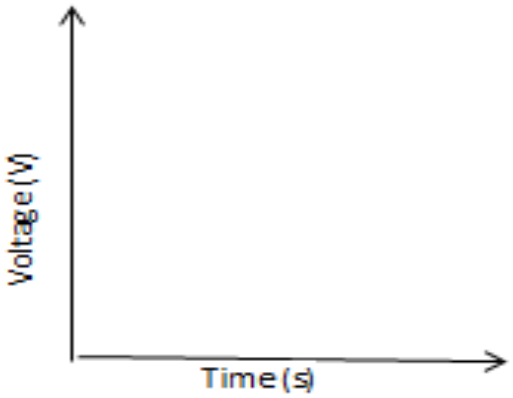
State what would be observed on the following when the switch is closed:

(i) The milliameter **(1mark)**

(ii) The voltmeter **(1mark)**

(iii) Explain how the capacitor is charged. **(2marks)**

(c) On the axis provided, sketch the graph of voltage (V) against time (t) **(1mark)**



KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 10)

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME…… ADM NO; ……

CLASS…… DATE……

SIGN: ……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

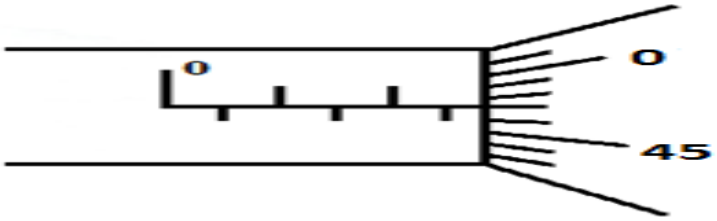
i) *Write your name and admission number in the spaces provided above.*
ii) *Sign and write the date of examination in the spaces provided above*
iii) *This paper consists of **TWO** sections **A** and **B.***
iv) *Answer **ALL** the questions in section **A** and **B** in the spaces provided.*
v) *All working **MUST** be clearly shown.*
vi) *Non programmable silent calculators may be used.*
vii) *ALL numerical answers must be expressed in decimal notation.*
Constant: g=10N/kg or 10m/s^2

FOR OFFICIAL USE

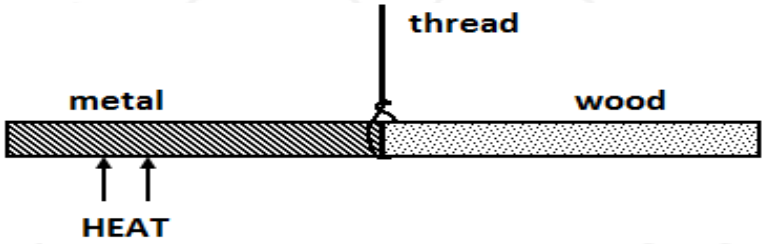
Section	Question	Max. Score	Candidate's score
A	1-13	25	
B	14	12	
	15	14	
	16	09	
	17	08	
	18	12	
TOTAL SCORE		**80**	

SECTION A: 25 MARKS

1. The figure below shows a part of micrometer screw gauge with a zero error of -0.04mm. Write down the exact length measured. **(2 marks)**



2. The following figure shows a rod made of wood on one end and metal on the other end suspended freely with a piece of thread so that it is in equilibrium.



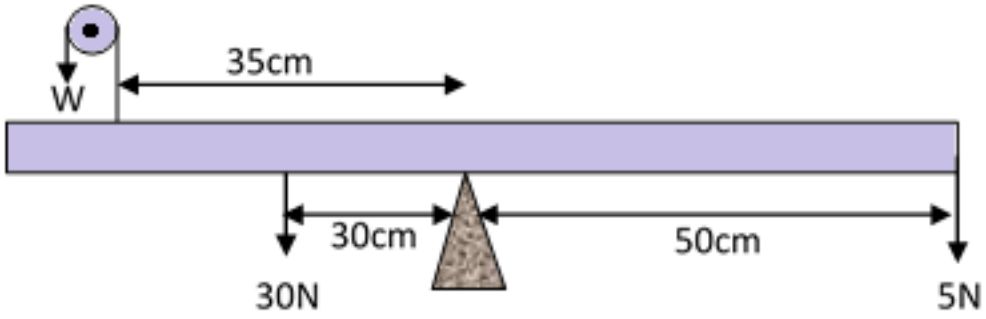
The side made of metal is now heated with a Bunsen flame. State and explain the observation that will be made after some time. **(2marks)**

3. Estimate the size of an oil molecule if a drop of oil of volume 6.0×10^{-10} m^3 forms a patch of diameter 32 cm on a water surface. **(2marks)**

4. An immersion heater rated at 180W is placed in a liquid of mass 2kg. When the heater is switched on for 7.5 minutes the temperature of the liquid rises by 40°C. Determine the specific heat capacity of the liquid. **(3marks)**

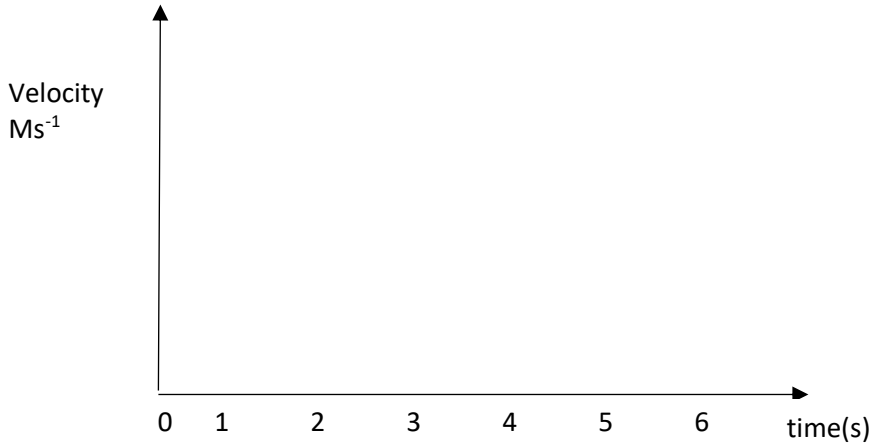
5. Other than increase in temperature state one other way of lowering the surface tension of a liquid. **(1mark)**

6. The figure below shows a uniform bar pivoted at its centre and is at equilibrium.



Determine the value of W. **(3marks)**

7.(i) Sketch a velocity – time graph on the axes provided for an object thrown vertically upwards with initial velocity 20 ms^{-1} and takes 2 seconds to reach maximum height. **(1 mark)**



(ii) Calculate the maximum height attained by the object in 7 (i) above **(2 marks)**

8. In an experiment to demonstrate Brownian motion, smoke was placed in a smoke cell and observed under a microscope. State and explain the observation. **(2marks)**

9. State a reason why a burn from steam at 100^0C is more severe than a burn from boiling water at the same temperature **(1 mark)**

10. Explain why the rate of heat flow in a conductor increases with increase in cross-section area. **(1 mark)**

11.A piece of paper is held in front of the mouth and air blown horizontally over the paper, it is observed that the paper get lifted up. Give reason for the observation. **(1mark)**

12. In the study of free fall, it is assumed that the gravitational force F acting on a given body of mass, m is given by F = mg. State two other forces that act on the same body. **(2marks)**

13.A girl in a school in Nakuru plans to make a barometer using a liquid of density 1.25gcm^{-3}. If the atmospheric pressure in the school is 93750Nm^{-2}. Determine the minimum length of the tube that she will require? **(2 marks)**

SECTION B (55MARKS)

ANSWER ALL QUESTIONS IN THIS SECTION

14a) (i) State Archimedes' Principle. **(1mk)**

(ii)A metal block weighs 1.04N in air, 0.64N when fully immersed in water and 0.72N when fully immersed in a liquid. If the density of water is 1000 kg m^{-3}, find:

I) the density of the liquid. **(2mks)**

II) The density of the metal block. **(2mks)**

b) A crane lifts a load of 2000Kg through a vertical distance of 3.0m in 6 seconds.

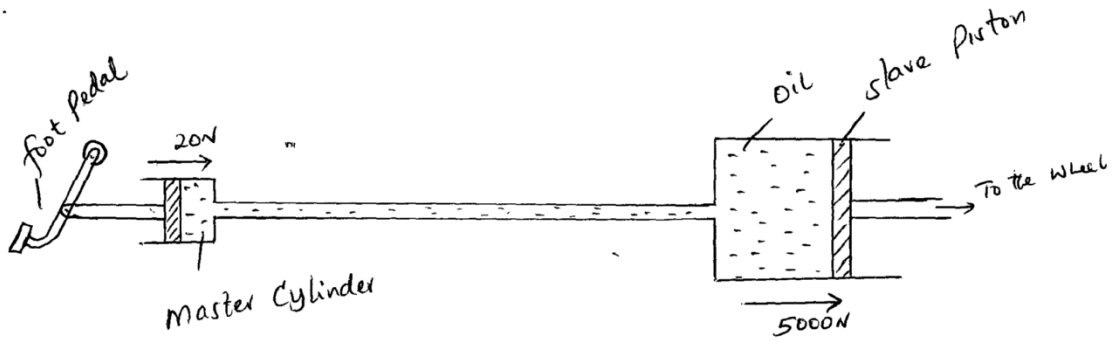
Determine the;

i) Work done by the crane. **(2mks**

ii) Power developed by the crane. **(2mks)**

iii) Efficiency of the crane given that it is operated by an electric motor rated 12.5kW. **(2mks)**

15. (A) The figure below shows a hydraulic brake system.



A force of 20 N is applied on the foot pedal connected to a master cylinder piston of area 500cm^2. This causes a stopping force of 5,000N on one wheel. Calculate.

i) Pressure on the master cylinder **(2 marks)**

ii) Area of the slave cylinder piston. **(2 marks)**

iii) Velocity ratio of the system. **(2 marks)**

B) I) State the reason why a body in uniform circular motion is said to be accelerating. **(1 mark)**

II) A particle moving along a circular path of radius 5cm describes an arc of length 2cm every second. Determine:

(i) Its angular velocity. **(1mark)**

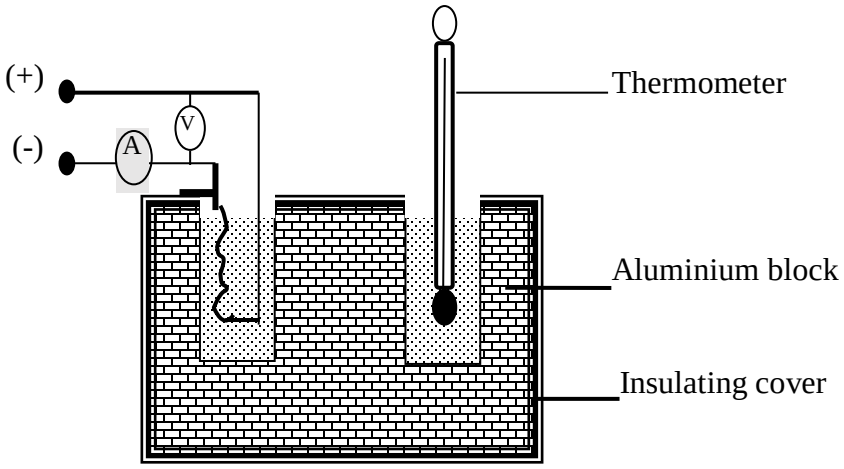
(ii) Its periodic time. **(2marks)**

c) A stone of mass 150g is tied to the end of a string 80cm long and whirled in a vertical circle at 2rev/s. Determine the maximum tension in the string. **(3marks)**

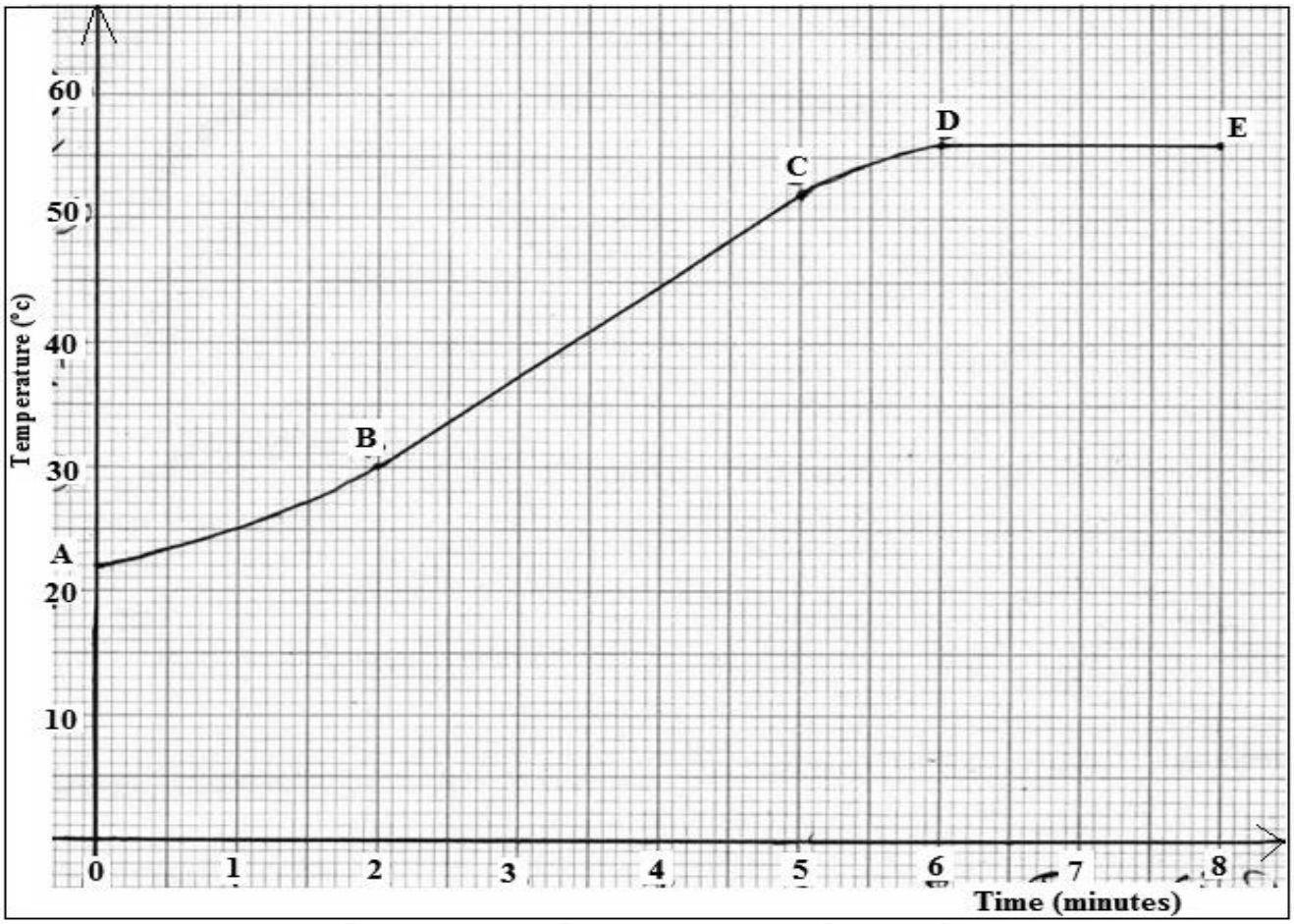
(d) State **one** factor affecting centripetal force **(1mark)**

16a) Define "specific heat capacity" of a substance **(1mark)**

b) In an experiment, an aluminum block of mass 2kg was heated using an immersion heater as shown in figure below.



The temperature of the block was recorded every minute for exactly five minutes and then the heater was switched off. A graph of temperature in ^oC against time in minutes for the experiment is shown below.



Using the graph, Suggest why;

i) The reading in the thermometer rose relatively slowly between point A and B. **(1mark)**

ii) The temperature continued to rise after the heater was switched off **(1mark)**

iii) Use the straight portion of the graph (B to C) to calculate the specific heat capacity of the aluminum given that the voltmeter reads 22.0 V and ammeter 10.0 A throughout the experiment. **(3 marks)**

c) Giving a reason explain why the value calculated in b) (iii) will not be accurate. **(1 mark)**

d) A faulty thermometer reads 40^0Cwhen dipped in pure melting ice and 240^0C when in contact with steam above pure boiling water. What would the same thermometer read when put in water at 50^0C? **(2 marks)**

17 (a) A stone is thrown horizontally with a velocity of 45m/s from the top of a vertical tower 50m high. Determine:

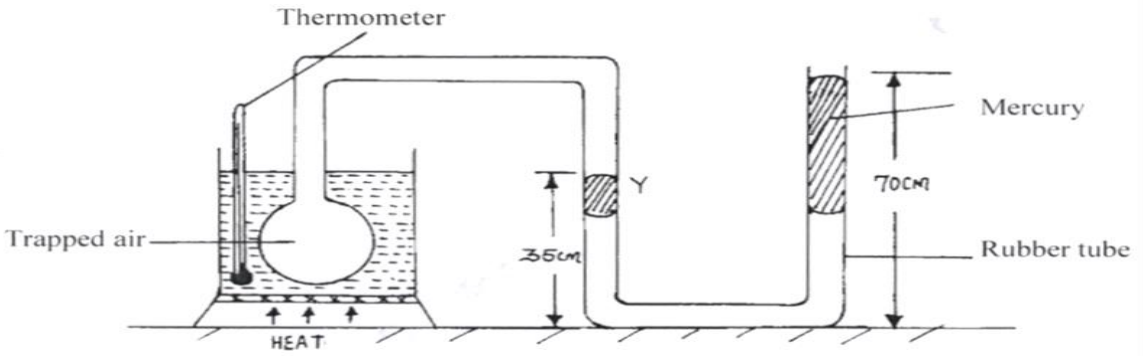
i.The time taken by the bullet to reach the bottom of the ground **(2 marks)**

ii. The maximum horizontal distance covered by the bullet **(2marks)**

b) i) Distinguish between elastic and inelastic collision. **(1mark)**

ii) A car of mass 800 kg collides heads on with a truck of mass 5000kg travelling at 40 m/s. The car is thrown to the bonnet of the truck which continues to move after impact at 10 m/s in the original direction. How fast was the car moving? **(3marks)**

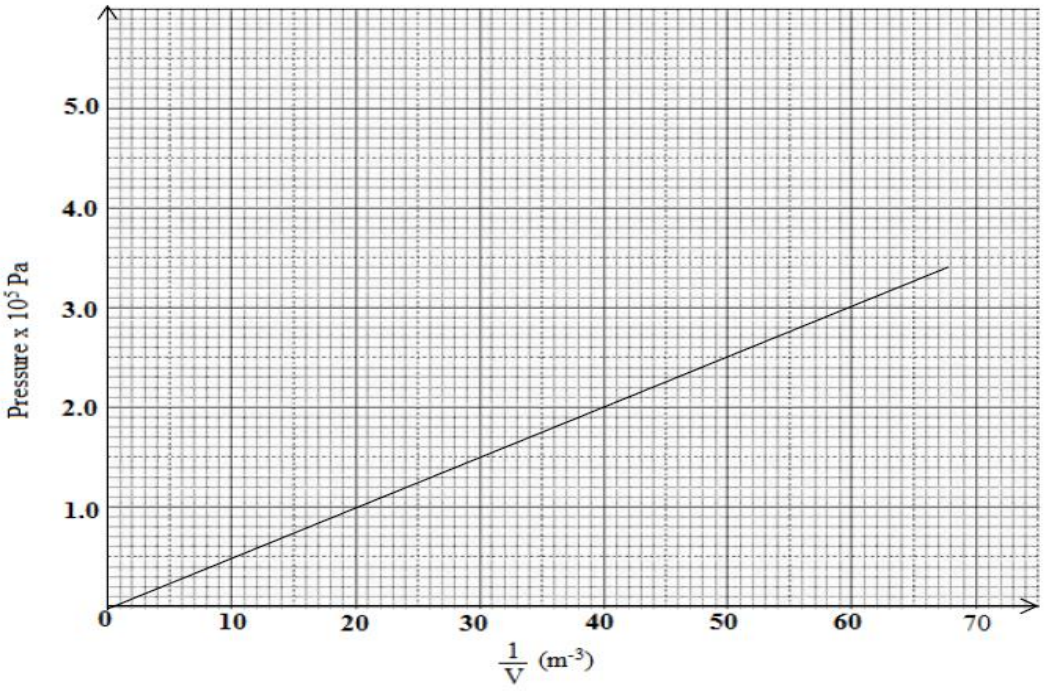
18. Figure below shows the apparatus that a student used to investigate the relationship between temperature and pressure of a fixed mass of a gas at constant volume.



a) i) Describe how the student should ensure that all air trapped has the same temperature as indicated by the thermometer. **(2 marks)**

ii) Give a reason why it is necessary to ensure that before taking any reading on pressure, the liquid level should reach the level marked Y. **(1 mark)**

(b) The pressure P of a fixed mass of a gas at a constant temperature of T = 200K is varied continuously and values of corresponding volume recorded. A graph P against $\frac{1}{V}$ is shown on grid below.



(i) determine the volume of the gas when the pressure reads 2.8 x **10^5pa** **(2 marks)**

(ii) find the value of R given that the pressure P and volume V of the gas are related by the equation $T = \frac{PV}{2R}$, where R is a constant **(4 marks)**

(c) The pressure of the air inside a car tyre increases if the car stands out in the sun for some time on a hot day. Explain the pressure increase in terms of the kinetic theory of gases. **(2 marks)**

(d) A gas is put into a container of fixed volume at a pressure of 3.6 x 10^5 Nm^{-2} and temperature 27°C. The gas is then heated to a temperature of 177°C. Determine the new pressure **(3 marks)**

THIS IS THE LAST PRINTED PAGE.

KCSE 2024 REPLICA PREDICTION

(POSSIBLE TRIAL 10)

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME…… ADM NO; ……

CLASS…… DATE……

SIGN: ……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

- *Write your name, admission number, class and date in the spaces provided at the top of the page.*
- *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	CANDIDATE'S SCORE
A	1 – 12	
B	13	
	14	
	15	
	16	
	17	
TOTAL		

SECTION A: (25 MARKS)

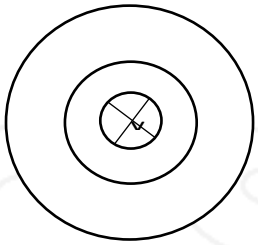
Answer all questions in the space provided

1. What is meant by virtual image? **(1mk)**

2. i) Arrange the following electromagnetic waves in order of their increasing wavelength *visible light, X-rays, Microwaves, infrared radiation.* **(1 mk).**

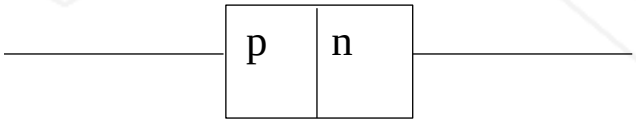
ii) Name one device that can be used to detect infrared radiation. **(1mk)**

3. Indicate the direction of the magnetic field in the conductor carrying current shown below. **(1mk)**



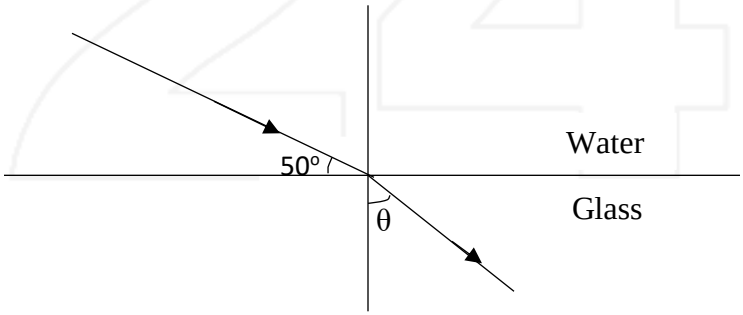
4. i) Define the term 'doping'. **(1mk)**

ii) The diagram below shows a p – n junction diode.



Complete the diagram above to show how the diode can be connected in reverse bias mode**. (1mk)**

5. Given that the refractive index of glass is 3/2 and that of water is 4/3. Determine the value of angle in the figure below. **(3mks)**



6. State two factors that determine how far X- rays penetrate a given material. **(2mks)**

7. i) Uranium $^{238}_{92}U$ emits an alpha particle to become another element X as shown in the equation below.

$$^{238}_{92}U \longrightarrow {}^{a}_{b}X + \text{alpha particle}$$

Determine the values of a and b. **(2mks)**

ii) State two sources of background radiation. **(2mks)**

8. i) Explain why Nichrome wire is used as a heating element rather than copper. **(1mk)**

ii) An electric bulb is rated 240V, 100W. Calculate the amount of current through its filament. **(2mks)**

iii) If ten such bulbs were used in a house for lighting, determine the most suitable fuse value. **(1mk)**

9. State two conditions for the formation of a stationary wave. **(2mks)**

10. A gun is fired and an echo heard at the same place 0.6s later. How far is the barrier which reflected the sound from the gun? (Speed of sound in air = 330m/s). **(3mks)**

11. State how polarization is reduced in a dry cell. **(1mk)**

12. A negatively charged rod is brought near the cap of lightly charged electroscope. The leaf divergence first reduces but as the rod comes nearer, it diverges more. State the charge of the electroscope. **(1 mk)**

SECTION B (55 MARKS).

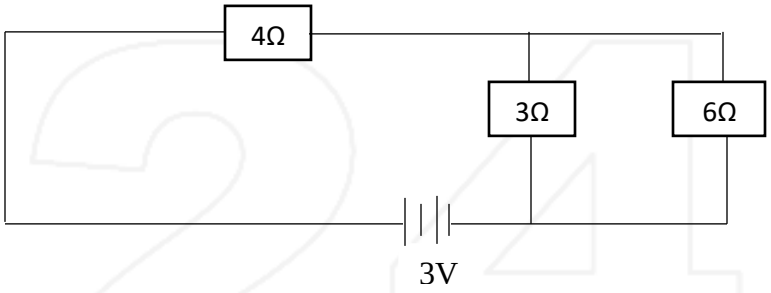
Answer all the questions in the spaces provided

13. a) State one condition under which ohm's law is obeyed in a metal conductor. **(1mk)**

b) You are provided with three resistors R_1, R_2 and R_3 connected in parallel. If the p.d across them is V, show that an expression for the effective resistance of the three resistors is given by.

$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ **(3mks)**

c) The diagram below shows the resistors connected in a circuit.



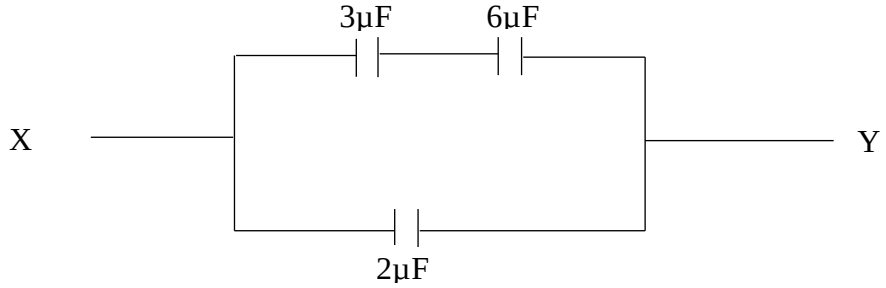
Calculate:

i) The total resistance in the circuit. **(2mks)**

ii) Total current flowing in the circuit. **(2mks)**

d. i) State one way of increasing the capacitance of a parallel plate capacitor. **(1mk)**

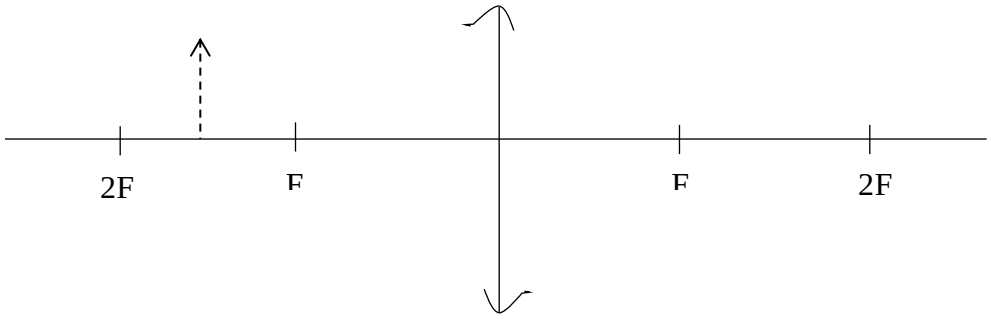
ii) The diagram below shows a simple network of capacitor.



If the potential difference between X and Y is 12V, calculate the total charge stored by the capacitors. **(3mks)**

14. a) Define Principal focus of a biconcave lens

b)The diagram below shows a virtual image of an object placed in front of a biconvex lens



Draw appropriate rays to locate the objects. **(3mks)**

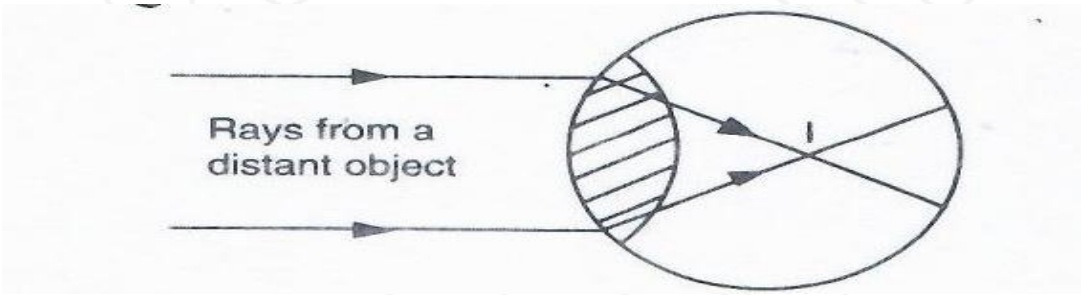
c). A convex lens forms a real image five times the size of the object on a screen. If the distance between the object and screen is 120cm.

Determine:

i. Image distance **(1mk)**

ii. Focal length. **(2mks)**

d) The diagram below shows a defect in human eye.



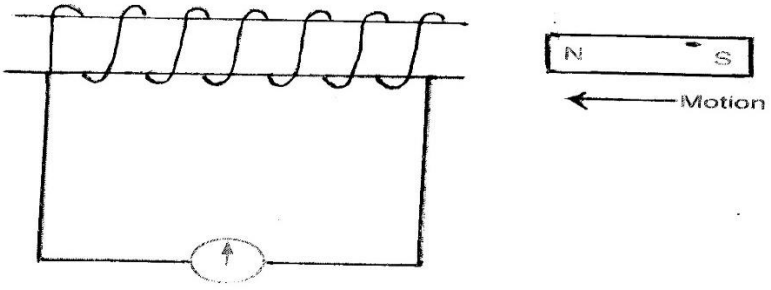
(i) Name the defect. **(1mk)**

ii) State one cause of the defect. **(1mk)**

iii) How can the defect be corrected? **(1mk)**

15. a) State Lenz's law of electromagnetic induction. **(1mk)**

b) The figure below shows a bar magnet being moved into a coil connected to a galvanometer in the direction indicated.



State the observation made on the galvanometer when:

i. The magnet is moved into the coil at a steady speed. **(1mk)**

ii. The magnet is held stationary inside the coil. **(1mk)**

c) How is a transformer designed to minimize energy losses through flux leakage? **(1mk)**

d) The primary coil of a transformer has 2000 turns and is connected to a 240V a.c supply. The secondary coil has 400 turns.

i. State with a reason the type of the transformer. **(1mk)**

ii. Determine the voltage in the secondary coil. **(2mks)**

iii. If the current flowing in the primary coil is 0.5A and in the secondary coil is 2.0 A determine the efficiency of the transformer. **(2mks)**

e) Electrical energy is transmitted at very high voltage and low current.

i. State how the high voltages are attained. **(1mk)**

ii. State two reasons why aluminum wires are preferred to copper wires for transmission over long distances. **(2mks)**

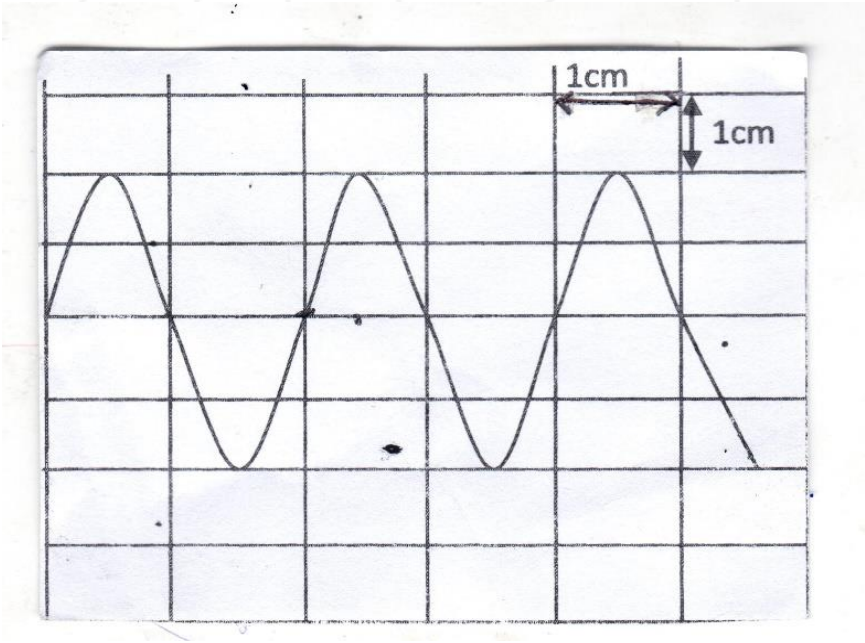
16. a) What is thermionic emission? **(1mk)**

b) Explain why a cathode ray tube is evacuated. **(1mk)**

c) Heated cathodes are coated with oxides of such metal as barium, Strontium or thorium. Explain. **(1mk)**

d) State one property of cathode rays. **(1mk)**

e) The figure below shows the waveform displayed on C.R.O screen when an alternating voltage is applied on the Y – input. The time – base is at 1ms/cm and the Y- gain at 10v/cm.



Calculate :

i. The pick voltage of the input signal. **(2mks)**

ii. The frequency of the a.c signal. **(2mks)**

f) In a certain X- ray tube, the electrons are accelerated by p.d of 12kv. Assuming that all the energy goes to produce X-rays, determine the frequency of the X rays produced.

(take planck's constant h = 6.62 x10 $^{-34}$ Js, and the charge of an electron e = 1.6 x 10 $^{-19}$ C) **(3mks)**

17. a) It is observed that when ultra – violet radiation is directed onto a clean Zinc plate connected to the cap of a negatively charged leaf electroscope, the leaf falls.

i. Explain this observation. **(1mk)**

ii. Explain why the leaf of the electroscope does not fall when infrared radiation is directed onto the zinc plate. **(1mk)**

b) State the effect on the electrons emitted by the photoelectric effect when the intensity of incident radiation is increased. **(1mk)**

c) The maximum wavelength required to cause photoelectric emission on a metal surface is 8.0 x 10 $^{-7}$ m. The metal surface is irradiated with light of frequency 8.5 x 10 ^{14} Hz.

(Take lev = 1.6 x 10 $^{-19}$ J , c = 3.0 x 10 ^{8} m/s , h= 6.63 x 10 $^{-34}$ Js)

Determine:

i). The threshold frequency. **(2mks)**

ii) .The work function of the metals in electron volts. **(2mks)**

iii) . The maximum Kinetic energy of the electrons. **(3mks)**