KCSE MOCKS

PHYSICS

SET 1

FOR MARKING SCHEMES CALL/WHATSAPP

0707550000 / 0705525657

(MOCKS TRIALS 1-15)

A COMPILATION OF RECENT TOP NATIONAL SCHOOLS PHYSICS MOCKS IDEAL FOR KCSE REVISION PURPOSES

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KCSE MOCK TRIAL 1

PHYSICS

PAPER 1

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A (25 marks)

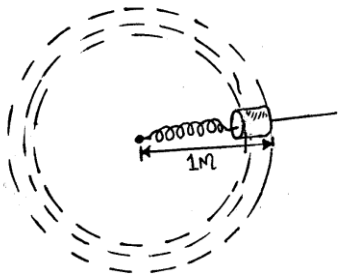
Answer all the questions in this section in the spaces provided.

1. Draw a section of a vernier calipers showing a reading of 10.35cm. (2 marks)

2. Figure 1 below represents a spiral spring being rotated in a horizontal circle at a constant speed. The length of the spiral spring including a mass of 100g at its end is 1m. The spring constant of the spring is 0.5N/cm. Calculate the extension produced in the spring when the spring is rotated at a constant speed of $4ms^{-1}$.

(3 marks)

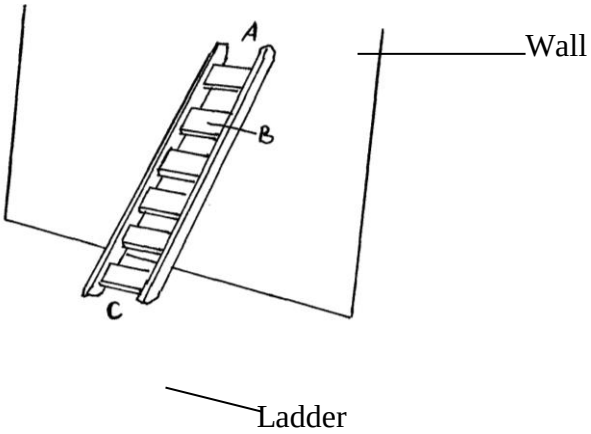
fig 1



3. Figure 2 below shows a ladder resting on a wall.

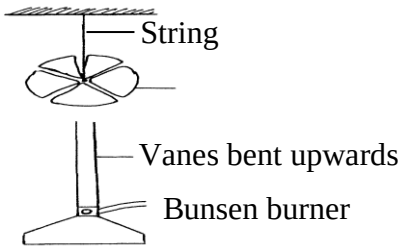
Indicate all the forces acting at points **A**, **B**, and **C**.

fig 2



4. Figure 3 below shows a paper vane suspended above a Bunsen burner with a light flexible string.

fig 3



State and explain the observation which is likely to be made when the burner is lit. (2 marks)

5. A glass bottle dropped on a surface is more likely to break if the surface is made of concrete than if it is made of wood. Explain why?

(1 mark)

6. Complete the clinical thermometer shown in figure 4 giving its temperature range. (2 marks)

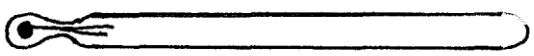


fig 4

7. The diagram in figure 5 below represents a motor car hydraulic braking system.

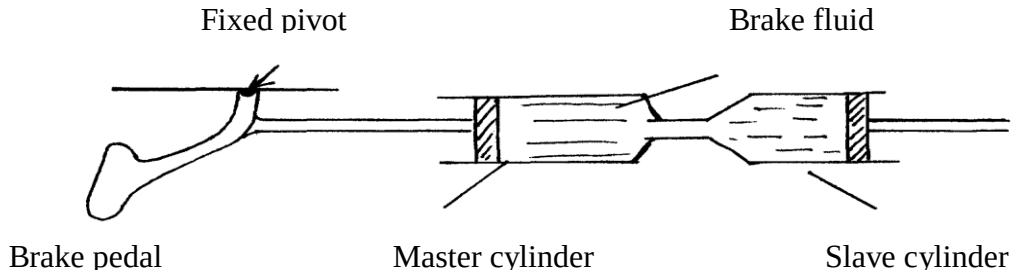


Fig 5

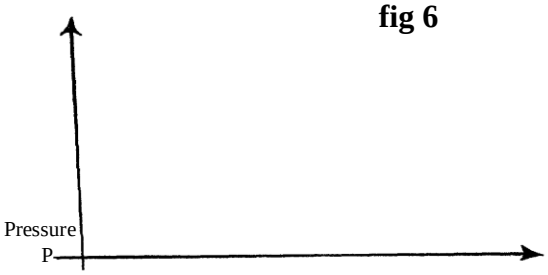
(i) State two properties of the liquid used as brake fluid. (2 marks)

(ii) Explain briefly how the system works. (2 marks)

8. On the axis provided, sketch the graph of pressure versus volume of a fixed mass of a gas that obeys Boyle's law.

(1 mark)

fig 6



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

(3 marks)

10. The level of water in a burette is $27cm^3$. If 88 drops of water fall from the burette and the average volume of one drop is 0.25 cm^3. What is the final water level in the burette?

(2 marks)

11. Figure 6 below shows a track loaded such that its centre of gravity is as shown with a dot.

More weights are added on the top of the first load. Indicate on the diagram, the relative position of the new centre of gravity. (1 mark)

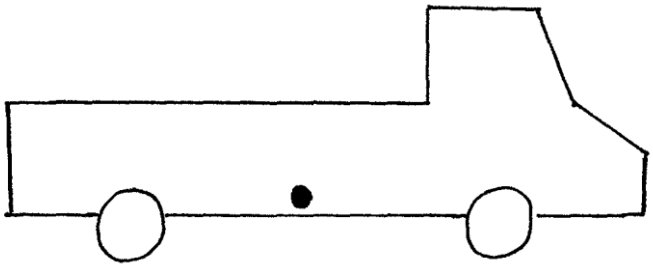


fig 6

12. Define the force in terms of momentum. (1 mark)

13. The figure 7 below shows water flowing through a pipe with three similar vertical columns. Indicate the direction of the flow in the main pipe and explain why the water levels in the columns are not the same.
(1 mark)

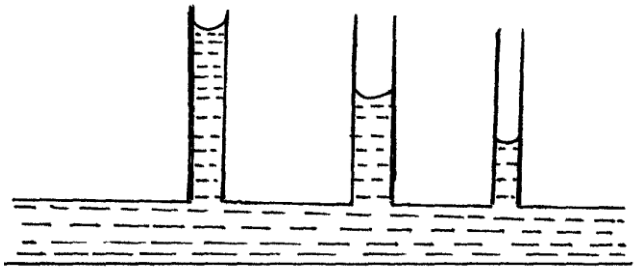


fig 7

SECTION B (55 marks)

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

14. The figure 8 below shows a non-uniform rod, lying in a horizontal position. Vertical forces of 5N and 4N can lift the rod when applied at the ends A and B respectively.

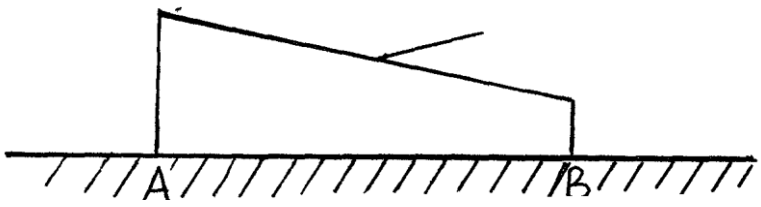


Fig 8

If the rod is 1.8m long find, with the help of a diagram, calculate the:

(a) (i) Weight of the rod. (3 marks)

(ii) position of the centre of gravity. (2 marks)

(b) A wooden block is pulled along a rough table by a force F, at a constant velocity. What is the value of the frictional force acting on it?
(1 mark)

(c) Figure 9 shows a body being pulled by a constant force of 10N for a distance of 4m over a wooden surface. The co-efficient of friction is 0.03.

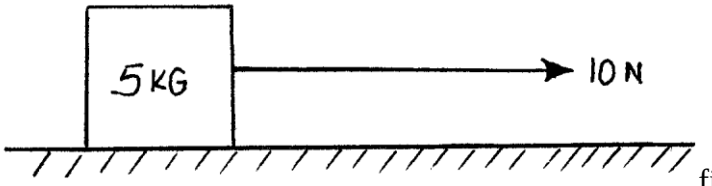


fig 9

Find the:

(i) Acceleration of the body (3 marks)

(ii) Velocity of the body after the 4 metres. (3 marks)

(iii) Kinetic energy of the body after the 4 metres. (3 marks)

(d) In the figure 10 below, sketch a graph showing the variation of velocity with time for a sphere moving in a viscous liquid in a tall measuring cylinder. Show the terminal velocity, V_T on the graph

.



Fig 10

15. (a) You are provided with the following:

A spring balance, some mass (50g and 100g), a piece of thread, water in a beaker and kerosene in a beaker.

Describe an experiment to determine the relative density of the kerosene applying Archimedes' principle. Draw any suitable diagrams. (6 marks)

(b) A wooden block of mass 375g and density 750kgm^{-3} is held under water by tying it to the bottom of the container with a light thread. Determine the tension in the thread. (Density of water e = 1000kgm^{-3})

(c) A sphere suspended from a spring balance in air has its weight recorded as 6N when submerged half-way in water, the spring balance reads 4.2 N. Calculate the volume of the sphere.
(3 marks)

16. (a) Define the term Latent heat. (1 mark)

(b) Figure 11 below shows a block of ice with two heavy weights hanging such that the copper wire/ string connecting them passes over the block of ice.

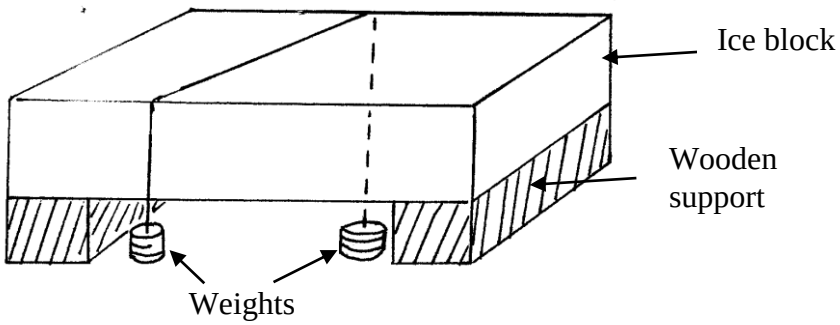


Fig 11

(i) It is observed that the wire gradually, cuts its way through the ice block, but leaves it as one piece. Explain.
(5 marks)

(ii) What change would be observed if the copper wire used in the experiment was replaced by a cotton thread. Explain your answer. (2 marks)

(c) 3kg of hot water was added to 9 kg of cold water at 10°C and the resulting temperature was 20°C. Ignoring heat gained by the container, determine the initial temperature of hot water. (Specific heat capacity of water = 4200J/kg/K) (3 marks)

(d) State the difference between boiling and evaporation. (1 mark)

17. (a) What is Brownian motion? (1 mark)

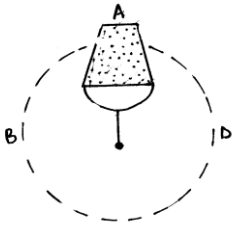
(b) Describe with the aid of a diagram, the apparatus you could set up in order to demonstrate Brownian motion of smoke particles suspended in air.
(5 marks)

(c) Explain what happens to the motion of smoke cell experiment when the set up is moved to a cooler environment.
(1 mark)

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

(b) Figure 12 shows a pail of water being swung in a vertical circle.

fig 12



Explain why the water does not pour out when the pail is at position A as shown. (1 mark)

(c) A string of negligible mass has a bucket tied at the end. The string is 60cm long and the buckets has a mass of 45g. The bucket is swung horizontally making 6 revolutions per second. Calculate:

(i) The angular velocity. (1 mark)

(ii) The angular acceleration. (2 marks)

(iii) The tension on the string. (2 marks)

(iv) The linear velocity. (1 mark)

KCSE MOCK TRIAL 1

PHYSICS

PAPER 2

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A (25 marks)

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

1. State two ways in which capacitance of a parallel plate capacitor can be increased. (2 marks)

2. Figure 1 below shows a current carrying conductor placed perpendicularly between the poles of a magnet.

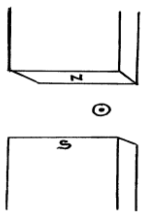


fig 1

Show on the diagram:

(a) the magnetic field pattern. (2 marks)

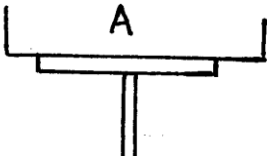
(b) direction of net force on the conductor. (1 mark)

3. Sketch a distance – time graph of a wave of amplitude 0.75cm and frequency 2Hz over a time 2 seconds in the space provided below. (2 marks)

4. State Snell's law. (1 mark)

5. Arrange the colours; Red, Blue and Green in the order of increasing wavelength. (1 mark)

6. Two metal cans A and B of different sizes rest on two identical gold leaf electroscopes as shown in figure 2 (a) and 2 (b) below



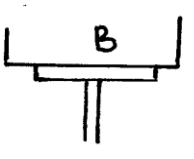


Fig 2(a) Fig 2 (b)

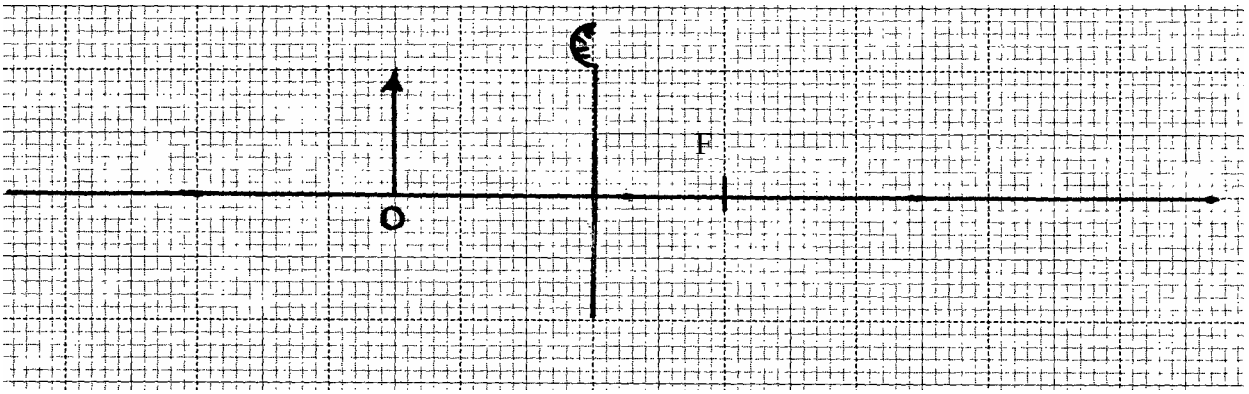
Compare the divergence of the gold leaves of the two electroscopes. (1 mark)

7. Give **one** reason why manganese (iv) is used in a dry cell. (1 mark)

8. One dry afternoon, a housemaid took a piece of cloth and decided to wipe a radio cassette recorder which was dusty. However as soon as she stopped wiping, she noticed fresh accumulation of dust on the recorder. This continued happening no matter how many times she repeated the process wiping. Explain. (2 marks)

9. Figure 3 below represents an object, O, placed in front of a curved mirror.

By drawing suitable rays, complete the diagram to show the position of the image and state its characteristics. (3 marks)



10. Figure 4 below shows a p-n junction diode.

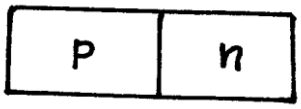


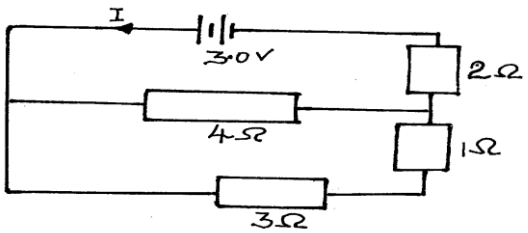
fig 4

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

11. Two electric cells with a net emf of 3.0V are connected to a network of resistors as shown in figure 5 below. Each cell has an internal resistance of 0.5Ω

Determine the value of the current, I (3 marks)

fig 5



12. The diagram in figure 6 below shows a defect of the human eye.

Name the defect……. (1 mark)

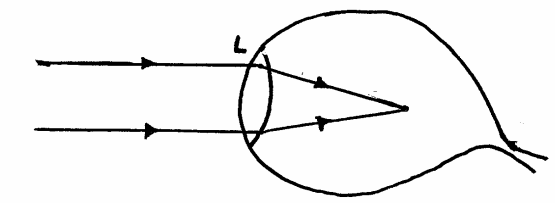


fig 6

13. Figure 7 below shows emergent rays as seen by the eye after reflection from a plane mirror. Complete the ray diagram on the figure 7 above to show the actual position of the object.

(2 marks)

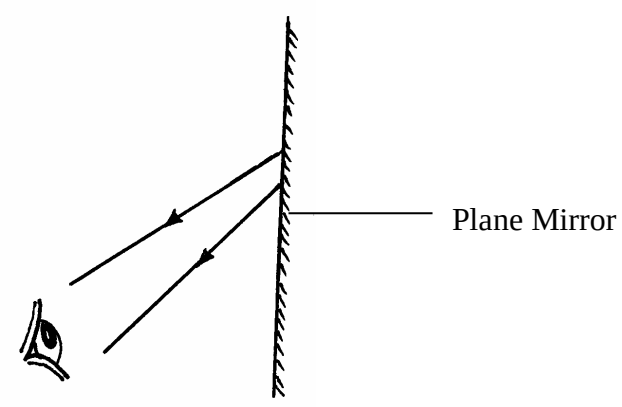


fig 7

14. Uranium – 235 isotope has the symbol $^{236}_{92}U$. When bombarded by a neutron, it splits to give substance X and Y and 2 neutrons. Complete the equation shown to show the value of a and b.

(2 marks)

$$^{236}_{92}U \; + \; ^{1}_{0}n \; \rightarrow \; ^{95}_{56}X \; + \; ^{a}_{b}Y \; + \; 2\,^{1}_{0}n$$

a …….

b. ……

SECTION B (55 marks)

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

15. (a) What is a radioactive substance? (1 mark)

(b) When carrying out experiments with radioactive substances one is instructed that the source should never be held with bare hands but with forceps. Why is this so? (1 mark)

(c) In an experiment to determine the half – life of Radon – 220 ($^{220}_{86}Rn$), the following results

were obtained as shown in table 1.

Time (Seconds)	0	10	20	30	40	50	60	70

Count rate (per second)	30	26	23	21	18	16	14	12

Table 1

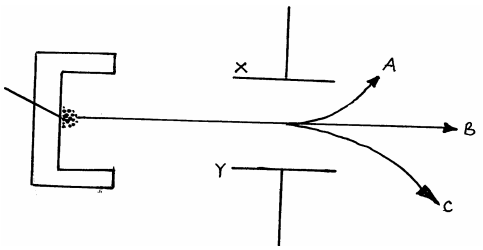
(i) Plot on the grid below the graph of the count rate (y – axis) against time. (5 marks)

(ii) From the graph, determine the half – life of Radon – 220. (1 mark)

(d) The diagram in figure 8 below shows the paths taken by three radiations A, B and C from

a radioactive isotope through an electric field.

Radioactive Isotope



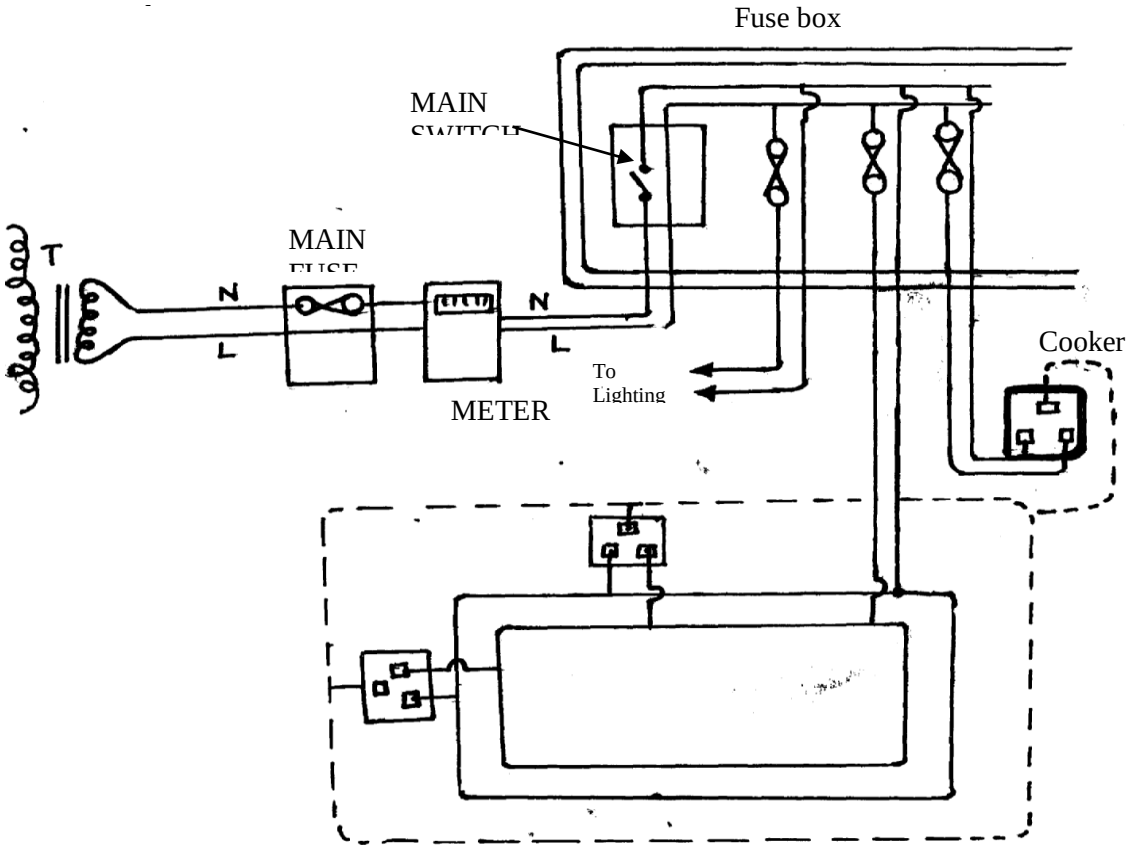
(i) State the charge on plate Y. (1 mark)

(ii) Identify the radiations A and C. (2mks)

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

16. (a) What is a fuse? (1 mark)

(b) The diagram in figure 9 below shows a ring – main circuit used by an electrician in a certain



2 marks)

(ii) Explain why the 3 – pin plug fuse has a longer earth pin than the live and neutral pins. (2 marks)

iii) Identify the type of transformer T used in the diagram in Fig. 9 (1 mark)

(c) A cooker rated 2.0kW was operated for 35minutes each for 30days. If the cost of each kilo – watt – hour unit is Shs. 12.50, Calculate the cost of electricity used. (4 marks)

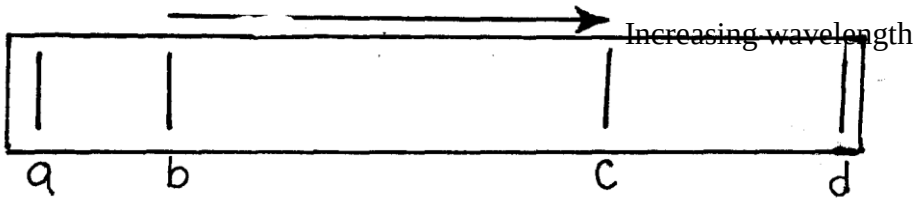
17. (a) Explain the meaning of the words below as used in photoelectric effect.

(i) Photoelectric emission. (1 mark)

(ii) Threshold frequency. (1 mark)

(b) Briefly explain why visible light cannot be used to eject electrons from a freshly cleaned Zinc plate. (2 marks)

(c) The diagram shown in figure 10 below shows part of the emission spectrum of an element.



Light of frequency corresponding to each of the above spectral lines were allowed to strike a metal in turn and in some cases electrons are ejected from the metal.

(i) From which of the above spectral lines is light most likely to eject electrons from the metal plate? Give a reason for your answer. (2 marks)

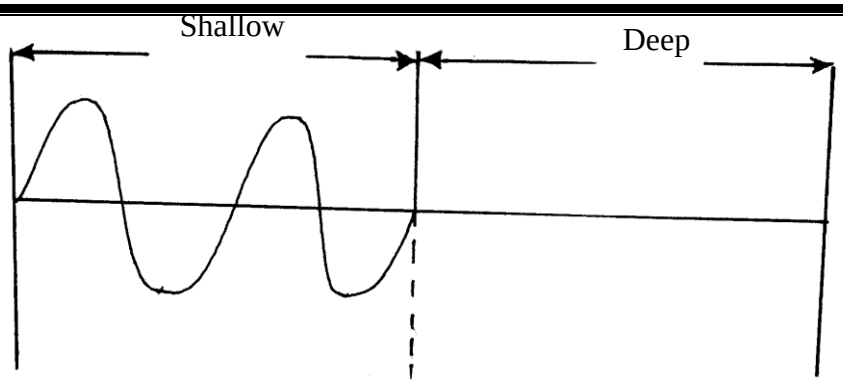
(ii) Light of frequency 5.08×10^{14} Hz corresponding to one of the above spectral lines can eject electrons with kinetic energy of 0.45×10^{-19} J from the metal plate. How much energy is required just to release electrons form the metal plate?(3)

(d) Sodium has a threshold frequency of 4.4×10^{14}Hz. What is the stopping potential when sodium is irradiated with light of frequency 6×10^{14} Hz? (3 marks)

18. (a) (i) State the difference between transverse and longitudinal wave. (1 mark)

(ii) Give **one** example of a transverse wave and one example of a longitudinal wave. (2 marks)

(b) Figure 11 below shows a displacement of a particle in a progressive wave incident on a boundary between shallow and deep regions



(i) Complete the diagram to show what is observed after the boundary (assume no losse of energy) (1 mark)

(ii) Explain the observation in (i) above. (3 marks)

(c) Water waves are observed as they pass a fixed point at a rate of 40 crests per minute. A particular wave crest takes 4 second to travel between two fixed points 10m apart. Determine for the wave:

(i) The frequency (1 mark)

(ii) The wavelength (3 marks)

19. (a) State Ohm's law. (1 mark)

(b) You are provided with the following apparatus:

- Connecting wires
- An ammeter
- Fixed resistor
- A voltmeter
- A variable resistor
- Switch
- 2 dry cells in a cell holder

(i) In the spaces below, draw the circuit that can be used using the apparatus above to verify Ohm's Law. (3 marks)

(ii) Briefly explain how you can obtain the results to verify Ohm's law. (4 marks)

(c) State two ways in which energy losses in a transformer is minimized. (2 marks)

KCSE MOCK TRIAL 2

PHYSICS

PAPER 1

2 HOURS

NAME…….INDEX NO……

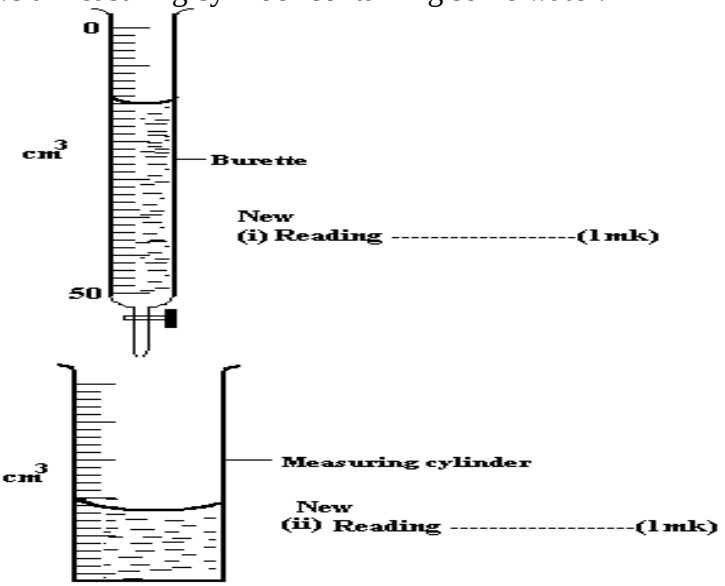
SCHOOL…….. SIGN……

DATE…….

SECTION A (25 Marks)

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

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



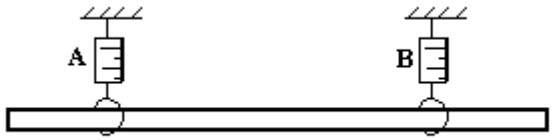
Another 10cm^{3}of water was in to the cylinder from a burette delivering volumes from 0cm^3 to 50 cm ^{3}. Record in the spaces provided the **new reading** indicated on each vessel.

……

……

2. **Sketch** a vernier calipers scale reading 3.41 cm. (1mk)

3. A uniform metallic bar of length 100cm and mass 40kg is supported horizontally by two vertical spring balances A and B as shown below.



Balance A is 20cm from one end while balance B is 30cm from the other end. Find the reading of each individual balance.

A:……

B:……

4. The reading on a mercury barometer at Mombasa is 760mm. **Calculate** the pressure at Mombasa (density 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. (3 marks)

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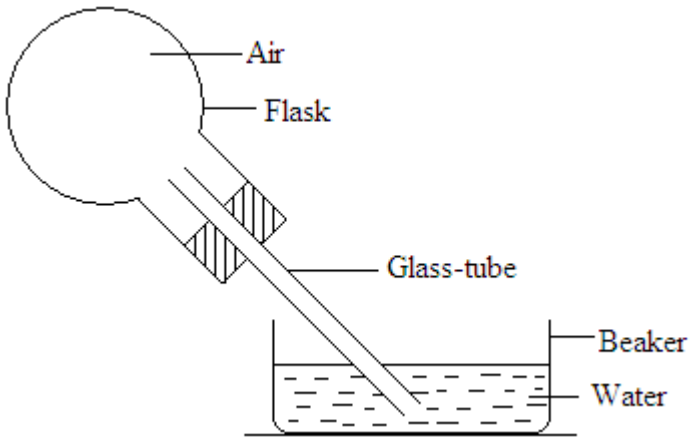
6. When a Bunsen burner is lit below a wire gauge, it is noted that the flame initially burns below the gauze as shown in the figure below. After sometime the flame burns below as well as above the gauze.

Explain this observation (2 marks)

……

……

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

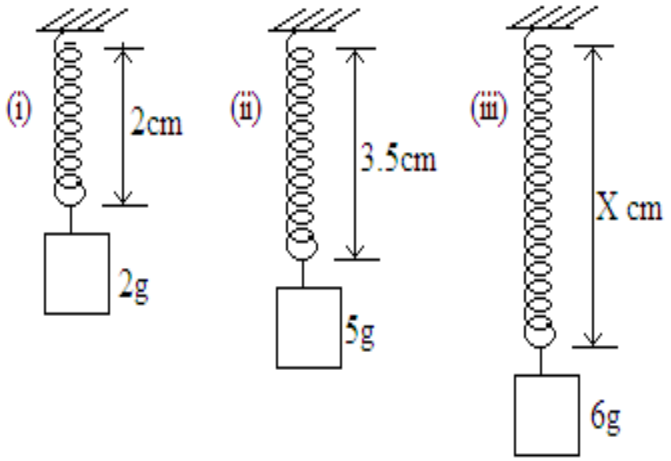


State with reason what would be observed if cold water is poured on to the flash. (2marks)

……

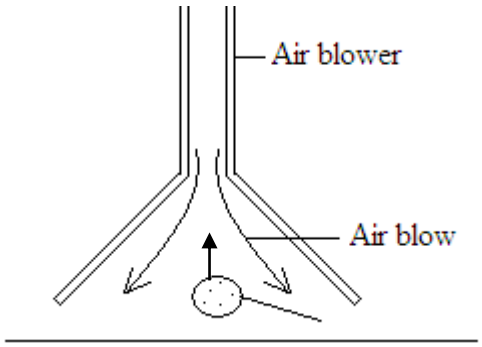
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8. The diagram below shows three identical springs which obey Hooke's law.



Determine the length X. (3 marks)

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



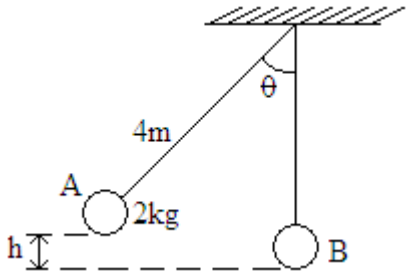
Explain this observation (2 marks)

……
……
……

10. A resultant force F acts on a body of '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. **Express** A_2 in terms of A_1. (3 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 $\left(g = 10m/s^2\right)$ (3 marks)

……
……

SECTION B (55 Marks)

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

12.

(a) Use simple sketches to show the three states of equilibrium.
Name the states. (3 marks)

(i)

(ii)

(iii)

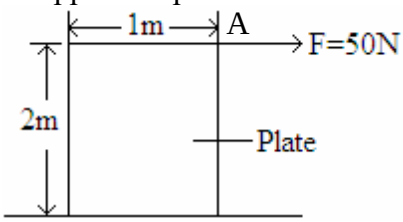
(b) **Define** center of gravity of a body. (1 mark)

……
……

(c) **State two factors** affecting stability of body (2 marks)

……
……

(d) The figure below shows a metal plate 2 m long, !m wide and negligible thickness. A horizontal force of 50 n applied at point 'A' Just makes the plate tilt.



Calculate the weight of the plete. (3 marks)

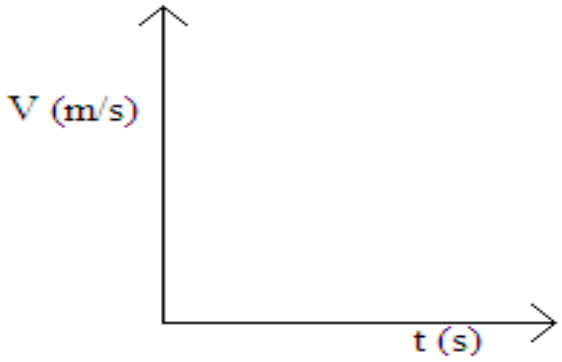
13. A heating element rated 2.5 KM is used to raise the temperature of 3.0 kg of water through 50^0 C. Calculate the time required to affect this. (Specific heat capacity of water is 4200J/kgK). (3 marks)

14. (a) **State** Charles' law (1 mark)

……
……

(b) A mass of gas occupies a volume of $150cm^3$ at a temperature of -73^0C and a pressure of 1 atmosphere. **Determine** the 1.5 atmospheres and the temperature 227 ^{0}C (3 marks)

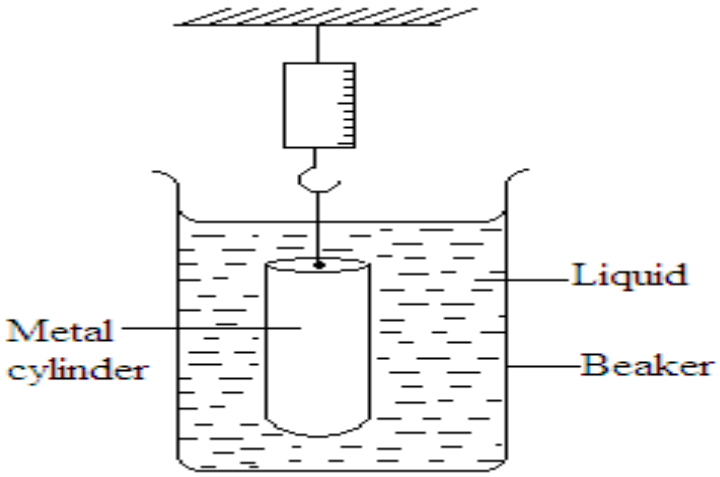
15. (a) On the axes provide below, sketch a graph of velocity V versus time (t) for uniformly accelerated motion given that when t=0, V is greater than zero. (1 mark)



(b) A car is brought to test from a speed of 20 ms^{-1} in time of 2 seconds. **Calculate** the deceleration. (3 marks)

16. A body of mass 0.50 kg is attached to the end of a string of length 50 cm and whirled in a horizontal circle. If the tension in the string is 8/N, **determine** the velocity of the body. (3 marks)

17. In an experiment to determine the density of a liquid a uniform metal cylinder of cross- sectional area cylinder of length 4.5 cm and half from a spring balance and lowered gradually in the liquid as shown below.



The up thrust was calculated from the spring balance and it was found to be 0.5N when the cylinder was fully submerged. **Determine:**

(i) Volume of the metal cylinder. (3marks)

(ii) Mass of the liquid displaced by the cylinder. (2 marks)

(iii) Density of the liquid (3 marks)

18. In an experiment to determine a certain length 'L' in a pendulum experiment the following results were obtained:

Length L (cm)	50	55	60	65	70	75	80	85	90
Time t for10 Oscillations (s)	13.54	13.44	13.13	12.75	12.12	12.03	11.50	10.84	10.09
Period T(s) (Time for one Oscillation)									
$T^4\left(S^4\right)$									
$L^2\left(cm^2\right)$									

(i) Fill – in the table. (6 marks)

(ii) On the grid provided plot a graph of the $T^4\left(y-axis\right)$ against L^2. (5 marks)

(iii) The relationship between T and L is given by the equation:
$T^4 = RL^2 + Q.$

a) **Calculate** the gradient of the graph.

b) Use your graph to **determine the:**
I constants R and Q:
(i) R _____ (1mark)
(ii) Q _____ (1 mark)
II maximum value of 'L' (3 marks)

KCSE MOCK TRIAL 2

PHYSICS

PAPER 2

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A (30 Marks)

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

1. A sharp point of a pin is held in the bare hands of a positive charged electroscope. **State** and **explain** the observation made on the electroscope. (2 marks)

   ……

2. **State two ways** in which energy is lost in a transformer and how it can be minimized in each case. (2 marks)

Source of energy loss	Remedy
(i) (ii)	

3. A bulb marked 60W is connected to 240 mains supply and the current switched on for one minute. **Determine** the number of joules of energy consumed by the bulb in the minute. (2 marks)

4. The fig 1 below shows a ray of light incident on a glass firm

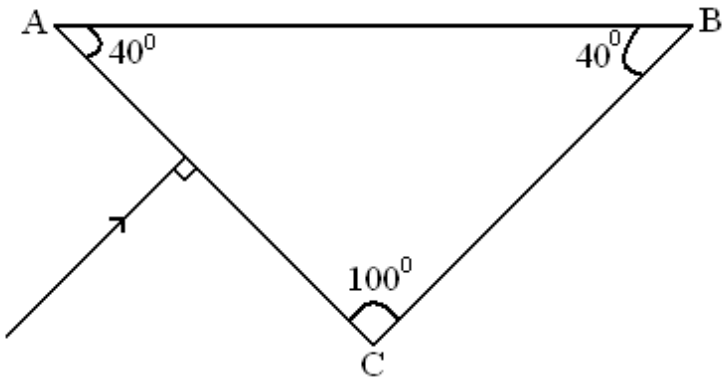


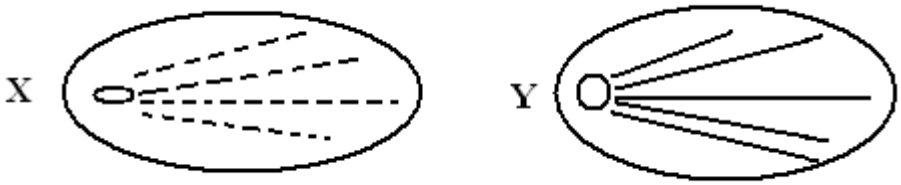
Figure 1

Given that the critical angle for the grass is 39^0, **sketch** on the diagram the parth of the ray through the prism (2 marks)

5. **Complete** the table of electromagnetic spectrum in the increasing order of way length from P to Q

P		X- rays			Infra -Red	

6. **Identify** the type of emissions that formed the tracks in each case below. (2mks)



X: ----------
Y: ----------

7. **Determine** the resistance or the carbon resistor shown in fig 2 below (1mk)

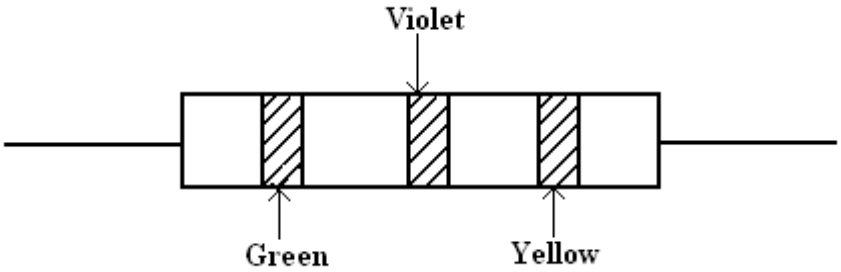


Figure 2

8. The fig 3 below show two conducting wire A and B passing through a horizontal piece of cardboard

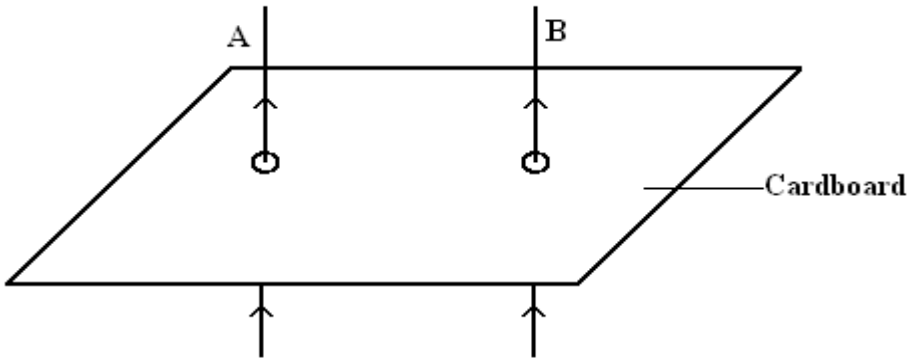


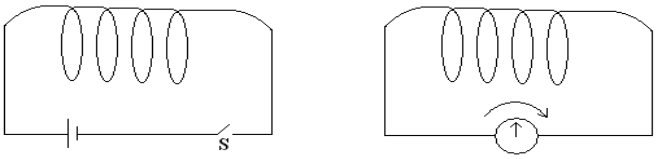
Figure 3

(i) **Sketch** the resultant magnetic field patterns when the currents of the high magnitude are following in both wires as shown. (1 mark)

(ii) **What** is the resulting effect of the field on the wires at the loose ends (1 mark)
……

(iii) If the current in B were to be reversed, **state how** resulting effect the wire conductors. (1 mark)
……

9. (i) **Indicate** the direction in which the pointer will move when switch s pointer will move when switch is closed. (1 mark)



(i) **Give a reason** for your answer (1 mark)
……

10. **State one** advantage of an electromagnet as compared to a permanent magnet (1 mark)
……
……

11. Using the circuit shown in fig 4 below, **calculate** the effective capacitance. (2 marks)

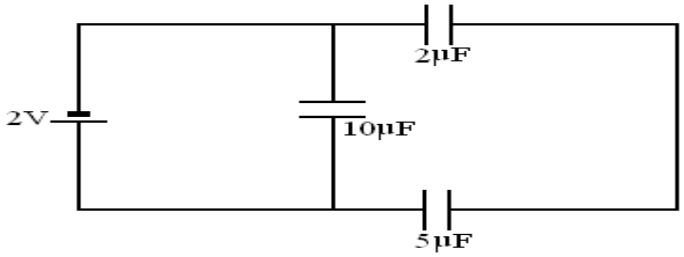


Figure 4

12. **State one** use and **one** source of gamma rays. (2mks)
Use: _____

Source:_____

13. Two resistors are placed in the gaps of metre bridge as shown in the fig 5

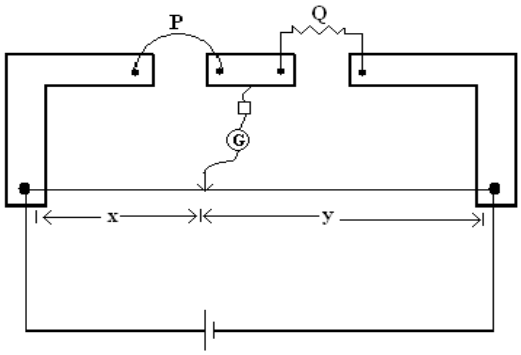


Figure 5

(i) **State the purpose** of the resistor M. (1mk)

……

(ii) A balance point is found when the morable contact touches the meter bridge wire at a distance of $x = 35.5cm$. If Q is a resistor of 10 ohms. When the balance point $y = 15.5cm$, **Find the value** of the resistor P. (2 marks)

14. Joan performed on experiment to measure the focal length of a convex lens. A series of object distances (u) and image distance (v) were recorded and then a graph of uv against u+ v was drawn; as shown.

(i) **Show** that the slope of the graph is equal to the focal length (2 marks)

……

……

(ii) **Determine** the focal length of the lens from the lens from the graph (2 marks)

15. The fig 6 show the effects of eddy currents on a copper metal plate

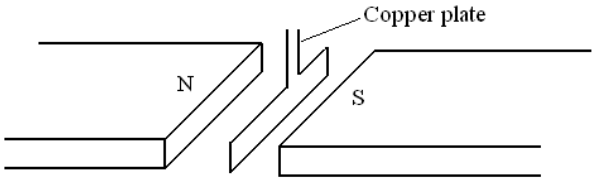
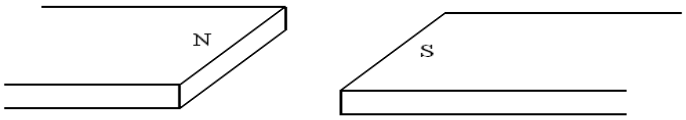


Figure 6

When the copper plate is allowed to swing in a magnetic field, It quick comes to rest. **Draw** on the fig 7 below the new shape of the copper plate between magnets which will take a longer time to corner to rest. (2 marks)



SECTION B (50 Marks)

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

16. (a) **Distinguish between** stationary and progressive waves. (1 mark)

……

……

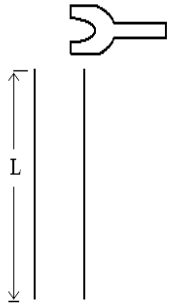
(b) You have been provided with a tuning fork of known frequency a resonance tube, a rule and water on a larger cylinder (container)

Describe an experiment that will help you determine the speed of sound. (4 marks)

……

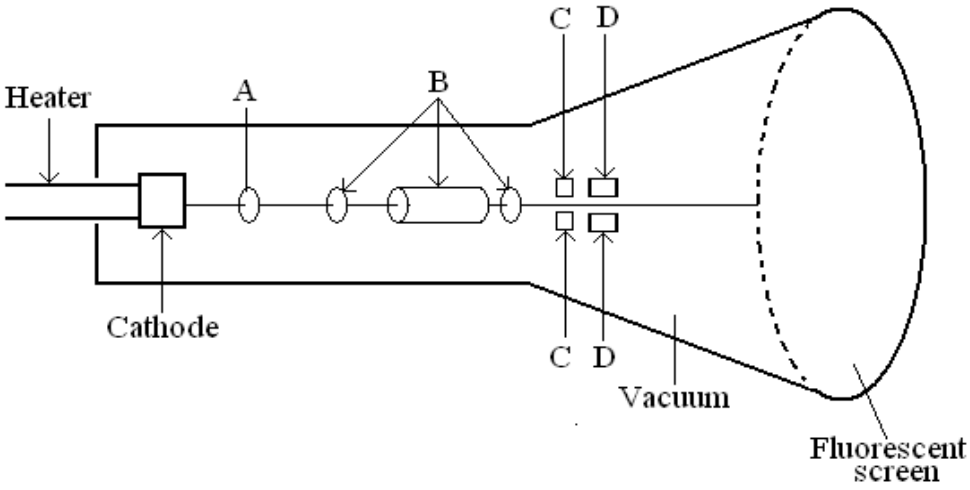
……

(c) A vibrating turning fork is held over a long tube open at both ends as shown below



By varying the length of air column, L, the first two positions of resonance are found to be 30 cm and 96cm respectively. If the frequency of the fork is 283.3 *HZ* , **calculate** the fork velocity of sound waves. (3 marks)

17. (a) The fig 8 represents cathode ray oscilloscope (CRO)



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

A_____

B_____

(ii) **What** are the factors of the parts labelled C and D? (2 marks)

C:_____
D:_____

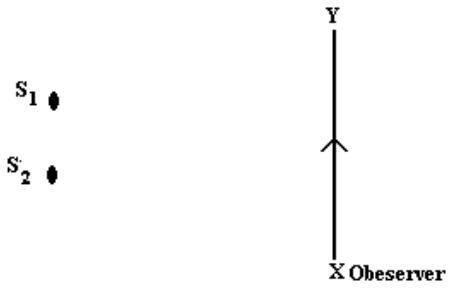
(iii) **Explain how** the electrons are produced (2 marks)
……
……

(iv) **Give a reason** why the tube is evacuated (1 mark)

(b) The work function of a tungsten is 7.2×10^{-19}J. **Calculate** the wavelength of the light photon that is capable of first removing an electron from the tungsten surface. (3 marks)

18. (a) **Explain** the term 'phase' as used in waves (1 mark)
……
……

(b) Two coherent sources of waves S_1 and S_2 are arranged as shown below

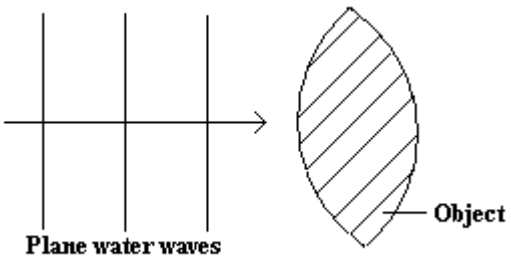


An observer moves along the live XY with a detector.

(i) **Explain** the meaning of coherent source of wave. (1 mark)
……

(ii) **Explain** the observation made by the observes as he moves from X toy. (1 mark)
……

(c) The diagram shows the arrangement to **sturdy** the effect of the object on plane water waves.



Draw the wave fronts of the wave after passing over the object. (2 marks)

19. (a) **What** do you understand by the following terms

(i) Open circuit (1 mark)

……

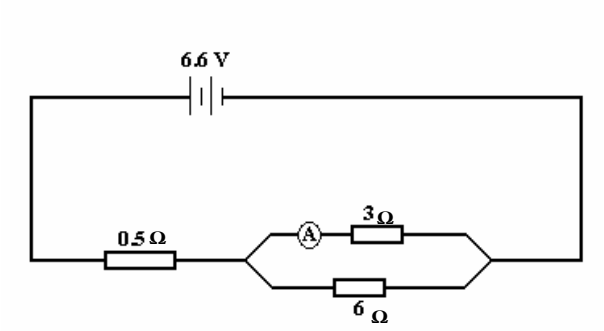
……

Closed circuit (1 mark)

……

……

(b) In the circuit shown in the fig 9, the battery has an e.m.f of 6.6 V and internal resistance of 0.3 ohms.



Determine the reading of the ammeter. (2 marks)

……

……

……

(b) (i) **Define** the term e.m.f. (1 mark)

……

……

The graph below shows the Voltage current relationship for a certain battery.

(ii) **Draw** the circuit that could be used to obtain the results shown on the graph. (2 marks)

(iii) From the graph **determine** the e.m.f of the battery. (1 mark)

……

(iv) From the graph, **determine** the internal resistance of the battery. (2 marks)

……

20. (a) **What** is doping (1 mark)

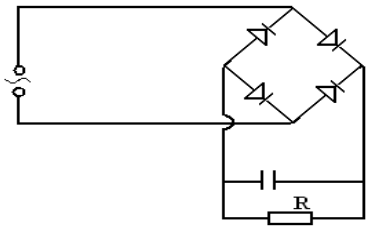
……

(b) **Distinguish between** a p-type and n- type extrinsic Semi –conductors. (2 marks)

……

(c) **Draw** a diagram to illustrate forward bias of P-N junction. (2 marks)

(d) The fig 10 below shows a bridge circuit



A capacitor has been connected across the resistor has shown

(i) **Sketch** on the fig 11 below the wave from when a C.R.O. is connected across the resistor; R (1 mark)



(ii) On the same axes, **sketch a wave** from when a C.R.O. is connected across R when capacitor has been removed. (1mark)

21. (a) **Define the term** monochromatic light (1 mark)

……

(b) The table before shows values of stopping potentials, V_2 and their curves pending frequencies for a metal surface monochromatic light is shone on it

Stopping potentials,V_s	1.2	0.88	0.60	0.78	0.12
Frequency(xx 10^{14} Hz)	7.5	6.7	6.0	5.2	4.8

(i) **Plot a graph** of stopping potentials, V_s against frequency (4 marks)

From the graph **determine**

(ii) Threshold frequency (1 mark)

……

……

(iii) The Planck's constant, h (take $Take = 1.6^{-19} \times 10C$ (2 marks)

……

……

(iv) The work function (2 marks)

……

……

KCSE MOCK TRIAL 3

PHYSICS

PAPER 1

2 HOURS

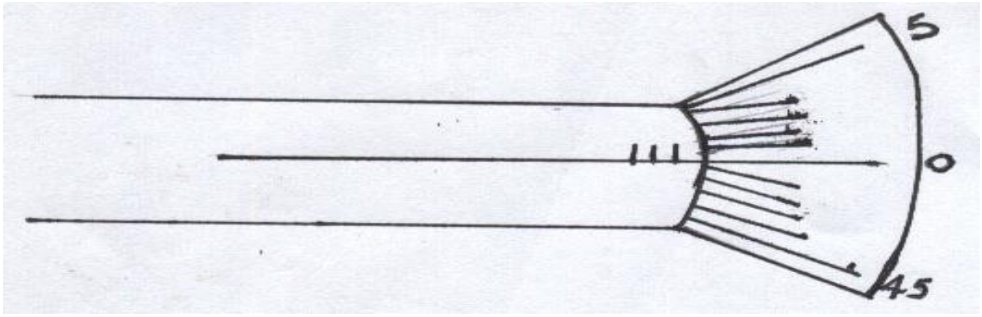
NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A (25 MARKS)

Figure one below shows part of a micrometer screw gauge. use the information and the figure to answer question one and two



1. **State** the pitch of the micrometer screw gauge (1mark)

   ……

   ……

   ……

2. **What** are the two limitation of the micromere screw gauge? (1mark)

……

……

……

3. Figure 2 shows two identical springs arranged in parallel supporting a force **F**

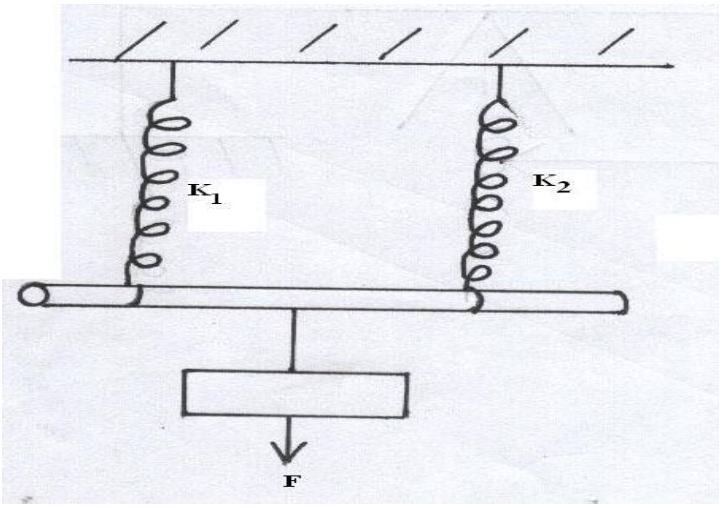
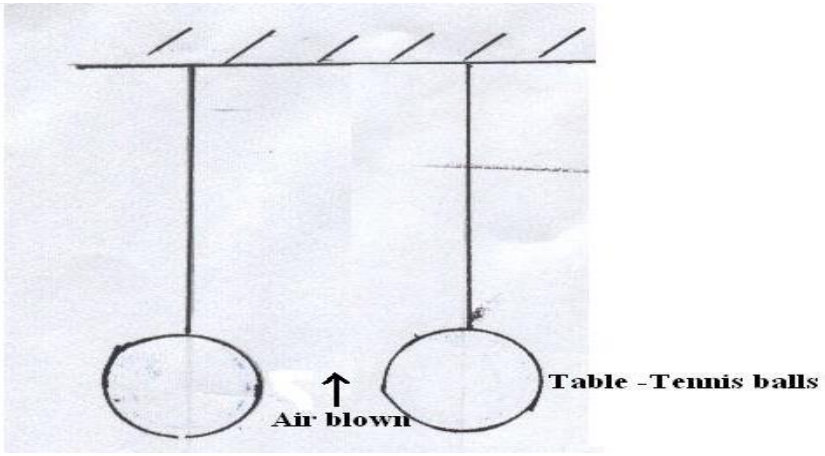


Figure 7

The spring constants for the parallel arrangement is K_p while K_1 for each spring
Show that $K_p=2K$ (3marks)

4. Two table tennis balls are suspended from a support by thin springs and air blown between them as shown in the figure below.



(i) **State** the observation (1mark)

……

……

……

(ii) **Explain** the observation (2marks)

……

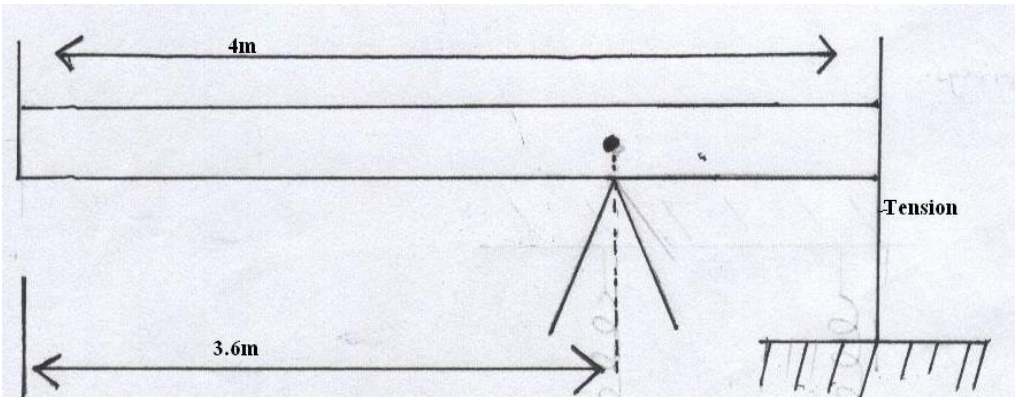
……

……

……

……

5. A Uniform rod of length 4m and mass of 4kg is pivoted at 3.6m mark. The rod is held horizontal with a vertical rope at the 4m marks as shown in the figure 4 below. **Calculate** the tension in the rope. (3marks)



6. **Sketch** a velocity –time graph for a body thrown vertical upwards to a maximum height. (2marks)

7. A tight rope walker carries a pole to maintain stability. **Explain** how he used it to achieve it. (1mark)

……

……

……

8. A small nail may pierce an inflated car tyre and remain there without pressure reduction in the tyre.**Explain** this observation (2marks)

……

……

……

……
……

9. **Give** a reason why heat transfer by radiation is faster than heat transfer by conduction (1mark)

……
……
……

10. **Name two** forces that determine the shape of a liquid drop on solid surface. (2marks)

……
……
……
……
……

11. Equal masses of water and paraffin are heated for same length of time. The final temperature of paraffin was found to be greater than the final temperature of water. **Explain** the observation. (2marks)

……
……
……

12. **State** Archimedes principle (1mark)

……
……
……

13. A solid copper sphere will sink in water while a hollow copper sphere of the same size may float. **Explain** this observation. (2marks)

……
……
……

14. **Explain** why pressure is more important than force when considering the damage which stiletto heels might cause to floor (2marks)

……

……

……

SECTION B (55MARKS)

15. A ballon seller has a cylinder of helium gas which he uses to blow up his ballons .The volume of the cylinder is $0.10m^3$ .It contains helium gas at a pressure of $1.0x10^7$ Nm^{-2} The balloon seller fills each balloon to a volume of $1.0x10^{-2}$ m^3 and a pressure of $2.0 \times 10^5 Nm^{-2}$

a) **Explain** in terms of particles how the helium in the cylinder produces a pressure (1mark)

……

……

……

b) **Calculate** the total volume that the helium gas occupy at a pressure of $1.2x10^5$ N/m^2.Assume the temperature of the helium does not change. (3marks)

……

……

……

c) **Calculate** the number of balloons of volume $1.0x10^{-2}$ M^3 that the balloon seller can fill using the gas. (2marks)

……

……

……

d) The graph below in figures shows how the pressure of a gas trapped inside a sealed container changes with temperature. The pressure is caused by the gas particles continually hitting the sides of the container

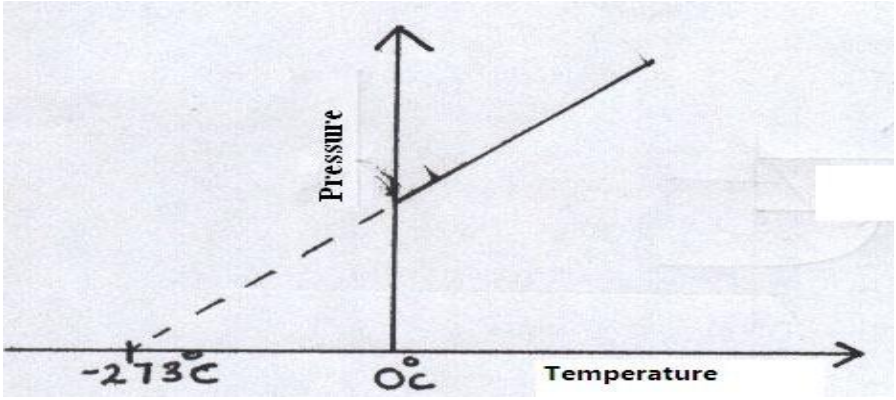


Figure 8

(i) **Write down** the name of the temperature at which the gas particles stop hitting the sides of the container (1mark)

……

……

……

……

(ii) **What** is the momentum of the gas particles at this temperature? Give reason for the answer. (2marks)

……

……

……

……

(iii) **Give** the value of the temperature in Kelvin. (1mark)

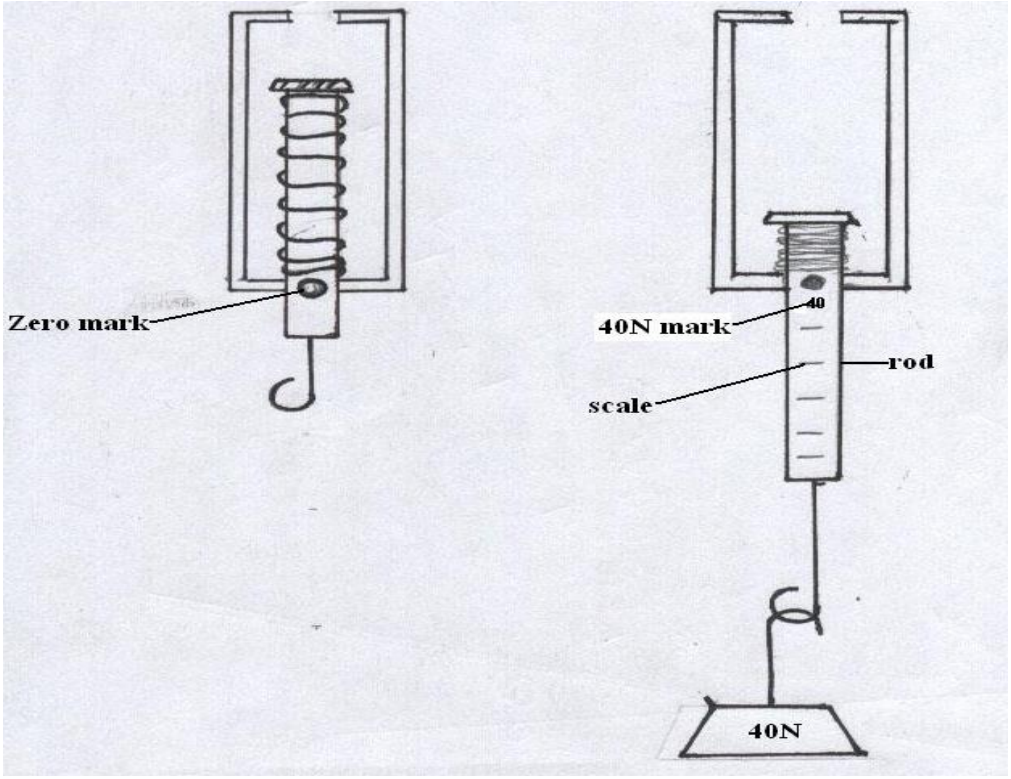
……

……

……

……

16. Jerry makes a spring balance (Newton-meter) for weighing fish. She uses a stiff spring and a part of a bicycle pump. She puts a scale in Newton's on the rod.



(i) **State** what happens to the spring when the 40N weight is put on the hook (1mark)

……

……

……

(ii) **Suggest** why the spring balance would not be suitable for weighing up to 80N (1mark)

……

……

……

(b) Jerry loads the spring balance each time. She adds another 5Newtons to the weight, she makes another scale mark on the rod. The graph shown in the figure 7 shows how adding weight increases the length of the scale

Drawn Graph paper

(i) How can you tell from the graph that the gaps between the marks on the scale are equal? (1mark)

……

……

……

(ii) Using the graph **find** how far long the scale the 30N mark is (2marks)

……

……

……

……

(iii) State the relationship between the weight and the length of the scale (1mark)

……

……

……

(c) (i) From the graph **determine** the spring constant in N\cm (1mark)

……

……

……

(ii) Express the value of the spring constant in SI units (1mark)

……

……

……

(d) Jerry catches a real big fish. It is too heavy for the balance. Her friend Tom also has a balance. They weigh the fish using both balances as shown in figure 7

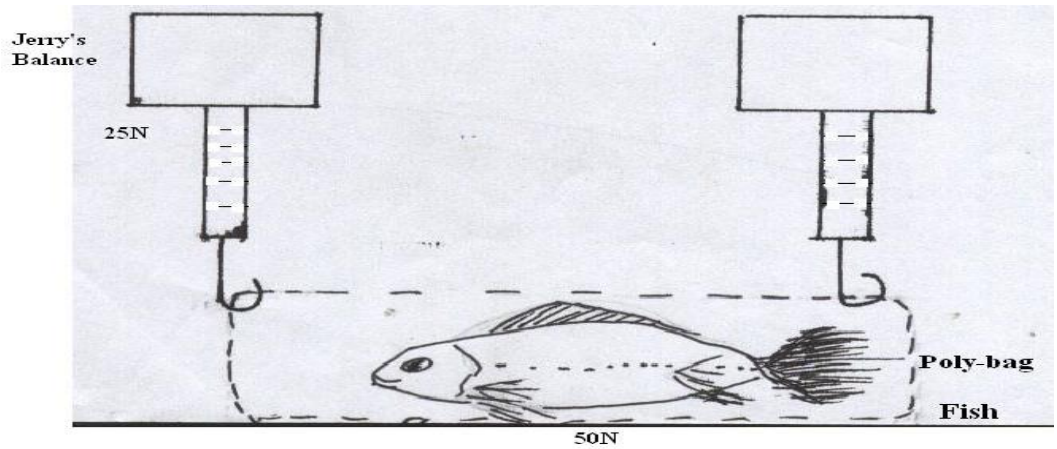


Figure 9

(i) **State** the reading of the Tom's balance (1mark)

……

……

……

(ii) **Explain** the answer in d (i) above (1mark)

……

……

……

17. (a) (i) **Why** must a liquid and not a gas be used as the 'fluid'in a hydraulic machine. (1mark)

……

……

……

(ii) **State** the other important property of a liquid to hydraulic machine depends on (1mark)

……

……

……

(b)The diagram below shows the principle of the hydraulic car jack

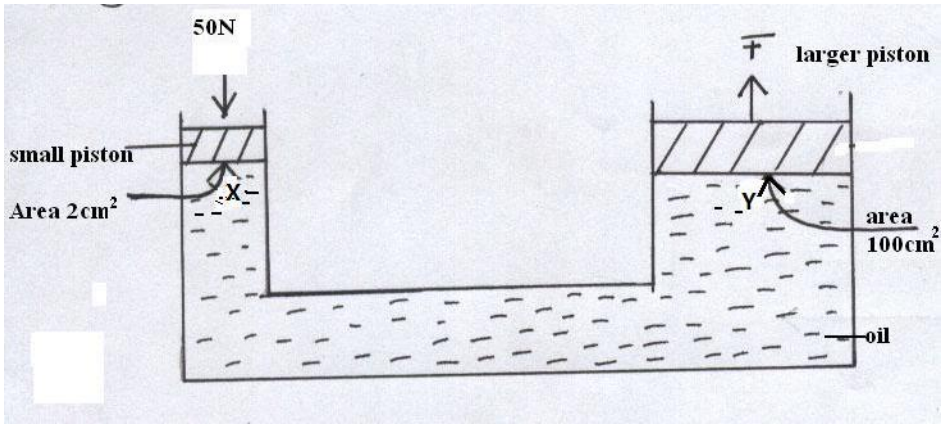


Figure 10

(i) If a force of 50N is applied to the smaller piston ;**calculate** the pressure produced in the oil at X (2marks)

……

……

……

(ii) **Determine** the pressure exerted by oil at Y (1mark)

……

……

……

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(iii) If the small piston moves down a distance of 5cm, **determine** how far upwards the larger piston moves. (2marks)

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(iv) Using the information in the figures determine the velocity ratio v_2 of the hydraulic jack

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18. Ian has a mass of 70kgs.he dives from a high board .his vertical velocity at different times is shown in the graph in figure 9

Drawn graph paper

a) From the graph **calculate**

(i) The time he took to reach the water.

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(ii) The height of the diving board (3marks)

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(iii) Ian's deceleration in the water. (2marks)

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(iv) The retarding force on Ian in the water (3marks)

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(v) The depth in the water that Ian reached (3marks)

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19. (a) **Define** angular velocity and state its SI unit (2marks)

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(b) What provides for the centripetal force the following cases of circular motion?

(i) The moon moving around the earth (1mark)

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(ii) A cyclist negotiating a curve (1mark)

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(c) A fun fair ride of diameter 12m makes 0.5 revolutions per second .determine

(i) Its angular velocity (2marks)

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(ii) The linear speed of a child ride in it (3marks)

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(iii) The centripetal acceleration experienced by the child if his mass was 40kg(3marks)

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KCSE MOCK TRIAL 3

PHYSICS

PAPER 2

2 HOURS

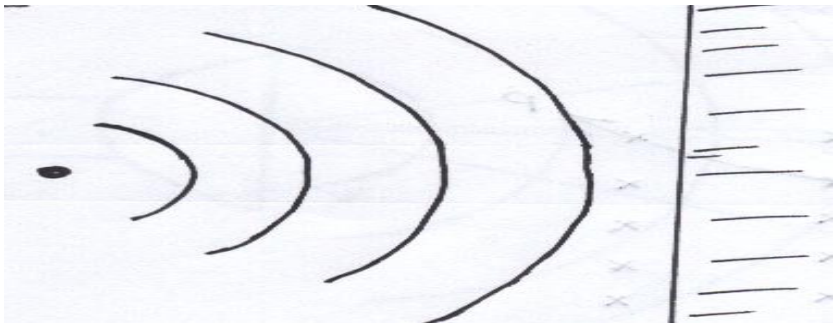
NAME…….INDEX NO……

SCHOOL…….. SIGN……

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SECTION A (25MARKS)

1. Figure 1 shows circular waves approaching a straight reflector. **Complete** the sketch to show what happens when the waves hit the reflector (1mk)



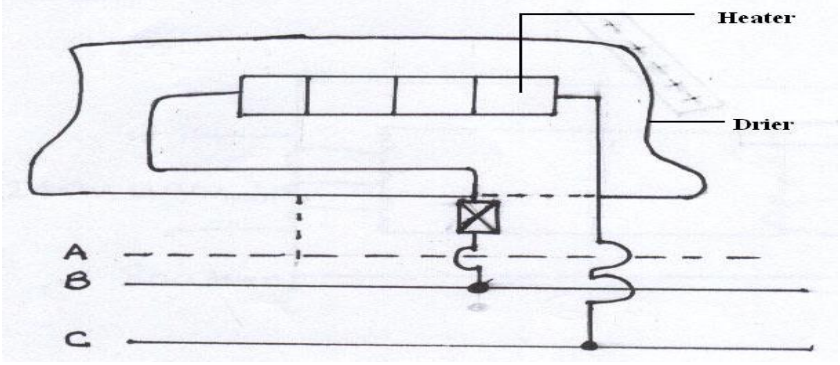
2. **State one** property that is common to all members of the electromagnetic spectrum. (1mk)

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3. Figures 2 below shows part of a ring main circuit connected to the hair drier in a salon



Identify the parts

A: ……

B: ……

C: ……

4. The longest wavelength of radiation that can produce photoelectric effect in iron is $2.67x10^{-7}$m.calculate the work function of iron. Take speed of light =$3.0x10^{8}$ m\s; Plank's constant h=$6.63x10^{-34}$ Js (3mks)

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5. Figure 3 below shows a source radiations .The radiations enter a uniform magnetic field as shown

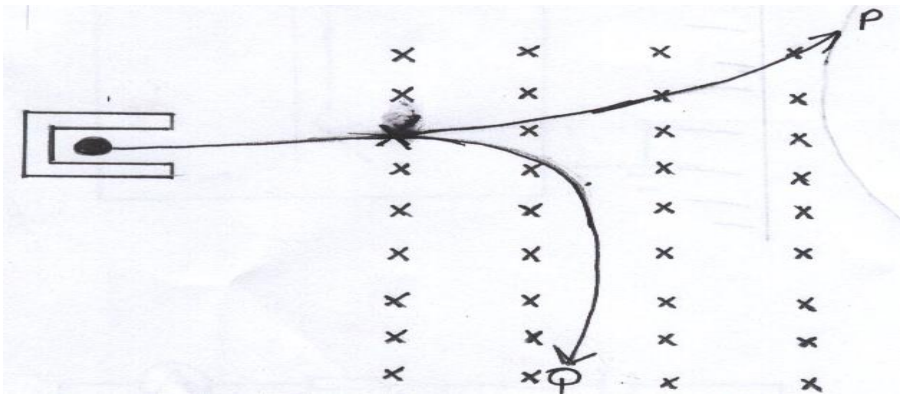


Figure 11

(i) **Identify** the radiation

P: ……..……..

Q: ……

(2mks)

(ii) **Give two** reasons for each of the radiations you have identified in 5(i) (2mks)

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6. **State one** way through which the electrical conductivity of a semi-conductor can be increased (1mk)

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7. **Draw** a simple diagram to show a p-n junction forward biased (1mk)

8. A real image, half the size of the object is formed by a lens. If the distance between the objects and the image is 450mm. **Determine** the focal length of the objects. (3mks)

9. Figure 4 below shows two parallel current carrying conductors A and B placed close to one another. Current flows in the opposite directions.



Figure 12

(i) Sketch the magnetic field pattern formed by the two conductors. (1mk)

(ii) Indicate the force F, due to the current on each conductor (1mk)

10. A small object lies at the bottom of a water pond at a depth of 2.4m.Given that the refractive index of water is 1.3, **determine** the apparent depth of the object. Give your answer to 1 decimal place. (2mks)

11. **State** the function of the control grid of the cathode ray oscilloscope and state how it is achieved. (2mks)

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12. **State one** difference between mechanical and electromagnetic waves. (1mk)

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13. Figures 5 shows a charged rod held close to the cap of an uncharged electroscope

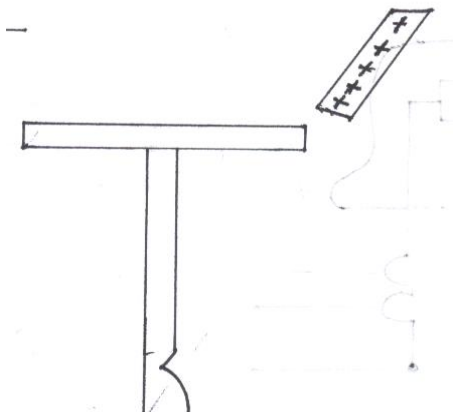


Figure 13

If the cap is momentarily earthed before removing the charged rod, what charge is left on the electroscope? (1mk)

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14. A capacitor of capacitance 10μf is charged by a battery to 5v.How much charge is stored in each plate (2mks)

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SECTION B (55MARKS)

15. (a) A Girl stands some distance from a high wall and claps her hands

(i) What two measurements would need to be made in order to determine the speed of sound? (2mks)

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(ii) **Describe** how you would make use of these measurements (3mks)

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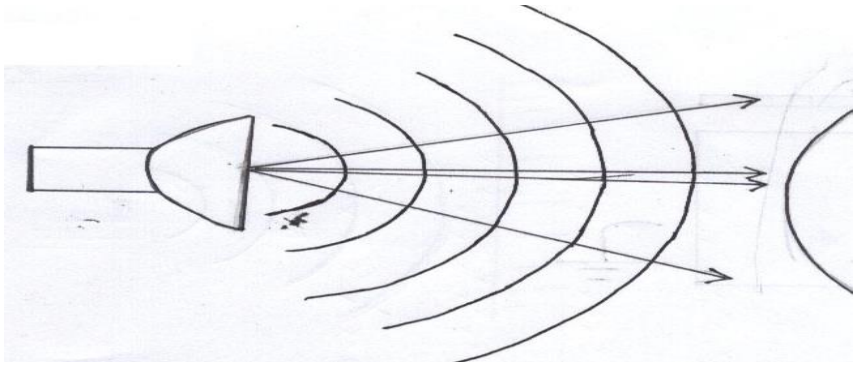
(iii) The speed of sound in air is 330m\s.How far from the wall would you stand? Choose an answer from the following distances .10m, 200m, 500m.
Give reasons why you did not choose each of the other two distances (2mks)

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(b) The balloon filled with carbon dioxide can act like a lens and focus sound from a loud speaker. On to the microphone, Figure 6 show waves produced by loud speaker moving towards the balloon.



(i) **Complete** the diagram to show what happens to the sound waves when they happens to the sound waves when they have passed through the balloon and moves towards the microphone (2mks)

(ii) The loud speaker is now moved towards the balloon .This results in less sound at the microphone. **Explain** why there is less sound at the microphone. (1mk)

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(iii) The frequency of the sound emitted by the loud speaker is 1020Hz. **Calculate** the wavelength of the sound wave in air where its velocity is 340m\s (2mks)

16. (a) **Describe** briefly the energy changes involved in the generation of electrical energy at a hydropower station. (2mks)

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(b)What are the advantages of transmitting power at

(i) Very high voltages

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(ii) Alternating voltage

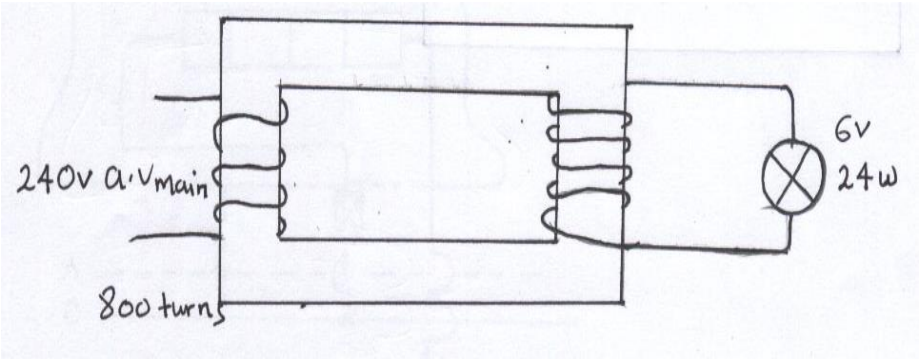
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(c) A 6v, 24w lamp shines at full brightness when it is connected to the output of this main transformer as shown in the figure 7



Assuming the transformer is 100% efficient, **calculate**

(i) The number of turns in the secondary coil if the lamp is to work at its normal brightness (2mks)

(ii) The current which flows in the main cables. (2mks)

(d) **Explain** whether and how the number of secondary turns of the transformer shown in figure 7 should be altered if

i) Two 6v lamps in series are to work at normal brightness (2mks)

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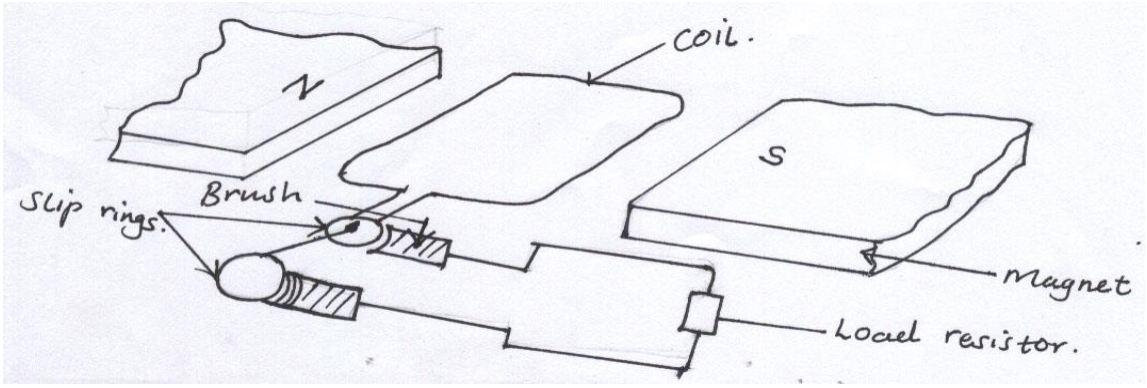
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ii) Two 6v lamps in parallel are to work at normal brightness (1mk)

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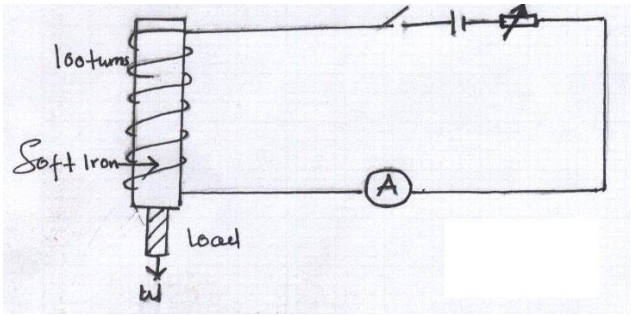
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(e) Figures 8 shows a generator of electricity



The coil rotates at a steady speed of 60 turns rotations per minute. An oscilloscope is connected a cross the load and adjusted to get on the screen a trace for one rotation of the coil. Sketch the trace for one rotation starting and finishing in the same position of the coil as shown in the figure 8 (3mks)

17. Two students investigated how the strength of an electromagnet depended on the current .The set up is as shown in the figure 9



They plotted the following graph showing how the load varies with the magnetizing current in figure 10

Picture GRAPH

a) From the graph determine the load that can be supported by the electromagnet if the current was

(i) 2.75A (2mks)

(ii) 6.0A (2mks)

b) **Sketch** on the same axis a graph you would expect if coil of 50 turns was used (1mk)

c) (i) Using the domain theory **explain** what happens to the iron (2mks)

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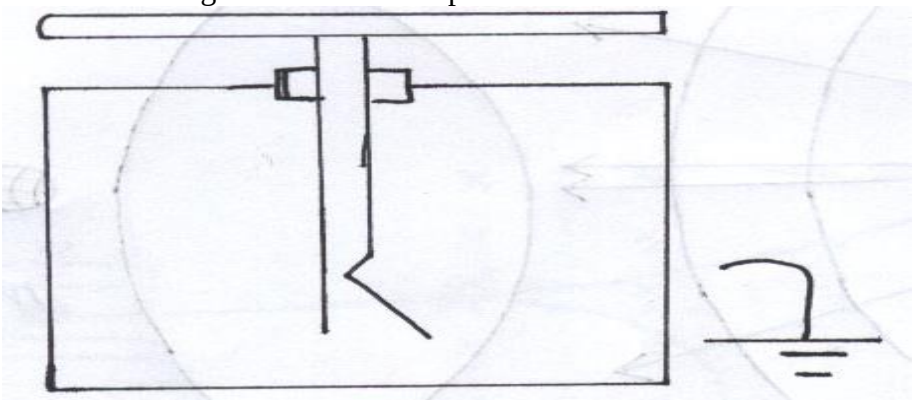
(ii) **State** the reason for graph levelling off at the top

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18. (a) Figure 11 shows a charged leaf electroscope



Given a dry glass rod and a silk cloth, **explain** how you would determine the type of charge on the electroscope (3mks)

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(b) An identical but uncharged electroscope is brought near the electroscope shown in the figure11 and the two connected with a conducting wire. **State** and **explain** what is observed on the leaves of the two electroscopes (2mks)

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(c) **Explain** how lighting a much box near the cap of a charged electroscope would cause the electroscope to discharge (2mks)

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(d) A capacitor was full charged to a potential of 40v. The capacitor is connected as shown in the figure 12 to discharge at load resistor R. Sketch a graph to show how the capacitor discharges with time (2mks)

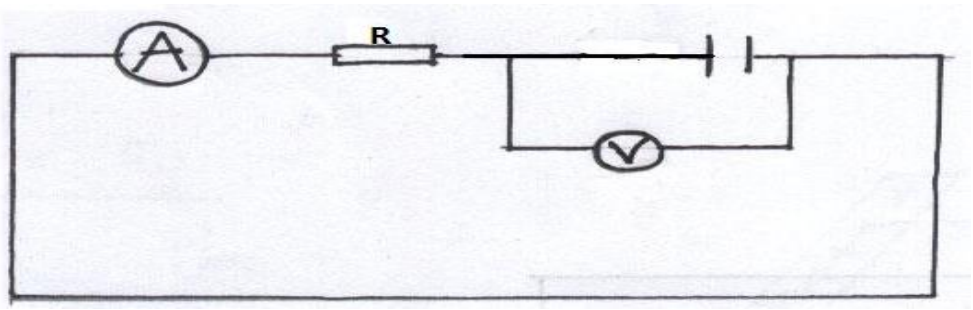


Figure 12

(e) Sketch an electric field pattern for an isolated negative charge. (1mk)

19. (a) **What** is meant by a radioactive substance? (1mk)

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(b) **Give two** reasons why alpha particles are more ionizing than βeta. (2mks)

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(c) $^{233}_{90}TH$ disintegrates into radium (Ra) by emission of two alpha and two beta particles **State**:

(i) the atomic number of the daughter nuclide (2mks)

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(ii) The mass number of the daughter nuclide (2mks)

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(d) One of the applications of βeta emission (β) is controlling thickness gauge. **Explain** how they are used for this purpose. (2mks)

KCSE MOCK TRIAL 4

PHYSICS

PAPER 1

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

This paper consists of 12 printed pages. Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing.

SECTION A: (25 MARKS)

Answer ALL the questions in this section in the spaces provided

1. Figure 1(a) represents a Voltmeter before being connected across a battery while figure 1(b) represents the same Voltmeter after being connected across a battery.



Figure 14

Determine the voltage of the battery (1mk)

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2. State the principle of conservation of energy (1mk)

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3. **Figure 2** represents a garden sprinkler

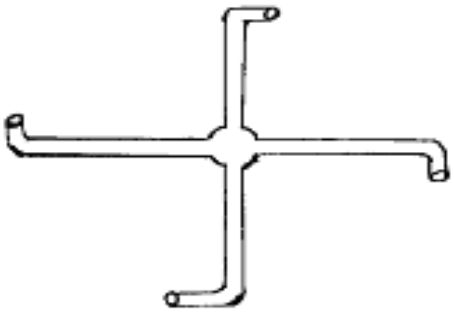


Figure 15

On the same figure indicate the direction of rotation of the sprinkler when water is ejected through the nozzles at a high velocity (1mk)

4. **Figure 3** shows a uniform cuboid block of mass 600g on which a weightless 50cm long wooden plank is fixed.

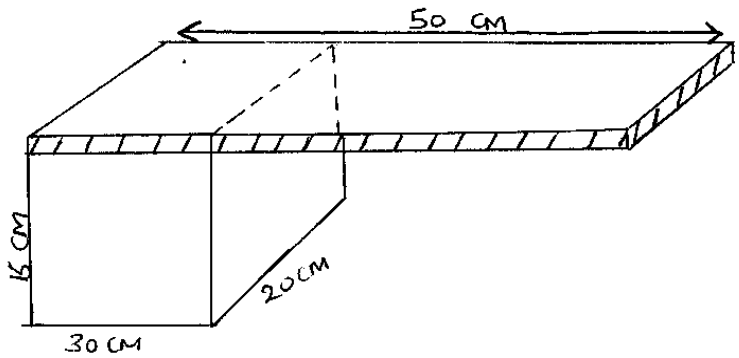


Figure 16

If the cuboid block is of dimensions 30cm x 20 cm x 15 cm find the minimum force F applied at the end of the plank as shown, to tilt the cuboid block (3mks)

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5. Use the kinetic theory to explain thermal expansion of solids (3mks)

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6. A part from the angle of banking and the radius of the curve, name one other factor that affects the critical velocity of a vehicle negotiating a bend. (1mk)

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7. A body weighs 1960N on the surface of the earth. The same body weighs 1470N on the surface of another planet. Determine the acceleration due to gravity on the surface of the planet. Take acceleration due to gravity on the surface of earth, g =10N/Kg. (3mks)

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8. Metals are better thermal conductors than non metals. Explain (1mk)

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The graph in **figure 4** represents part of a displacement – time graph of a motion described by a body moving at constant velocity.

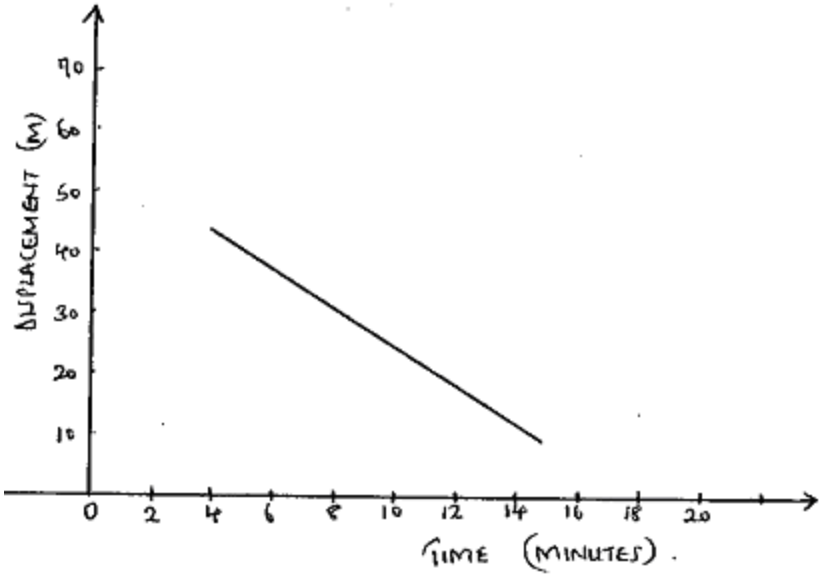


Figure 17

(a) Use the graph to determine the initial displacement of the body. (1mk)

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(b) Describe the motion of the body (2mks)

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9. The atmospheric pressure at the foot of Mt. Longonot is 760mm of mercury while at the peak of the mountain, the atmospheric pressure is 580mm of mercury. Given that the density of mercury is 13600Kg/m^3, Calculate the height of the mountain (density of air = 1.3 Kg/m^3.) (3mks)

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11. **Figure 5** shows a bimetallic strip.

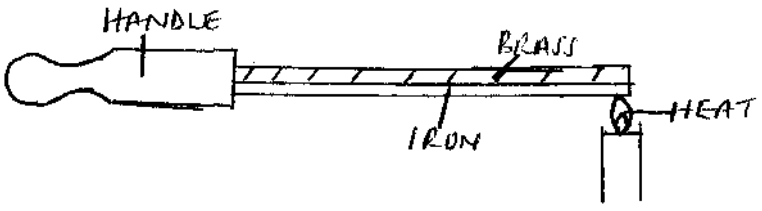


Figure 18

Draw the final shape of the bimetallic strip when heated at its tip as shown (1mk)

12. **Figures 6 (i) and 6(ii)** show two identical pulleys A and B supporting equal loads.

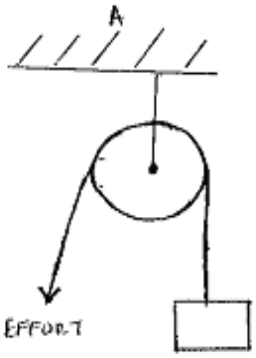


Fig 6 (i)

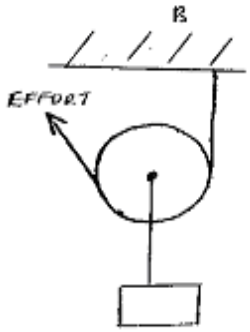


Fig 6 (ii)

State with reason(s) which of the two pulleys is easier to operate (3mks)

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13. State one assumption made when estimating the size of an oil molecule using the oil-patch experiment. (1mk)

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SECTION B: (55 MARKS)

Answer ALL questions in this section in the spaces provided.

14. (a) State Charles Law of gases (1mk)

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(b) You are provided with a capillary tube sealed at one end containing concentrated sulphuric acid index, a thermometer, a rule, a stirrer, source of heat, retort stand, rubber band and a water bath.

(i) Using a well labeled diagram briefly describe an experiment you can perform using the apparatus to verify Charles Law.

(ii) Explain the other use of concentrated sulphuric acid other than a pointer and trap of air. (1mk)

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(c) The volume of a gas at 70^0C is 6×10^{-3} m^3. The gas is cooled at constant pressure until its volume is $0.0014m^3$. Find the final temperatures of the gas. (3mks)

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15. **Figure 7** shows a set-up used to investigate compressional property of a spring.
The shaft moves freely through a hole in the stand to support the pan. Weights are then added onto the pan each at a time and the length of the spring L noted for various weights in the table below, figure 8,

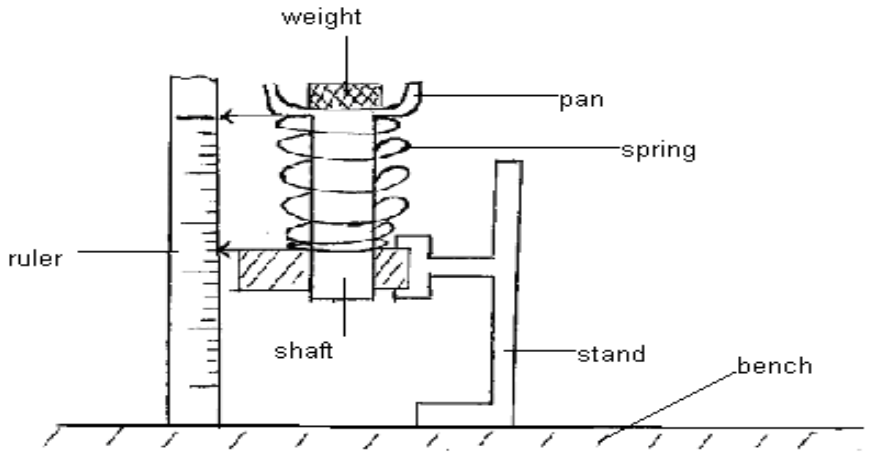


Fig 7

Load N	2	4	8	10	14	16	18	20	22
Length (L) x 10^{-2}m	27	24	18	15	9	7	6	6	6

(a) On the grid provided plot the graph of length L (cm) (Y – axis) against the load (N). NB: Use a scale of 1:2 (X-axis) and 2: 5 (Y – axis) (5mks)

(b) Use your graph to determine;

(i) The spring constant (3mks)

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(ii) The length of the unloaded spring, Lo. (1mk)

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(c) Find the extension that a mass of 550g would produce on the spring if suspended from its lower end. (3mks)

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16 (i) State Bernoulli's principle of fluids (2mks)

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(iii) **Figure 8** below shows cross – sections of two submerged bodies A and B inside water in a swimming pool. The bodies were then fast pulled in the direction shown by the arrows.

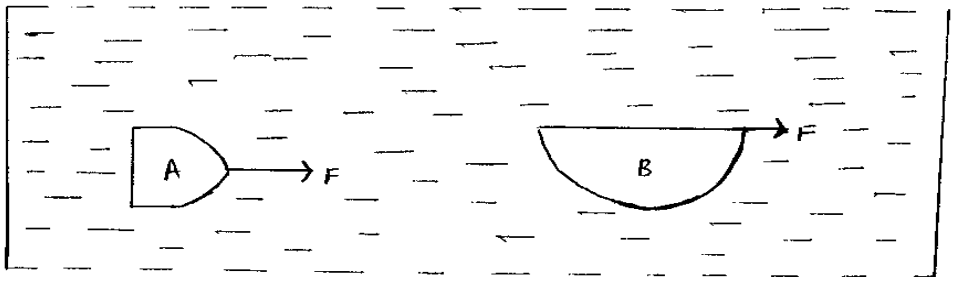


Figure 19

Use the figure to answer questions a and b below.

(a) State with a reason which body is easier to pull if they have equal volume and density. (2mks)

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(b) On the same diagram show the path followed by each body (2mks)

(iii)Water flows steadily in a pipe as shown in **figure 9** below. The diameters at A and B are given.

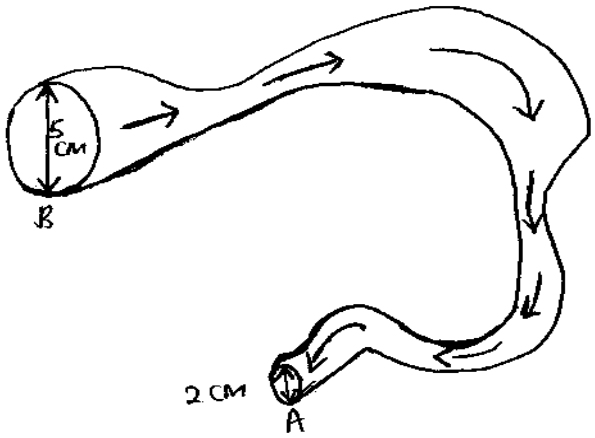


Figure 20

If the volume flux at A is 45cm^3/s, find the speed of the water at B. (3mks)

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17. (a) State Archimedes' principle (1mk)

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(b) **Figure I0** shows a solid cylinder floating between two liquids A and B of densities 0.8g/cm^3 and 1.2g/cm^3 respectively. Half of its volume sinks in liquid B as shown. The cylinder has a diameter of 7cm and a length of 12cm. uses it to answer questions that follows.

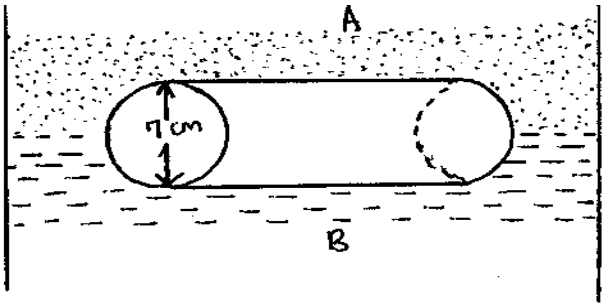


Figure 21

Find;

(i) The volume of the liquid B displaced (2mks)

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(ii) Upthrust on the cylinder due to liquid B (3mks)

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(iii) Upthrust on the cylinder due to liquid A (3mks)

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(iv) The mass of the cylinder (2mks)

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18 (a) i) **Define** latent heat of fusion of a substance (1mk)

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(ii) 83.6 Kilojoules of heat was lost in cooling an amount of water at 15^0C to ice at -10^0C. **Find** mass of the water (specific heat capacity of water 4.2 x 10^{-3}JKg^{-1}K^{-1} specific heat capacity of ice = 2.1 x 10^2JKg^{-1}K^{-1}, Latent heat of fusion of water = 3.3 x 10^5JKg^{-1})

(5mks)

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Figure 11 shows a six maximum and minimum thermometer in a room. Use it to answer questions that follow.

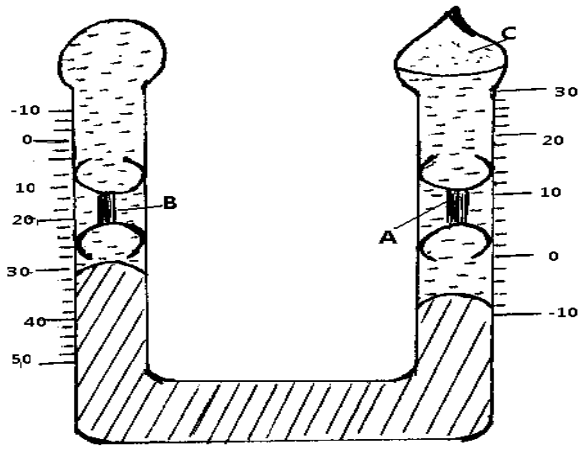


Figure 22

(i) State the function of part marked A. (1mk)

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(ii) State and explain the function of part C. (2mks)

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(iii) Explain what is observed in the thermometer if it is placed in a colder refrigerator. (2mks)

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(iv) State the type of material suitable for part B. (1mk)

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KCSE MOCK TRIAL 4

PHYSICS

PAPER 2

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A: (25 MARKS)
Answer ALL the questions in this section in the spaces provided

8. Define a non-ohmic conductor (1mk)

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2. State the property of light associated with formation of shadows (1mk)

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3. State two uses of microwaves. (2mks)

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4. The force on a conductor carrying an electric current in a magnetic field can be varied by changing the magnetic field strength and the magnitude of the current. Name two other factors that can affect the force. (2mks)

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5. Figure 1 below shows a soft iron rod placed between two poles of a magnet



Fig.23

On the same figure sketch the magnetic field lines between the poles. (2mks)

6. (a) Explain why an x-ray tube is evacuated. (1mk)

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(b) Distinguish between 'hard and soft' x – rays (1mk)

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7. An electric kettle is rated 3KW, 250V. Determine the resistance of the coil. (3mks)

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8. **Figure 2** below shows the path of light through a transparent material placed in air.

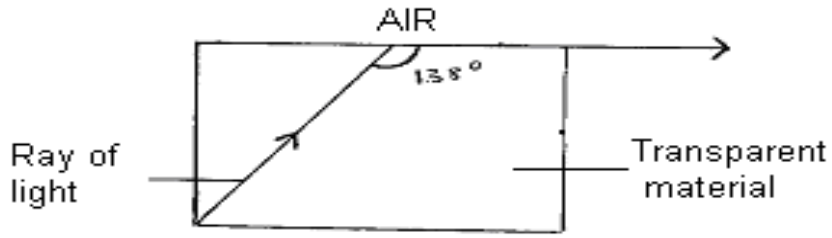


Fig.2

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

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9. **Calculate** the wavelength of Green light whose energy is 3.37 x 10^{-19} J.
((h = 6.63 x 10^{-34}JS, C = 3.0 x 10^{8} m/s) (3mks)

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10. **State** the function of the grid in a cathode ray tube (CRT) (1mk)

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.....

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.....

11. **Figure 3** below shows a laclanche cell.

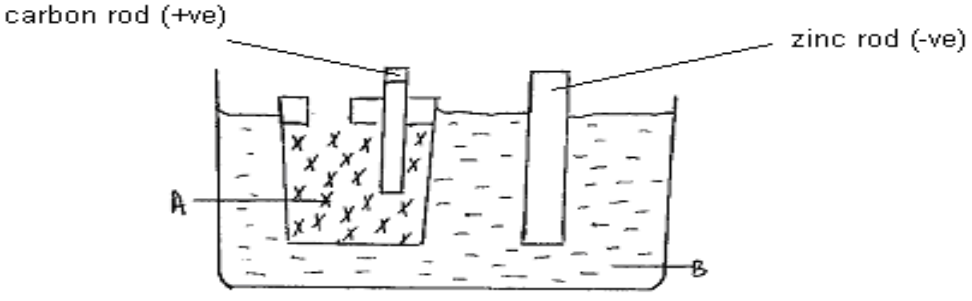


Fig.3

Name the chemical substances in the parts labeled.

A.....

B.....

(2mks)

12. **Figure 4** below shows a highly charged needle bought near a candle flame

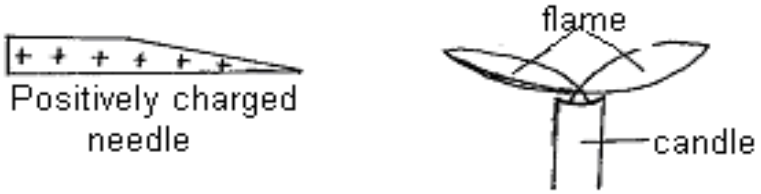


Fig.4

Explain why the flame burns in the direction shown (2mks)

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13. State the major difference between a dry cell and a wet cell (1mk)

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SECTION B; (55 MARKS)

Answer ALL Questions in this section in the spaces provided

14. (a) **Figure 5** below shows the diagram of a Geiger – Muller tube connected to a power supply and a pulse counter.

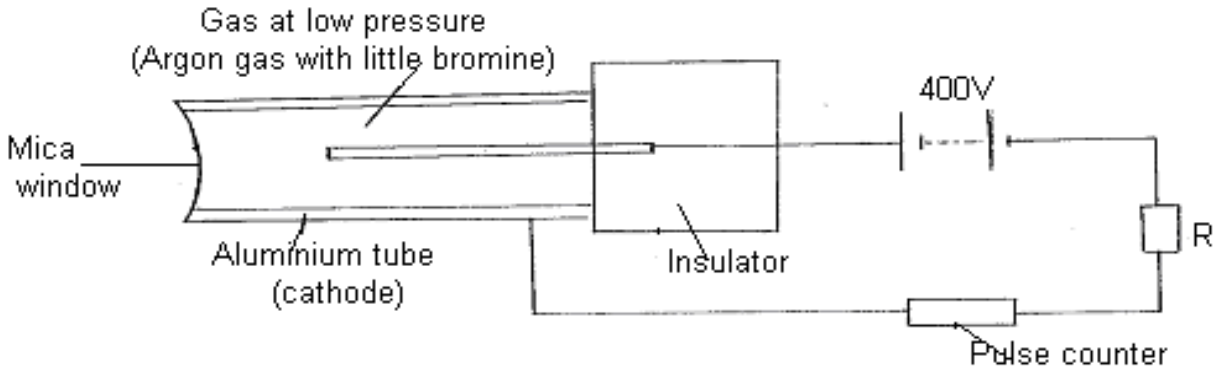


Fig. 5

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

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.....

(ii) Briefly explain how the Geiger – Muller tube detects the radiation emitted by a radioactive (4mks)

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.....

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

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.....
.....

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

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.....
.....

(v) Find the value of a and b up the following equation (2mks)

$$^{234}_{92}U \longrightarrow {}^{a}_{b}X + 2\alpha$$

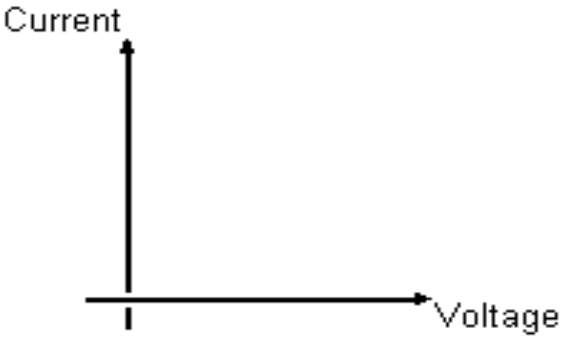
a =.....

b =.....

(b) i) Explain how the resistance of semi-conductors and metal conductors are affected by temperature rise. (2mks)

.....
.....
.....
.....

(b) ii) Sketch a forward bias characteristic of a P – N junction diode in the axis below. (1mk)



15. (a) Explain why a concave mirror is used as a shaving mirror (1mk)

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.....

(b) You are provided with a metre rule, distant object, concave mirror and a white screen. Briefly describe how you can estimate the focal length of the focal length of the concave mirror. (3mks)

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(c) **Figure 6** below shows a real image formed by a convex lens.

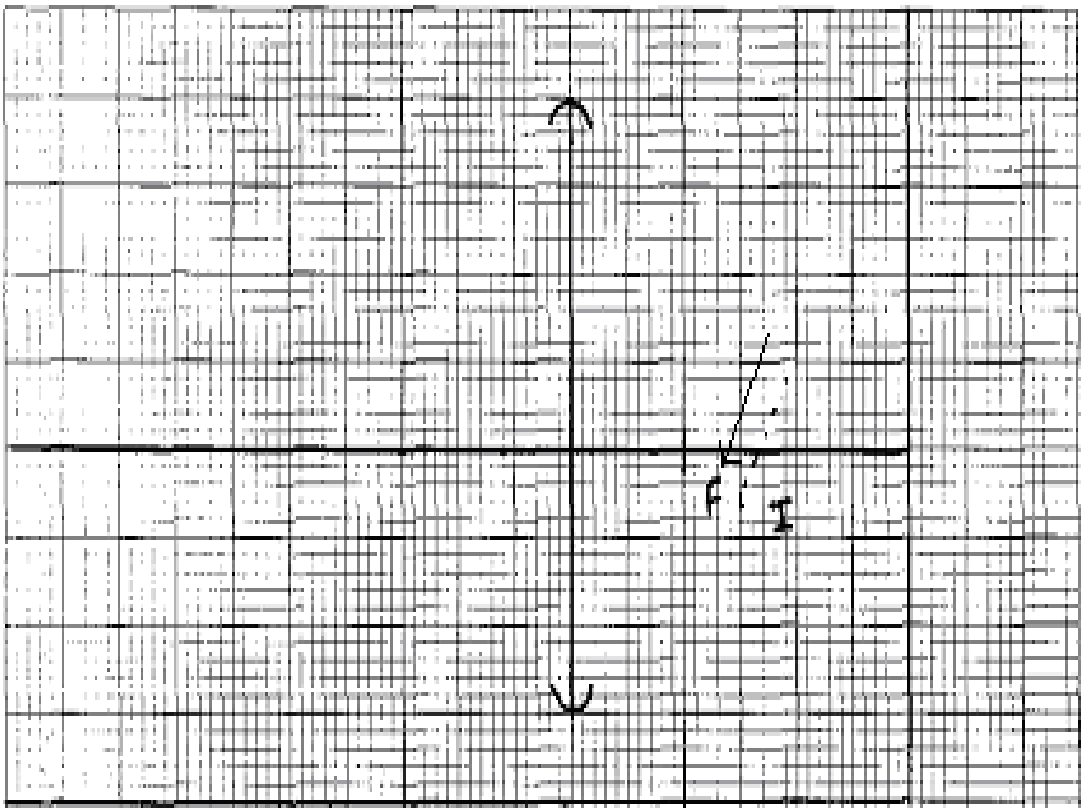


Fig.6

On the same grid, construct a ray diagram to locate the position of the object (3mks)

(d) A convex lens forms an image five times the size of the object on a screen. If the distance between the object and the screen is 120cm, determine the focal length of the lens. (3mks)

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16. (a) State one cause of energy losses in a transformer and explain how it can be minimized. (2mks)

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.....

(b) A transformer is designed to supply a current of 5A at a potential difference of 50V to a motor from an a.c supply of 240V. If the efficiency of the transformer is 80%.

Calculate

(I) The power supplied to the transformer (3mks)

.....

.....

.....

.....

(II) The current in the primary coil (2mks)

.....

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.....

(c) **Figure 7** shows a cross –section of a bicycle dynamo. The wheel is connected by an axle to a permanent cylindrical magnet and is rotated by the bicycle tyre.

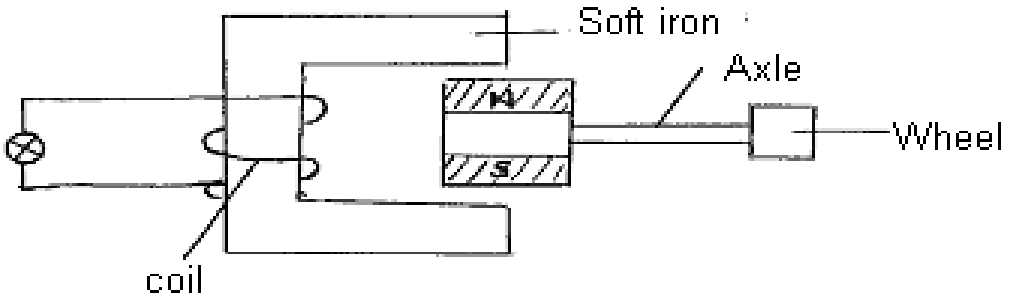


Fig.7

(I) Explain why the bulb lights (1mk)

.....

.....

.....

(II) How can the bulb be made brighter? (1mk)

.....

.....

.....

17. (a) State two differences between sound waves and electromagnetic waves (2mks)

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(b) **Figure 8** below shows a waveform of a wave moving at velocity of 2m/s.

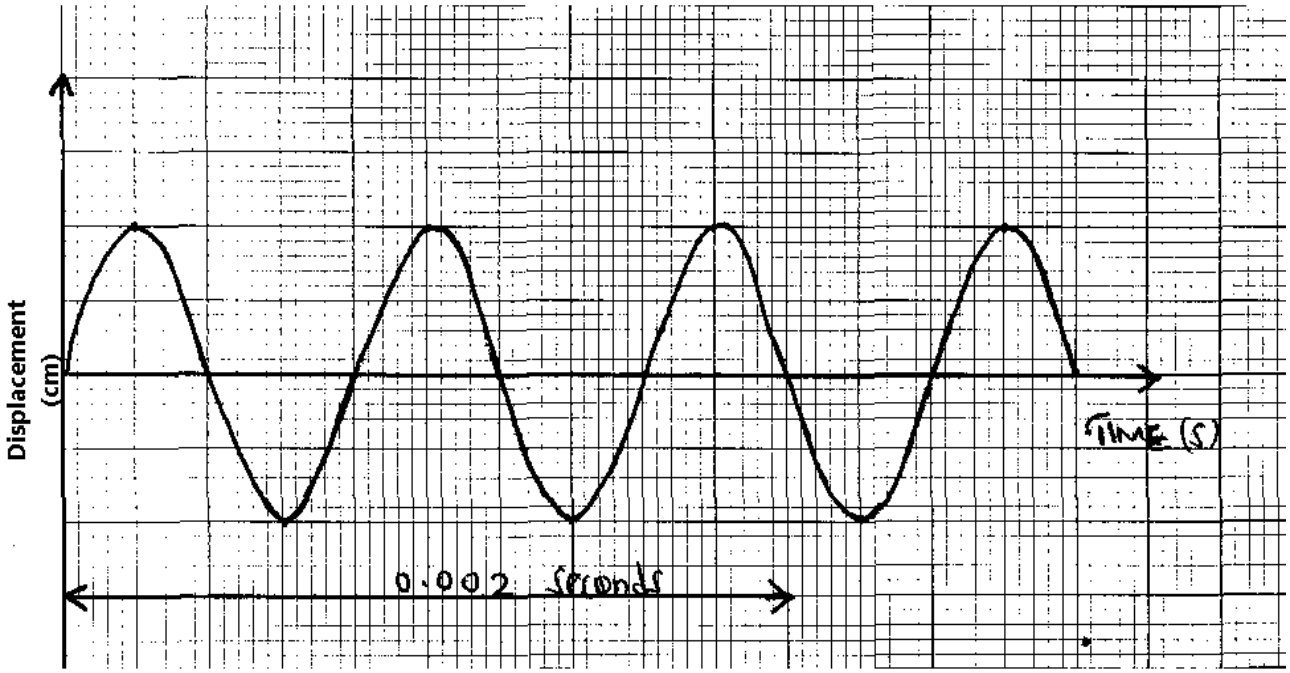


Fig.8

Determine:

(i) The periodic time (T) (2mks)

.....
.....
.....
.....

(ii) The wavelength (λ) (3mks)

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(c) A fathometer produces sound in a ship and receives two echo's where there is a raised sea bed one after 2.5 seconds and the other after 3.0 seconds. Find the height of the raised sea bank if the velocity of sound in water is 1460m/s.(3mks)

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.....
.....
.....

18. (a) What do you understand by the term photoelectric effect? (1mk)

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.....

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.....

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

.....
.....
.....

(c) In a photoelectric effect experiment, a certain surface was illuminated with radiations of different wavelengths and the stopping potential determined for each wavelength. The table in **figure 9** below shows the results obtained.

Stopping potential ,V_s (V)	1.35	1.15	0.93	0.62	0.36
Wave length ,ג($x10^{-7}$m)	3.77	4.04	4.36	4.92	5.46

Fig.9

(I) On the grid provided plot a graph of stopping potential (Y-axis) against frequency. (7mks)

(II) From your graph **determine:**

(a) The threshold frequency (1mk)

.....
.....
.....
.....

(b) The Plank's constant, h (3mks)

(e = 1.6 x 10^{-19} Coulomb, C = 3.0 x 10^{8} m/s)

.....
.....
.....

KCSE MOCK TRIAL 5

PHYSICS

PAPER 1

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A (25 MARKS)

Answer all questions in this section in the spaces provided.

Figure 1 below show parts of vernier callipers when the Jaws are closed without an object between them. Use the information to answer question 1 and 2.

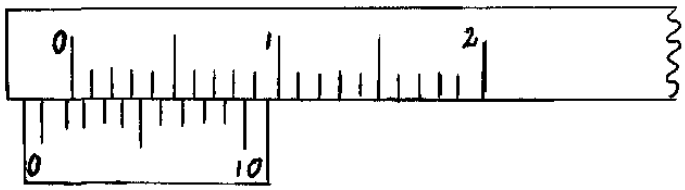


Figure 24

1. **State** the error of the vernier callipers in figure 1. (1mk)

……

2. A student used the vernier callipers to measure the diameter of the a test tube and read it to be 1.76cm. **Determine** the actual diameter of the test tube. (2mks)

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3. **Explain** why you can dry your hands with a towel but not with a sheet of polythene. (1mk)

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……

4. A bubble of air of volume $1cm^3$ is released by a deep-sea diver at a depth where the pressure is 4.0 atmospheres. Assuming its temperature remains constant ($T_1 = T_2$) **what** is its volume just before it reaches the surface where the pressure is 1.0 atmosphere? (3mks)

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……

……

5. **Explain** why a shiny tea pot stays hotter than a dull brown tea pot. (1mk)

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6. A student put some small pieces of ice in a beaker and sprinkled salt on the ice. He stirred until the ice melted and took the temperature of the content in the beaker- as shown in figure 2

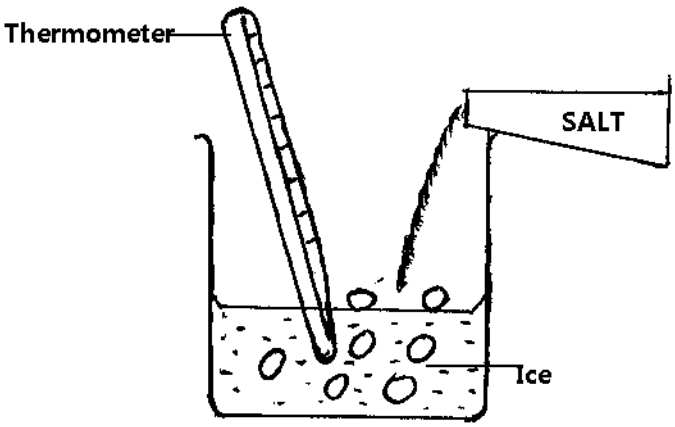


Figure 25

(i) **State** the observation made. (1mk)

……

……

……

(ii) **Explain** the observation. (1mk)

……

……

……

7. Using the idea of particles **explain** why the pressure inside the tyre increases when the tyre is pumped up. (2mks)

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8. **State** Newton's third law of motion. (1mk)

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9. **Explain** why a hole in a ship near the bottom is more dangerous than one nearer the surface. (2mks)

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10. Figure 3 below shows a piece of wood in equilibrium. The spring balance reads 5.5N.

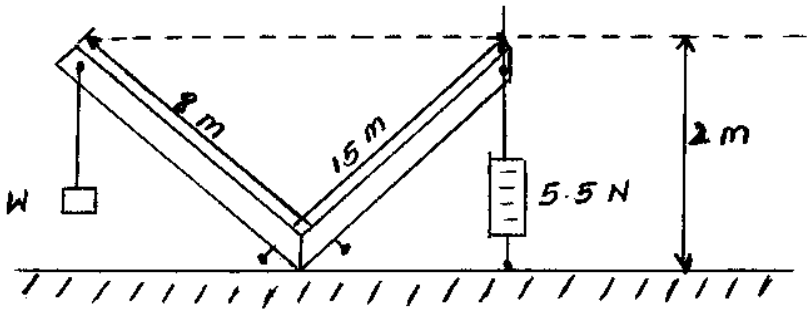


Figure 26

Determine the weight W keeping the wood in equilibrium. (4mks)

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11. **Explain** why it is difficult to steer a bi cycle by gripping the centre of the handlebars. (2mks)

……

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12. **Write down** what provides for the centripetal force when a cyclist negotiating a corner on a road. (1mk)

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13. Figure four below shows the forces acting on a rain drop which is falling to the ground.

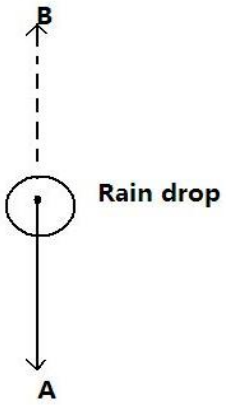


Figure 27

(i) A is the force which causes the rain drop to fall. **What** is this force called? (1mk)

……

(ii) B is the total force opposing the motion of the drop. **State one** of the possible causes of this force. (1mk)

……

……

(iii) **Write down** an equation to show the condition when force A = force B and **state** what happen to the rain drop. (2mks)

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SECTION B (55 MARKS)

14. (a) The circuit in figure 5 below is often used in cars.

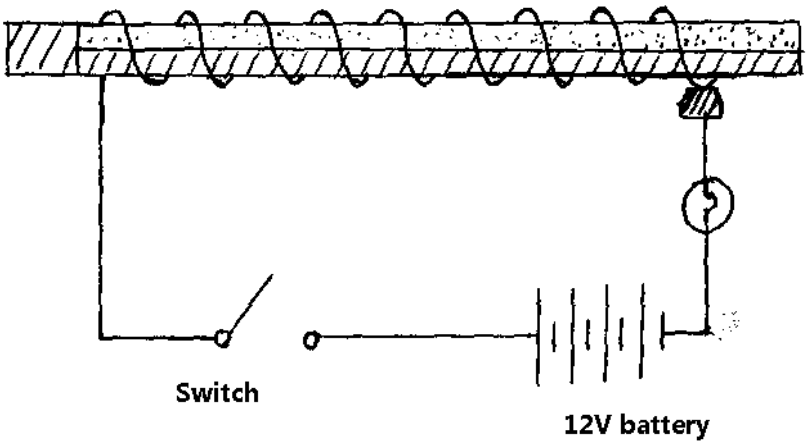


Figure 28

Briefly explain how the above unit is used in the car. (3mks)

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(b) A plump was used to suck air bubbles through a tank of ether resting on a saucer of water as shown in figures 6.

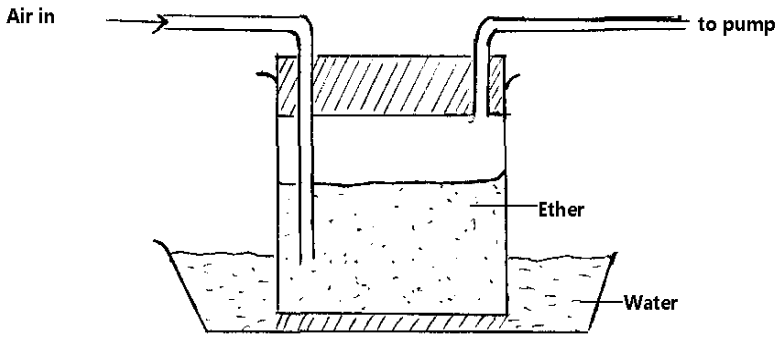


Figure 29

(i) **State** the observation and **explain** how it occurs. (2mks)

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(ii) **Name** a domestic device in which the idea above is used. (1mk)

……

(c) If the specific latent heat of ice is 340000 J /kg and the specific latent heat of steam is 2,300,000 J/kg and the specific heat capacity of water is 4200 $Jkg^{-1}k^{-1}$ **calculate** the heat needed to change 2kg of ice at 0^0c to steam at 100^0c. (4mks)

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15. (a) **What** is meant by the term the velocity ratio of a machine? (1mk)

……

……

(b) Figure 7 shows a pulley system used to lift a load.

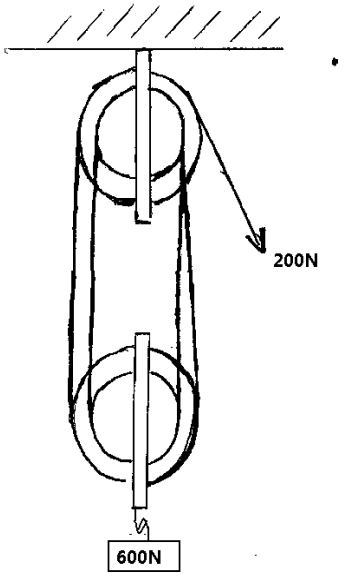


Figure 30

(i) **Determine** the velocity ratio of this machine. (1mk)

……

……

……

(ii) **Calculate** the work done by the effort in lifting the load through 1metre. (3mks)

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……

(iii)**Calculate** the percentage (%) efficiency of the machine. (3mks)

……

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……

(c) The machine wheel and axle has a lot of application in real life. **Name any two** practical examples of such machine. (2mks)

……

……

16. (a) A watchman uses a bow to fire an arrow of mass 0.2kg vertically upwards into the air.

(i) The watchman stretches the bow by 0.15m with a maximum force of 100N. **Calculate** the energy transferred to the arrow. (3mks)

……

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……

(ii) **Calculate** the speed with which the arrow leaves the bow assuming all energy is transferred to the arrow. (2mks)

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(iii) **Determine** the greatest height reached by the arrow before it begins to fall. (3mks)

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(iv) **Determine** the time the arrow will remain in the air. (3mks)

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17. (a) **State** what is meant by absolute zero temperature. (1mk)

……

……

……

(b) **What** are the molecular differences between a real gas and ideal gas? (2mks)

……

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(c) In an experiment to find the relationship between volume and temperature of a given mass of air at constant pressure the following results were obtained

Volume (cm^3)	31	33	35	38	40	43
Temperature(^0c)	0	20	40	60	80	100

(i) Plot an appropriate graph to show the relationship between volume and temperature.

(ii) Use the graph to **calculate** the increase in volume of the air per unit rise in temperature. (3mks)

……

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(iii) **Give a reason** why the volume of a real gas can not be reduced to zero by cooling. (1mk)

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18. Figure 8 below shows a spinning ball in air.

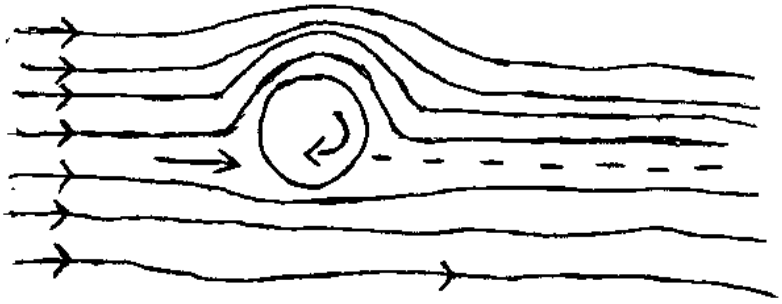


Figure 31

(i) On the figure **show** the path the ball will take. (1mk)

(ii) **Explain** why the ball takes the path you have indicated above. (2mks)

……

……

……

(b) A fisherman on a boat offloads fish from the boat by throwing them to the land.

(i) **State two** observable changes as he ressumes fishing. (2mks)

……

……

……

(ii) **Give** reason for your answer in (i) (2mks)

……

……

……

(c) A car ferry has a uniform cross-sectional area of $1000m^2$ and floats in water of density $1000kgm^3$. **How** deep will it sink if 10 cars each of mass 1000kg are taken aboard? (3mks)

……

……

……

(d) **Explain** how a submarine can be made to float and sink in the sea. (2mks)

……

……

……

KCSE MOCK TRIAL 5

PHYSICS

PAPER 2

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A (25 MARKS)

Answer all questions in this section in the spaces provided.

1. An object O is placed near a plane mirror as shown in **fig. 1** below

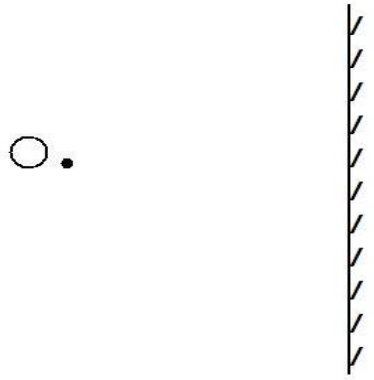


Figure 32

Using two rays **complete** the diagram showing the position of the image. (2mks)

2. **Explain** with an aid of a diagram why to a diver under water, most of the surface looks slivery. Bubbles of air rising from the diver look slivery. (2mks)

3. **State** the type of electromagnetic spectrum emitted by warm objects. (1mk)

……

……

……

4. A soldier standing between 2 cliffs fires a gun. He hears the first echo after 2s and the next after 5s. **Determine** the distance, between the two cliffs (3mks)

(Take speed of sound as 340 m/s.)

……

……

……

5. **Explain** why soft iron keepers are suitable for storing magnets (2mks)

……

……

……

6. **Fig. 2** below shows a conductor carrying current placed in the magnetic field of two magnets. **Complete** the diagram by showing the field pattern and the direction of force F that acts on the conductor. (2mks)



Figure 33

7. You are provided with a polythene rod, an Electroscope, two bars; one a conductor and another one an insulator. **Briefly describe** how you will use the electroscope to determine which one is an insulator. (3mks)

……

……

……

……

8. **State two** quantities that are used to determine whether accumulator require recharging or not. (2mks)

……

……

……

9. **Complete** the table by stating the different types of electromagnetic radiations. (3mks)

Type of radiation	Use
	Sending information to and from satellites
	Emitted by a remote control unit
	Producing shadow pictures of bones

10. **State any one** safety feature present in modern mains plug. (1mk)

……

……

11. **Draw** a circuit diagram to show how you would use a voltmeter, ammeter, variable resistor and connecting wires to find the resistance of a lamp. (1mk)

12. **State** the Flemings left hand rule. (1mk)

……

……

13. A time- base is adjusted so that it draws a horizontal line as shown, 50 times per second.

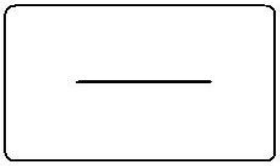


Figure 34

Draw a diagram of what is seen when the following are connected.

(a) A battery which makes the upper y- plate positive. (1mk)

(b) an a.c supply of 50Hz. (1mk)

SECTION B (55 MARKS)

Answer all questions in the spaces provided after each question.

15 (a) A student hung a magnet next to coil of wire to make a door chime as shown in fig. 4

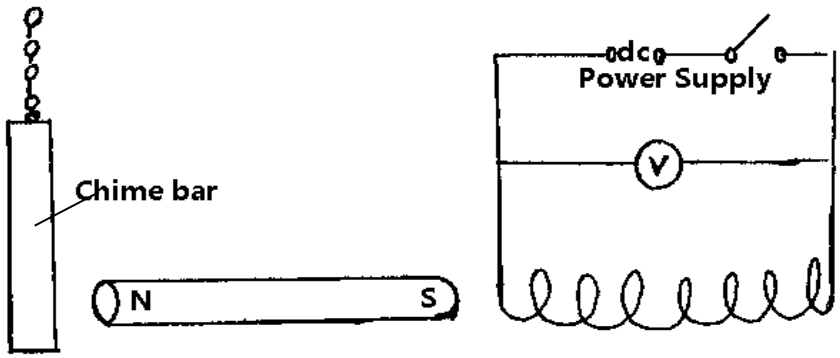


Figure 35

When the current was switched on the magnet hit the chime bar which made a noise.

(i) **Explain** how the current made the magnet move towards the chime bar. (2mks)

……

……

……

(ii) The student wanted the magnet to hit the chime bar harder, **suggest two** changes that would make it happen. (2mks)

……

……

(iii) The student was told to describe the energy transfers inside the device. **Give two** changes that will happen to the energy as the current flows through the coil. (2mks)

……

……

(b) A coil of wire is connected in series with a battery a rheostat and a switch as shown in figure 5.

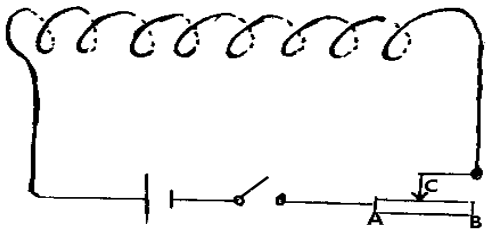


Figure 36

(i) **Draw**, on the diagram, the shape of the magnetic field inside and outside the coil when the switch is closed. (2mks)

If the slider, C on the rheostat is moved towards B, **What** is the effect on:

(ii) the resistance of the circuit (1mk)

……

……

(iii) The current through the coil (1mk)

……

……

(iv) The magnetic field in the coil. (1mk)

……

……

(c) i) **Explain** why a transformer will only transform alternating voltages not dc voltages. (2mks)

……

……

(ii) **Explain** why transformers are widely used throughout the national grid (2mks)

……

……

16 a) Three radioactive substances have to be stored safely. Details of the substances are given below.

Substance	Half life	Type of radiation given out
A	5000 years	Alpha ($\propto$)
B	4 years	Beta (β)
C	156 years	Gamma (γ) Alpha ($\propto$)

Which of the following containers would you use for each substance.

(i) Aluminium (ii) Thin plastic (iii) lead lined (3mks)

A: .....

B: .....

C: .....

Give a **reason** to your answer to part (iii) (1mk)

……

……

……

(b) **Copy and complete** the table below for substance B (2mks)

Date	Mass of original radioactive substance left.
1 March 1992	8 Kg
1 March 1996	
1 March 2004	

(c) A Geiger counter was used to measure the activity (In count per minute) from a radioactive sample in the laboratory over a period of years. Over this period the background radiation was regularly measured at 4 counts/minute.

The table of results is shown below.

Time in years	0	1	2	3	4	5	6
Recorded activity in counts/min	124	80	52	34	23	16	12
Activity due to sample alone							

(i) **Complete** the table by giving the activity of the sample alone. (1mk)

(ii) **Explain** what is meant by background radiations. (1mk)

……

……

(iii) On the grid provided plot a graph of activity of the sample alone against time. (4mks)

GriD

(iv) **Find** the half life of the substance from your graph. (1mk)

……

……

(d) While animals or plants are living, the proportion of $^{14}_{6}C$ in them remain constant but once they die, the carbon 14 decays. Suppose a modern born contains 80 units of C – 14, and an old born contains just 10 units. **How** old is the bone? (2mks)

(Take the half life of carbon – 14 to be 5700 years).

……

……

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17. (a) A vibrating source S produces circular water waves near, a straight reflector as shown in **fig. 6**.

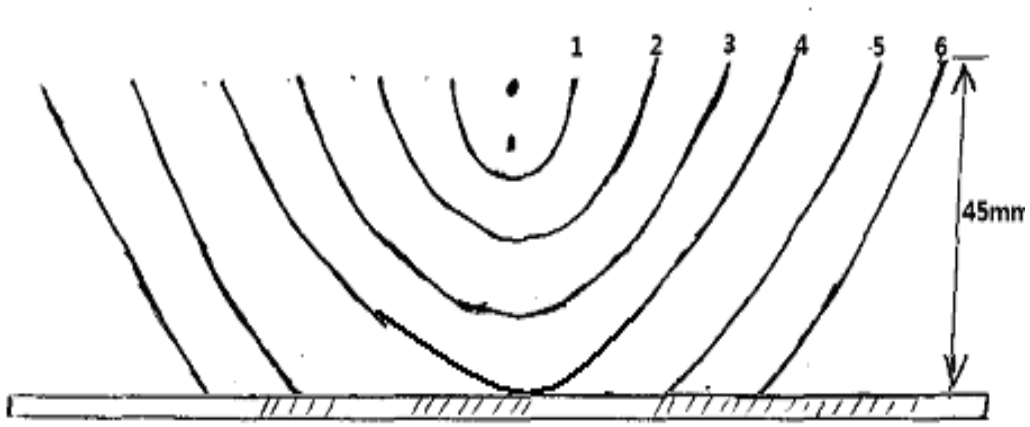


Figure 37

(i) **Copy and complete** the diagram to show how crest 5 and 6 are reflected (1mk)

(ii) From the figure **determine** the wavelength of the water waves. (1mk)

……

……

(iii) **Find** the frequency of the waves if their speed is 60mm/s. (2mks)

……

……

(b) The figure below show a simple diagram of an eye as shown in **fig. 7**.

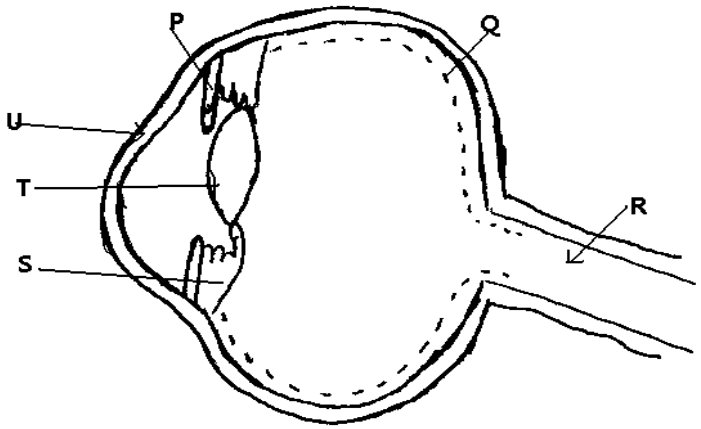


Figure 38

(i) **Identify** the following parts of the eye by indicating the letter against them.

The cornea:.....

The Retina:.....

(2mks)

(ii) A person enters a brightly lit room from a dark corridor.

I. **State** the effect on the pupil of the eye. (1mk)

……

……

II. **How** does this affect the amount of light entering the eye? (1mk)

……

……

……

(iii) **Copy and complete** the table below

Part of the eye	Description
	Sensitive to light
	Carries to light
	Alters the size of the pupil

(3mks)

(iv) A normal eye is able to produce sharp images of objects at different distances.
Describe and explain how it does this (2mks)

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17. (a) A car battery is used to light a 12V lamp A constant current of 3 A passes round the circuit.

(i) **Explain** what happens to the energy of the electron as they flow through the lamp wire. (3mks)

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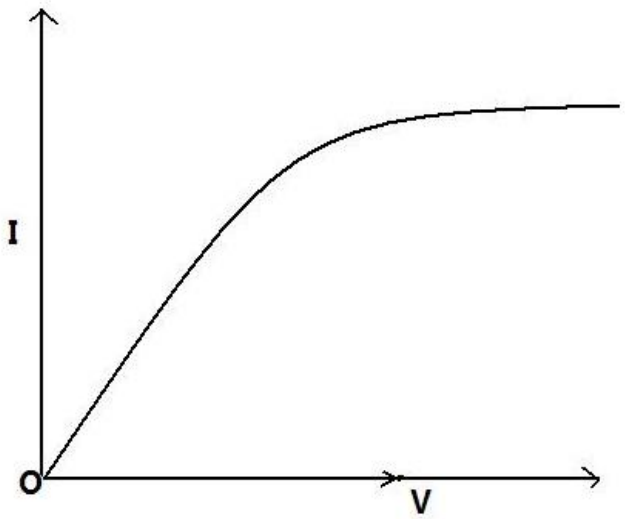
(ii) **How** much energy is transferred by the lamp in 20 seconds? (2mks)

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(b) For a particular specimen of wire, a series of readings of the current through the wire for different potential differences across it is taken and plotted as shown.



(i) **Explain** how the resistance of the wire changes (3mks)

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……

(iii) **How** would the resistance of a piece of wire change if

(I) the length were doubled (2mks)

……

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……

(II) the diameter were doubled (2mks)

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KCSE MOCK TRIAL 6

PHYSICS

PAPER 1

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

Answer ALL questions in this section in the spaces provided.

1. Figure 1 below shows a vernier calipers being used to measure the thickness of an object. It has a error of +0.01cm.

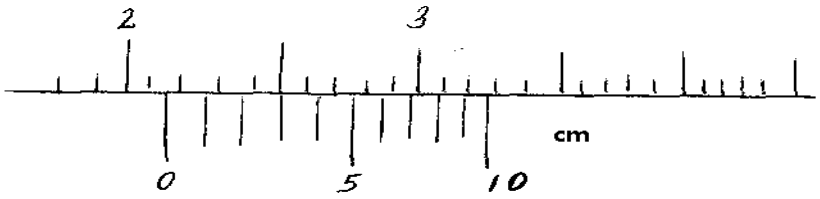


Figure 39

What is the correct measurement? (2mks)

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2. Figure 2 below shows a toy boat. A piece of soap is attached to end A and then the toy placed on a surface of clean water.

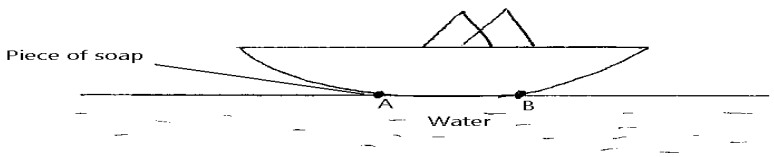


Figure 40

Explain the observation that would be made immediately. (2mks)

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3. Figure 3 below shows a student drinking a soda using a straw.

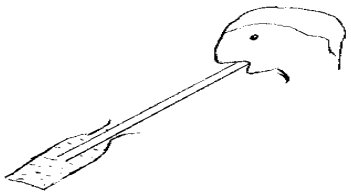


Figure 41

Explain why the soda rises up a straw when the student sucked on it. (2mks)

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4. Figure 4 below shows the levels attained by two liquid L_1 and L_2 after the temperatures has been raised. The liquids were initially at the same levels as shown by the dotted line. The capillary tubes are identical and closed at the lower end.

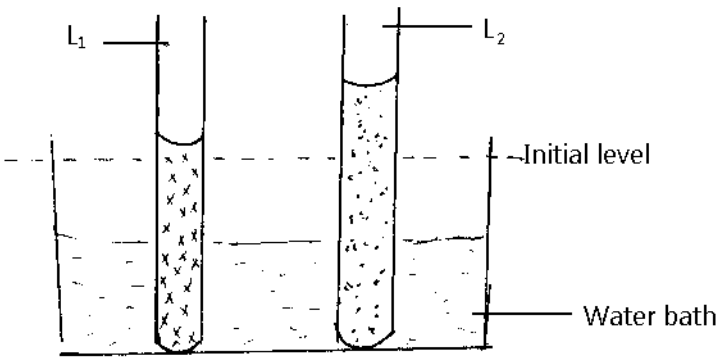


Figure 42

(i) **Mark** on the same diagram the relative levels of the liquids when the temperature is lowered below the initial value. (1mk)

(ii) **Give a reason** for your answer (i) above (1mk)

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5. An object of mass 20kg balances on a uniform plank of length 6m as shown in figure 5 below.

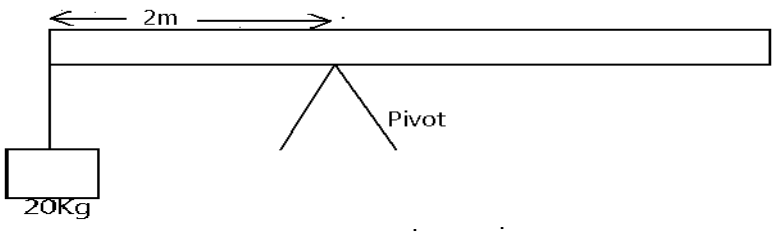


Figure 43

Determine the weight of the plank (3mks)

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6. Figure 6 below shows the glass shade of a lamp with a copper wire wound round it. It was observed that the glass is less likely to crack than when there is no copper wire wound around it.

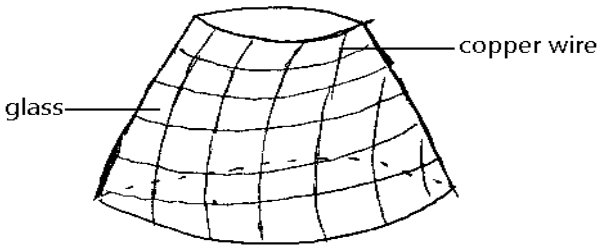


Figure 44

Explain the above observation (2mks)

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7. Figure 7 below shows the variation of force with extension for a certain spring.

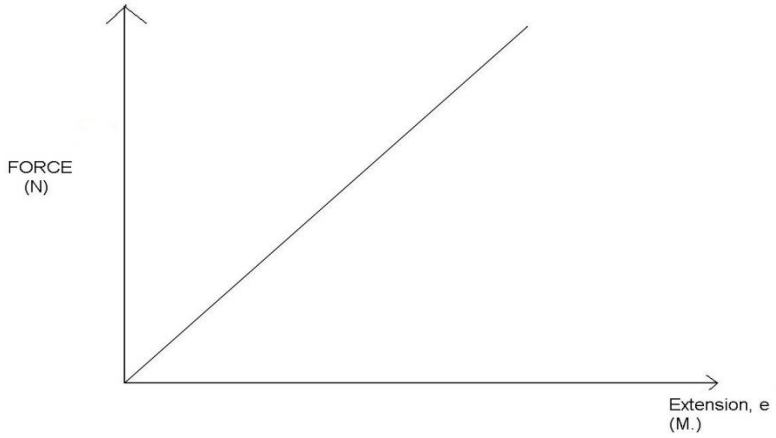


Figure 45

On the same axis, **sketch** the variation of force with extension for another similar spring whose length is double the first spring (1mk)

8. A small iron ball is dropped from the top of a vertical cliff and takes 2.5 seconds to reach the sandy beach. Find the velocity with which it strikes the sand. (3mks)

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9. Figure 8 below shows a modern latrine.

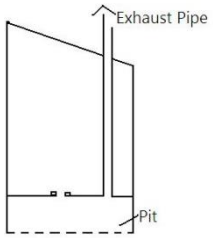


Figure 46

Explain how the exhaust pipe minimizes foul smell especially on a windy day. (2mks)

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10. Figure 9 below shows a simple bottle opener being used to remove the top from a bottle which is the position of the load? (1mk)

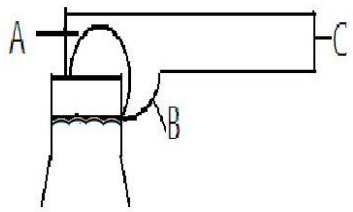


Figure 47

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11. Equal quantities of heat are used to raise temperature of a certain liquid. On the axes provided below, **sketch** the graph of change in temperature $\Delta\theta$ against mass M of the liquid (1mk)



12. **State** Charle's law (1mk)

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13. **State one** way by which the stability of a racing car is increased. (1mk)

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14. A cyclist carrying two bags of maize tied a cross back seat is traveling at uniform velocity. The bags suddenly fall. If the bags do not touch the back wheel **explain** what happens?

(2mks)

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SECTION B (55 MARKS)

Answer ALL questions in this section in the spaces provided.

15. The table below is similar to that in the Highway code and shows how the overall stopping distance for a car varies with the speed of the car. The overall stopping distance is the sum of the thinking distance and braking distance.

Speed of car (m/s)	10	15	20	25	30
Thinking distance(m)	6	9		15	18
Braking distance (m)	8	18		50	72
Overall stopping (m)	14	27		65	90

(a) **What** do you think is meant by thinking distance (1mk)

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(b) **How does** thinking distance depend on the speed of the car? (2mks)

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(c) **What** is the thinking distance which corresponds to a speed of 20mls? (3mks)

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(d) The graph in figure 10 shows the relation between braking distance and the (speed of car)^2

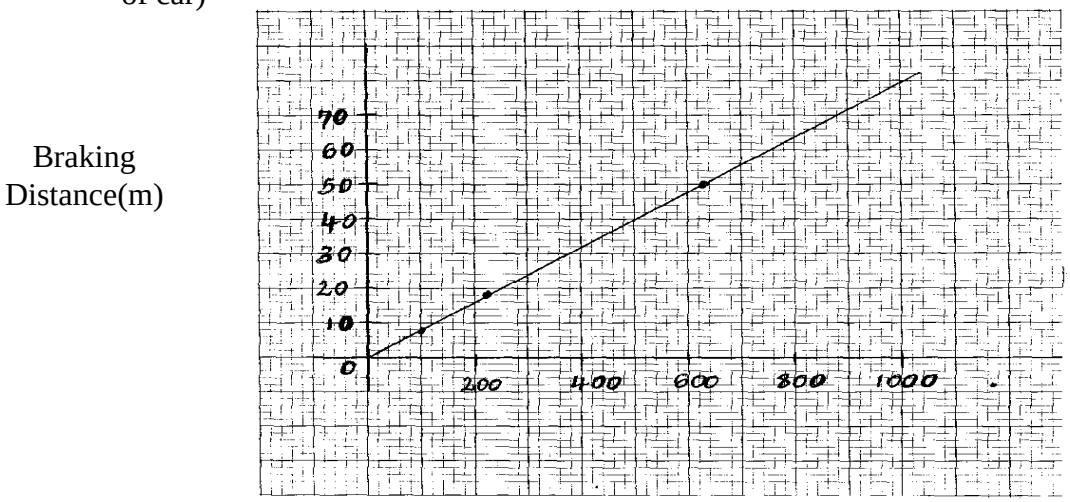


Figure 48

Use the above graph to **calculate** the overall stopping distance for car traveling 20mls.

(3mks)

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(e) **Explain** why the graph is a straight line through the origin. (2mks)

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16. (a) **State** Hooke's Law (1mk)

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(b) A student carried out an experiment to investigate the relationship between the force applied and extension produced on a spiral spring. He tabulated his results as shown in the table below.

Force (N)	0	0.8	1.5	3.0	4.5	6.0	7.5

Extension(cm)	0	0.5	1.0	2.0	3.0	4.0	5.0

(i) **Plot** a graph of extension in cm on the Y-axis against force in N (5mks)

From the graph

(ii) **Determine** the spring constant (3mks)

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(iii) **What** force would be required to produce an extension of 2.5 cm? (1mk)

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(iv) **What** extension is produced by a force of 5.5N? (1mk)

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17 (a) **Define** the term centre of gravity of an object. (1mk)

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(b) (i) With the aid of a labelled diagram **describe** an experiment to determine the c.o.g of an irregular lamina (6mks)

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(ii) **State two** ways that would show that the c.o.g has been attained. (2mks)

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(c) Figure 11 shows a non-uniform rod lying in a horizontal position. Vertical forces of 60N and 40N can lift the rod when applied at the ends A and B respectively.

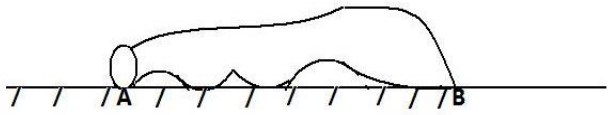


Figure 11

(i) If the rod is 2 metres, find the weight of the rod. (2mks)

(ii) The position of centre of gravity (3mks)

18. (a) **Explain** why food cooks more quickly in a pressure cooker than in a sufuria (3mks)

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(b) 32g of dry ice was added to 200g of water at 25^0C in a beaker of negligible heat capacity. When all ice had melted the temperature of water was found to be 10^0C. 9 (Take specific heat capacity of water to be 4.0J/gk)

(i) **Calculate** the heat lost by water (2mks)

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(ii) **Write** an expression for the heat gained by ice to melt and for temperature to rise to 10^0C. (2mks)

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(iii) **Calculate** the specific latent heat of fusion of ice. (2mks)

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19. (a) A wheel rotates at 45 revolution per minute. **What** is the angular velocity in rad/s? (3mks)

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(b) A body weighs 22N in kerosene and 20N in water. If it weighs 30N in air, **find** the relative density of kerosene. (3mks)

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(c) (i) **State one** assumption made when carrying out the oil drop experiment(1mk)

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(ii) An oil drop of volume of 6.546×10^{-5} cm^3 spread to form a circular patch of radius 9cm.Determine the diameter of the oil molecule (3mks)

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KCSE MOCK TRIAL 6

PHYSICS

PAPER 2

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A:

Answer ALL questions in this section in the spaces provided.

1. **Explain** why the image of an object formed by a plane mirror is called a virtual image. (1mk)

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2. A polythene rod may be charged by rubbing it with a cloth while being held in the hand but a metal rod cannot be charged in a similar way. **Explain** why. (2mks)

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3. A current of 0.48A was passed through an electrolyte for ½ hours. **Calculate** the quatity of electricity used. (3mks)

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4. Figure 1 below shows two conducting wires A and B passing through a horizontal piece of cardboard.

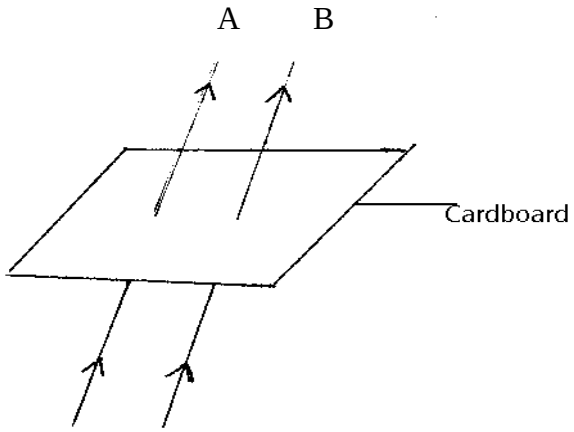


Figure 49

(i) Sketch the resultant magnetic field patterns when the current flow in both wires as shown. (1mk)

(ii) **Show** the direction of the force existing between the two wires. (1mk)

5. A person watching a miner sees the miner strike, the rock and hears the sound 2 seconds later. **Determine** the distance between the person and the miner. Speed of sound = 340m/s) (3mks)

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6. **Explain** in terms of domain theory what happens when a bar magnet is placed in a solenoid in which an alternating current flows. (2mks)

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7. **State** how polarization is reduced in a dry cell (1mk)

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8. **Draw** a ray diagram to show how a parallel ray of light is reflected by a convex mirror. On it mark the principal focus F and the centre of curvature, C. (2mks)

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8. Figure 2 shows arrangement of three capacities of 10μF, 2μF and 5μF.

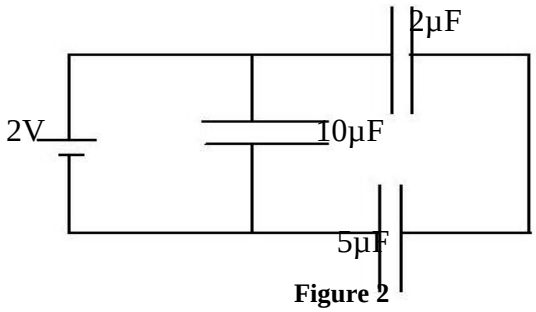


Figure 2

Figure 50

Determine the effective capacitance. (3mks)

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9. Figure 3 shows an ammeter used by a student in an experiment.

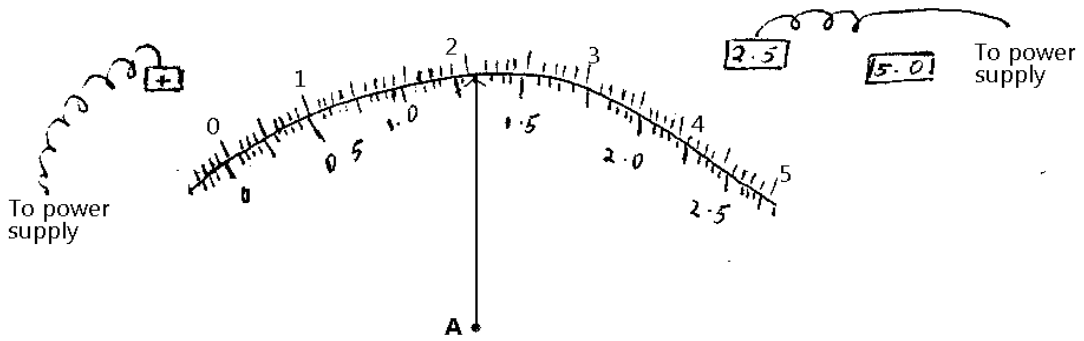


Figure 3

State the ammeter reading (1mk)

11. **State one** source of background radiation (1mk)

……

……

10. **Give a reason** why a colour T.V consumes more energy than a black and white TV. (1mk)

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13. Figure 4 shows the table of electromagnetic. Spectrum in the increasing order of wavelengths.

P	x-rays		Q	Infra red	

Figure 4

Identify the radiation marked P and Q (2mks)

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……

14. What are eddy currents (1mk)

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SECTION B. (55 MARKS)

Answer All questions in this section in the spaces provided.

15. (a) A large battery is connected as shown in figure 5 to a resistor of resistance 1000Ω. The voltmeter across the resistor reads 50V.

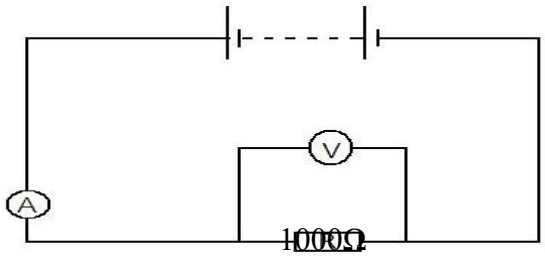


Figure 5

(i) **What** is the reading of the ammeter (A)? (3mks)

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(ii) **Determine** the electrical energy dissipated by the resistor in one minute. (3mks)

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(b) **Determine** the effective resistance in figure 6 below. (3mks)

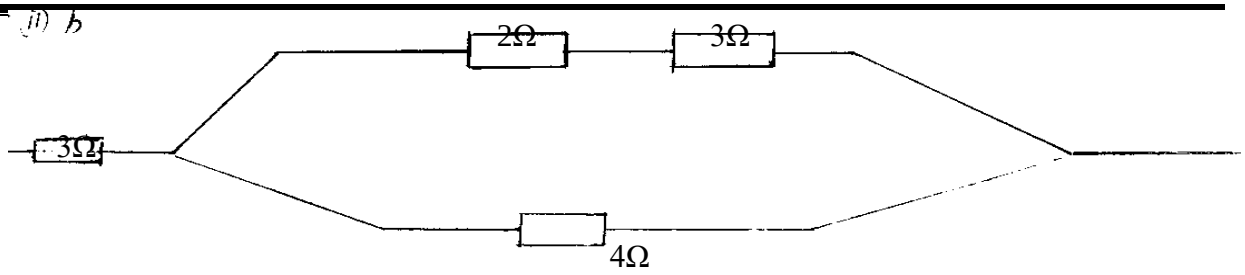


Figure 6

(c) A washing machine for use on 240V mains has a $^1/_3$h.p motor and a heating element rated 3Kw.(1h.p = 0.75kw) . **What** current does it take it take when in use (3mks)

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16. Figure 7. Shows part of an x-ray tube

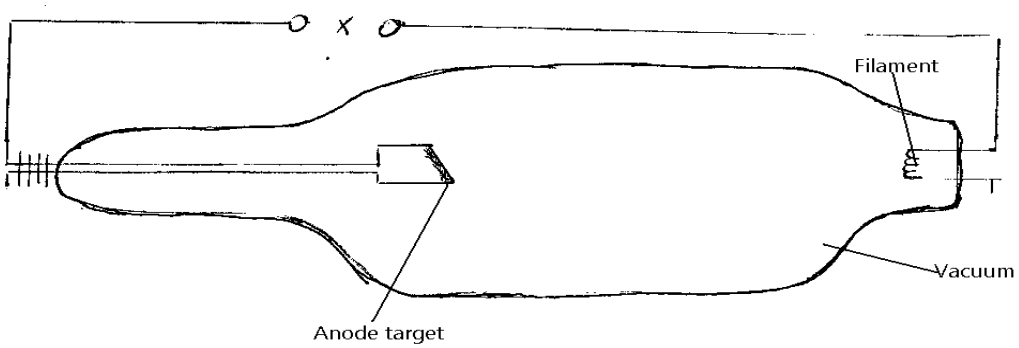


Figure 7

(i) **Explain** how x-rays are produced in the tube. (1mk)

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(ii) **What** property of tungsten makes it suitable for use as a target? (1mk)

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(iii) **Why** is the anode made of thick copper metal? (1mk)

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……

(iv) **Why** is it necessary to have a vacuum inside the tube? (2mks)

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(v) **What** effect will increasing current through the filament have on x-ray produced? (1mk)

……

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(vi) **What** effect will increasing the p.d have on the x-rays produced? (2mks)

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(b) The accelerating voltage between cathode and anode is 1000V. **Calculate** the

(i) Energy possessed by the electrons across the tube. (3mks)

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(ii) Speed of the electrons (take e = 1.6×10^{-19} C $m_e = 9.1 \times 10^{-31}$ kg) (3mks)

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17. (a) **Distinguish** between semiconductor and conductors (2mks)

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(b) **Give one** example of a semiconductor and one for a conductor (2mks)

……

……

(c) **Distinguish** between intrinsic and extrinsic semi-conductor (2mks)

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(ii) **State** how the conductivity of an intrinsic semi-conductor can be improved. (1mk)

……

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(d) Figure 8 shows a puzzle box containing two lamps and other simple components connected so that, when terminal T_1 is connected to the positive pole of a cell, Lamp L_1 alone lights but when terminal T_2 is connected to the positive lamp L_2 alone lights.

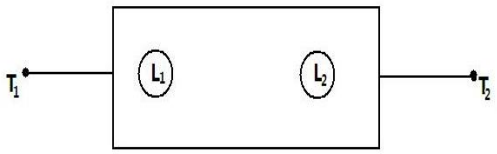


Figure 8

Sketch a possible arrangement including lamps L_1 and L_2 and a set of diodes.

(2mks)

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18. Figure 9 below shows a flex to the 13A – 3pin.

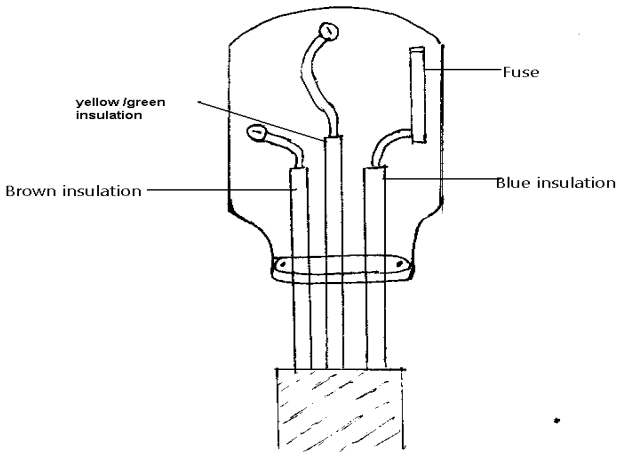


Figure 9

(a) Plug which has been incorrectly fitted.

List two mistakes and suggest corresponding remedies. (4mks)

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(b) (i) **Why** would it be wrong to fit an electric fire in a bathroom on the wall directly above the bath? (1mk)

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(ii) **Where** would such a heater be fitted and what type of switch should be used to operate it? (2mks)

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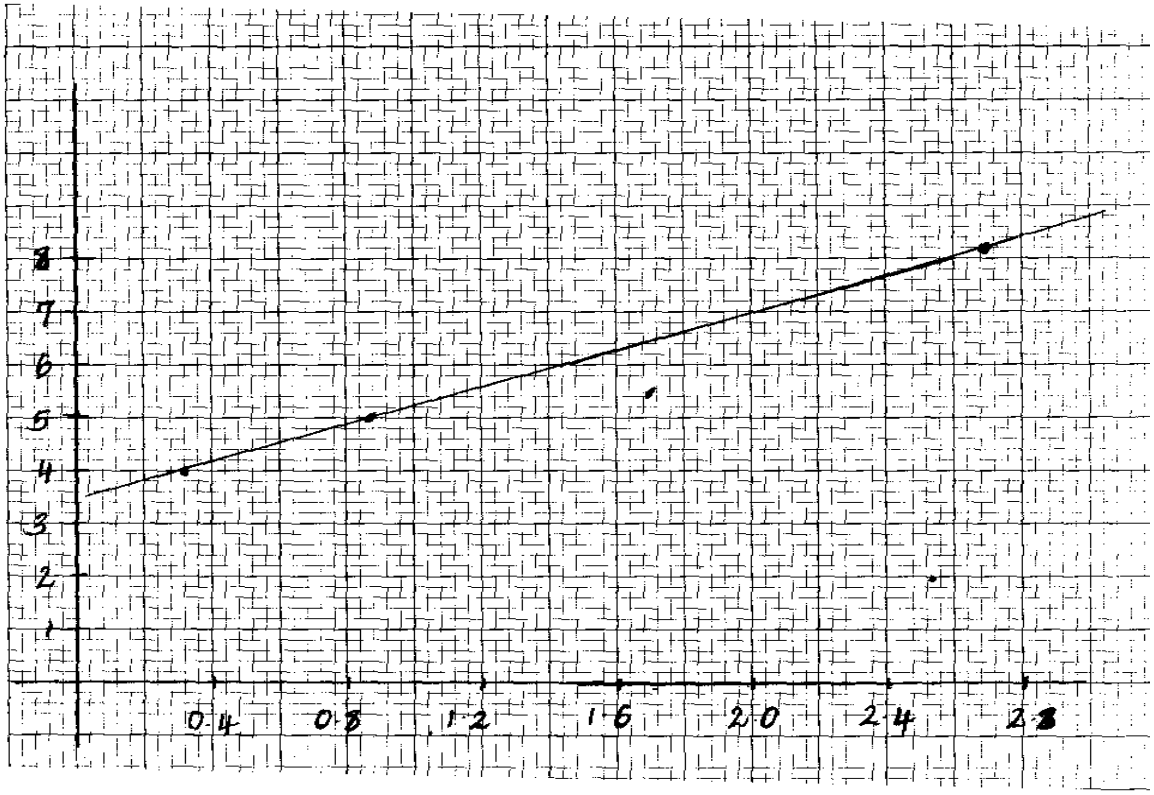
(c) A power line from a power sub station to a town some distance away, has a resistance of 0.10 hms per kilometer. **Determine** the rate of energy loss in the transmission of power over 50km at a current of 60 Amperes (3mks)

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19. (a) The graph in Figure shows the variation of frequency of radiation f with the greatest kinetic energy of the emitted electrons.



From the graph **determine**

(i) Plank's constant (4mks)

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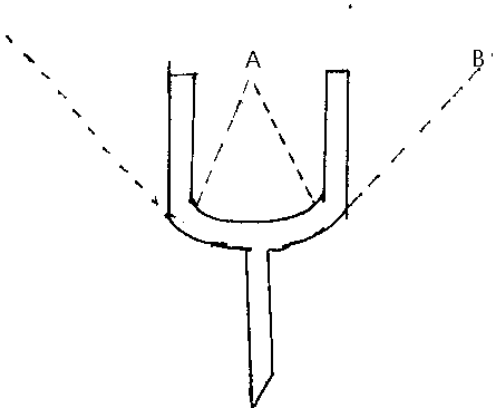
(ii) Hence or otherwise **calculate** the work function of the metal. (3mks)

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(b) The figure below shows vibrating tuning forks. The time taken for aprong to undergo maximum displacement is 0.002 seconds.



Determine the frequency of the vibration. (2mks)

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(c) **State one** condition for total internal reflection to occur. (1mk)

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KCSE MOCK TRIAL 7

PHYSICS

PAPER 1

2 HOURS

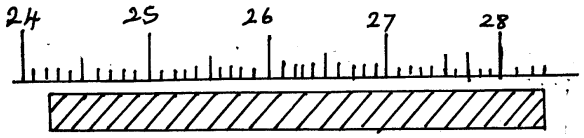
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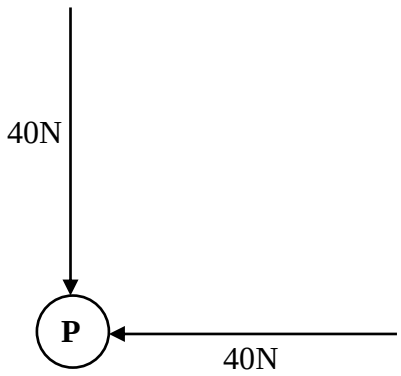
SECTION A (25 Marks)

1. The diagram below shows a piece of wood whose length is being measured using a strip of measuring tape.

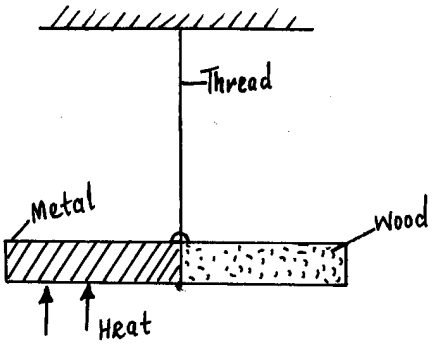


What is the length of the piece of wood. (1 mk)

2. The figure below shows two forces acting on an object P. complete the diagram to show the direction in which P would move. (1 mk)



3. The figure below shows a rod made of wood on one end and metal on the other end, it is 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 and the rod tips to the left. Explain.

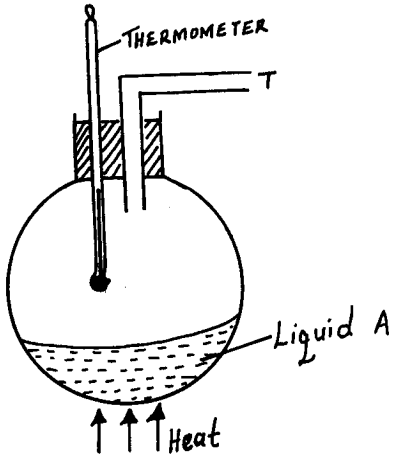
(2 mks)

4. Explain why a high jumper flexes his knees when landing on the ground. (2 mks)

5. State <u>one</u> way of making the surface tension of a liquid stronger. (1 mk)

6. a) What do you understand by the term upper fixed point? (1 mk)

b) The diagram below shows an arrangement used to determine the upper fixed point of ungraduated thermometer.



(i) Name liquid A. (1 mk)

(ii) Why is the bulb of thermometer not dipped in liquid A. (1 mk)

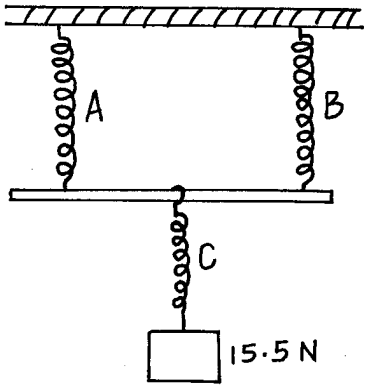
7. Two iron bars A and B with the same cross section area stand on a horizontal table as shown.



State and explain which of the bars is more stable. (2 mks)

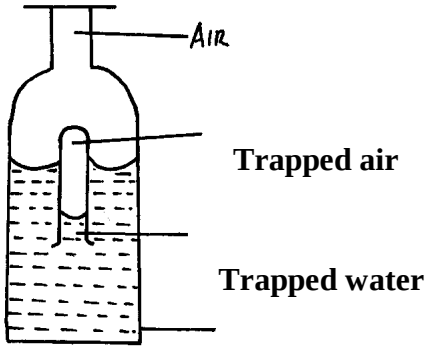
8. The pressure in a moving fluid varies with speed of the fluid. Explain. (2 mks)

9. Three identical springs A, B and C are used to support a 15.5N weight as shown below.



If the weight of the horizontal beam is 0.5N, determine the extension of each spring given that 4N causes an extension of 1cm. (3 mks)

10. The figure shows an inverted test tube which floats in water enclosed in a plastic bottle.



Plastic bottle

When the sides of the plastic bottle are squeezed, explain what would be observed.(3 mks)

11. A liquid at a temperature of 70^0C was poured into a calorimeter containing pure ice. The whole ice was melted and the mixture attained a final temperature, θ.

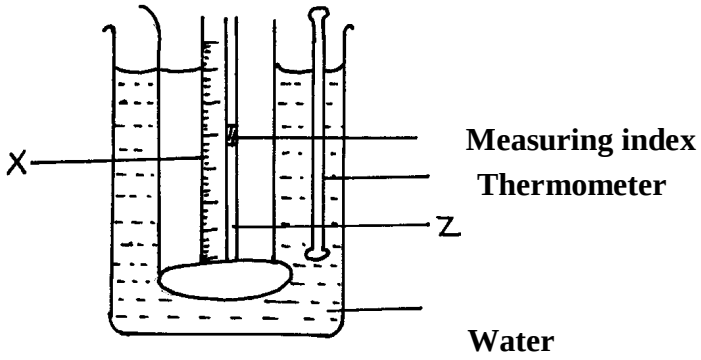
Write down an expression for the final temperature explaining any symbols used. (3 mks)

12. A liquid at **80^0C** in a cup was allowed to cool for 20 minutes. State two factors that determine the final temperature. (2 mks)

SECTION B (55 Marks)

13. a) Two identical containers A and B are placed on a bench, container A is filled with oxygen gas and B with hydrogen gas such that the two gases have equal masses. If the containers are maintained at the same temperature, state with a reason the container which pressure is higher. (3 marks)

b) The figure below shows a set up of an experiment used to investigate Charles's law



(i) Name the parts labeled X and Z. (2 mks)

(ii) State the measurements to be taken in this experiment.

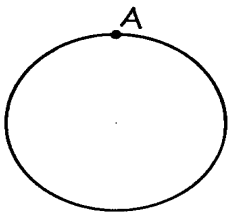
(2 mks)

(iii) Explain how the reading taken (ii) above may be used to investigate Charles law.(2 mks)

(iv) State the two purposes of mercury index. (2 mks)

(v) A constant mass of hydrogen gas occupies a volume of $4.0cm^3$ at a pressure of 2.4×10^5 Pa and temperature of 288K. Find its volume at a pressure of 1.6×10^5 Pa when the temperature is 293K. (3 mks)

14. a) (i) The figure below shows a ball being whirled in a clockwise direction in a vertical plane. Sketch on the figure the path followed by the ball if the strings cuts when the ball is at position A.

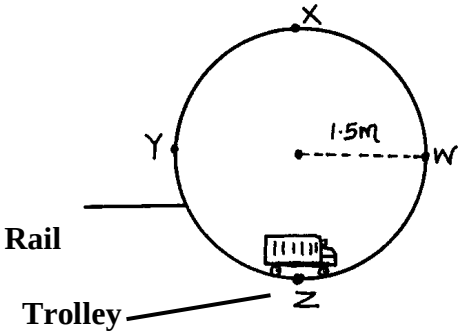


(1 mk)

(ii) A body having uniform motion in a circular path is always accelerating. Explain. (1 mk)

b) (i) The figure below shows a trolley moving on a circular rail in a vertical plane.

Given that the mass of the trolley is 200g and the radius of the rail is 1.5m, (i) determine the minimum velocity at which trolley passes point X. (3 mks)

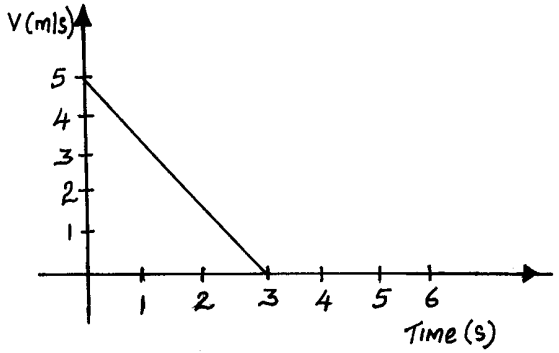


(ii) If the trolley moves with a velocity of 4m/s as it passes point Z, find (I) angular velocity at this point. (3 mks)

(II) The force exerted on the rails at this point. (3 mks)

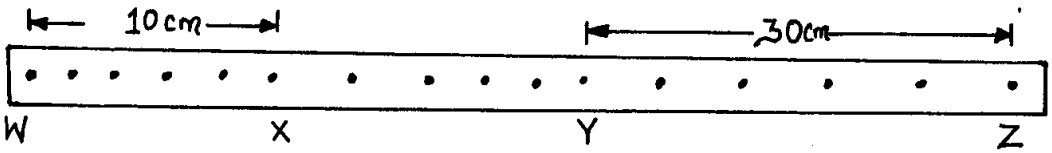
15. a) Distinguish between velocity and speed. (1 mk)

b) The velocity – time graph in the figure below illustrates the motion of a ball which has been projected vertically upwards from the surface of a planet. The weight of the ball on earth is 30N.



Determine the weight of a ball on the planet. (3 mks)

c) The figure below shows a section of a tape from a ten – tick' timer whose frequency is 50Hz.



Calculate

(i) The average velocity of the trolley between points

WX (2 mks)

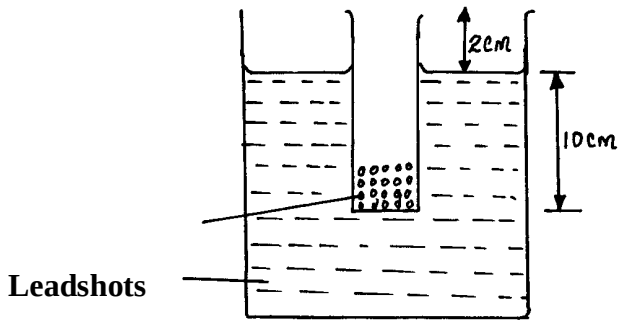
YZ (2 mks)

(ii) The acceleration of the trolley. (3 mks)

16. a) State the law of floatation. (1 mk)

b) A body weighs 40N in air, 30N when in water and 35N when in liquid X. Find the relative density of liquid X. (3 mks)

c) A simple hydrometer is set up with a test – tube of mass 10g and length 12cm with a flat base and partly filled with lead shots. The test tube has a uniform Cross – Sectional area 2.0cm^2 and 10cm of its length is under water as shown in the figure below.

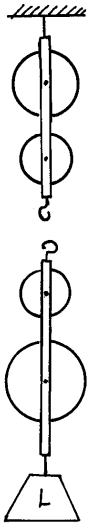


(i) Taking the density of water as 1000Kg/m^3. Calculate the mass of the lead shots in the tube.

(3 mks)

(ii) The mass of the lead shots to be added if it has to displace an equal volume of a liquid of density 1.25g/cm^3. (3 mks)

17. The pulley system in the diagram has two wheels in each block.



a) Complete the diagram to show the string as the pulley is being used to lift the load L. (1 mk)

b) The block and tackle pulley system is used to investigate relationship between mechanical advantage and efficiency.

(i) State the measurements to be taken in this investigation. (2 mks)

(ii) In the axes below sketch a graph of efficiency against load. (2 mks)



(iii) A block and tackle pulley system with a velocity ratio of 5 and 60% efficiency is used to lift a load of mass 60Kg through a vertical height of 2 metres. Calculate the work done by the effort.

(4 mks)

KCSE MOCK TRIAL 7

PHYSICS

PAPER 2

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION I (25MARKS)

Answer all questions in the spaces provided

1. (a) **What** is the name of the apparatus shown in the diagram below?

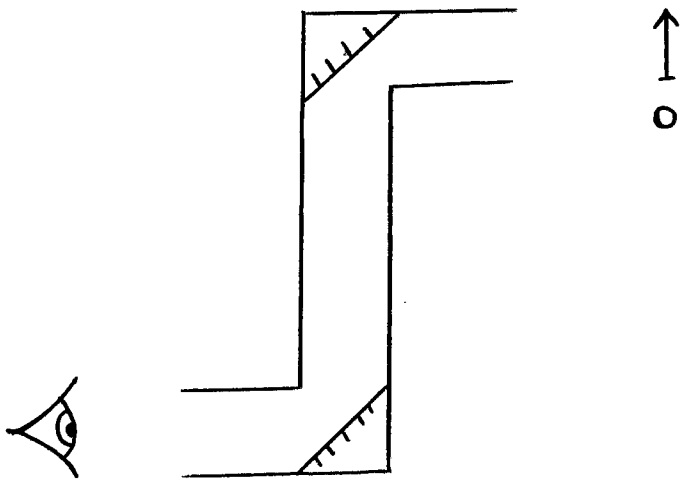


Figure 51

Name of instrument…… (1mk)

(b) Akinyi used the above apparatus to observe a concert in a crowded theatre. **Complete** the ray diagram to show to the final image position (1mk)

2. The diagram below shows a positively charged rod brought close to a candle flame. It is Observed that the flame split into two

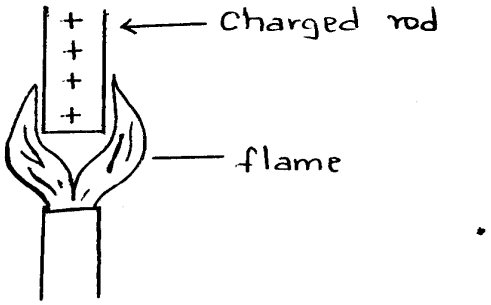


Figure 52

Explain this observation. (2mks)

……

……

3. **Explain** briefly how heating demagnetizes a magnet (1mk)

……

……

4. **Why** is it possible to start the car engine with a 12v –lead -acid accumulator, but not with eight 1.5V dry cells arranged in series (1mk)

……

……

5. A conductor carrying current is placed in the magnetic field and moves in the direction shown

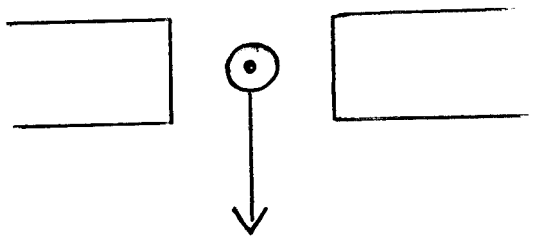


Figure 53

Indicate the polarity of the magnets in the diagram (1mk)

6. The reading of the Ammeter in **fig.4** below is 0.5A when the switch, S is closed.

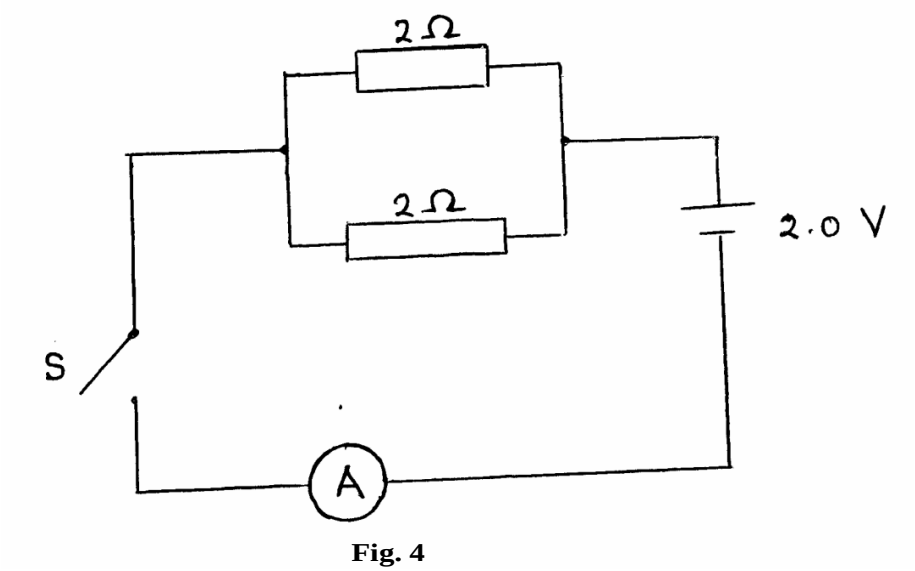


Fig. 4

Determine the internal resistance of the cell (3mks)

7. The sketch graph in figure 5 (a) and (b) below represent the same wave.

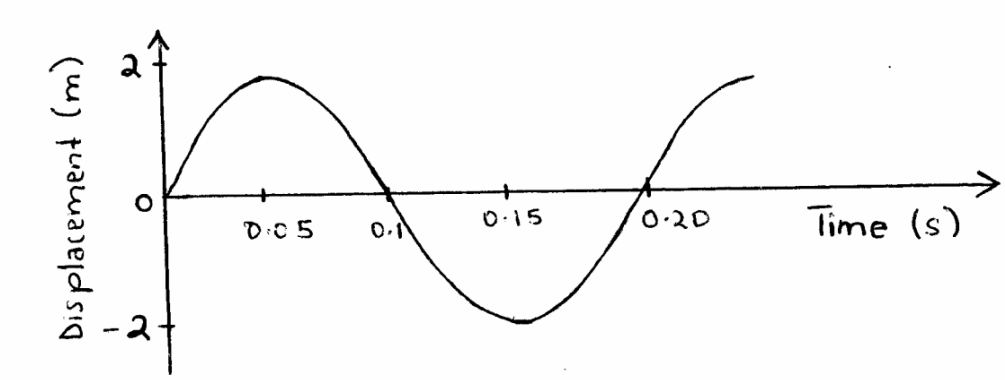


Fig. 5(a)

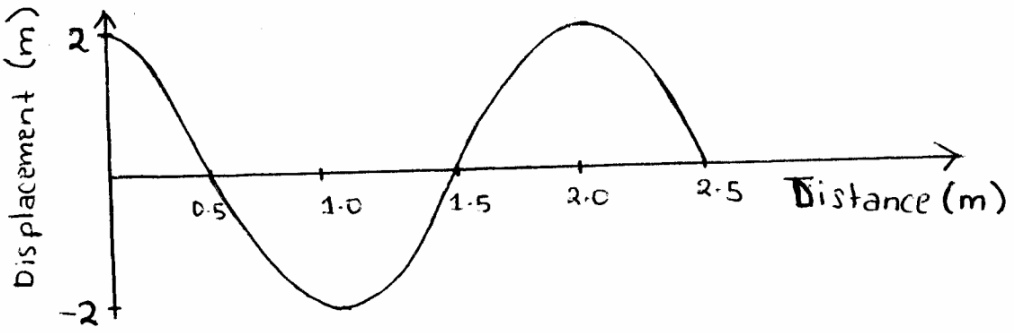


Fig. 5(b)

Determine the velocity of the wave (3mks)

8. **Fig.6** below shows an object, O placed in front of concave mirror and its image, I formed by the mirror. **Draw** rays to show the principal focus of the mirror. (2mks)

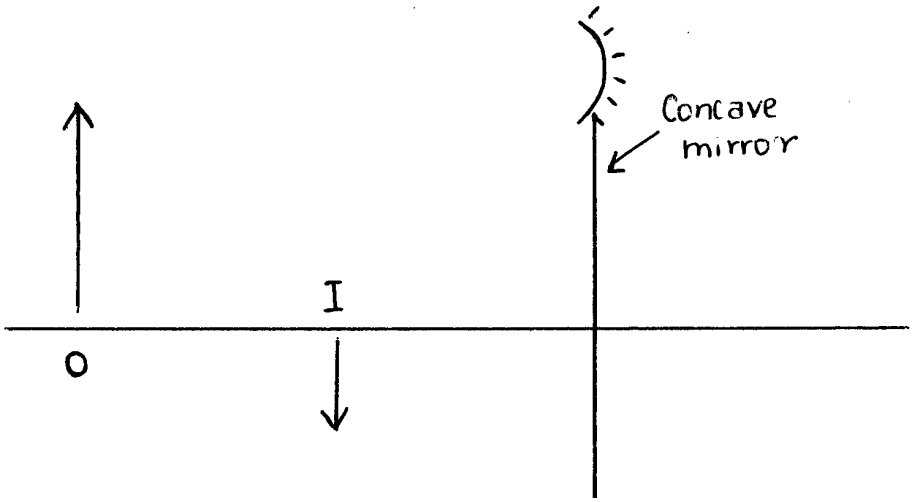


Figure 6

9. **Give** a reason why flourescent tubes are preferred to filament bulbs for domestic lighting. (1mk)

……

……

10. **Arrange** the following electromagnetic radiations in order of increasing frequency; infra - red, Gamma rays, radiowaves, ultra-violets rays. (1mk)

……

11. **Calculate** the apparent depth of an object, O in the **fig. 7** below. (3mks)

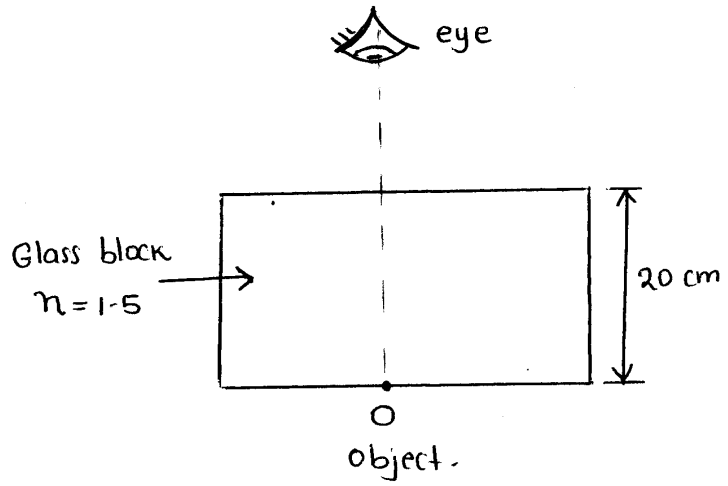


Figure 7

12. Sodium metal requires a minimum energy of 3.2×10^{-19}J to lose its outermost electron. **What** is its threshold frequency? (Planks constant=6.67×10^{-34}Js) (3mks)

13. **What** is meant by 'doping' a semi-conductor? (1mk)

……

……

14. **Define** the term half –life of a radio-active material. (1mk)

……

……

SECTION II (55 MARKS)

15. A student carried out an experiment to investigate how current varies with potential difference applied across a filament lamp. The following readings were obtained.

P.d.(V)	0	0.20	0.40	0.60	0.80	1.20	1.60	2.40
I (A)	0.0	0.11	0.20	0.28	0.34	0.43	0.50	0.58

(a) **Draw** a diagram for the circuit used to obtain the values. (2mks)

(b) **Describe** briefly how the experiment was carried out. (2mks)

……

……

……

……

(c) **Plot** a graph of V against I for the values presented in the table. (5mks)

(d) **Determine** the resistance of the lamp when a current of 0.4A flows through it. (3mks)

.

(e) **Explain** why a filament lamp does not obey Ohm's law. (2mks)

……

……

……

16. (a) **Define** the term principal focus in relation to a thin convex lens (2mks)

……

……

……

(b) **Distinguish** between a real and a virtual image. (2mks)

……

……

……

……

(c) The diagram below shows an arrangement of lenses, L_o and L_e used in a compound microscope F_o and F_e are principal foci of L_o and L_e respectively.

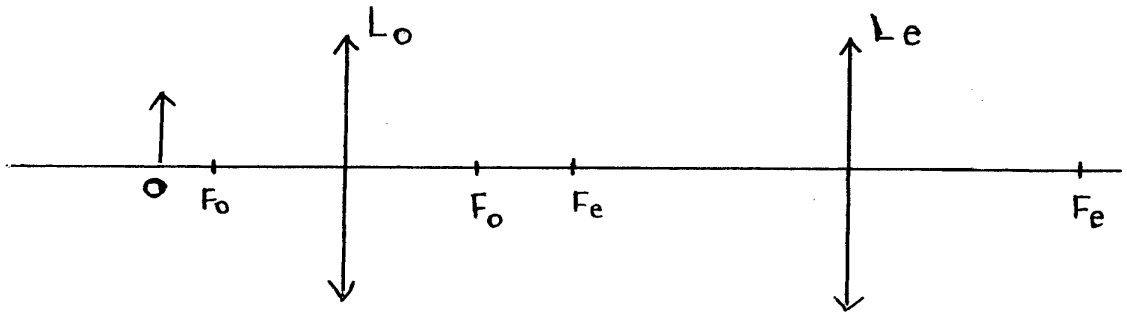


Figure 8

Draw the rays to show how the final image is formed in the microscope (3mks)

(d) The table below shows the object distance, U and the corresponding image distance, V for an object placed

U (cm)	20	25	30	35	40	45
V (cm)	60.0	37.5	30.0	26.3	24.0	22.5
$\frac{1}{u}$ (cm^{-1})						
$\frac{1}{V}$ (cm^{-1})						

(i) **Complete** the table and plot a graph of $\frac{1}{V}$ against $\frac{1}{u}$ (7mks)

(ii) **Determine** the focal length of the lens. (2mks)

17. (a) **State** the laws of electro-magnetic induction (2mks)

……

……

(b) In **fig. 9** below the bar magnetic is moved out of the coil

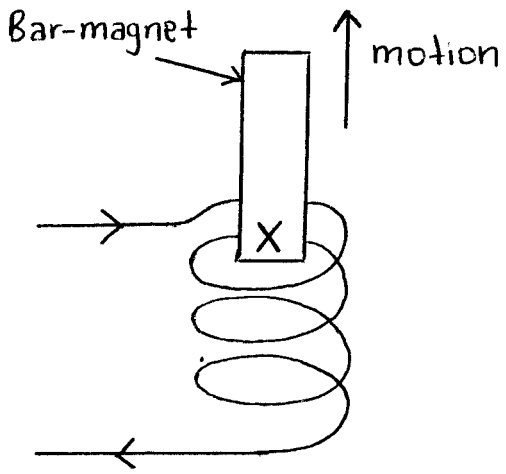


Figure 9

(i) If a current, I is induced in the coil in the direction shown. **What** is the polarity of the end X of the magnet? (1mk)

……

……

(ii) **Explain** briefly the sources of electrical energy in the circuit. (1mk)

……

……

(c) A Hydro-electrical power station produces 500KW at a voltage of 10KV.The voltage is then Stepped up to 150KV and the power is transmitted through cables of resistance 200Ω to a step down transformer in a sub station. Assuming that both transformers are 100%

efficient.

Calculate:

(i) The current produced by the generators. (2mks)

(ii) The current that flows through the transmission cables. (2mks)

(iii) The voltage drop across the transmission cables (2mks)

(iv) The power loss during transmission (2mks)

(v) The power that reaches the sub-station (2mks)

18. (a) (i) **What** is 'Background' radiation in radio-activity? (1mk)

……

……

(ii) The following nuclear reaction is part of radio-active series.

$$^{210}_{83}X \xrightarrow{q} {}^{210}_{84}Y \xrightarrow{a} {}^{a}_{b}Z$$

Identify the radiation q and determine the values of b and c (3mks

q ……

b ……

c …….

. (iii) Cobalt 60 has a half life of 4 yrs. Its initial mass is 50g. **After how many** years will it decay to 1.5625g? (2mks)

(b) **Explain** briefly how a p-type semi-conductor may be made from a pure semi- conductor material. (3mks)

……

……

……

(c) Draw circuit diagrams to distinguish between forward and reverse bias of a p-n junction diode (2mks)

(d) **Sketch** the characteristic graph for a p-n junction diode. (1mk)

KCSE MOCK TRIAL 8

PHYSICS

PAPER 1

2 HOURS

NAME……INDEX NO……

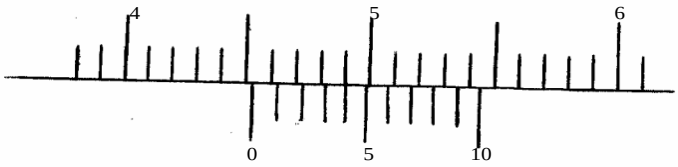
SCHOOL…….. SIGN……

DATE…….

SECTION A (25 MARKS)

Answer ALL they question in this section in the goes provided.

1. The figure below shows a vernier callipers scales.



What is the reading of the instrument in cm (1mk)

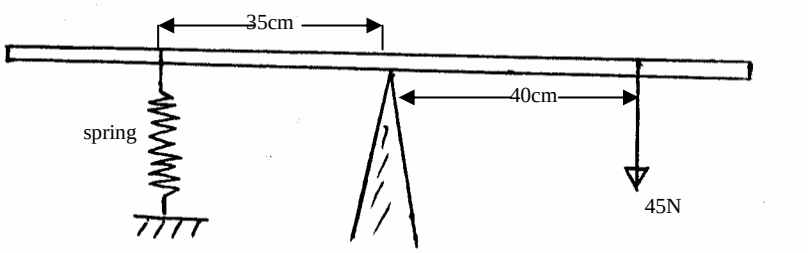
……

2. It is much easier to compress a gas than a solid or a liquid. **Explain**. (2mks)

……

……

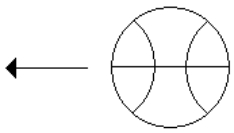
3. The figure below shows a uniform rod that is balanced when the spring extend by 5mm.



(i) **Determine** the force on the spring (2mks)

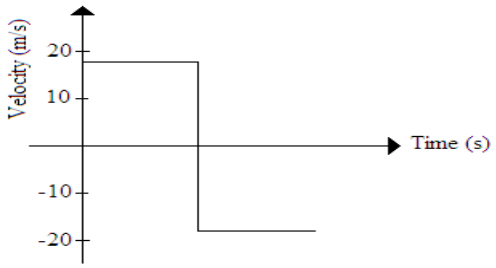
(ii) **Determine** the spring constant (2mks)

4. The figure below shows a spinning ball m, it moves through air in the direction shown.



Draw streamlines of air around the ball and show the direction in which it spins such that an upward force is created. (2mks)

5. The figure below shows the velocity – time graph for the motion of a body.



Sketch the speed time graph for the same motion. (1mk)

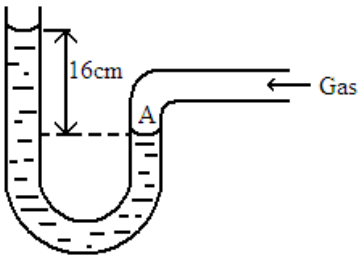
6. **Distinguish between** perfectly elastic and perfectly inelastic collisions. (2mks)

……

……

7. A liquid manometer is used to measure pressure of a gas supply as shown in figure below. **Determine** the gas pressure at A, (take the density of the liquid to be 1.2 x 10^3 Kg m^{-3} , acceleration due to gravity g to be 10ms^{-2} and the atmospheric pressure in 1x10^5 pascals)

(3mks)



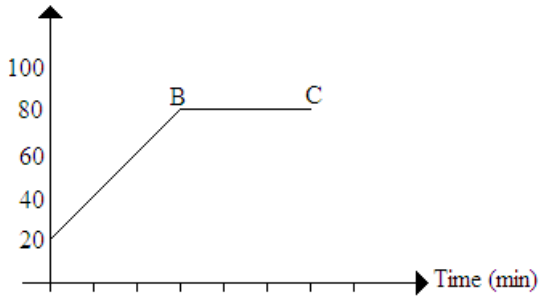
8. A body has a kinetic energy of 16 Joules. **What** would be its kinetic energy if its velocity was doubled? (2mks)

9. **Sketch** a graph of changes in destiny of the water for temperature between 0^0C to 10^0C

(2mks)

10. A balloon is filled with air to a volume of 200ml at a temperature of 293 K. **Determine** the volume when the temperature rises to 353 K at the same pressure: (2mks)

11. The figure below shows the variation of temperature θ with time t_1 when an immersion heater is used to heat a certain liquid. **Study** the figure and answer the following question.

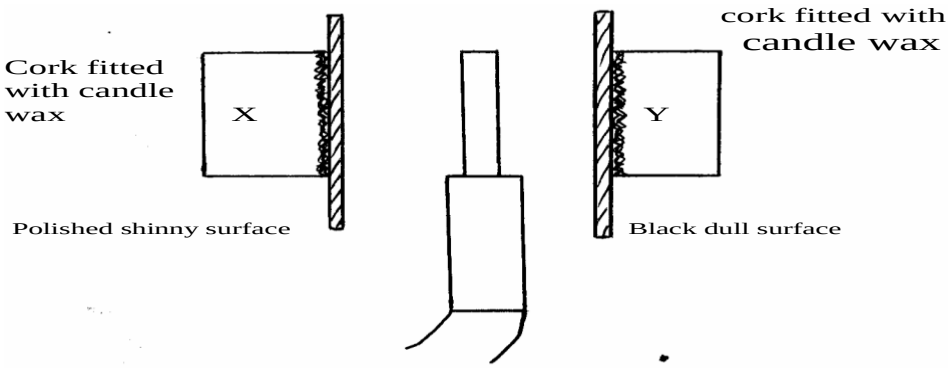


State the reasons for the shape of the graph in the region labelled BC and what kind of heat is supplied at this section / stage of substance. (2mks)

……

……

12. The figure below shows two cork x and y fixed on a polished plate and a dash plate with candle wax respectively.



Explain the observations made when the heater is switched on for a short time. (2mks)

……

SECTION B (55 MARKS)

Answer ALL the questions in this section in the space provided.

13. (a) A small drop of oil has a volume $5x10^{-10}m^3$ when it is put on surface of some clean water it forms a circular film of $0.1m^2$ in area.

(i) **Describe** how the oil patch /film is formed. (2mks)

……

……

(ii) **Why does** the film form into a circular shape (1mk)

……

(iii) **What** in the size of a molecule of oil? (3mks)

(b) In an experiment to show Brownian motion, smoke was placed in an air cell and observed to move randomly.

(i) **Explain** the observation. (1mk)

……

(ii) **Give a reason** for using small particles such as a smoke in this experiment.(1mk)

……

(iii) If the temperature of the air cell was raised **explain** the new observation. (1mk)

……

(c) (i) **Distinguish** between liquid and gaseous states of matter in terms of molecular forces. (1mk)

……

……

(ii) **Distinguish** between cohesion and adhesion. (1mk)

……

14. (a) **Define** the term 'work' (1mk)

……

(b) The table below shows the value of extensions of a spiral spring when various forces are applied to it.

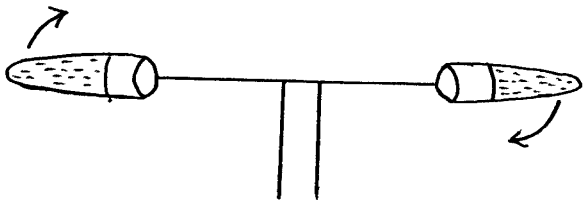
Force, F (N)	0	1.0	2.0	3.0	4.0	5.0	6.0
Extension, e (cm)	0	0.8	1.5	2.3	3.1	3.8	4.6

(i) **Plot a graph** of force (y- axis) against the extension (5mks)

(ii) **Determine** the work done in stretching the spring by 4 cm. (3mks)

(c) A pump can raise 120 kg of water to a height of 10.0 m every minute. **Determine** the power of the pump. (3mks)

15. (a) (i) The figure shows a centrifuge and two tubes containing muddy water being whirled at high speed



Explain how the high speed rotation causes the separation of mud from water. (2mks)

……

……

(ii) A perforated drum in a spin –dryer is used to dry wet clothes by rotating it at very higher speed. **Explain.** (2mks)

……
……
……

(b) A pilot has a weight of 800N. He flies his plane at $60ms^{-1}$ in a vertical circle of radius 100m.

(i) **Calculate** the centripetal force on the pilot. (3mks)

(ii) **Draw** a diagram to show the two forces on the pilot at the top and at the bottom of the loop. (4mks)

16. (a) **Why** is a burn from steam of boiling water more severe than that of boiling water itself? (1mk)

……
……

(b) An energy saving stove when burning steadily has an efficiency of 60%. The stove melts 0.03 kg of ice at 0^0C in 180 seconds. **Calculate:** (*take the specific latent heat of formation of ice = 340000 Jkg^{-1}*)

(i) The power of the stove (3mks)

(ii) The heat energy wasted by the machine (2mks)

(c)

(i) **State three** differences between boiling and evaporation . (3mks)

……
……
……

(ii) **Explain why** points in greenhouse, experience higher temperature than the ones outside. (1mk)

……
……

17. (a) **Distinguish** between the terms 'uniform velocity' and 'uniform acceleration.' (2mks)

……
……

(b) A car of mass 800kg travels along a straight level road. The graph shows its speed against time.

Use the graph to **find**

(i) The initial acceleration (a) (2mks)

(ii) The total distance traveled (2mks)

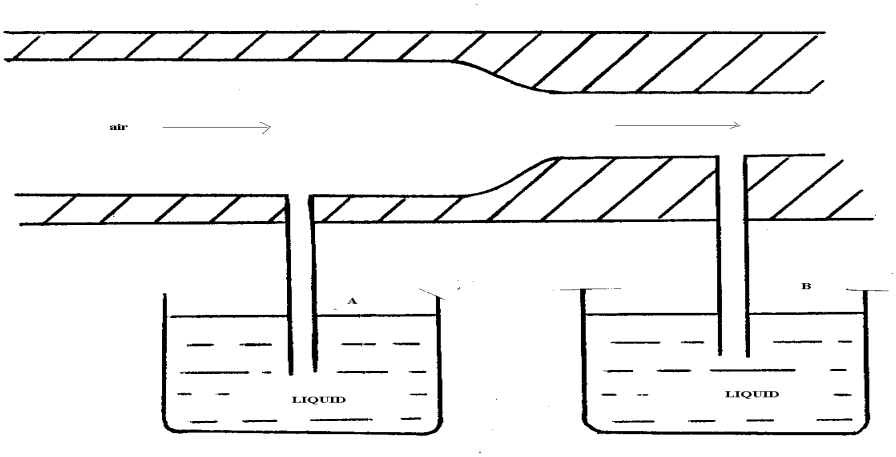
(iii) The average speed for the journey (2mks)

(c) (i) **How** does the pressure of a fluid relate to its rate of flow? (1mk)

……

……

(i) The figure below shows air flowing a pipe of non- uniform cross- sectional area. Two pipes **A** and **B** are dipped into liquids as shown.



Indicate the levels of the liquids in A and B, giving a reason for your answer. (2mks)

……

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KCSE MOCK TRIAL 8

PHYSICS

PAPER 2

2 HOURS

NAME…….INDEX NO……

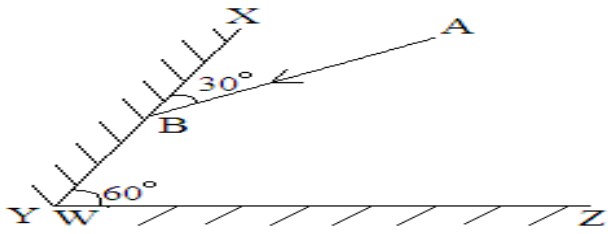
SCHOOL…….. SIGN……

DATE…….

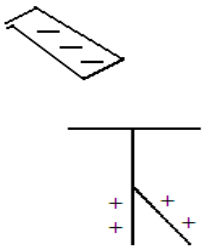
INSTRUCTIONS TO CANDIDATES

SECTION A (25 MARKS)

1. The figure below shows XY and WZ placed at an angle of 60^0 to each other. The ray AB is incident on mirror XY as shown in **fig.1 Sketch** the path of the ray after striking mirror XY. (1mk)



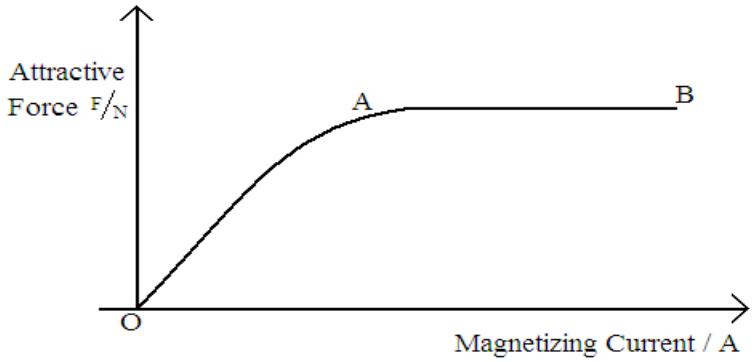
2. **State and explain** the observation on the leaf of a positively charged electroscope when a negative charge is brought close to cap as shown in **fig. 2** below. (2mks)



S

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……

3. The sketch graph below shows the relationship between the attractive force of on electromagnet and the magnetizing current use the domain theory to **explain** the shape of the curve as show in **fig.3** below. (2mks)



……
……

4. The diagram below shows two circuits in which identical dry cells send identical bulbs are used as shown **figure.4** below.

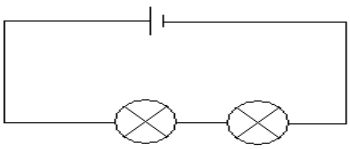


Figure 54(a)

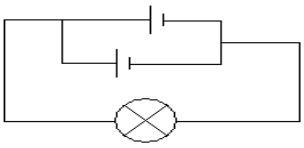
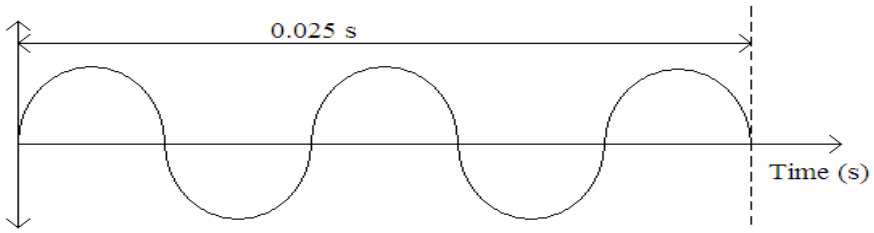


Figure 4(b)

Explain why the cells in (b) can be used for a longer period than in (a) (2mks)

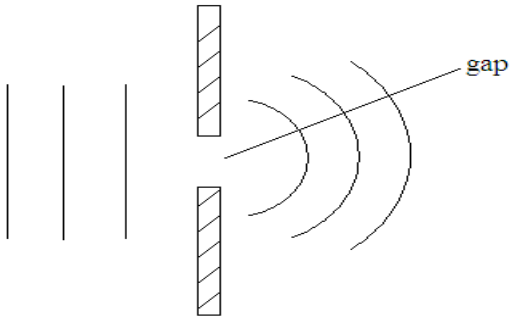
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5. **Figure. 5** below shows a displacement time graph for a wave



Determine the frequency of the wave. (3mks)

6. **Figure. 6** below shows wavefront before and after passing through an opening as shown in **fig.5**



State what would be observed on the pattern after passing the opening if

(i) wave length is increased (1mk)

……

……

(ii) Gap is increased (1mk)

7. **State two** ways by which the frequency of a note produced by a sonometer wire may be increased. (2mks)

……

……

8. An electric kettle rated at 2.0 kw, 240v is filled with water. If the water requires 7.0×10^5 Joules of heat to boil from the initial temperature, **determine** the resistance of the element. (3mks)

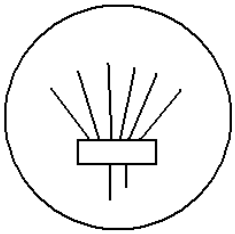
9. A certain glass material has a refractive index of 2.5. **What** is its critical angle? (2mks)

10. **Distinguish** between thermionic emission and photo- electric effect. (1mk)

……

……

11. **Figure.7** below shows tracks made by a radiation of a radioactive element. **Identify** the kind of radiation that could produce this. **Give** reasons for your answers. (2mks)



……

……

12. **Define** the term doping as used in semiconductors. (1mk)

……

13. $1/64$ of a sample of a radioactive substance remains after 2 hours, **what** is its half- life. (2mks)

SECTION 2

14. In an experiment to find the relationship between frequency of radiation and the kinetic energy of photo electrons in a photo electric device, the following results were obtained.

Frequency $\left(f \times 10^{14} H_3\right)$	7.4	6.8	6.1	5.3	4.7
Stopping potential (V_s)	1.7	1.6	1.26	0.8	0.74

(a) On the grid provided **plot a graph** of stopping potential (V_s) against frequency (FHz)

(b) From the graph **find**

(i) The threshold frequency (1mk)

(ii) The planks constant (h) (3mks)

(iii) The work function of the metal in Joules (2mks)

15. A student performed an experiment to measure focal length of a converging lens. In the experiment, a series of object and image distance U and V were obtained and a graph of UV against U+V was drawn as shown.

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

(ii) **Obtain** the magnification of this lense when the image distance is 30 cm. (2mks)

(b) The figure below shows a certain eye defect.

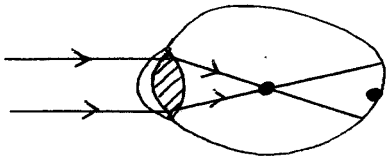


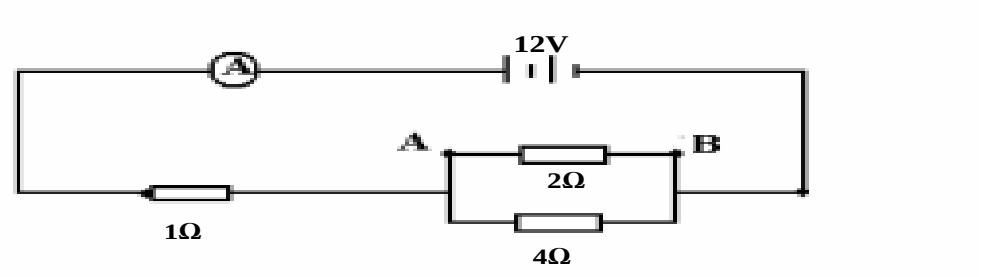
Figure 55

(i) What is the **name** of this defect (1mk)

……

(ii) On the same arrangement draw an arrangement to show how the defect can be corrected. (2mks)

16. **Study** the circuit diagram below and answer the questions that follow.



(a) Calculate

(i) The current flowing through the ammeter. (3mks)

(ii) The P.d. across AB (2mks)

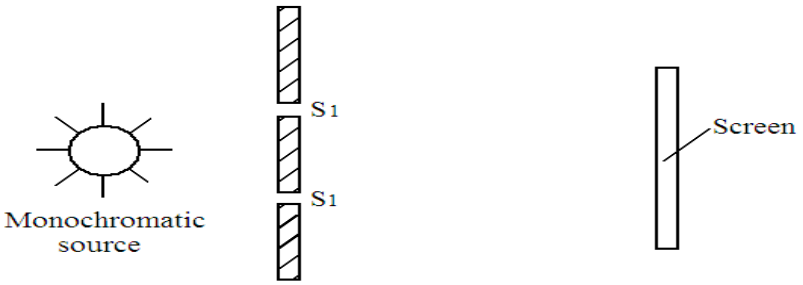
(iii) The current through the 4Ω resistor (2mks)

(b) The graph below shows the relationship between voltage and the current obtained from an experiment performed by form four students

(i) From the graph **determine** the e.m.f. (1mk)

(ii) **Determine** the internal resistance of the battery (3mks)

17. (a) In an experiment to observe interference of light waves a double slit placed close to the source as shown in **fig. 9** below.



(i) **What** is monochromatic source (1mk)

……

(ii) **State** the function of the double slit (1mk)

……

(iii) **Briefly describe** what is observed on the screen (1mk)

……

(b) **Briefly explain** what is observed on the screen when

(i) The slit separation S_1S_2 is reduced (1mk)

……

……

(ii) White light source is used in place of monochromatic source. (1mk)

……

(c) (i) **Distinguish** between extrinsic and intrinsic semi-conductors. (2mks)

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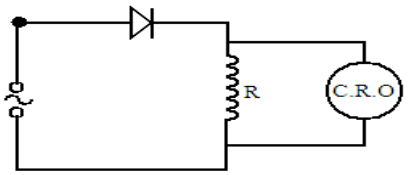
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(ii) **Explain how** an n-type semi conductor is produced. (2mks)

……

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(iii) A diode D is connected to a source of alternating current as shown below.



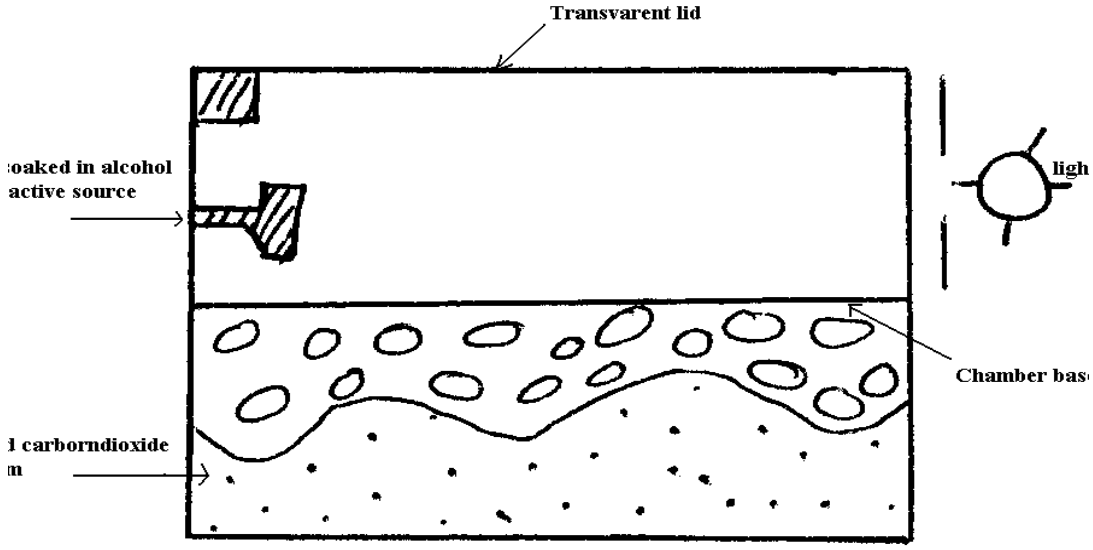
Sketch a graph of the out put as seen on C.R.O. (2mks)

Draw a diagram to show how the out put on the C.R.O could be improved. (2mks)

18. (a) **What** is meant by radioactive decay? (1mk)

……

(b) The figure below shows a diagram of a diffusion cloud chamber for detecting radiations emitted by radioactive element.



(i) **Briefly explain** how the radiation emitted by-the source is detected using the above cloud chamber detector. (3mks)

……
……
……

(ii) **State one** advantage of this detector over charged electroscope. (1mk)

……
……

(c) The table below shows the results obtained from activity of a sample of a radioactive materials which was measured for a period of time

Time (minutes)	0	1	2	3	4	5
Activity count/ minute	225	170	113	75	50	28

(i) **Plot a graph** of activity (y axis) against time (5mks)

(ii) Use your graph to **determine** the half life of the sample (1mk)

KCSE MOCK TRIAL 9

PHYSICS

PAPER 1

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

This paper consists of 12 printed pages. Candidates should check the question paper to ensure that all the pages are printed as indicates and no questions are missing.

SECTION A (25 MARKS)

1. Before using a vernier calipers to measure the diameter of a marble, a student confirmed that it has a zero error of -0.03cm. The **figure 1** below shows the vernier calipers scale when in use.

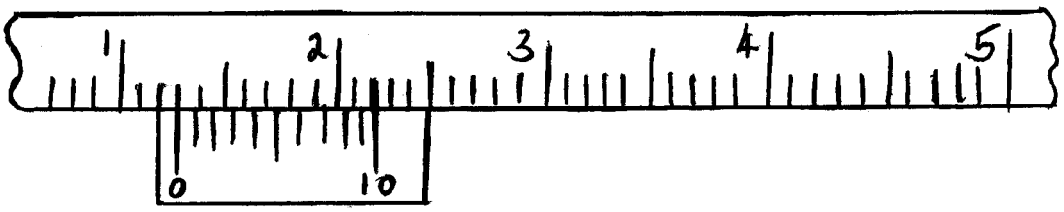


Fig. 56

State the correct diameter of the marble. (2mks)

……

……

2. A balloon was filled with hydrogen gas whose density is about 0.09kg m^{-3} and released outside in air whose density is about 1.3kgm^{-3}. **State** and **explain** the observation made. (3mks)

……

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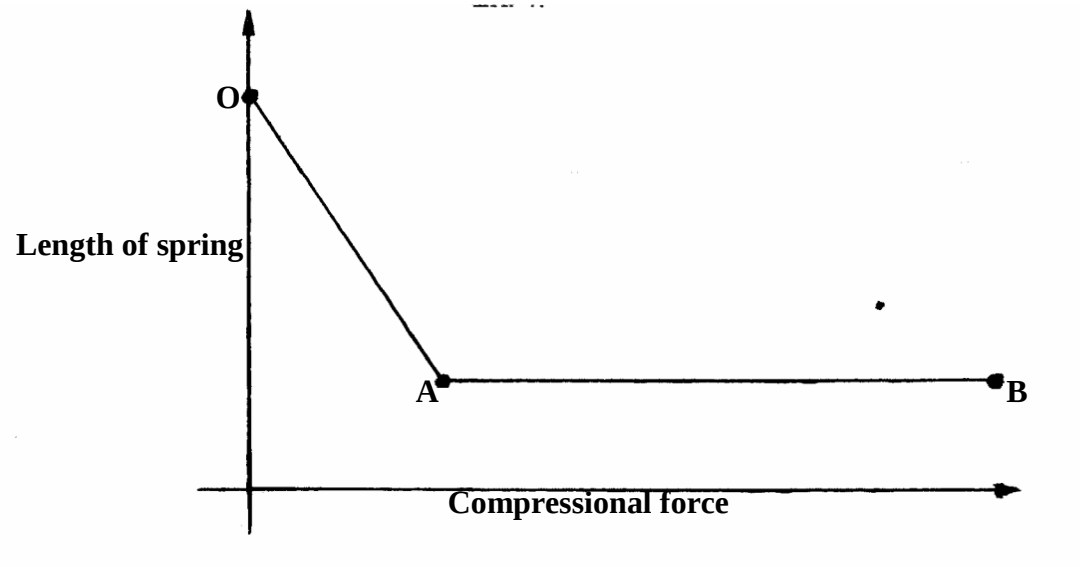
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Use the graph below showing the variation of the length of a spring and the compressional force applied on it to answer questions 3 and 4.



3. **State** the significance of the point labelled **A**. (1mk)

……

……

……

4. **Explain** the nature of the graph between **A** and **B**. (1mk)

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……

……

5. **State** the Bernoulli's principle in fluids. (1mk)

……

……

……

6. **Figure 2** shows a uniform metre rule balanced by a rectangular glass block that is totally immersed in oil of relative density 0.89. The block has a volume of $2.1 \times 10^{-2}m^3$ and density of glass is $2500kgm^{-3}$.

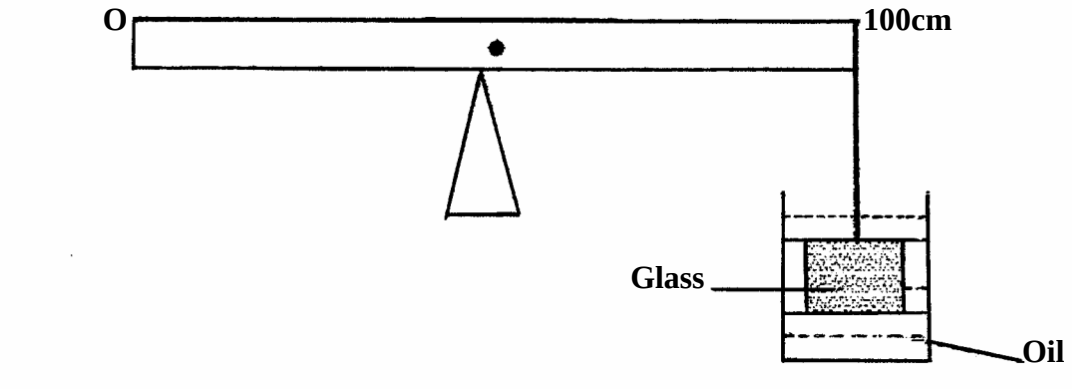


Fig. 57

Find the position of the pivot if the mass of rule is 97g. (3mks)

7. The **figure 3** below represents a mercury barometer at sea level. Use the information in the figure to answer questions 7 and 8.

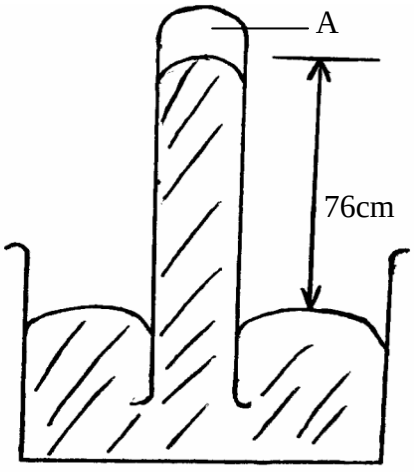


Fig. 58

8. (i) **What** is the name of the part labelled **A**? (1mk)

……

……

……

(ii) **What** will happen to the barometric height if the barometer is taken to a place of higher altitude.? (1mk)

……

……

……

(iii) **Give** a reason for your answer in 8(ii) above. (1mk)

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……

9. **Figure 4** below shows a manometer used to measure gas pressure.

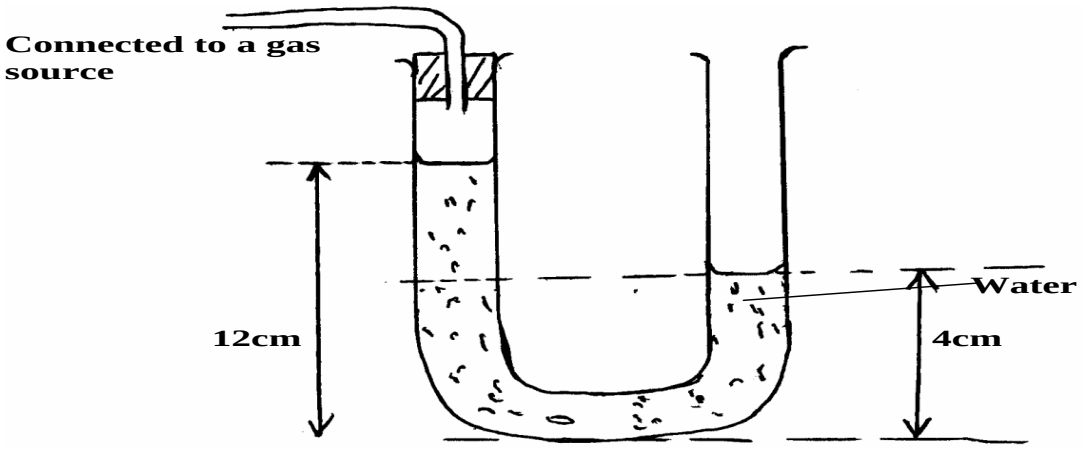


Fig. 59

Determine the gas pressure Pg given that atmospheric pressure is 760mmHg, density of water is $1gcm^{-3}$ (3mks)

Density of mercury $13,600kgm^{-3}$

10. A string will break under a load of 2Kg. A mass of 250g is attached to a piece of the string 2m long and is rotated horizontally in a circle of radius 2m. **Find** the maximum frequency of revolution that can be made without the string breaking. (3mks)

11. **What** is the significance of absolute zero on the Kelvin scale? (1mk)

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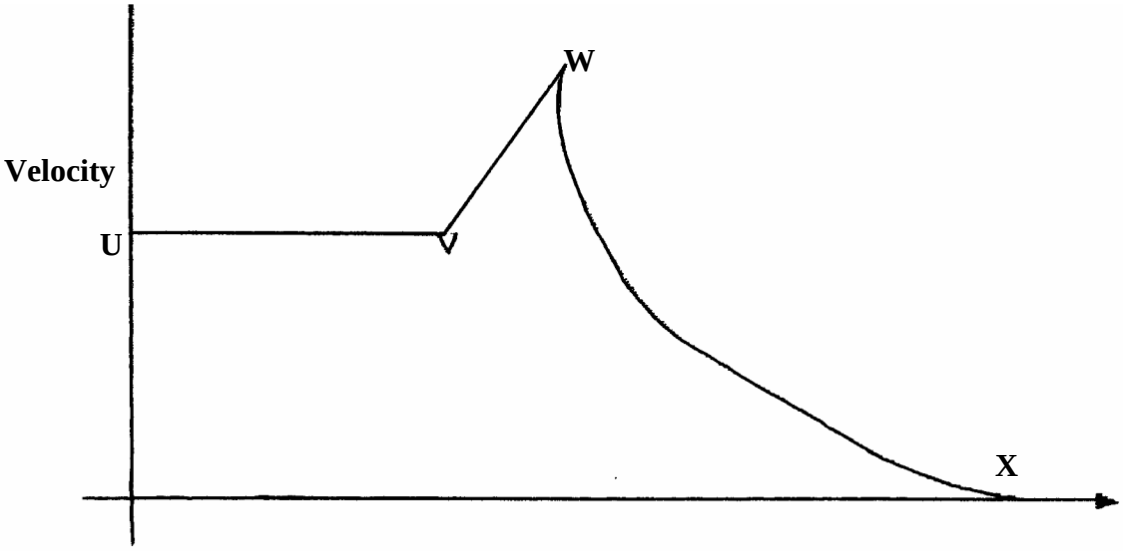
12. **State** how the viscosity of a liquid is affected by temperature. (1mk)

……

……

SECTION B (55 MARKS)

13. (a) The graph shows the velocity time graph of the motion of a body.



State the nature of motion of the body represented by graph between.

(i) U and V. (1mk)

……

……

(ii) V and W (1mk)

……

……

(iii) W and X (1mk)

……

……

(b) A body is projected vertically upwards with an initial velocity u. It returns to the same point of projection after 8 seconds. **Sketch**:

(i) The speed time graph. (2mks)

(ii) The velocity time graph for the body. (2mks)

(c) The figure 5 below represents part of a tape pulled through a ticker timer by a trolley moving down an inclined plane. If the frequency of the ticker timer is 100Hz, **calculate** the acceleration of the trolley. (3mks)

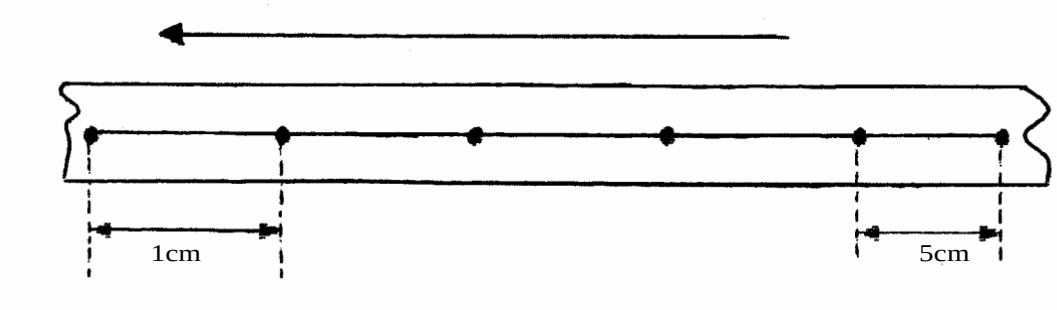


Fig. 60

14. (i) **State two** factors that affect melting and boiling points of a substance. (2mks)

……

……

……

(ii) **State two** applications of the factors above on melting of ice. (2mks)

……

……

(iii) **Describe** an experiment using a diagram you can use to show the effect of reduced pressure on boiling point. (5mks)

15. (a) **Distinguish** between mass and weight. (1mk)

……

……

……

(b) A constant force is applied to a body moving with a constant speed. **What** observable changes in state of motion of the body is likely to occur? (2mks)

……

……

……

(c) (i) **Distinguish** between perfect elastic collision and a perfect inelastic collision. (2mks)

……

……

……

(ii) A bullet of mass 10.0g is fired at close range into a block of mass 4.99kg suspended from a rigid support by a string. It becomes embedded in the block. As illustrated in the **figure 6** the block rises to a height of 2.50cm before comes to rest. **Calculate** the initial speed of the bullet. (4mks)

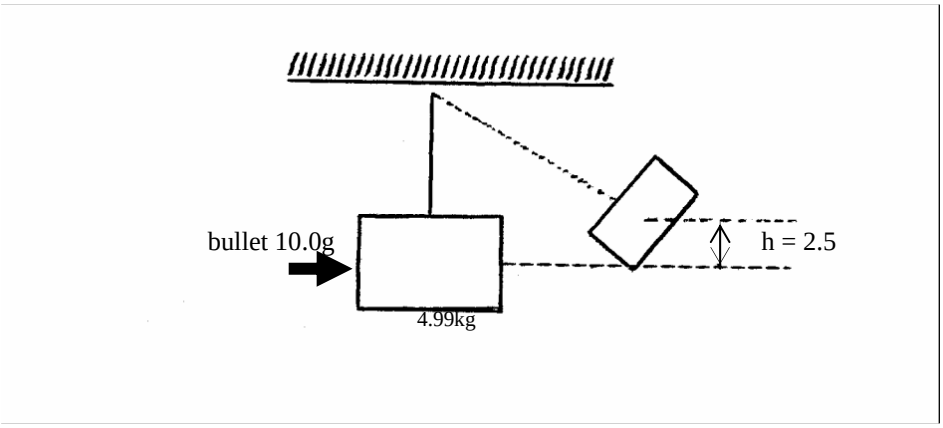


Fig. 61

(d) **What** energy changes take place when a moving car is brought to rest using its breaks? (2mks)

……

……

16. (a) The **figure 7** shows a system in equilibrium with the horizontal rule.

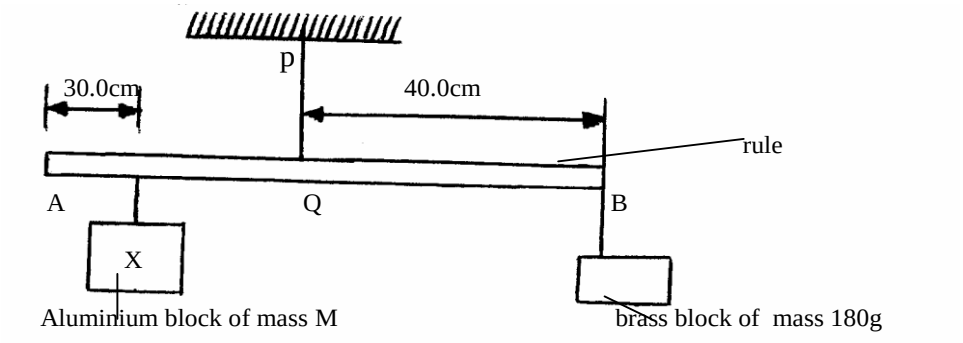


Fig. 62

AB is a uniform rule of length 1.0m and weight 1.8N. **Calculate** the

(i) Weight of the block X. (3mks)

(ii) Tension in the string PQ. (2mks)

(b) The **figure 8** below shows a non-uniform rod lying on a horizontal position. Vertical forces of 5N and 4N can lift the rod when applied at the ends A and B respectively.

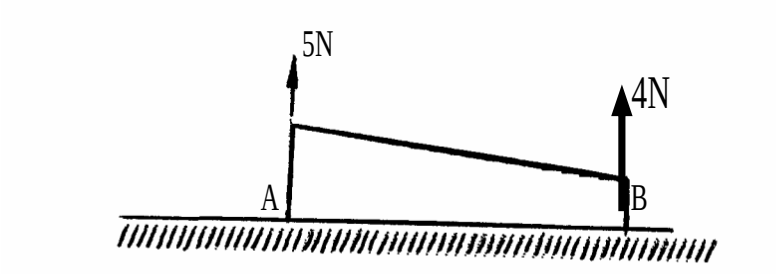


Fig. 63

If the rod is 1.8m long, **find** with the help of the diagram, the

(i) Weight of the rod (2mks)

(ii) Position of the centre of gravity. (3mks)

(c) Briefly **describe** how you would determine the centre of gravity of a lamina. (3mks)

……

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……

17. (a) A flat bottomed tube of base area 2.5cm^2 has lead shot (small balls made of lead) placed in it. It is floated upright in a liquid of unknown density as shown below.

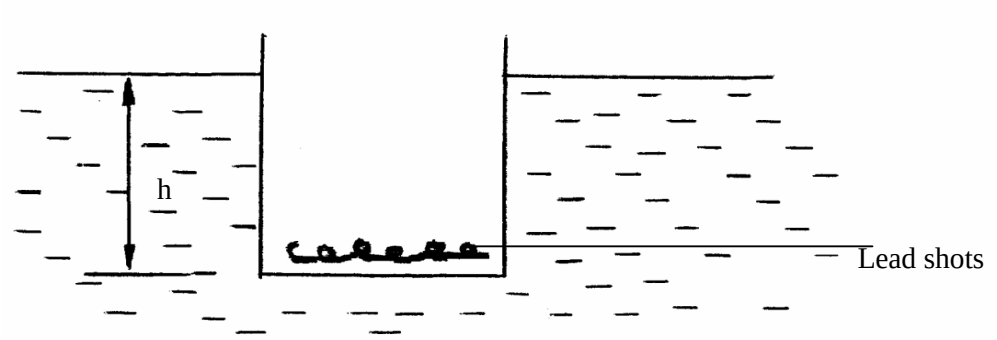


Fig. 64

The following results were obtained when the lead shot was gradually increased.

Mass of empty tube = 20g

Mass of shot in grams	10	13	16	19	22	25
Depth (h) immersed in cm	10	11	12	13	14	15
Total mass of tube and lead shot (grams)						

(i) **Complete** the table above. (2mks)

(ii) On the grid provided, **plot** a graph of total mass of the tube and lead shot against h. (5mks)

(iii) **Determine** the gradient of the graph. (3mks)

(iv) Use your graph to **determine** the density of the liquid. (2mks)

KCSE MOCK TRIAL 9

PHYSICS

PAPER 2

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A (25 MARKS)

1. **Figure 1** below shows an ammeter used to measure current through the conductor. The student used the lower scale.

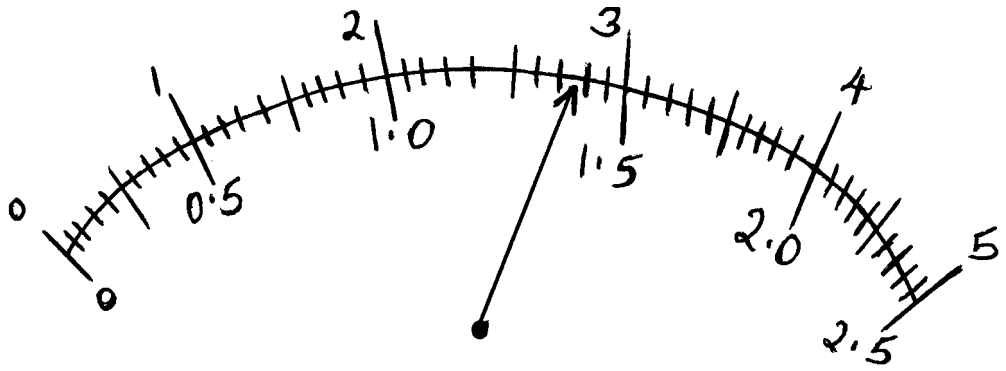


Figure 65

State the reading from the meter.
……Amperes. (1mk)

2. The **figure 2** below shows how a white light behaves when it is incident on a glass prism.

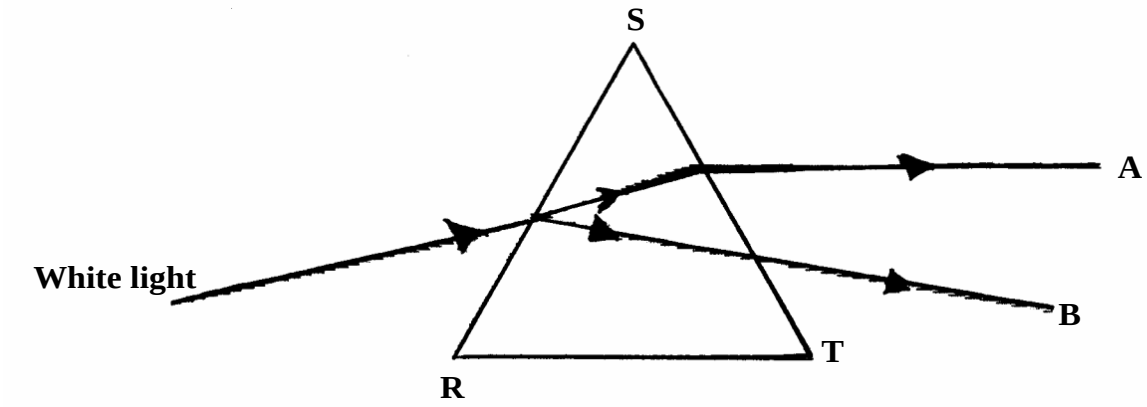


Figure 66

(i) **Explain** why it split into different colours between A and B. (2mks)

……..

……..

(ii) Suppose the white light is incident on the face S.R normally, **State** and **explain** the observation. (2mks)

……..

……..

3. An electric kettle is rated at 1.8kw, 240V. **Explain** the choice of the safest fuse to use for the kettle. (3mks)

……

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……

4. **Draw** a circuit diagram of two diodes depicting full wave rectification. (2mks)

5. **What** are the main charge carriers in an n-type of semiconductosr? (1mk)

……

……

……

6. A girl was working on a model placed 70cm away from a concave mirror of focal length 90cm. **State two** characteristics of the image observed. (2mks)

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7. **Figure 3** below shows a copper ring lying next to the North pole of magnet

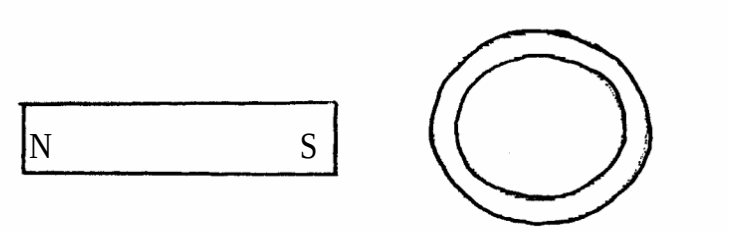


Figure 67

Complete the diagram to show the correct magnetic field patterns for the arrangement. (2mks)

8. **Distinguish** between thermionic and photoelectric emission. (1mk)

……

……

……

9. An X-ray tube has an accelerating potential of 60kv. **What** is the shortest wavelength of the X-ray beam? Take planck constant -6.63 x 10^{-34}JS (3mks)
The electronic charge to be -1.6 x 10^{-19}C

10. **State** the reason why the sound of thunder is always heard sometime after lighting flash is observed. (1mk)

……

……

……

11. The set up in **figure 4** below shows that the brass is free to move.

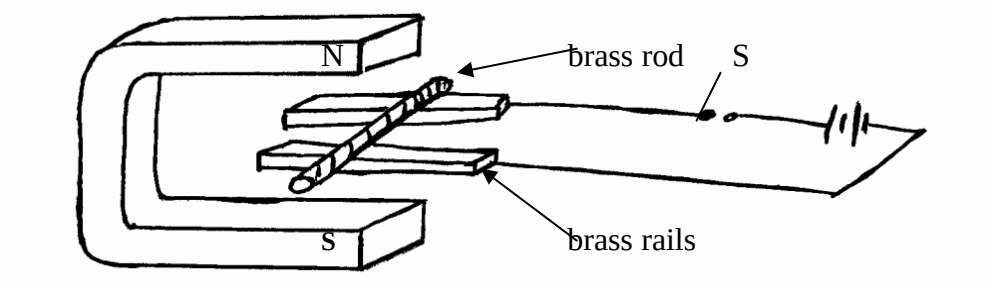


Figure 68

State and **explain** what is observed when the switch **S** is closed. (3mks)

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……

12. **Name one** application of photoelectric effect. (1mk)

……

……

……

……

13. One of the conditions for total internal reflection to occur is that the angle of incidence must be greater than the critical angle of the medium. **State** the other conditions. (1mk)

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……

SECTION B (55 MARKS)

14. (a) The current I through a given diode for various values of voltage V between anode and cathode is given in the table below.

V (volts)	0	25	50	75	100	125	150	175	225
I(mA)	0	1.0	3.0	4.0	6.0	10.0	16.0	28.0	80.0

(i) **Draw** the characteristic graph of the diode using the data. (5mks)

(ii) **Explain** the nature of graph. (2mks)

……

……

(iii) **Determine** the resistance of the diode when the voltage is 150V. (3mks)

(b) (i) **Differentiate** between soft x-rays and hard x-rays. (2mks)

……

……

……

(ii) **State three** properties of X-rays. (3mks)

……

……

……

……

15. (a) **State three** conditions necessary for the formation of stationary waves by two progressive waves traveling in opposite direction. (3mks)

……

……

……

……

(b) The **figure 5** below shows the position of the nodes N and the antinodes A of a wave.

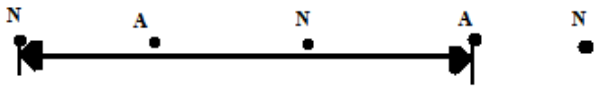


Figure 69

(i) **Determine** the wavelength of the wave. (2mks)

(ii) **State five** properties of stationary waves. (5mks)

……

……

……

……

……

16. (a) (i) **State three** properties of electric field lines. (3mks)

……

……

……

(ii) With the help of a diagram **explain** how a lighting arrestor works. (5mks)

(b) (i) **Define** the term capacitance of a capacitor. (1mk)

……

……

(ii) Other than area of overlap of plates and the separation distance between plates. **State** any other factor that affect the capacitance of a capacitor. (1mk)

……

……

……

(iii) **Write down** an equation relating three factors in b(ii) above to the capacitance of a capacitor. (1mk)

(c) 2 μ f capacitor is charged to a potential of 200v, then the supply is disconnected. The capacitor is then connected to another uncharged capacitor. The potential difference across the parallel arrangement is 80v. **Find** the capacitance of the second capacitor. (4mks)

17. An electrician installed electric wiring in a house and connected the bulbs and the switches as shown in the **figure 6** below.

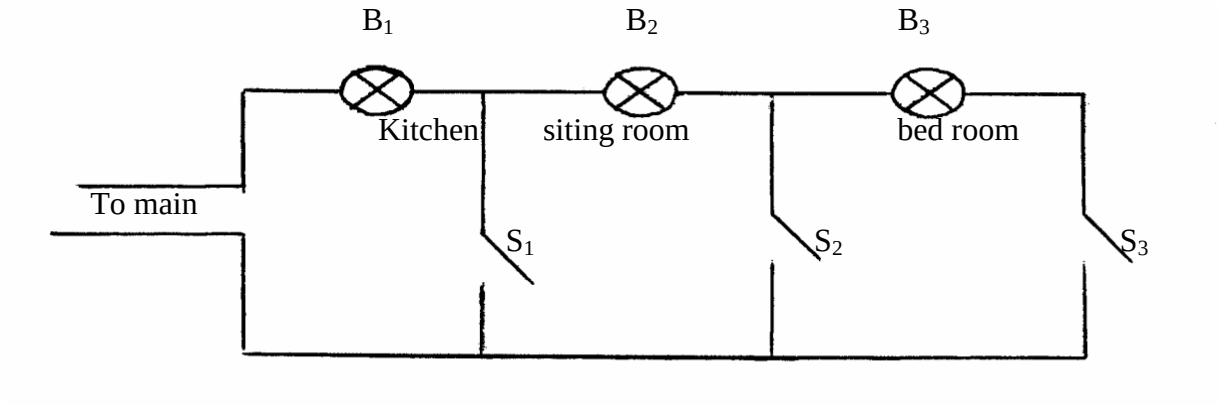


Figure 70

(a) **Explain** what happens when switch

(i) S_1 is closed. (1mk)

……

……

(ii) S_2 is closed. (1mk)

……

……

(iii) S_3 is closed. (1mk)

……

……

(b) (i) Using a redrawn diagram **show** the best position the bulbs should be installed. (3mks)

(ii) **Explain** why you consider the arrangement in (b) (i) above to be the best. (3mks)

……

……

……

(c) A cell drives a current of 8A through a $1.2\,\Omega$ resistor when the same cell is connected to a $1.8\,\Omega$ resistor, the current that flows is 6.0A. **Determine**

(i) The internal resistance. (4mks)

(ii) E.m.f of the cell. (2mks)

KCSE MOCK TRIAL 10

PHYSICS

PAPER 1

2 HOURS

NAME…….INDEX NO……

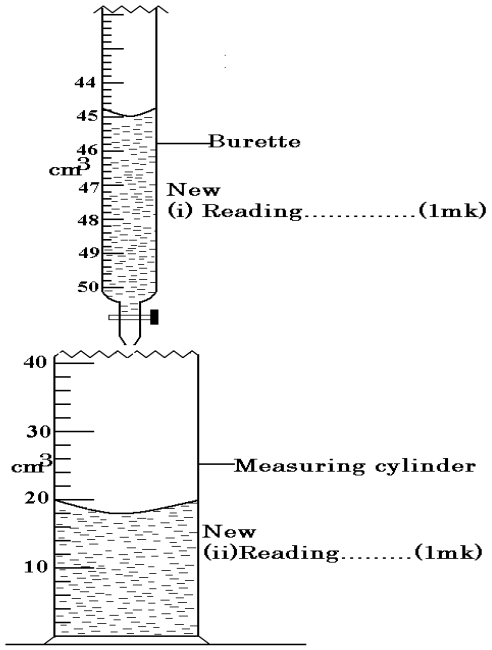
SCHOOL…….. SIGN……

DATE…….

SECTION A (25 Marks)

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

1. The figure below 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.

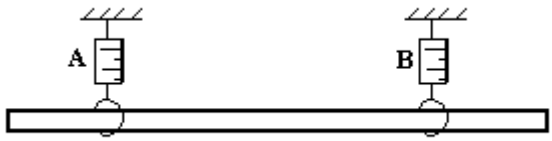
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2. **Sketch** a vernier callipers scale reading 3.41 cm. (1mk)

3. A uniform metallic bar of length 100cm and mass 40kg is supported horizontally by two vertical spring balances A and B as shown below.



Balance A is 20cm from one end while balance B is 30cm from the other end. Find the reading of each individual balance.

A:……

……

B:……

……

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

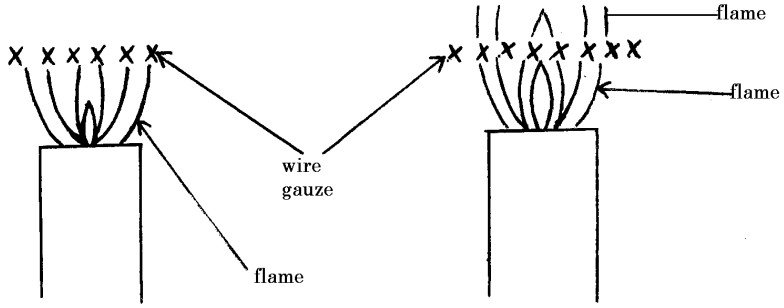
5. **Explain** the cause of random motion of smoke particles as observed in Brownian motion experiment using a smoke cell. (3 marks)

……

……

……

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.



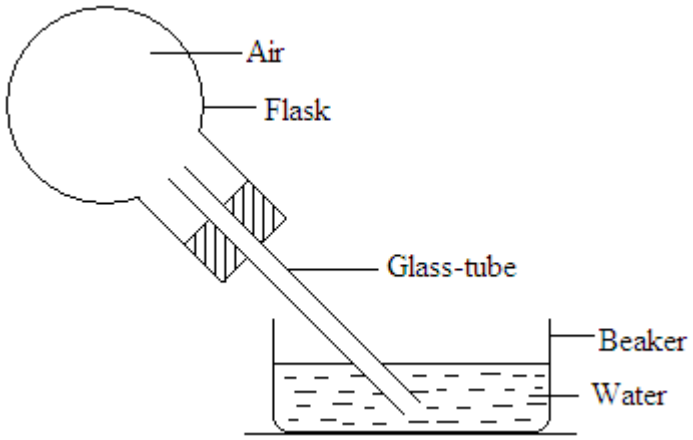
Explain this observation (2 marks)

……

……

……

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.



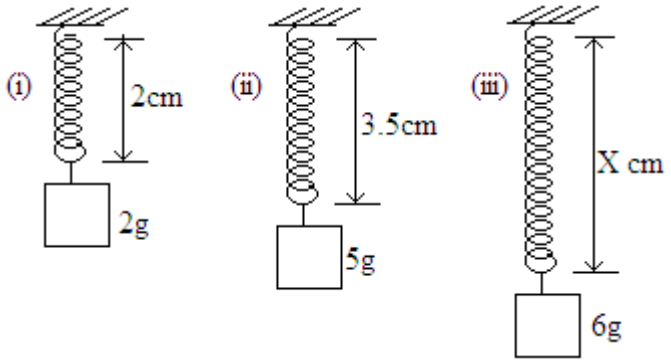
State with reason what would be observed if cold water is poured on to the flask. (2marks)

……

……

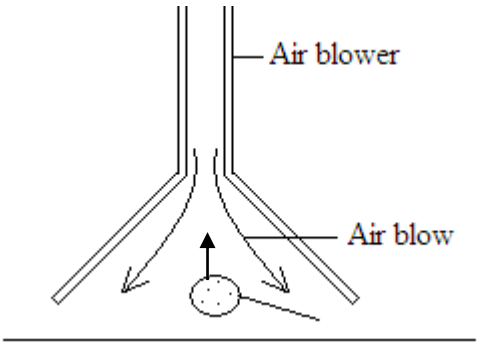
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8. The diagram below shows three identical springs which obey Hooke's law.



Determine the length X. (3 marks)

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



Explain this observation (2 marks)

……

……

……

10. 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. **Express** A_2 in terms of A_1. (3 marks)

……

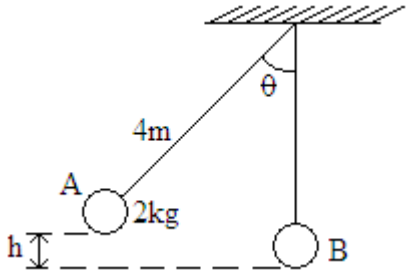
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11. A metal ball suspended vertically with a wire is displaced through an angle θ as shown in the diagram below. The body is released from A and swings back to 'B'.



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 $\left(g = 10m/s^2\right)$ (3 marks)

……

……

……

SECTION B (55 Marks)

Answer ALL questions in this section in the spaces provided.

12.

(a) Use simple sketches to show the three states of equilibrium.

Name the states. (3 marks)

(i)

(ii)

(iii)

(b) **Define** center of gravity of a body. (1 mark)

……

……

……

(c) **State two factors** affecting stability of body (2 marks)

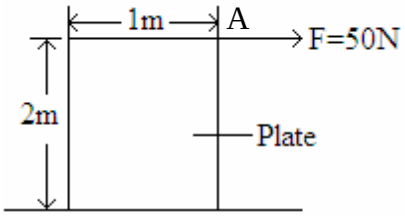
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……

(d) The figure below shows a metal plate 2 m long, 1m wide and negligible thickness. A horizontal force of 50 n applied at point 'A' Just makes the plate tilt.



Calculate the weight of the plate. (3 marks)

13. A heating element rated 2.5 KW is used to raise the temperature of 3.0 kg of water through 50^0 C. calculate the time required to effect this. (Specific heat capacity of water is 4200J/kgK). (3 marks)

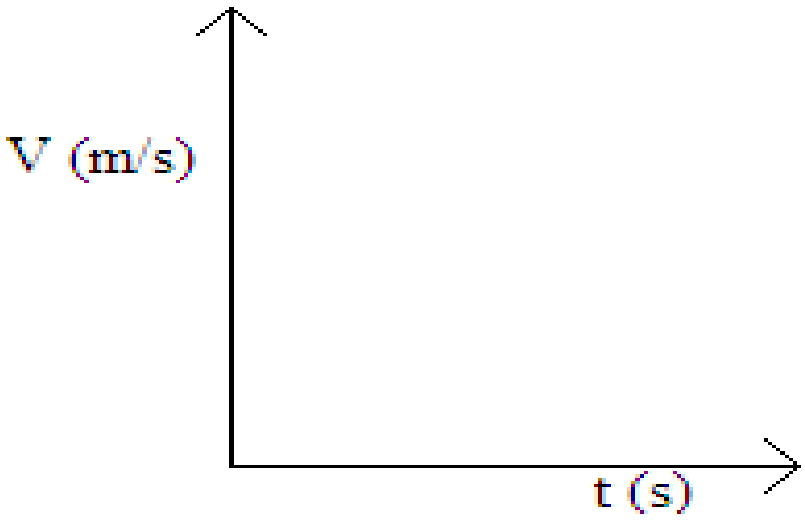
14. (a) **State** Charles' law (1 mark)

……

……

(b) A mass of gas occupies a volume of 150cm^3 at a temperature of -73^{0}C and a pressure of l atmosphere. **Determine** volume when the pressure is 1.5 atmospheres and the temperature 227 ^{0}C (3 marks)

15. (a) On the axes provided below, sketch a graph of velocity V versus time (t) for uniformly accelerated motion given that when t=0, V is greater than zero. (1 mark)

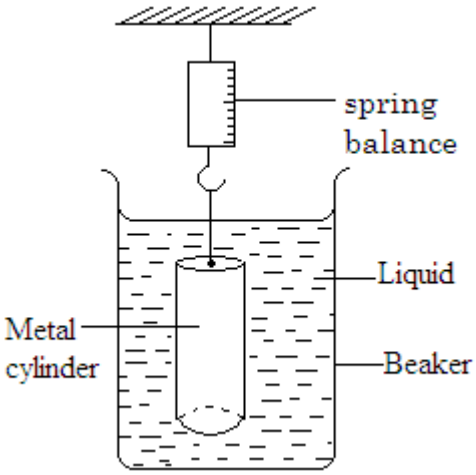


(c) A car is brought to rest from a speed of 20 ms^{-1} in time of 2 seconds. **Calculate** the deceleration. (3 marks)

16. A body of mass 0.50 kg is attached to the end of a string of length 50 cm and whirled in a horizontal circle. If the tension in the string is 8N, **determine** the velocity of the body.

(3 marks)

17. In an experiment to determine the density of a liquid a uniform metal cylinder of cross- sectional area 6.2 cm^2 and length 4.5 cm was hang from a spring balance and lowered gradually into the liquid as shown below.



The up thrust was calculated from the spring balance and it was found to be 0.5N when the cylinder was fully submerged. **Determine:**

(i) Volume of the metal cylinder.

(3marks)

(ii) Mass of the liquid displaced by the cylinder.

(2 marks)

(iii) Density of the liquid

(3 marks)

18. In an experiment to determine a certain length 'L' in a pendulum experiment the following results were obtained:

Length L (cm)	50	55	60	65	70	75	80	85	90
Time t for10 Oscillations (s)	13.54	13.44	13.13	12.75	12.12	12.03	11.50	10.84	10.09
Period T(s) (Time for one Oscillation)									
$T^4\left(S^4\right)$									
$L^2\left(cm^2\right)$									

(i) Fill – in the table.

(6 marks)

(ii) On the grid provided plot a graph of the $T^4\left(y-axis\right)$ against L^2.

(5 marks)

graph

(iii) The relationship between T and L is given by the equation:

$T^4 = RL^2 + Q.$

a) **Calculate** the gradient of the graph.

b) Use your graph to **determine the:**

I constants R and Q:

(i) R _____

(1mark)

(ii) Q _____

(1 mark)

II maximum value of 'L' (3 marks)

L----------

KCSE MOCK TRIAL 10

PHYSICS

PAPER 2

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A (30 Marks)

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

1. A sharp point of a pin is held in the bare hands and brought near the cap of a positive charged electroscope. **State** and **explain** the observation made on the electroscope. (2 marks)

   ……

   ……

2. **State two ways** in which energy is lost in a transformer and how it can be minimized in each case. (2 marks)

Source of energy loss	Remedy
(i)	
(ii)	

3. A bulb marked 60W is connected to 240V mains supply and the current switched on for one minute. **Determine** the number of joules of energy consumed by the bulb in the 1 minute. (2 marks)

4. The fig 1 below shows a ray of light incident on a glass prism

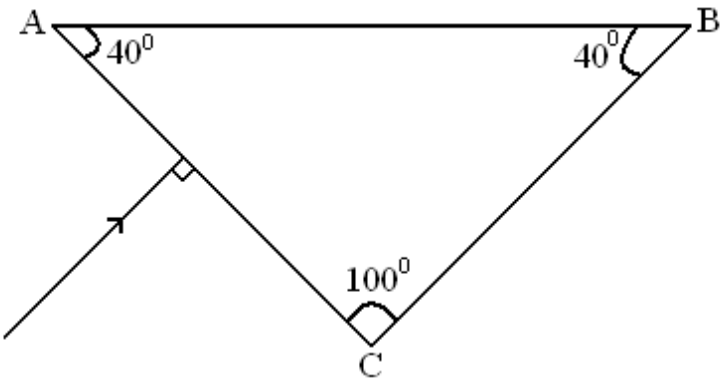


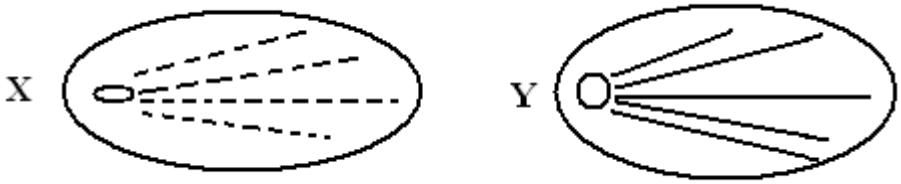
Figure 71

Given that the critical angle for the grass is 39^0, **sketch** on the diagram the path of the ray through the prism (2 marks)

5. **Complete** the table of electromagnetic spectrum in the increasing order of wave length from P to Q

P			X- rays			Infra -Red		**Q**

6. **Identify** the type of emissions that formed the tracks in each case below. (2mks)



X: ----------

Y: ----------

7. **Determine** the resistance of the carbon resistor shown in fig 2 below (1mk)

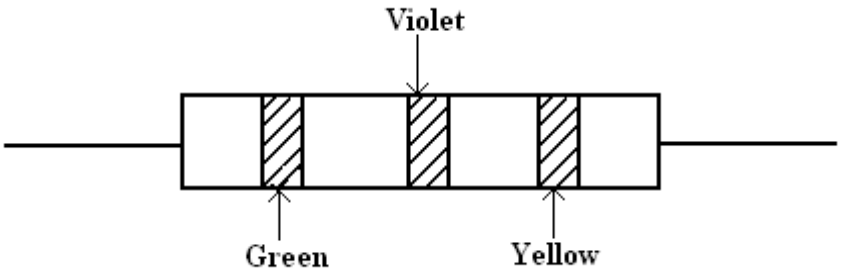


Figure 72

8. The fig 3 below shows two conducting wires A and B passing through a horizontal piece of cardboard

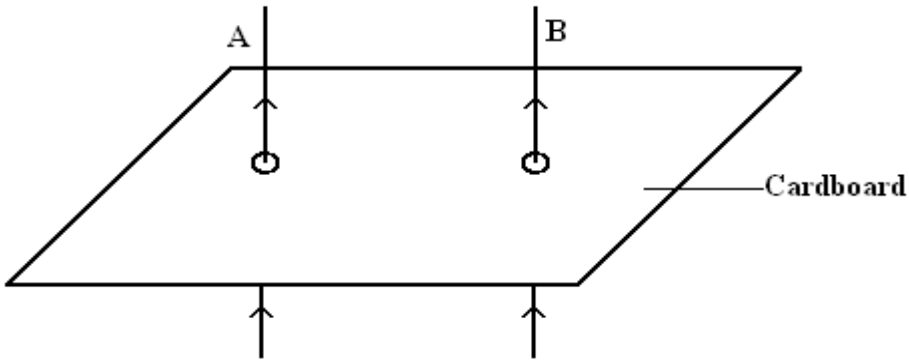


Figure 73

(i) **Sketch** the resultant magnetic field patterns when the currents of the high magnitude are flowing in both wires as shown. (1 mark)

(ii) **What** is the resulting effect of the field on the wires at the loose ends (1 mark)

……

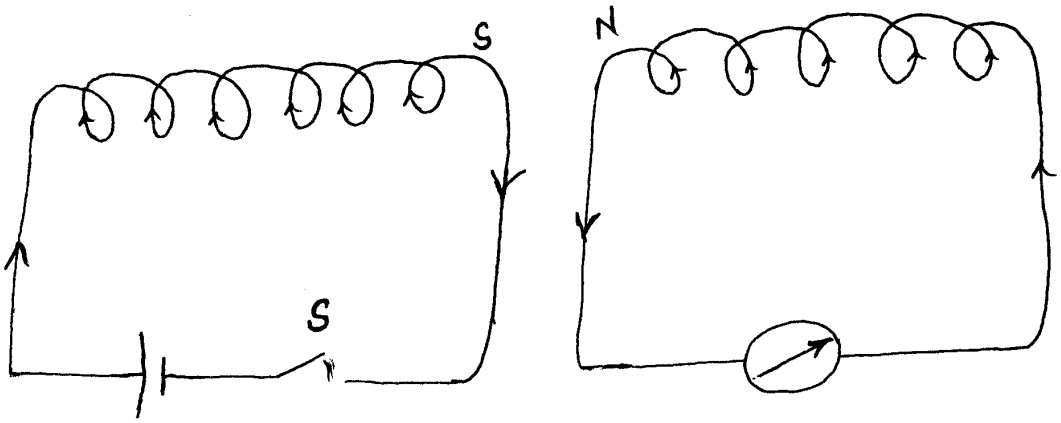
……

(iii) If the current in B were to be reversed, **state how** resulting would affect the wire conductors. (1 mark)

……

……

9. (i) **Indicate** the direction in which the pointer will move when switch S is closed. (1 mark)



(i) **Give a reason** for your answer (1 mark)

……

……

10. **State one** advantage of an electromagnet as compared to a permanent magnet (1 mark)

……

……

11. Using the circuit shown in fig 4 below, **calculate** the effective capacitance. (2 marks)

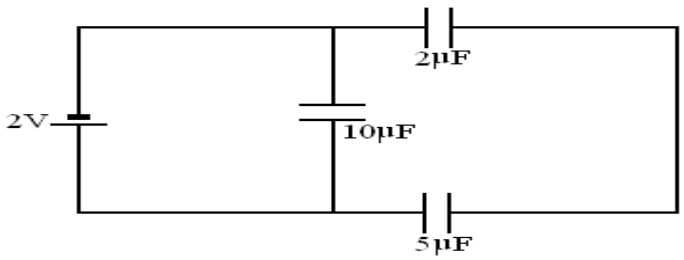


Figure 74

12. **State one** use and **one** source of gamma rays. (2mks)

Use: _____

Source:_____

13. Two resistors are placed in the gaps of the metre bridge as shown in the fig 5

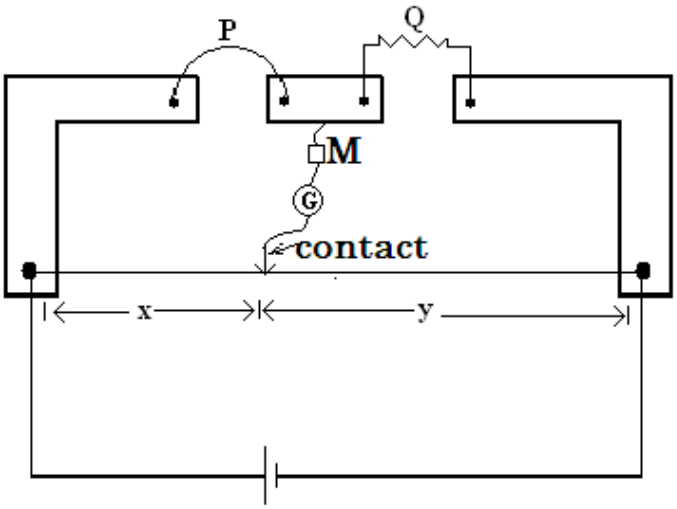


Figure 75

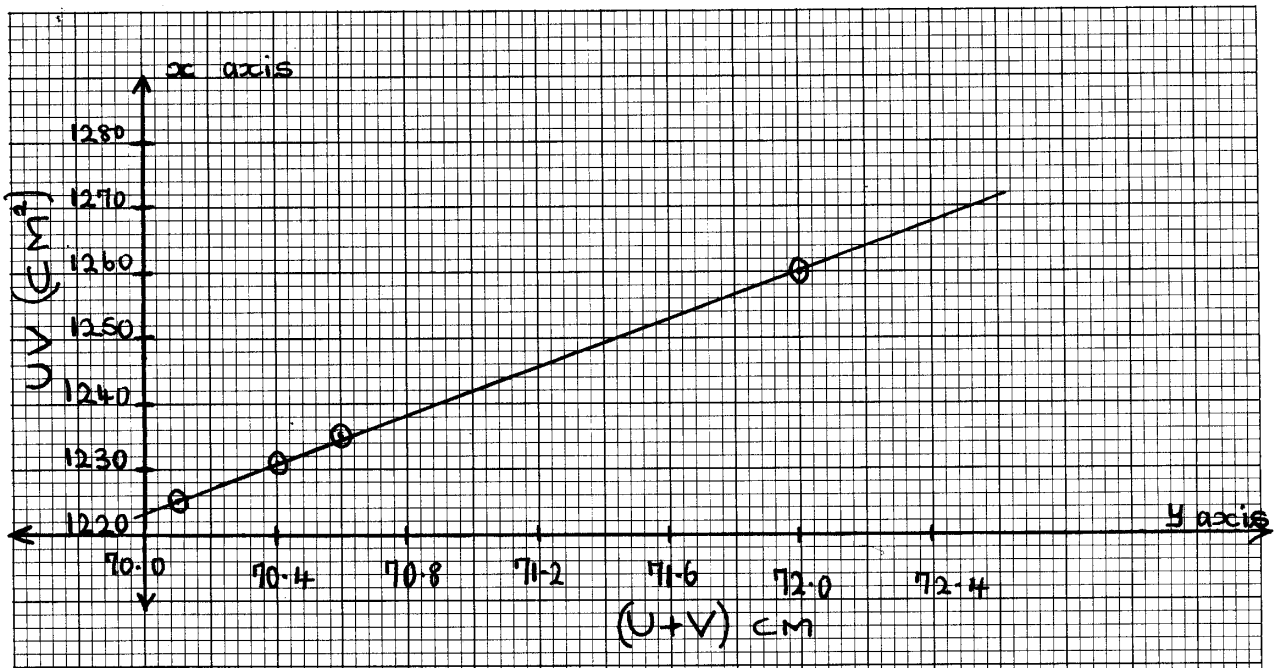
(i) **State the purpose** of the resistor M. (1mk)

……

……

(ii) A balance point is found when the movable contact touches the meter bridge wire at a distance of $x = 35.5cm$. If Q is a resistor of 10 ohms; when the balance point $y = 15.5cm$, **find the value** of the resistor P. (2 marks)

14. Joan performed an experiment to measure the focal length of a convex lens. A series of object distances (u) and image distance (v) were recorded and then a graph of uv against u+ v was drawn; as shown.



(i) **Show** that the slope of the graph is equal to the focal length (2 marks)

……

……

……

(ii) **Determine** the focal length of the lens from the graph. (2 marks)

15. The fig 6 show the effects of eddy currents on a copper metal plate

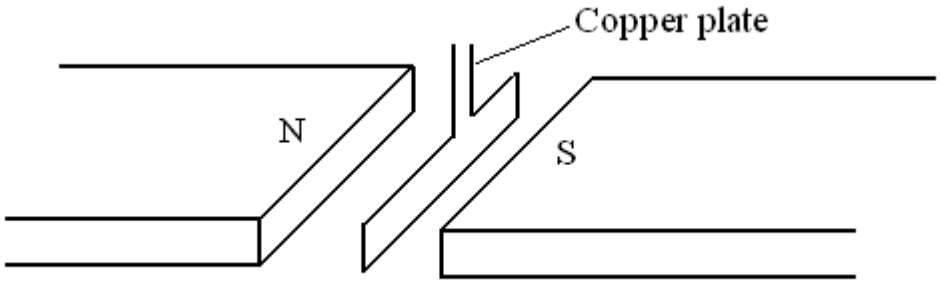


Figure 76

When the copper plate is allowed to swing in a magnetic field, it quickly comes to rest. **Draw** on the fig 7 below the new shape of the copper plate between magnets which will take a longer time to come to rest. (2 marks)

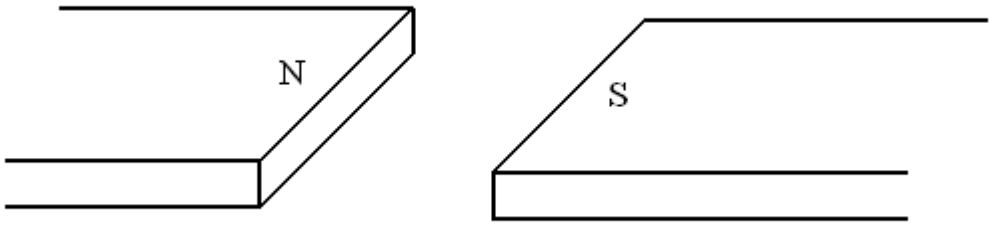


Figure 77

SECTION B (50 Marks)

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

16. (a) **Distinguish between** stationary and progressive waves. (1 mark)

……

……

……

(b) You have been provided with a tuning fork of known frequency, a resonance tube, a ruler and water on a larger cylinder (container)

Describe an experiment that will help you determine the speed of sound. (4 marks)

……

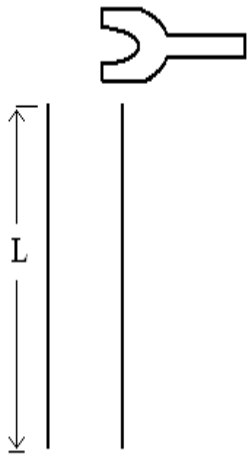
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……

……

(d) A vibrating turning fork is held over a long tube open at both ends as shown below



By varying the length of air column, L, the first two positions of resonance are found to be 30 cm and 96cm respectively. If the frequency of the fork is 283.3 *HZ* , **calculate** the velocity of sound waves. (3 marks)

17. (a) The fig 8 represents cathode ray oscilloscope (CRO)

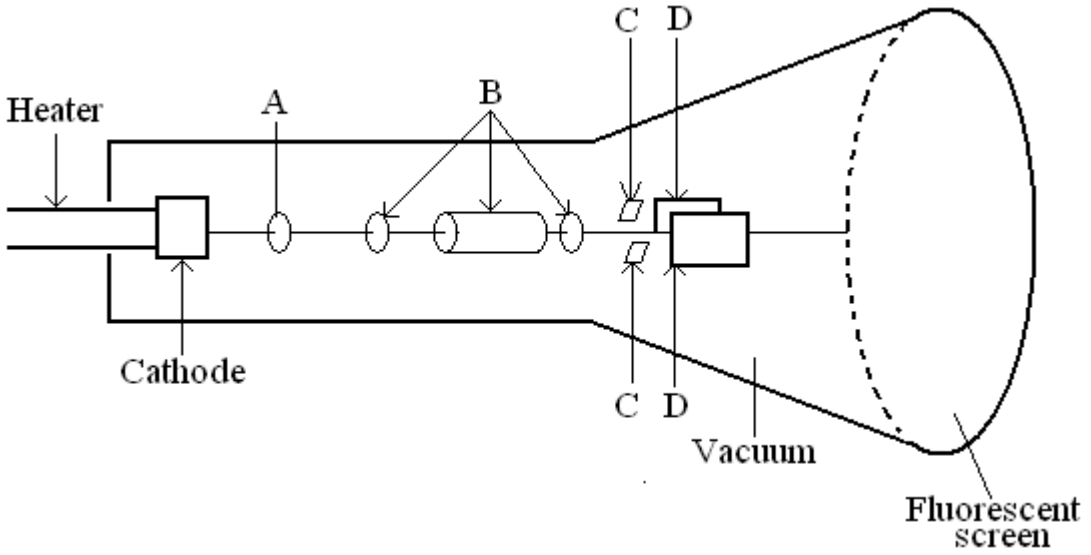


Figure 78

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

A_____

B_____

(ii) **What** are the functions of the parts labelled C and D? (2 marks)

C:_____

D:_____

(iii) **Explain how** the electrons are produced (2 marks)

……

……

……

……

(iv) **Give a reason** why the tube is evacuated (1 mark)

……

……

(b) The work function of a tungsten is 7.2×10^{-19}J. **Calculate** the wavelength of the light photon that is capable of first removing an electron from the tungsten surface. (3 marks)

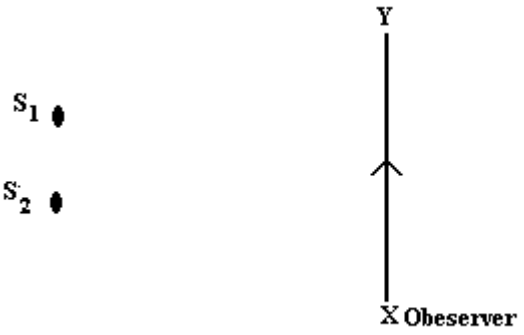
18. (a) **Explain** the term 'phase' as used in waves (1 mark)

……

……

……

(b) Two coherent sources of waves S_1 and S_2 are arranged as shown below



An observer moves along the line XY with a detector.

(i) **Explain** the meaning of coherent source of wave. (1 mark)

……

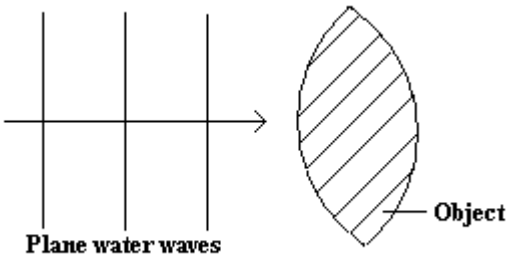
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(ii) **Explain** the observation made by the observer as he moves from X to Y. (1 mark)

……

……

(c) The diagram shows the arrangement to **study** the effect of the object on plane water waves.



Draw the wave fronts of the wave after passing over the object.

(2 marks)

19. (a) **What** do you understand by the following terms

(i) Open circuit (1 mark)

……

……

Closed circuit (1 mark)

……

……

(b) In the circuit shown in the fig 9, the battery has an e.m.f of 6.6 V and internal resistance of 0.3 ohms.

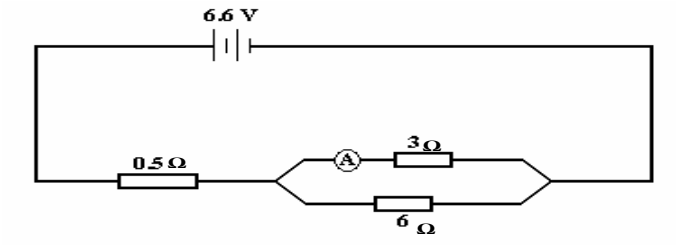


Figure 79

Determine the reading of the ammeter. (2 marks)

……

……

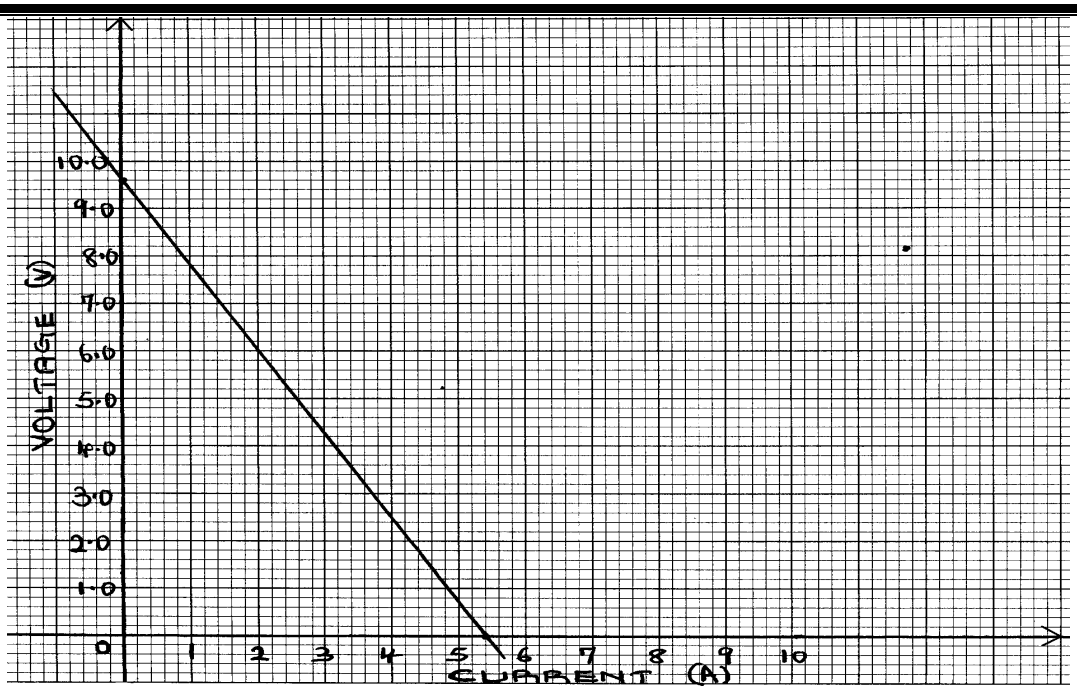
……

(b) (i) **Define** the term e.m.f. (1 mark)

……

……

The graph below shows the Voltage current relationship for a certain battery.



(ii) **Draw** the circuit that could be used to obtain the results shown on the graph. (2 marks)

(iii) From the graph **determine** the e.m.f of the battery. (1 mark)

……

……

(iv) From the graph, **determine** the internal resistance of the battery. (2 marks)

……

……

……

20. (a) **What** is doping (1 mark)

……

……

(b) **Distinguish between** a p-type and n- type extrinsic Semi –conductors. (2 marks)

……

……

(c) **Draw** a diagram to illustrate forward bias of P-N junction. (2 marks)

(d) The fig 10 below shows a bridge circuit

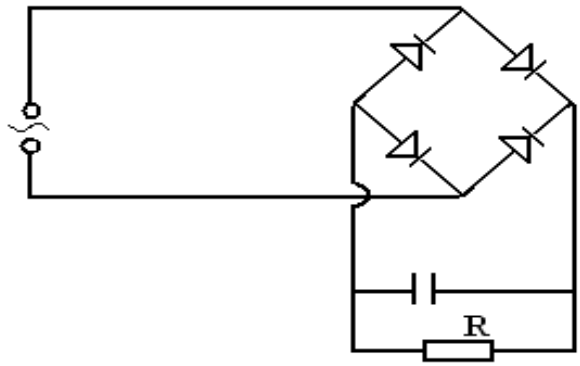


Figure 80

A capacitor has been connected across the resistor as shown

(i) **Sketch** on the fig 11 below the wave form when a C.R.O. is connected across the resistor; R (1 mark)

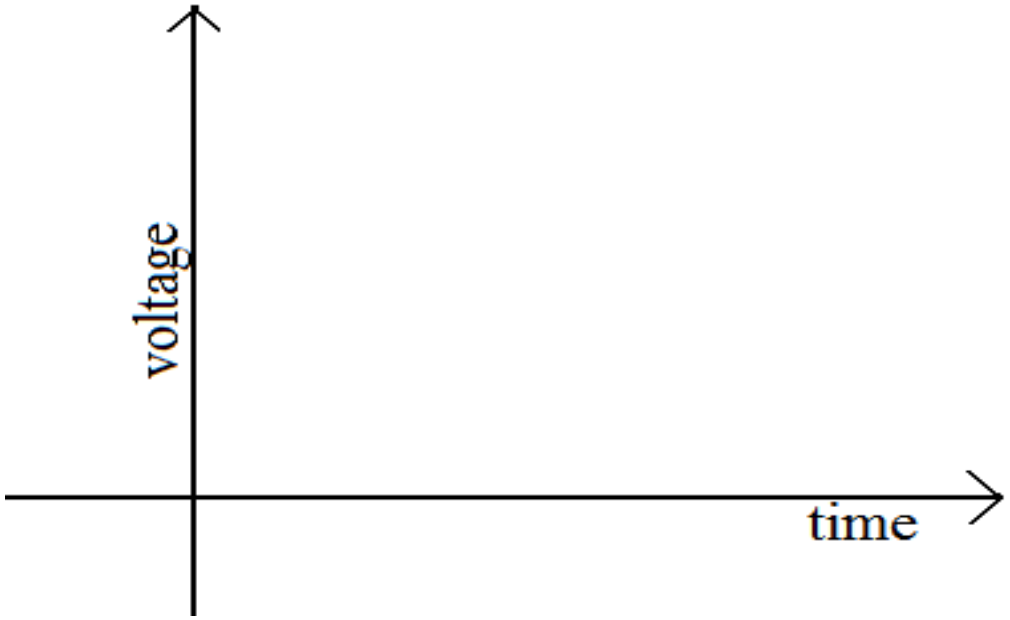


Figure 81

(ii) On the same axes, **sketch a wave** form when a C.R.O. is connected across R when capacitor has been removed. (1mark)

21. (a) **Define the term** monochromatic light (1 mark)

……

……

(b) The table below shows values of stopping potentials, V_s and their corresponding frequencies for a metal surface when monochromatic light is shone on it

Stopping potentials,V_s	1.2	0.88	0.60	0.78	0.12
Frequency f($x10^4$ Hz)	7.5	6.7	6.0	5.2	4.8

(i) **Plot a graph** of stopping potentials, V_s against frequency (4 marks)

From the graph **determine**

(ii) Threshold frequency (1 mark)

……

……

(iii) The Planck's constant, h ($Take\ e = 1.6 \times 10^{-19} c$) (2 marks)

……

……

(iv) The work function (2 marks)

……

……

KCSE MOCK TRIAL 11

PHYSICS

PAPER 1

2 HOURS

NAME……INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION AI (25MKS)

1. Fig 1. shows a measuring cylinder into which an irregular stone of mass 60grams has been immersed.

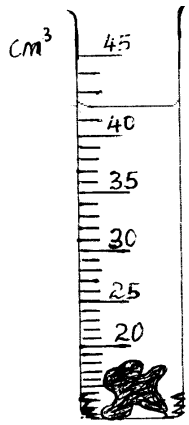


Figure 1

If the initial reading before immersing was 27cm^3. Find the density of the stone.

(2mks)

2. Give a reason why the weight of a body varies from place to place.

(lMk)

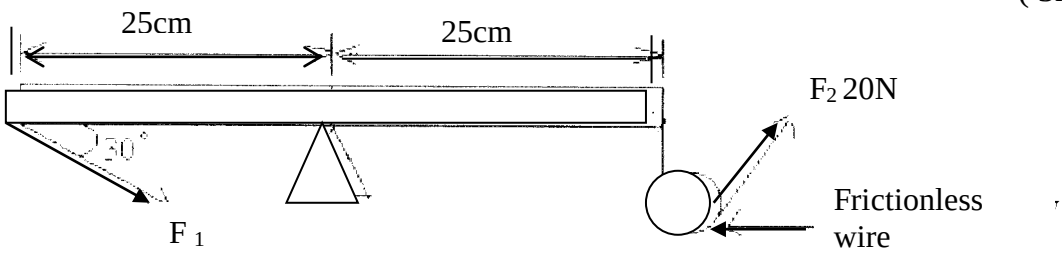
3. Fig 2 shows a bimetallic strip made of brass and invar. Brass expands more than invar when heated equally. Sketch the Bimetallic strip after heat is applied from the side marked A (1mk)



Figure 2

4. Explain why plants in greenhouse, experience higher temperature than the ones outside. (1mk)

5. Fig. 3 shows a system balanced by forces F1 and F2. Determine the value of F1 (3mks)



7. The moon goes round the earth at constant speed. Explain why it is true to say that the moon is accelerating. (2mks)

7. Figure 4. shows an axis. On it plt a velocity time graph for a body moving at an increasing acceleration (1mk)



Fig. 4

11. Fig 5 shows a toy placed on a dining table. Explain why part A should be made of a more dense material than B. (2mks)

11 Fig. 6 shows two bodies A and B of the same density, which is lower than that of water. With reason suggest which of the two bodies would move more easily in water. (2mks)

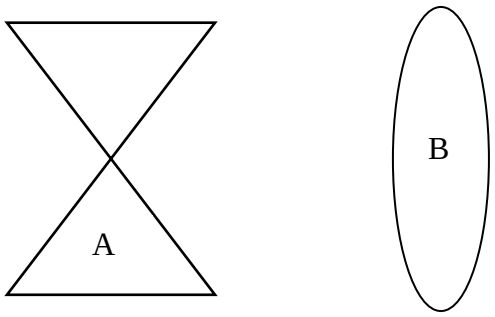
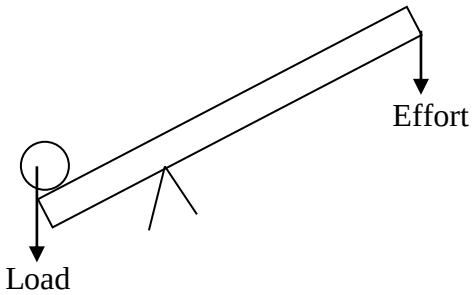


Fig. 6

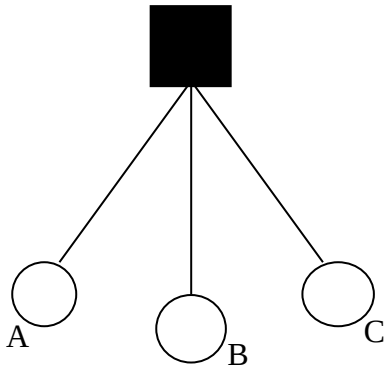
11 A uniform metre rule pivoted at 59cm mark is balanced by a mass of 50gm at 95cm mark. Calculate the weight of the metre rule. (3mks)

11 Suggest why by using the lever in Fig. 7 the load moved is greater than the effort applied. (2mks)



12. A man of mass 60kg climbs up 30 steps each of 0.15m high in 50 seconds. Find his power output. (3mks)

13. Fig. 8 shows a swinging pendulum. State the energy conversion taking place as pendulum move from A to B and B to C. (2mks)



SECTION B; (55MKS)

14. a). State the difference between heat and temperature. (2mks)

b). Garang used a 240V, 4000W heater to warm 20kg of water initially at 30°C, for bathing.

i). If he heated the water for 7 minutes what was the final temperature, (take specific heat capacity of water to be 4200 $Jke\text{-}iK^{-1}$) (4mks)

ii). If Garang instead wanted to bath with water at 40°C, and he had some ice cubes in his refrigerator at -10°C. Determine the quantity of ice he would need to acid to the water to have the desired temperature.

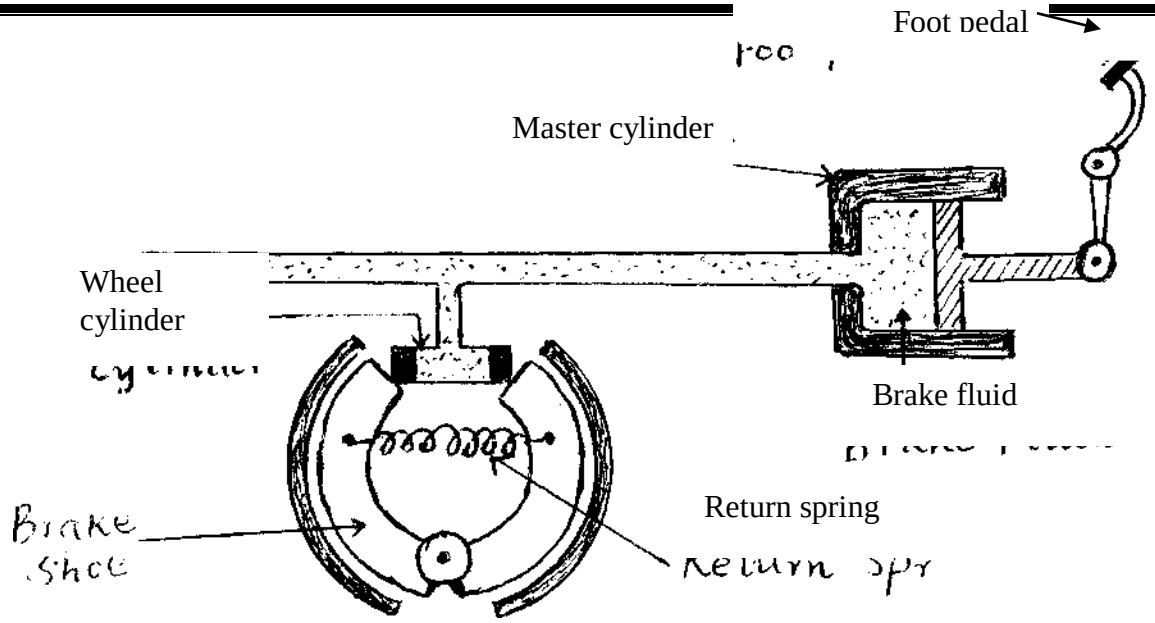
Take the specific latent heat capacity of fusion of ice to be 340,000 $JKg^{-1}k^{-1}$

(4mks)

(ii) What assumptions did you make in your workings in (i) and (ii) above (2mks)

15. Fig. 9 shows a hydraulic brake of a car.

Brake shoe



i). Explain how it works (4 Mks)

(ii) State the advantage of hydraulic brake. (1Mk)

(iii) State the properties of the brake fluid that make it useful in the car brake. (2Mks)

iii). The force of impulse during collision (2mks)

iv). Kinetic energy before and after collision. (3mks)

v). Explain the changes in kinetic energy before and after collision. (1mk)

17. A student performed an experiment to study the relationship between pressure and volume of a gas enclosed in a vessel; temperature was kept constant throughout the experiment. The results were as recorded below.

Pressure, P (Pa)	2	4	6	8	10
Volume (v) (cm^3)	0.5	0.25	0.17	0.13	0.1
$\frac{I}{v}$ (cm^3)					

i) Fill the table (2mks)

ii) Name and state the law the student was investigating (2mks)

iii) Plot a graph of pressure p, against $\frac{I}{v}$ (5mks)

iv). Explain why if air gets in the brake system would reduce the efficiency of the break. (2mks)

16. a). State the principle of conservation of linear momentum. (2mks)

b). Fig. 10. shows a system where matatu A of mass 1500kg travelling at a velocity of 72km/hr towards a stationary car B of mass 900kg.

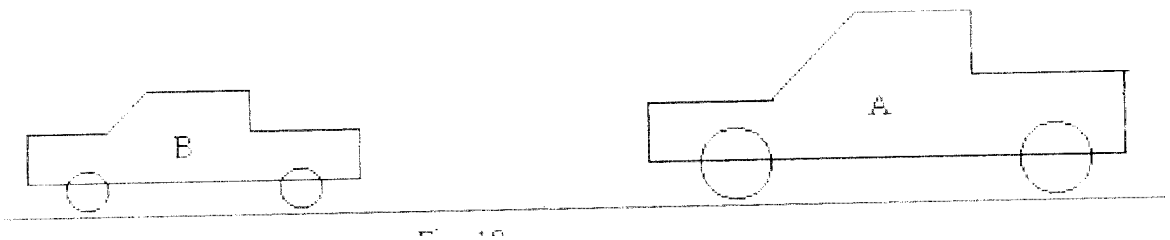


Fig 10

If a collides B in an impact that takes 2 seconds before the two move together at a constant velocity for 20 seconds, calculate

i). The common velocity. (4mks)

ii) The distance moved after impact. (2mks)

iv). An air bubble moves from the bottom of a well 30m deep to the top of 1 he well, its volume just below the surface of water is 9cm-?. What was its volume at the bottom of the well (atmospheric pressure = 10m of water) (3 mks)

18. a). Slate the law of floatation. (Imk)

B). A piece of metal is suspended from a spring balance and the balance reads SON. When the metal is immersed in a liquid of a relative density 1.2, the spring reads TON. Calculate.

i). The mass of the metal (Imk)

ii) The weight of the fluid displaced. (2mks)

iii) The density of the metal. (4mks)

FOR MARKING SCHEMES CALL 0705525657/0770195807

KCSE MOCK TRIAL 11

PHYSICS

PAPER 2

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A: (25MKS)

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

2. State any two differences between the lens of a camera and that of a human eye. (2mks)

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

$$^{210}_{83}X \xrightarrow{q} {}^{210}_{84}Y \xrightarrow{\alpha} {}^{c}_{B}Z$$

Identify the radiation q and determine the values of b and c (3mks)

q.....

b.....

c .....

4. The figure below shows a vertical object O, placed infront of a convex mirror. On the same diagram, draw appropriate rays and locate the image formed. (3mks)

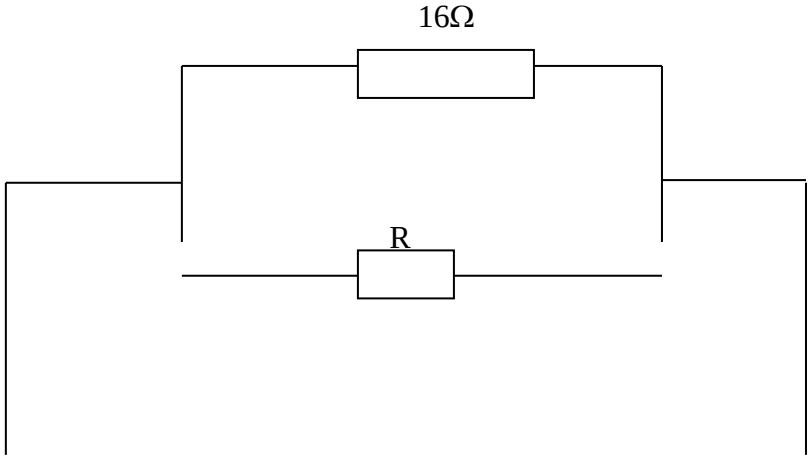
5, Explain how doping produces an n-type semi-conductor. (2mks)

6. state the advantage of generating a.c rather than d.c voltage in a power station. (1mk)

7. State the reason why the sound of thunder is always heard sometime after the lightning flash is observed. (1mk)

8. In the circuit shown below, the effective resistance if $\frac{80}{9}\Omega$

Find the value of R. (3mks)



9. In the diagram shown below a conductor is shown carrying current. Show the direction of the thrust on the conductor and name the rule that you have used. (2mks)

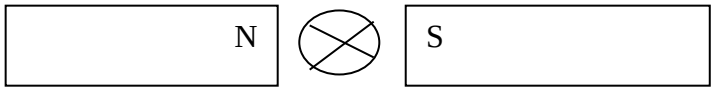


Fig. 3

10. The figure below shows a network of capacitors.

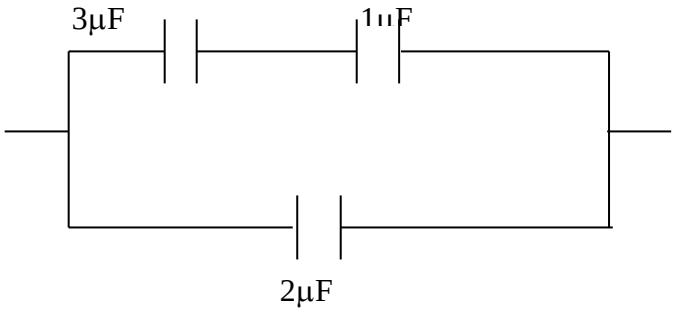


Fig. 4

Determine the combined capacitance of the network. (2mks)

11. A metal has a work function of 2.0ev. Calculate the threshold wavelength of the metal given that e=1.6 x 10^{-19}C and h=6.6 x 10^{-34}Js. (3mks)

12. For the circuit shown in the diagram below, sketch a graph of current I, through the resistor R, against time t, for more than one cycle. (1mk)

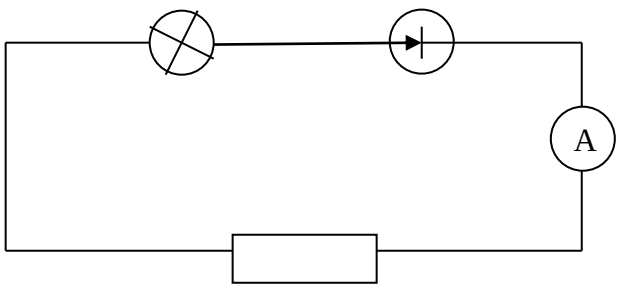


Fig. 5

13. The figure below shows a series of plane waves approaching a gap.

Complete the diagram to show the wave after passing through gap. (1mk)

SECTION B: (55 MARKS)

Answer all the questions in this section in the spaces provided

14. a) A piece of soft iron B is suspended by a spring attached to a fixed support as shown below.

i). State and explain what happens to the spring and the soft iron when the switch is closed. (2mks)

ii). What would be observed if current is increased. (1mk)

i) A student designed an a.c generator which produces a current of 10A at a p.d of 340V. State three ways by which he can improve his generator to increase the output. (3mks)

ii). He uses a transformer to step up the voltage produced by the generator to obtain a voltage of 1700V. Calculate:
(II the turns ratio of this transformer. (2mks)

II). the current output. (2mks)

III) If the primary turns are 600, calculate the number of turns in the output. (2mks)

KCSE MOCK TRIAL 12

PHYSICS

PAPER 1

2 HOURS

NAME……INDEX NO……

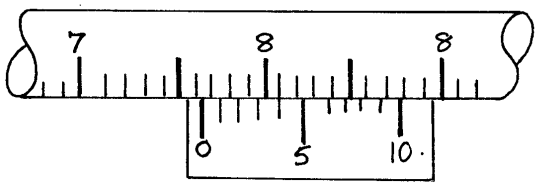
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SECTION 1

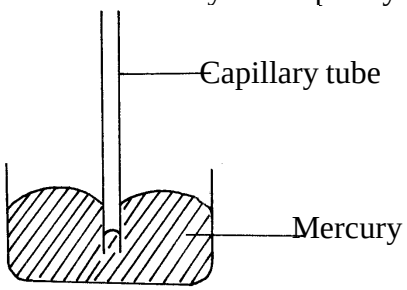
Answer all questions in the spaces provided

1. The figure below shows a vernier calipers scale



State the correct reading of scale if the instrument has a zero-error of -0.02cm 2mks*Tso*

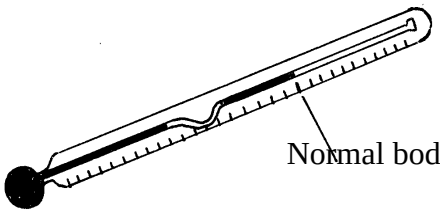
2. The diagram below shows the behaviour of mercury in a capillary tube.



Explain the behaviour 2mks*Tso*

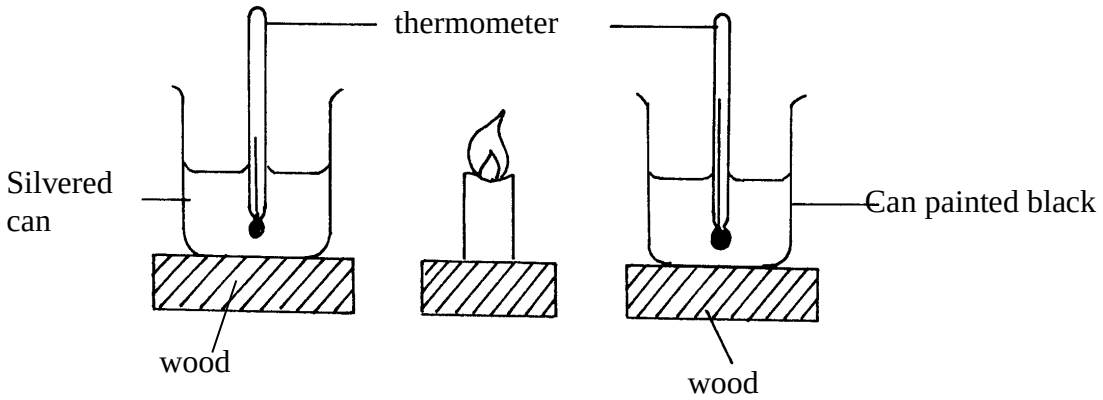
3. In an experiment to estimate the size of a molecule of olive oil, a drop of oil of volume $0.12cm^3$ was placed on a clean water surface. The oil spread on a patch of diameter 6.0×10^6 mm^2.
   a) Calculate the size of the molecule 3mks*Tso*
   b) State an assumption made in the above calculations. 1mk*Tso*

4. The figure below shows a clinical thermometer.



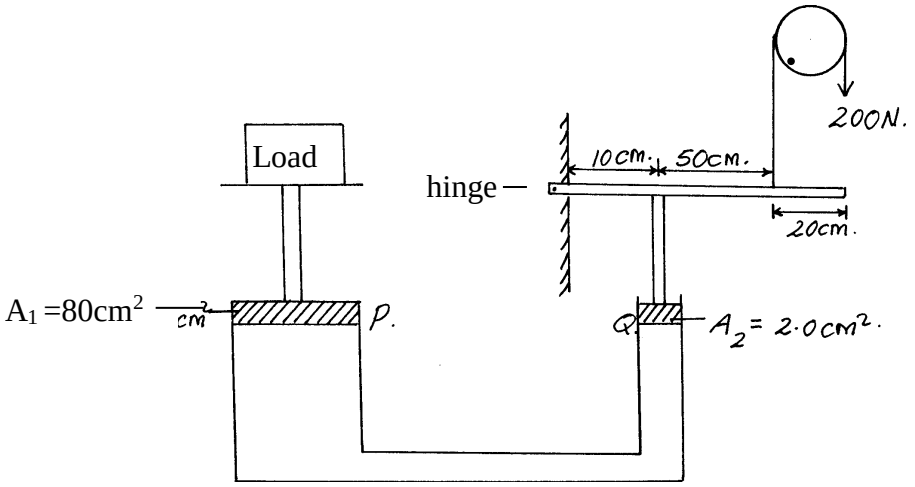
State the function of the constriction. 1mk*Tso*

5. Two similar cans are partly filled with equal quantities of water. Each holds a thermometer and are placed at equal distances from a radiant heater as shown in the figure below.



State with reason, the container in which the temperature is likely to be higher after a few minutes. 2mks*Tso*

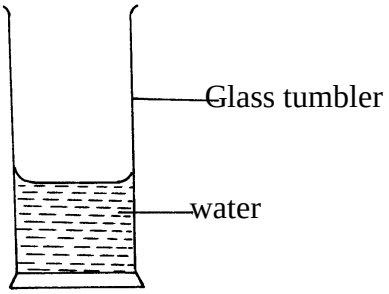
6. The figure below shows an hydraulic lift used to lift a load.



Determine the force acting on the smaller piston Q. 2mks*Tso*

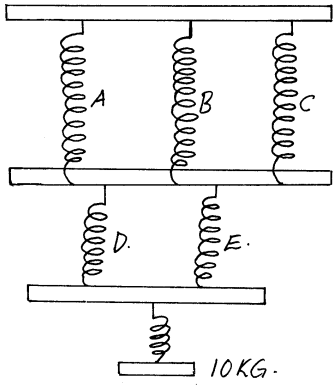
7. Calculate the load that can be supported by the above machine.(Q 6 above) 2mks*Tso*

8. The figure below shows a glass tumbler partly filled with water at room temperature.



Briefly explain what happens to the stability of the tumbler when water is cooled to temperatures below 0^0C. 2mks*Tso*

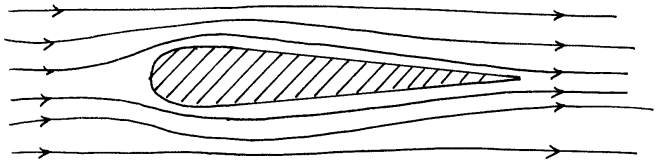
9. The diagram below shows a mass of 10kg hanged on a set of 6 identical springs.



When a mass of 10g was hanged on spring A, its extension was 5cm. Find the extension of the combination shown if each spring has mass of 50g. 3mks*Tso*

10. A car is brought to rest from a speed of 30m/s^{-1} m. 2 seconds. If the driver's reaction time is 0.3s, determine the shortest stopping distance. 3mks*Tso*

11. The figure below shows an aerofoil



Explain how Bernoulli's principle is applied in the design of the aerofoil. 2mks*Tso*

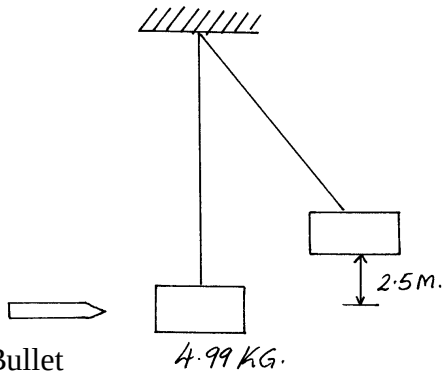
SECTION II (55 marks)

12. a) Distinguish between mass and weight. 1mk*Tso*

b) A constant force is applied to a moving body with constant speed. What observable changes of stage of motion of a body are likely to occur. 3mks*Tso*

c) (i) Distinguish between perfectly elastic and inelastic collision. 2mks*Tso*

ii) A bullet of mass 10.0g is fired at a close range into a block of mass 4.99kg suspended from a rigid support by an elastic string and becomes embodded into the block. The block rises through a height of 2.5cm before momentarily coming to rest. Calculate initial speed of the bullet. 5mks*Tso*



13. a) i) A diver at the bottom of a swimming pool releases an air bubble of volume $2cm^3$. As the air bubble rises, its volume increases to $5cm^3$ at the surface of the pool. Explain this observation. 1mk**Tso**

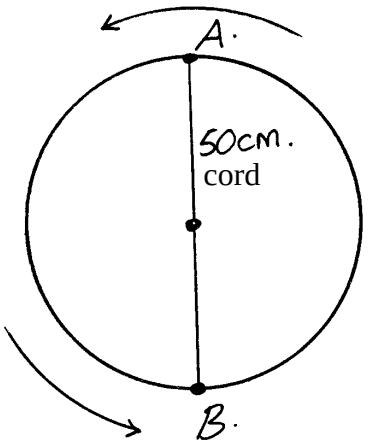
ii) Determine the pressure due to the water column acting on the air bubble at the bottom of the pool given that atmospheric is 101350Pa. 3mks**Tso**

b) (i) Define specific latent heat of vaporization. 1mk**Tso**

(ii) What mass of steam initially at 130^0C is needed to warm 200g of water in a glass container of mass 100g from 20^0C to 50^0C.?

Specific heat capacity of steam = $200JKg^{-1}K^{-1}$
Specific heat capacity of water = $4200\ JKg^{-1}K^{-1}$
Specific latent heat of vaporization of water = $2.26 \times 10^6 JKg^{-1}$
Specific heat capacity of glass = $840JK^{-1}K^{-1}$ 4mks**Tso**

14. a) A mass of 1kg is attached to a cord of length 50cm. It is whirled in a circle in a vertical plane at 10 revolutions per second as shown in the figure below.



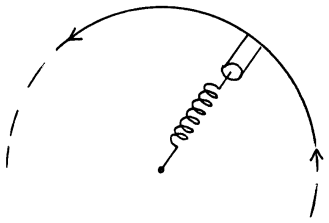
a) Find the tensions in the cord when the mass is at

(i) highest point of the circle A 2mks**Tso**

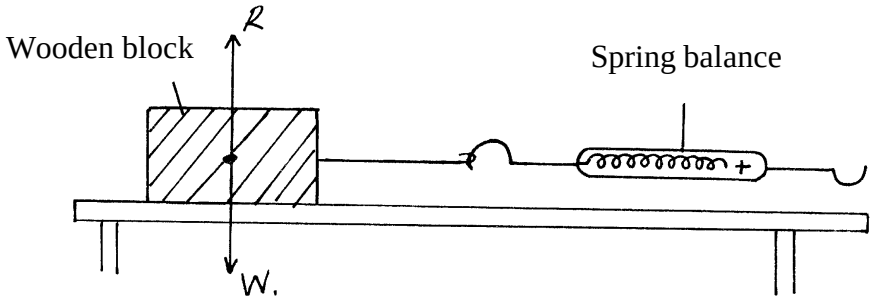
(ii) Lowest point of the circle, B. 2mks**Tso**

b) Describe an experiment to determine specific heat capacity of aluminium block with two holes drilled in it to accommodate a thermometer and an electric heater. 5mks**Tso**

15. a) The following figure represents a spiral spring being rotated in a horizontal circle at a constant speed. The length of the spiral spring including a mass of 100g at its ends is 0.4m. The spring constant of the spring is 0.5N/cm. determine the extension produced when the spring is rotates at a constant speed of 4m/s and radius of 1.2m. 3mks**Tso**



b. Omukaga, a form three physics student in Father Okodoi secondary school conducted an experiment purposed to establish relationship between normal reaction and frictional force between two surfaces. He measured the masses of the blocks of wood. Then he hooked the blocks of wood on the spring balance and pulled each of them gradually in turn until the block just begins to slide. He recorded the maximum reading registered by the spring balance for each of the block.



Mass of block (g)	Normal reaction R (N)	Spring balance reading (N)
160		0.9
250		1.8
390		2.7
490		3.7
600		4.6
640		5.0

i) If g=9.807 m/s^2 complete the table 3mks*Tso*

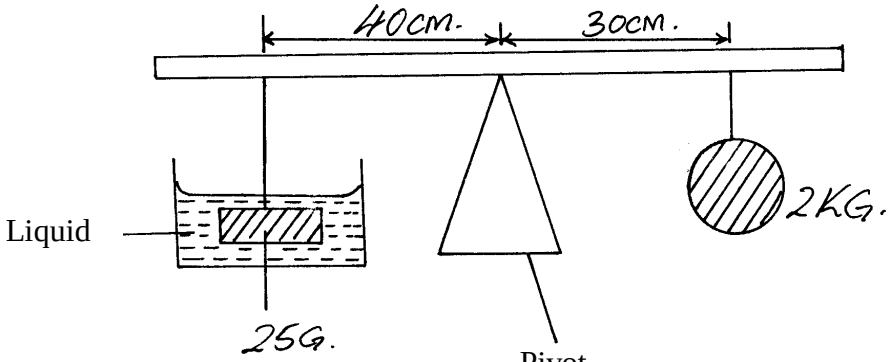
(ii) Plot a graph of normal reaction R (y-axis)against spring balance reading 4mks*Tso*

iii) from the graph determine the gradient of the graph 3mks*Tso*

iv) What physical quantity does the gradient of the graph represent. 1mk*Tso*

v) What is the type of friction measured by the spring balance. 1mk*Tso*

16. a) The figure below shows a block of mass 25g and density 200kg/m^3 submerged in a certain liquid and suspended from a homogenous horizontal beam by means of a thread. A mass of 2kg is suspended from the beam as shown in the figure below.

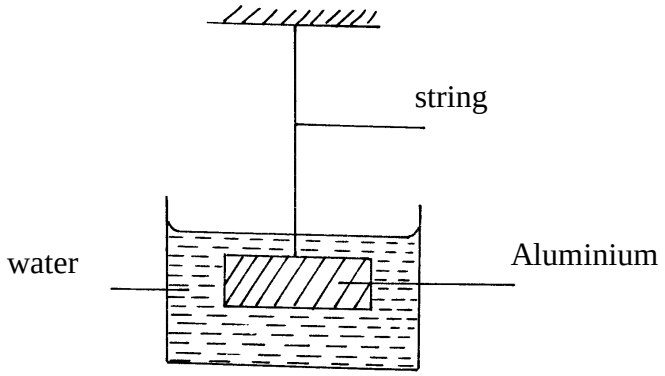


i) Determine the upthrust force acting on the block. 3mks*Tso*

ii) Calculate the density of the liquid 3mks*Tso*

b (i) State the law of floatation. 1mk*Tso*

(ii) The figure below shows a piece of aluminium suspended from a string and completely immersed in a container of water. The mass of the aluminium is 1kg and its density is 2.7 x 10^{3}kg/m^3



Calculate the tension in the string. 3mks*Tso*

KCSE MOCK TRIAL 12

PHYSICS

PAPER 2

2 HOURS

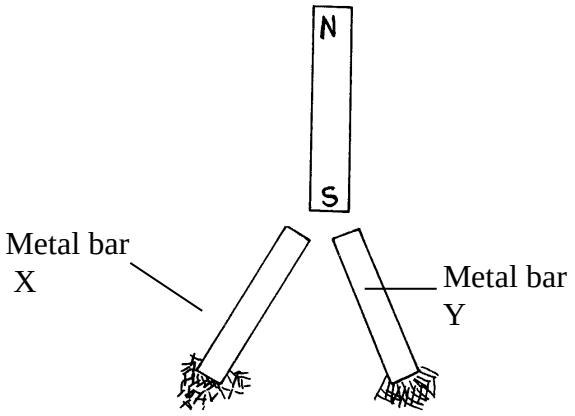
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SCHOOL…….. SIGN……

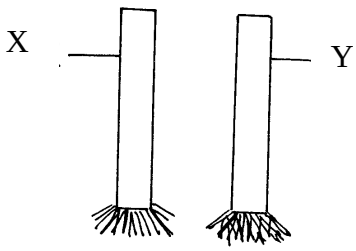
DATE…….

Section A (25 marks)
Answer all questions in the spaces provided

1. What property of light is illustrated by formation of shadows? 1mk*Tso*
2. Other than local action state another defect of a simple cell and explain how it reduces the current produced. 2mks*Tso*
3. The figure below shows a simple experiment using a permanent magnet and two metal bars X and Y.



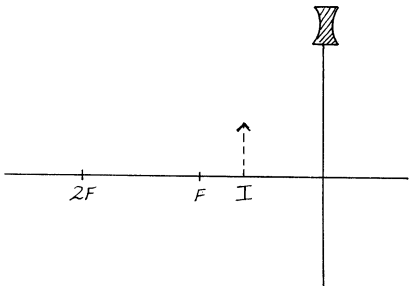
During attraction



After attraction

State, with reason, which bar is a soft magnetic material. 2mks*Tso*

4. The figure below shows the image formed when an object is placed in front of a concave lens.

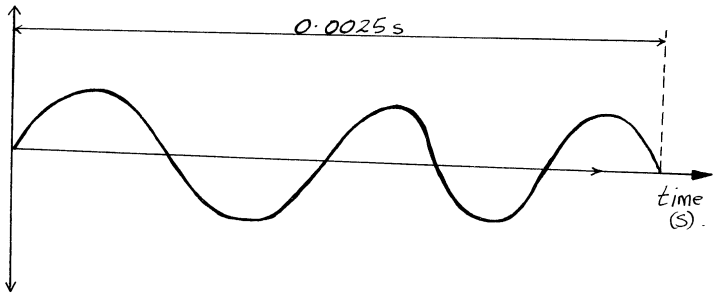


Using suitable rays locate the position of the object. 3mks*Tso*

5. Sketch the magnetic field pattern between the two poles of the magnet shown below. The wire carrying current is in between the poles. 2mks*Tso*



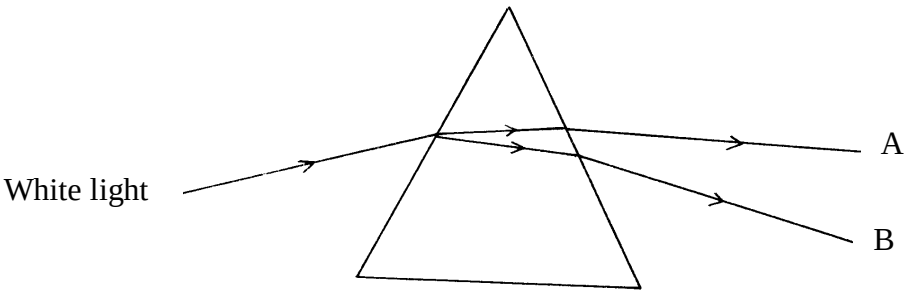
6. The figure below shows a displacement time graph for a wave.



Determine the frequency of the wave. 3mks*Tso*

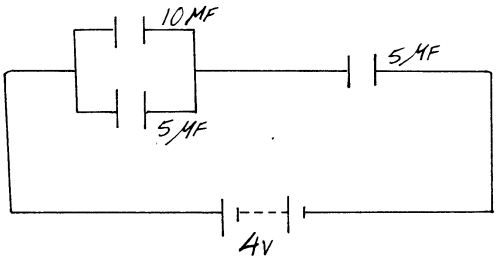
7. A mine worker stands between two vertical cliffs 500m from the nearest cliff. The cliffs are x metres apart. Every time he strikes the rocks, he hears the echos. The first one comes after 2.5s while the other comes 3s later. Calculate the distance between the cliffs. 3mks*Tso*

8. The figure below shows how white light behaves when it is incident on a glass prism.



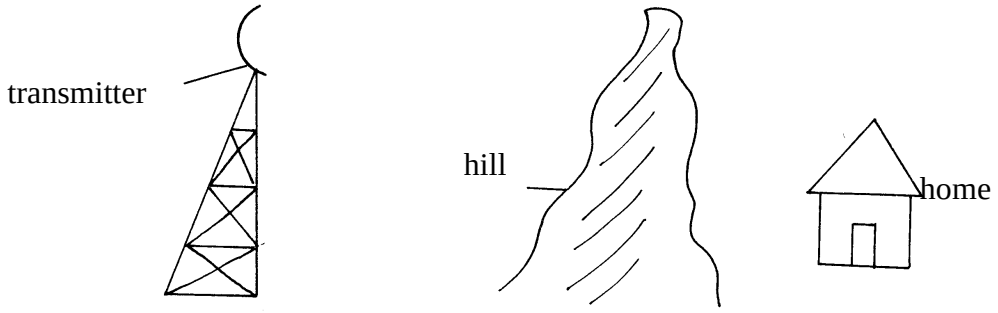
Explain why it splits to different colours between A and B. 2mks*Tso*

9. Determine the total energy in the following arrangement of capacitors. 3mks*Tso*



10. A household uses a 1.5KW water heater for 2 hours a day for 30 days. If the cost of electricity is sh.6.70 per kwh, how much will they pay for this consumption? 3mks*Tso*

11. The figure shows a transmitter producing both TV and radio waves.



Briefly explain why radio reception will be better than TV beyond the hill. 1mk*Tso*

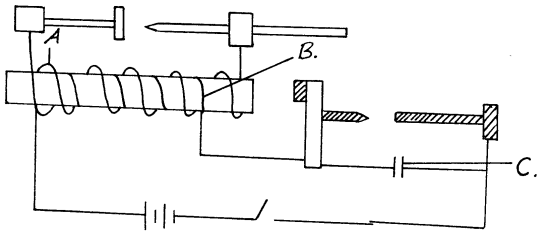
SECTION B (55 MARKS)

Answer all questions in this section

12. a) What do you understand by the term mutual induction. 1mk*Tso*

b) State two factors that determine magnitude of e.m.f induced in a coil. 2mks*Tso*

c) The diagram below shows an induction coil used to produce sparks.



(i) Name parts labeled A, B and C. 3mks*Tso*

A

B

C

(ii) Explain the purpose of device C 1mk

d) A transformer is used on a 240v a.c supply to deliver 12A at 120v to a heating coil. If 20% of energy taken from the supply is dissipated in the transformer

(i) What is the current in the primary coil 3mks*Tso*

(ii) Give three causes of 20% energy dissipation in the transformation above. 3mks*Tso*

13. a) Define threshold frequency. 1mk*Tso*

b) A form 4 student carried out an experiment to investigate photoelectric effect and obtained the results below

Wavelength, λ x 10^{-7}m	1.88	2.14	2.50	3.00	3.75	5.00
Stopping potential (v)	4.97	4.16	3.31	2.50	1.68	0.85

(i) Plot a graph of v (y – axis) against $^1/_\lambda$ 7mks*Tso*

From your graph determine :

(i) The Planck's constant 3mks*Tso*

(ii) The work function of the metal irradiated by the student. 3mks*Tso*

14. a) Define radioactivity. 1mk*Tso*

b) Four nuclides are represented by the following symbols.

$^{234}_{89}W$ $^{235}_{92}X$ $^{234}_{90}Y$ $^{238}_{92}Z$

(i) Which nuclides are isotopes and which ones are isobars of the same element? 2mks*Tso*

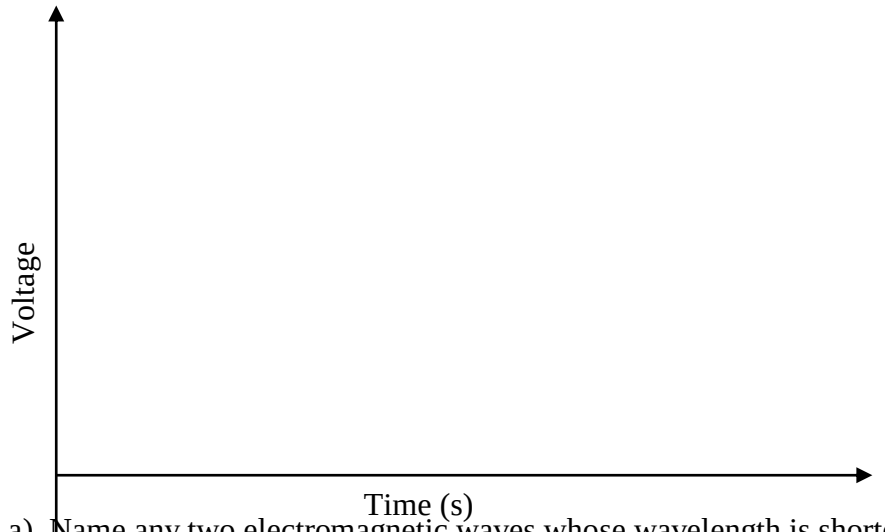
(ii) Name the nuclides one of which could be produced from the other by emission of a beta

particle. Write the equation of the reaction 2mks*Tso*

(iii) A manufacturer wishes to check on the thickness of steel sheets he produces. Describe how this could be done using radioactive source and a counter. 3mks*Tso*

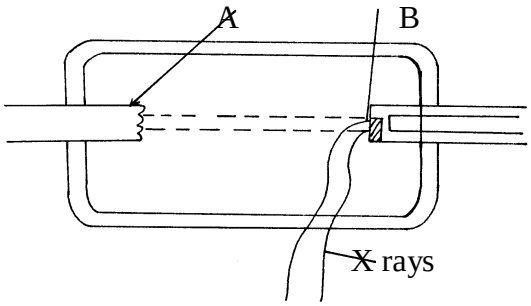
c) Explain how N-type and P-type semi-conductors are obtained. 3mks*Tso*

d) Sketch a graph below of voltage against time for full wave rectification using 4 diodes. 2mks*Tso*



15. a) Name any two electromagnetic waves whose wavelength is shorter than visible light. 2mks*Tso*

b)



(i) The diagram above shows part of x-ray tube. Name parts

A

B 2mks*Tso*

(ii) Why is part B preferred 1mk*Tso*

c) (i) State two differences between x-rays and cathode rays. 2mks*Tso*

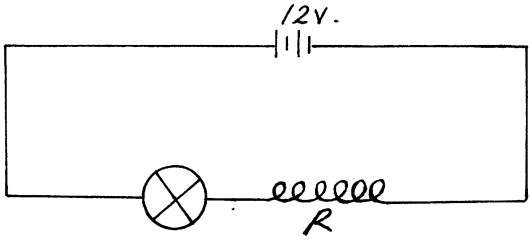
(ii) What is the effect on the wavelength of x-rays if the number of electrons hitting metal target are increased. 1mk*Tso*

(iii) What is the effect on wavelength of x-rays when p.d across the tube is decreased? 1mk*Tso*

d) Calculate the maximum velocity of electrons that would produce x-rays of frequency 8.0×10^{8}Hz if only 20% of kinetic energy is converted to x-rays. 3mks*Tso*

Take Planks constant = 6.63×10^{-34}JS

e) The circuit diagram below was used to light 3v 0.5A bulb from 12.0v d.c supply.



Determine the rate at which electrical energy is converted into heat energy in appliance R.
3mks*Tso*

KCSE MOCK TRIAL 13

PHYSICS

PAPER 1

2 HOURS

NAME…….INDEX NO……

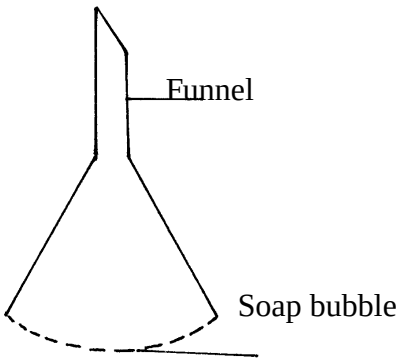
SCHOOL…….. SIGN……

DATE…….

Section A (25mks)

1. The water level in a burette is $27cm^3$. If 88 drops of water fall from the burette and the average volume of one drop is $0.25cm^3$ what is the final water level in the burette? (2mks)**Nrk**

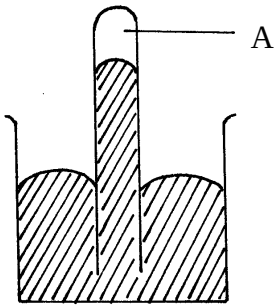
2. A glass funnel is dipped in soap solution, then taken out and blown gently to form a soap bubble as shown below



Explain why the bubble flattens to a film which then rises up the funnel (2mks) **Nrk**

3. Why are the bright specks observed in a smoke cell seen to be in continuous random motion? *(1mk)*Nrk**

4. The diagram below shows a simple barometer



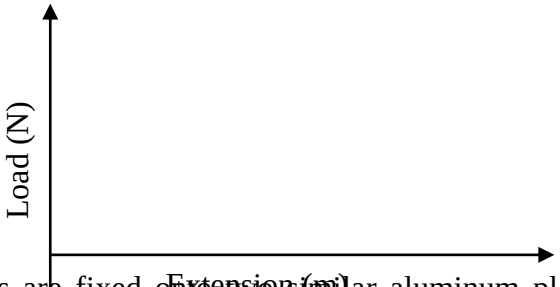
(i) Name the part labeled A (1mk) *Nrk*

(ii) Explain what would happen to the level of mercury in the tube if the barometer was taken high up the mountain (2mks) *Nrk*

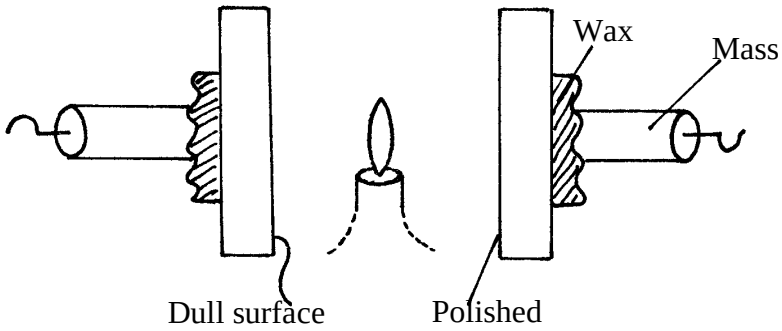
An object is projected vertically upwards at $15ms^{-1.}$ How long will it take to return to the same level of projection (3mks) *Nrk*

On the grid below, sketch a load (N) against extension (m) graph for a helical spring and rubber material (2mks) *Nrk*

5.



6. Two 10g masses are fixed onto two similar aluminum plates, one polished and the other painted black, using wax as shown in the figure below. A Bunsen flame is placed mid way between the plates.



Give and explain the observation made (2mks) *Nrk*

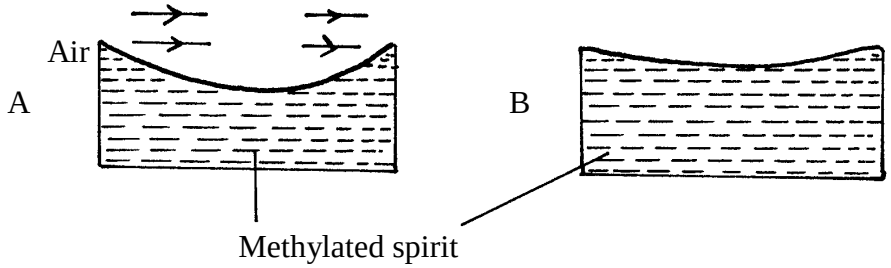
A cord 2.5m long has a breaking strength of 500N. one end of the cord is fixed and a 2kg mass attached to the free end moves in a horizontal circular path on a frictionless level surface. Determine the maximum speed if the cord is not to break (3mks) *Nrk*

7. The diagram below shows two horizontal pipes A and B connected to two identical vertical tubes



Water flows in pipe A at a velocity V_1 and in pipe B at a velocity V_2. Explain why the level of water in tube T in B is lower than that of tube T in A (2mks) *Nrk*

8. Some quantity of methylated spirit at room temperature were poured into two petri dishes, A and B of same surface area. A draught of air was blown over one of them and their temperature taken after some time.



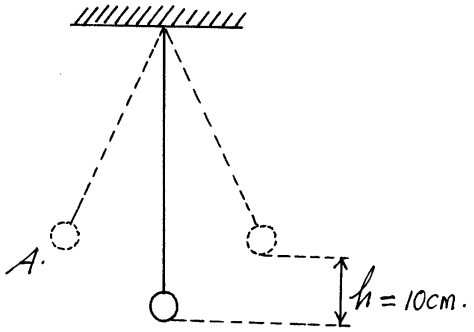
State and explain the one that will be at a lower temperature (2mks) *Nrk*

9. (i) State Boyles Law (1mk)*Nrk*

(ii) When an inflated balloon is placed in a refrigerator, it is noted that its volume reduces. Use kinetic theory to explain this observation (2mks) *Nrk*

SECTION B (55MKS)

10. (a) The diagram below shows a pendulum bob swinging to and fro



(i) State the position where the pendulum bob has maximum kinetic energy (1mk) *Nrk*

(ii) Determine the velocity of the bob at position identified in a(i) above if the maximum vertical displacement of the bob is 10cm (3mks) *Nrk*

(b) (i) What is meant by perfectly inelastic collision? (2mks) *Nrk*

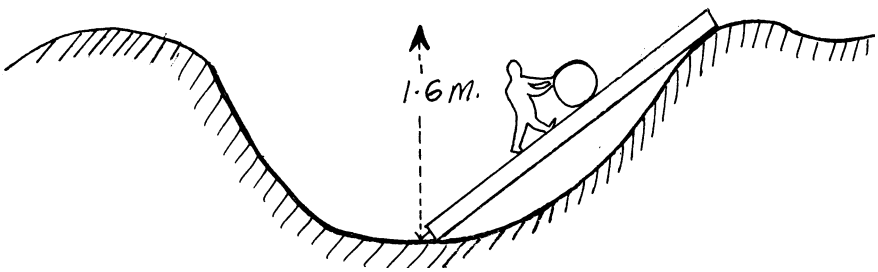
(ii)A minibus of mass 1600kg traveling at a constant velocity of 72km/h collides with a stationary car of mass 800kg. Impact takes 2 seconds before the two move together at a constant velocity for 15 seconds. Determine;

(I) The common velocity (3mks) *Nrk*

(II) The distance moved after the impact (2mks) *Nrk*

(III) The impulsive force (3mks)

11. (a) A boy used a wooden plank 4 meters long to push a log of wood out of a ditch 1.6 meters deep as shown in the diagram below



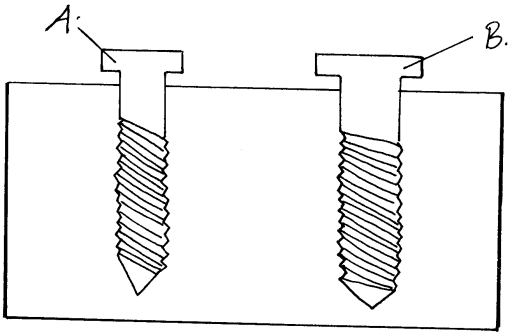
(i) Indicate on the diagram with an arrow the direction of ; I) the effort; II) The load(2mks) *Nrk*

(ii) Determine the velocity ratio of the arrangement (3mks) *Nrk*

(iii) Determine the mechanical advantage of the arrangement if its efficiency is 60% (3mks) *Nrk*

(iv) Give one reason why the efficiency is less than 100% (1mk) *Nrk*

(b) The figure below shows two bolts A and B driven into a block of wood



State with a reason which of the two bolts A and B is likely to require greater effort in order to turn it if both have the same pitch (3mks) **Nrk**

12. (a) Distinguish between heat capacity and specific heat capacity (1mk)**Nrk**

(b) A 180 watt heater and a thermometer were immersed in 0.5kg of water in a copper colorimeter. The following readings were obtained

Temp ^{0}C	30	36	40	45	49	54	57
Time (Min)	3	4	5	6	7	8	9

(i) On the grid provided plot a graph of temperature against time (5mks) **Nrk**ii)

Using the graph or otherwise:

(a) Determine the room temperature (1mk) **Nrk**

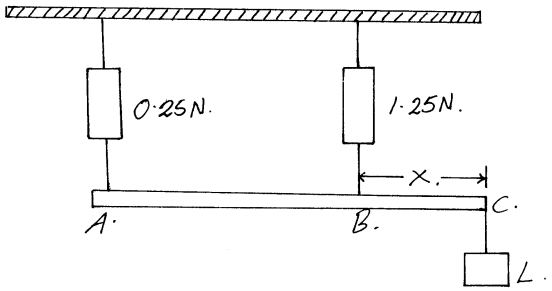
(b) The specific heat capacity of water (3mks) **Nrk**

(ii) Give one reason why the value obtained for specific heat capacity is more than the expected value (1mk) **Nrk**

13. (a) State the principle of moments (1mk*)*Nrk**

(b) Give one application of moments of force (1mk) **Nrk**

(c) The figure below shows a uniform metre rule of weight 1.0N suspended from the spring balances. A load is attached to the extreme right hand end C. the spring balance attached to the extreme left hand end of the rule (A) reads 0.25N. the spring balance attached at B a distance X from the right hand ends reads 1.25N



(i) Calculate the weight of load, L (2mks) **Nrk**

(ii) Determine the value of distance X (4mks) **Nrk**

14. (a) State the law of floatation (1mk)**Nrk**

(b) A block of wood of mass 80kg floats in water with 0.6 of its volume in water. Calculate the number of rods each 20g that can be placed on the block so that its top is level with the surface of water (4mks) **Nrk**

(c) A piece of metal is suspended from a spring balance and the balance reads 80N. when the metal is immersed in a liquid of relative density 1.2 the spring reads 70N. find

(i) The mass of the metal (2mks) **Nrk**

(ii) The weight of the fluid displaced (1mk) **Nrk**

(iii) The density of the metal (4mks) **Nrk**

KCSE MOCK TRIAL 13

PHYSICS

PAPER 2

2 HOURS

NAME……INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A (25MKS)

1. State one disadvantage of using a pin hole camera to take photographs (1mk)**Nrk**
2. Name two advantages which a lead accumulator has over a dry cell (2mks)**Nrk**
3. A girl observes her face in a concave mirror of a focal length 90cm. If the mirror is 70cm away, state two characteristics of the image observed. (2mks)*Nrk*
4. State a condition necessary for a wave incident on slit to be diffracted (1mk*)*Nrk**
5. The following reaction is part of a radioactive series

$$^{210}_{83}\text{Bi} \xrightarrow{x} {}^{210}_{84}\text{Po} \xrightarrow{\alpha} {}^{c}_{b}\text{Z}$$

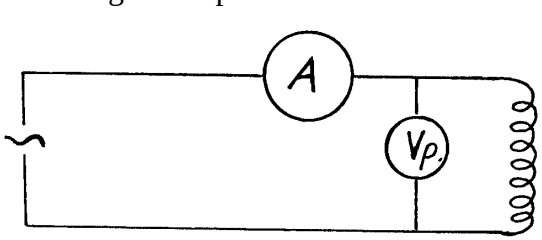
identify the radiation X and determine the values b and c (3mks) **Nrk*S*

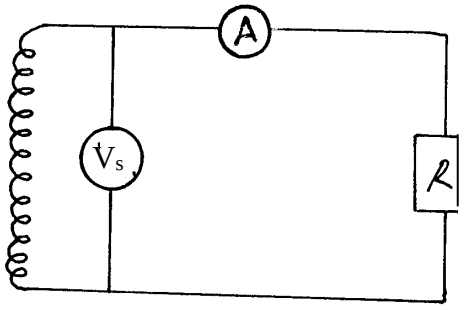
X

b

c

6. The sharp point of a pin is held with a bare hands and brought near the cap of a positively charged electroscope. State and explain the observation made on the electroscope (2mks*)*Nrk**
7. The figure I represents a transformer connected to an a.c source and resistor R





Compare the magnitudes of

8. I V_p and V_s (1mk) **Nrk**

9. II I_P and I_S (1mk) **Nrk**

10. The following circuit connection was made from an a.c mains.

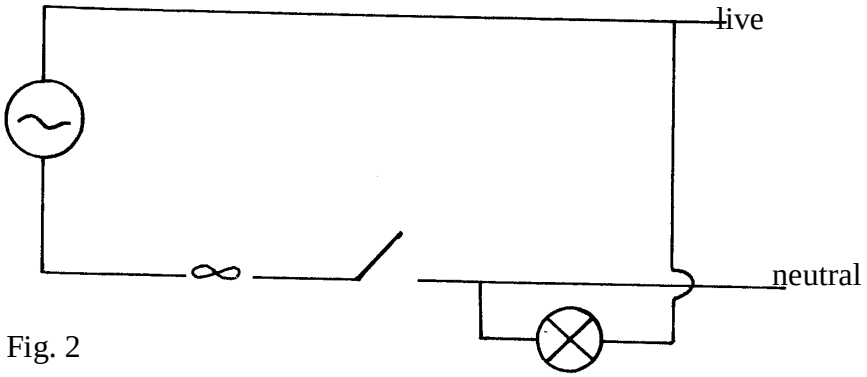
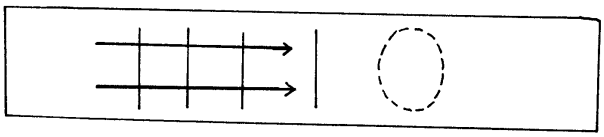


Fig. 2

11. Identify the faults in the wiring and suggest away of connecting them (3mks) **Nrk**

12. State one difference between X-rays and visible light (1mk) **Nrk**

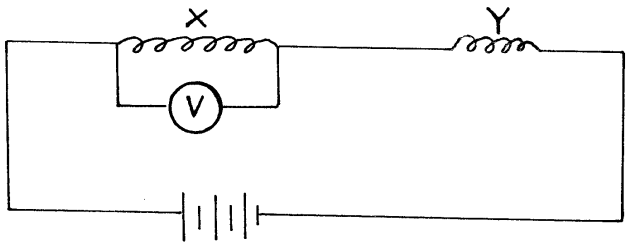
13. The figure (3) below shows waves incident on a shallow region of the shape shown with dotted lines



14. on the same diagram sketch the wave pattern in and beyond the shallow region (1mk) **Nrk**

15. In the figure 4 below coils X and Y are connected in series. The e.m.f of A.c supply is 15V. if the voltmeter (V) reads 12.5Volts and the resistance of coil X is 50Ω calculate the resistance of the coil Y (3mks) **Nrk**

16.



15 volts

17. A refrigerator has a compressor driven by 250 W electric motor from a 200V main supply. Calculate the current that passes in the circuit when the motor is operating (3mks) **Nrk**

18. Using the domain theory, explain why a magnet may lose its magnetism by heating or hammering (1mk) **Nrk**

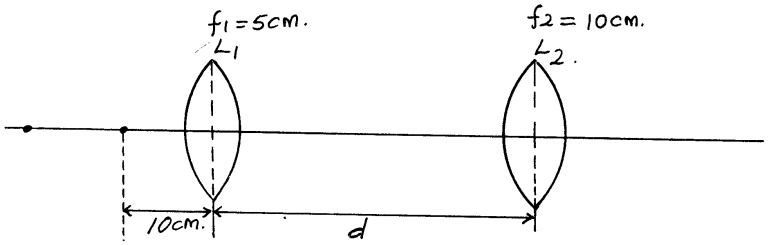
SECTION B(55MKS)

19. (a) With an aid of a ray diagram show how a convex lens can be used as a magnifying glass (3mks) **Nrk**

(b) From the definition of magnification M and equation $f=\frac{uv}{v+u}$ show that magnification

M=v/f-1where the symbols have their visual meanings (3mks) **Nrk**

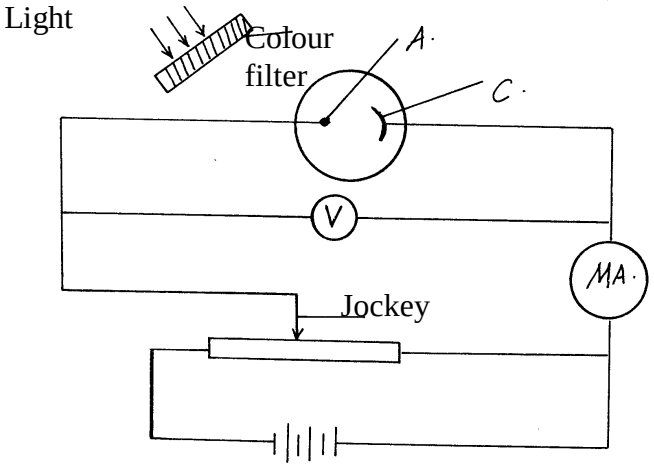
(c) Two converging lenses whose focal lengths are f_1=5cm and f_2=10cm are arranged to have a common axis as shown in figure below.



20. A point object is placed 10cm from L1. Given that the final image is formed 20cm to the left of $L2_1$ calculate the separation d of the lenses (3mks) *Nrk*

21. (a) What is meant by the term photoelectric effect (1mk) *Nrk*

(b) The figure (5) below shows an arrangement used to investigate photoelectric effect



(i) Name parts A and C (1mk) *Nrk*

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

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

(c) In an experiment on photoelectric emission from a metal surface, the following measurements were obtained

Stopping potential V_s (V)	0.6	1.0	1.4	1.8	2.2
Light frequency (f)x10Hz	6.0	7.0	8.0	9.0	10.0

22. i) Plot the graph of stooping potential y(axis) against frequency (x-axis) on the grid provided (5mks) *Nrk*

23. (ii) Use your graph to determine the threshold frequency (2mks) *Nrk*

24. (a) Describe with the aid of a labeled diagram an experiment set up to investigate the forward bias characteristics of a p-n function diode (4mks) *Nrk*

(b) The table below shows the variation of current with voltage for a certain semi-conductor diode

Voltage (V)	0	8	10	12	14	16	18	20
Current (MA)	0	10	30	50	150	250	450	900

25. (i) Plot a graph of current (I) against voltage (V) (5mks) *Nrk*

(ii) Find the resistance when the voltage is 6v (2mks) *Nrk*

(iii) From the graph what can you say about the semi-conductor as a conductor (2mks) *Nrk*

26. (a) Liquid X has a greater refractive index than refractive index of water. What can you say about

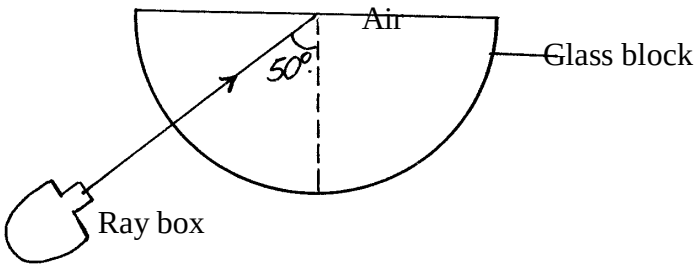
27. (i) The relative velocity of light in X and in water (1mk) *Nrk*

28. (ii) The path of a ray of light passing from water to a layer of liquid X on top of it (1mk) *Nrk*

29. (b) A coin is placed at the bottom of a tall gas jar. When the jar is filled with paraffin to a depth of 32.4cm, the coin is apparently seen displaced 9.9cm from the bottom. What is the refractive index of paraffin. (3mks) *Nrk*

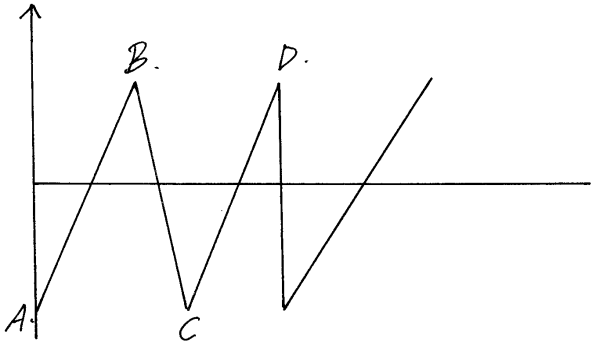
(c) State snell's law (1mk) **Nrk**

(d) (i) The critical angle for crown glass is 42^0. Using this information complete the figure below to show the passage of the ray shown through the glass block (1mk) **Nrk**



30. (ii) The critical angle of paraffin is 45^0 what is the refractive index of paraffin (2mks) **Nrk**

31. (a) The figure (6) below is a sketch of the time base voltage fed to the X plates of a C.R.O

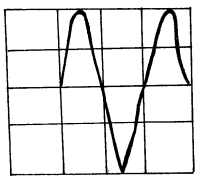


32. State what happens to the spot along sections (2mks) **Nrk**

(i) AB

(ii) BC

(b) The figure below shows the trace on the screen of an a.c signal connected to the y-plates of a C.R.O with time base on. Given that the time base control is 100ms/div and the y-gain is at 120v/d.v determine

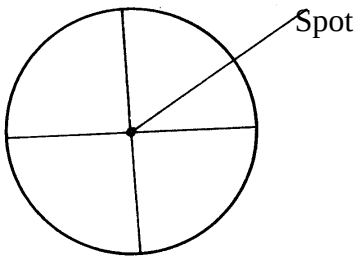


33. (i) The frequency of the a.c signal (3mks) **Nrk**

(ii) The peak voltage of the input signal (3mks) **Nrk**

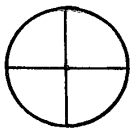
(c) State the purpose of the grid in the cathode ray oscilloscope (1mk) **Nrk**

(d) The diagram below shows a spot on the screen of a CRO when the time base is off.

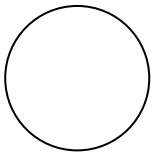


On the diagrams below sketch the appearance when

34. (i) Y-plate on (1mk) **Nrk**



35. (ii) The time base on and Y plate on (1mk) **Nrk**



KCSE MOCK TRIAL 14

PHYSICS

PAPER 1

2 HOURS

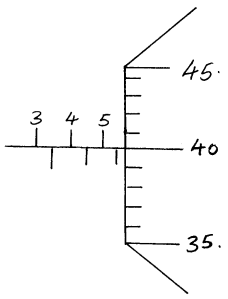
NAME…….INDEX NO……

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SECTION A (25MKS)

1. Figure 1 shows a micrometer with a negative error of 0.02 mm, used to measure the diameter of a ball bearing.



   Record the diameter of the ball (2mks) *Kyo*

2. Explain the washing effects of detergents of soap and why detergents in warm water washes greasy clothes even better (2mks) *Kyo*
3. State the reasons why concrete beam reinforced with steel does not crack when subjected to changes in temperature (1mk) *Kyo*
4. Figure 2 shows a uniform bar 2m long in equilibrium, acted by forces as shown.

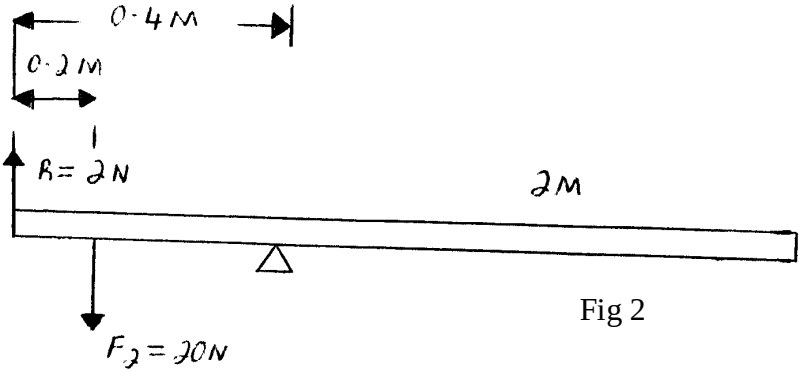
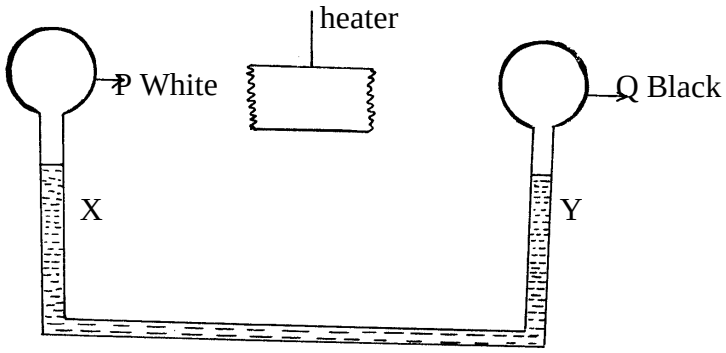


Fig 2

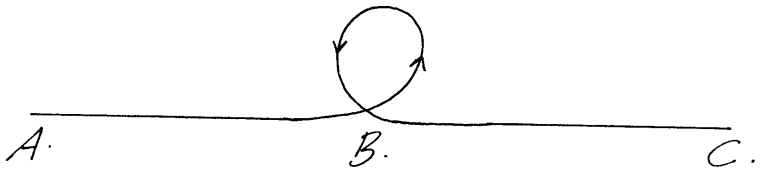
Determine the weight of the bar (3mks) *Kyo*

5. The diagram below shows two bulbs P and Q painted white and black



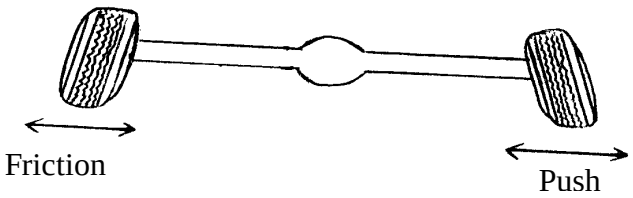
Explain what happens when the heater is turned on? (2mks) *Kyo*

6. The figure below shows the path taken by a fluid flowing from region A to C



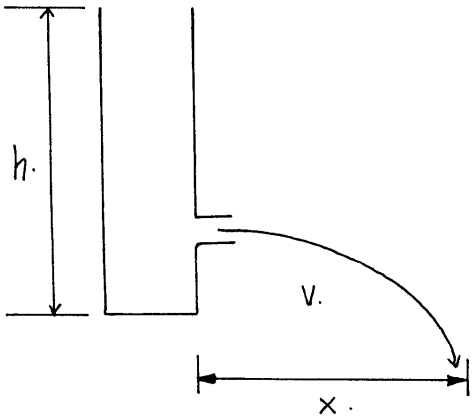
Explain the looping at B (1mk) *Kyo*

7. A car of mass 1000kg traveling at 36km/h is brought to rest over a distance of 20m. Find
   (i) The acceleration (2mks) *Kyo*
   (ii) The breaking force in Newton's (1mk) *Kyo*
8. A carbon dioxide cylinder contains $300cm^3$ of gas at a pressure of $2.40o10^7$ pa. Atmosphere pressure is $1.01o10^5$ pa. Calculate the volume of the gas at atmospheric pressure (2mks) *Kyo*
9. Figure 4 below shows a cambered wheels 1mk*Kyo*



What is the advantage of these?

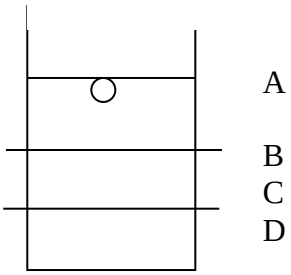
10. The diagram below shows a water tank of height h?



What is the relationship between the velocity V of the water jet and the height h (2mks) *Kyo*

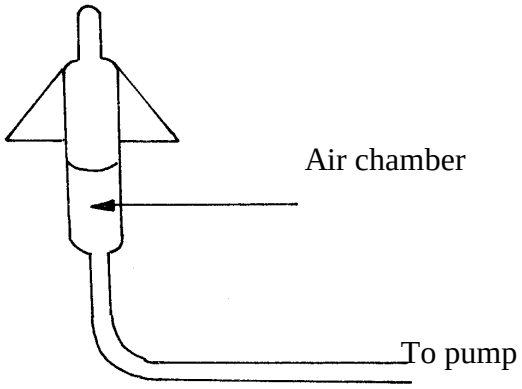
11. A cylindrical container has a base area of 150cm^2 and is filled with water to a depth of 25cm. Find the pressure due to water on the base (2mks) *Kyo*

12. Figure 6 shows the motion of steel ball released at A in a cylinder containing glue



Sketch distance time graph for the velocity from B to C (2mks) *Kyo*

13. Figure 7 shows two plastic bottles jointed base-to-base using glue.



State and explain the observation when air is pumped in? (2mks) *Kyo*

14. Why are wire shelves used rather than solid shelves in the centre of a refrigerator? (1mk) *Kyo*

SECTION B (55 MARKS)

Answer all questions in this section

15. (a) An object is released to fall vertically form height of 100m. At the same time another object is projected vertically upward with velocity of 40m/s.

(i) Calculate the time taken before the objects meet (3mks) *Kyo*

(ii) At what height do the objects meet? (2mks) *Kyo*

(b) A stone is projected horizontally at a speed of 40m/s from a cliff 60m high. After how long will it strike the ground? (2mks) *Kyo*

(c) A string of negligible mass has a bucket tied at the end. The string is 60cm long and the bucket has a mass of 45g. The bucket is swung horizontally making 6 revolutions per second. Calculate

(i) The angular velocity (1mk) *Kyo*

(ii) The angular acceleration (2mks) *Kyo*

(iii) The tension on the string (2mks) *Kyo*

(iv) The linear velocity (1mk) *Kyo*

16. (a) A block metal weighted 60N in air and 50N when completely submerged in water of density $1.0g/cm^3$

(i) Calculate the density of the metal block (2mks) *Kyo*

(ii) Calculate the upthrust on the metal and the apparent weight of the metal when completely submerged in slat solution of density $1.2g/cm^3$ (3mks) *Kyo*

(b) A machine with a wheel of diameter 1.2m and an axle of diameter 0.4m lifts a lot of mass 9kg with an effort of 100N. Given that the acceleration due to gravity is $10m/s^2$ calculate.

(i) The velocity ratios of the machine (1mk) *Kyo*

(ii) The mechanical advantage of the machine (1mk) *Kyo*

(iii) The efficiency (2mks) *Kyo*

(c) Draw a well labeled diagram of a pulley system with a velocity ration of 3 showing application of load and effort (2mks) *Kyo*

17. (a) Define the terms

(i) Inelastic collisions (1mk) *Kyo*

(ii) Momentum (1mk) *Kyo*

(b) A bullet of mass 20g moving with a velocity of 1000m/s hits stationery antelope of mass 12kg. The bullet imbeds and the two move in one direction. Calculate its final velocity(2mks) *Kyo*

(c) Block of mass 200g rests on a rough horizontal table. A force of 0.6N pulls the block so that it moves with a constant acceleration of $1m/s^2$ calculate

(i) The time it takes to travel a distance of 200m (2mks) *Kyo*

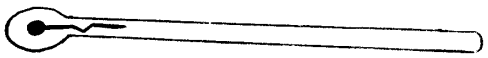
(ii) The frictional force between the block and the table (2mks) *Kyo*

(iii) The coefficient of kinetic friction between the two forces (2mks) *Kyo*

(iv) A part from the normal reaction and frictional force, name any other force(1mk) *Kyo*

18. (a) (i) State a reason why clinical thermometer is a special thermometer (1mk) *Kyo*

(ii) Complete the clinical thermometer shown, giving its temperature range (2mks) *Kyo*



(iii) State three difference between boiling and evaporation (3mks) *Kyo*

(b) (i) Define specific latent heat of fusion (1mk) *Kyo*

(ii) A copper calorimeter of mass 25g contains water of mass 150g at 60^oC. Then ice of mass 30g at 60^oC is added to water, melted and well stirred until the temperature of 38 ^oC is attained. Calculate the specific latent heat of fusion of ice. (4mks) *Kyo*

19. (a) (i) State Boyles Law (1mk) *Kyo*

(ii) Draw a well labeled diagram of the apparatus you would use to verify Boyles Law (2mks) *Kyo*

(iii) Describe how you would use the apparatus to verify Boyles Law. (4mks) *Kyo*

(b) A gas occupies a volume of 4.0 liters when its temperature is 20 ^oC and its pressure is 76cm of mercury. It the temperature of the gas is raised to 80 ^oC and its pressure is increased to 180cm of mercury. Calculate the new volume occupied by the gas. (3mks) *Kyo*

KCSE MOCK TRIAL 14

PHYSICS

PAPER 2

2 HOURS

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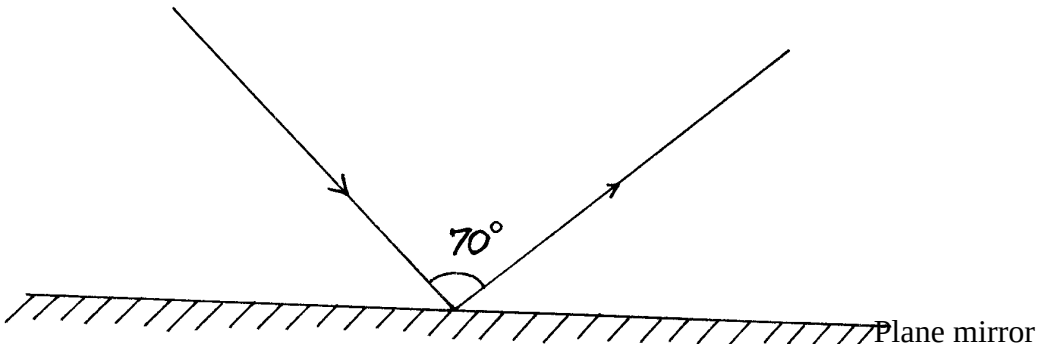
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SECTION A (25MKS)

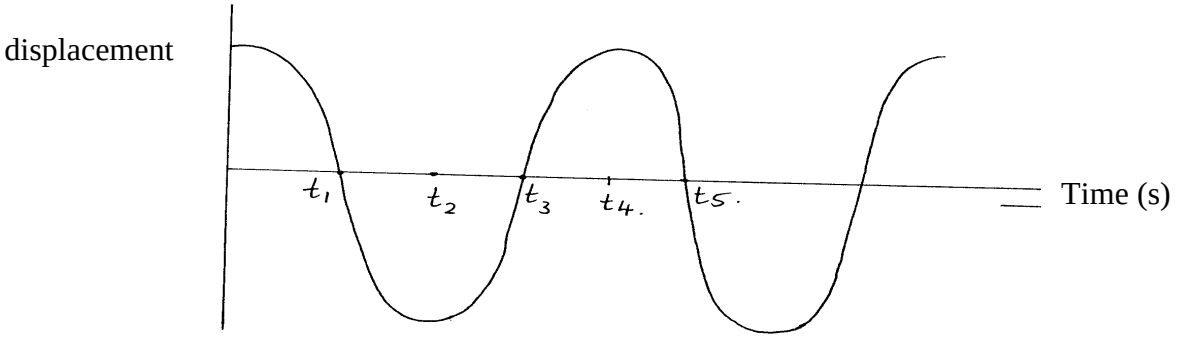
Answer all questions in the spaces provided

1. The figure below shows a ray of light being reflected from a plane mirror



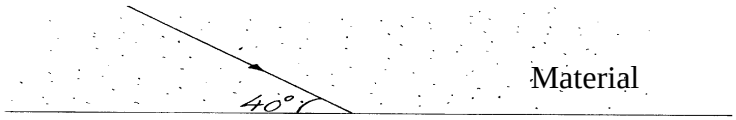
The plane mirror is then rotated clockwise through 20^0 keeping the incident ray fixed. What would be the new angle of reflection? (1mk) *Kyo*

2. Why is a concave mirror suitable for use as a shaving mirror? (2mks) *Kyo*
3. The figure below shows a wave profile for a wave whose frequency is 2Hz



Determine the value of t_3 (s) (2mks) *Kyo*

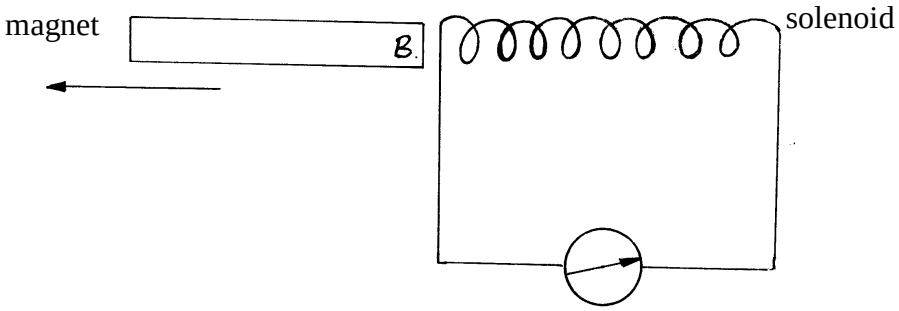
4. A certain material has a critical angle of 42^0. The diagram below shows a ray of light incident on the material-air boundary.



(i) What's is the refractive index of the material? 2mks*Kyo*

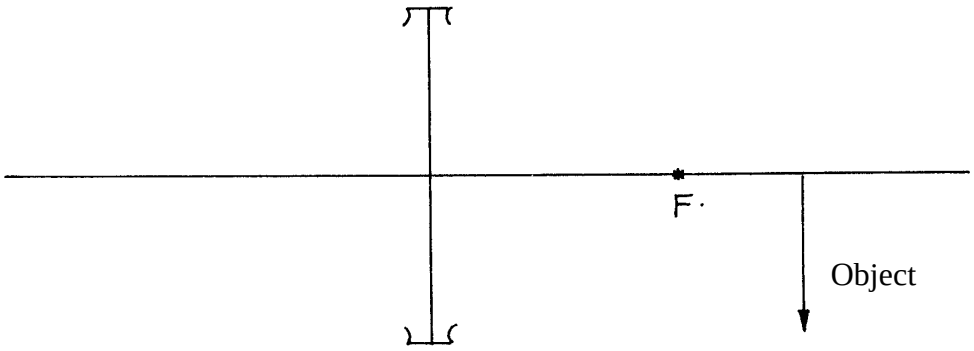
(ii) On the diagram indicate the path of the ray after hitting the boundary, showing the angles(1mk)

5. The diagram below shows a bar magnet being withdrawn from a solenoid



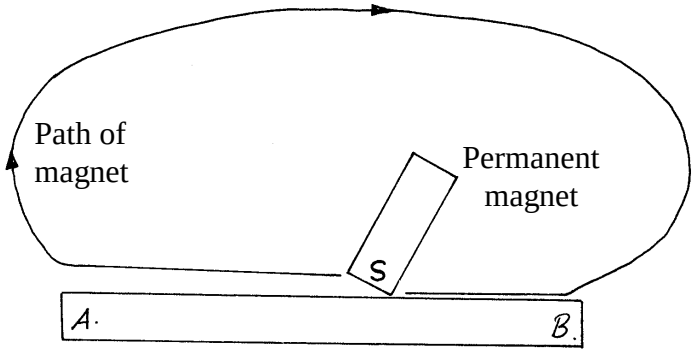
The center zero galvanometer is observed to deflect in the direction shown. What is the polarity of the magnet at B? (1mk) *Kyo*

6. An electric heater is rated 3KW what is the electrical energy in kWh (Kilo watt-hours) consumed by the heater when used on a 240V supply for 180 minutes? (2mks) *Kyo*
7. Briefly explain why in domestic wiring all the lamps in the house are connected in parallel (1mk) *Kyo*
8. The diagram below shows an object placed some distance from a biconcave lens.



Construct the image on the diagram

9. Other than penetrating powers, state two differences between soft and hard X rays(2mks) *Kyo*
10. What is the half-life of a radioactive material if its activity falls to 1/8 of its initial value in 3360 seconds? (2mks) *Kyo*
11. Two capacitors of x Farads and 2 micro Farads are connected in parallel and the combination joined in series to 5 micro Farads capacitor. The effective capacitance of the network is then 2.5 micro Farads.
    Determine the value of x (3mks) *Kyo*
12. The diagram below shows a method of magnetization



Ferromagnetic material is being magnetized

(i) What pole is acquired by the pole at B ?

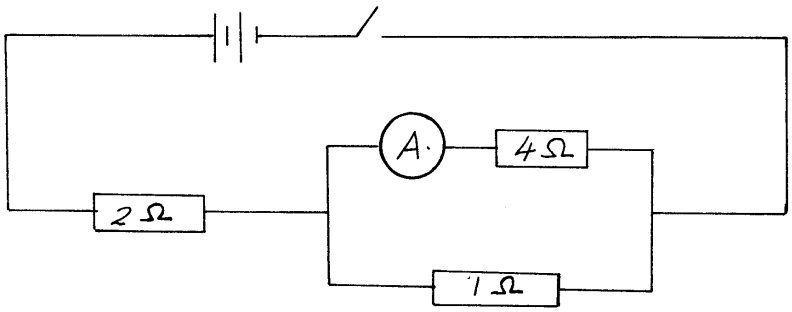
(ii) Sketch a graph to show how the strength of the magnet being created varies with the number of strokes (2mks) *Kyo*

13. What is the difference in energy transformation between a d.c motor and a d.c generator? (1mk) *Kyo*

SECTION B (55 Marks)

Answer all questions in this section in the spaces provided

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



(ii) The circuit diagram above shows two cells each of e.m.f. E volts and internal resistance 0.5 Ohms supplying a current to a network of resistors.

When switched on the ammeter reading is found to be 0.2Amperes. Determine the value of E (4mks) *Kyo*

(b) A piece of red-hot charcoal is brought close to the cap of a negatively charged electroscope, using a tweezers. Explain what is observed. (3mks)*Kyo*

(c) A transformer has 1000 turns in its primary coil, which is connected to a 250V a.c supply. The secondary coil is connected to an ammeter via a 100 Ohm resistor. Determine the number of turns in the secondary coil of the ammeter reads 1.5A (3mks) *Kyo*

(d) The power company supplies electrical energy and charges the consumption to ordinary domestic consumers as follows.

A monthly fixed charge of Ksh. 75
Ksh. 1.55 per unit for the first 50 units consumed
Ksh. 6.65 per unit for the next51- 300 units

(Source KPLC Schedule of Tariffs and rates)

1 unit = I Kilowatt-hour (Kwh)

a consumer uses 1.98×10^5 Kilojoules of electrical energy in a given month. Determine the total month's bill (4mks) *Kyo*

15. (a) Water waves from a given source move from a shallow to a deeper end what effect would this have on the
    (i) Frequency
    (ii) Wavelength
    (iii) Velocity of the wave

(b) A biconvex lens forms an erect image twice the size of the object if the focal length of the lens is 20 cm determine the object distance (3mks) *Kyo*

(c) Below is part of the electromagnetic spectrum in order of increasing wavelength

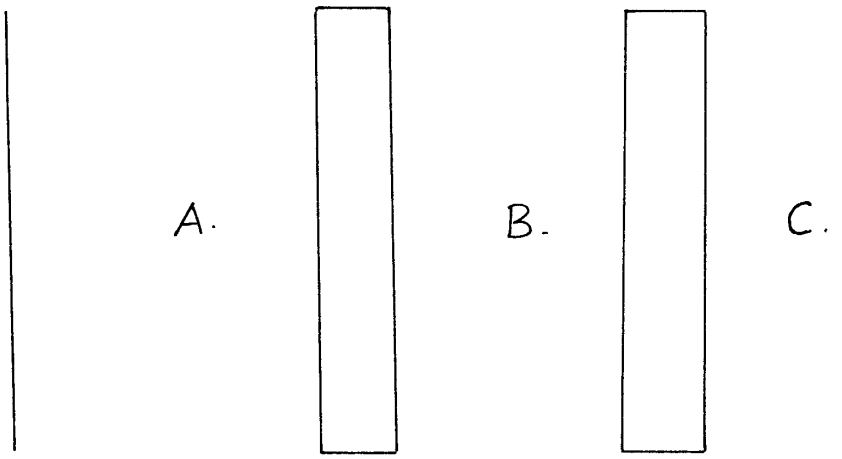
A	B	C	Visible light	Infrared radiation	D	E

(i) How are waves B produced? (2mks) *Kyo*
(ii) State two uses of the waves (2mks) *Kyo*
(iii) How are infrared waves detected? (1mk) *Kyo*

(d) (i) Why is the speed of sound greater in a solid than in air? (2mks) *Kyo*

(ii) An echo sounder produces a pulse and an echo is received from the seabed after 0.4 seconds. If the speed of sound in water is 1500m/s. Calculate the depth of the seabed. (2mks) *Kyo*

16. (a) Americium-241, strontium -90 and cobalt-60 are known sources of alpha, beta particles and gamma rays respectively. All the three sources are placed in front of the obstacles shown below



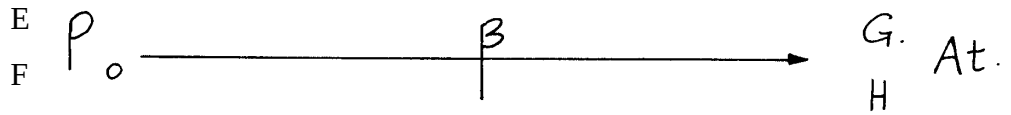
An attempt is then made to detect the particles/radiations at points A,B and C using a Geiger-Muller. Which particle(s)/radiations are detected at points (3mks) *Kyo*

(b) State two dangers of radioactive emissions (2mks) *Kyo*

(c) Radium (Ra) 226 decays by alpha emission to Radon (Rn). The atomic number of Ra is 88.

(i) Write down an equation to show this decay (2mks) *Kyo*

ii) Rn is itself radioactive and decays by alpha emission to polonium (po) while Po can decay by beta emission according to the equation



determine the values of

E

F

G

H (2mks) *Kyo*

(d) Briefly explain how doping produces p types semiconductor (3mks) *Kyo*

17. (a) The following are work functions of some metal surfaces

Sodium	2 electron Volts (eV)
Beryllium	3.9eV
Magnesium	2.8eV

(i) What is meant by 'work function' of a surface? (1mk) *Kyo*

(ii) What is the work function of magnesium in joules? (1mk) *Kyo*

(iii) Determine the threshold wavelength for Beryllium (3mks) *Kyo*

(b) A cell of e.m.f E and internal resistance r is used to pass a current through various resistors R, Ohms and the values of current recorded in the table below.

R(Ohms)	1.6	2.1	2.5	3.6	5	8
i(A)	1	0.8	0.7	0.5	0.37	0.24
$1/_i(A^{-1})$						

(i) On the table record values of 1/i (1mk) *Kyo*

(ii) Plot a graph of 1/i versus R and use it to determine E (8mks) *Kyo*

KCSE MOCK TRIAL 15

PHYSICS

PAPER 1

2 HOURS

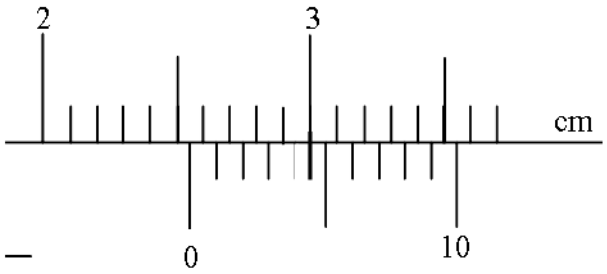
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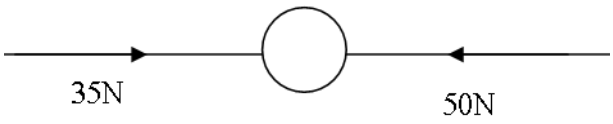
SECTION A (25 MARKS)
Answer ALL questions in this section

1. The vernier caliper in the figure below has a zero error of -0.05cm

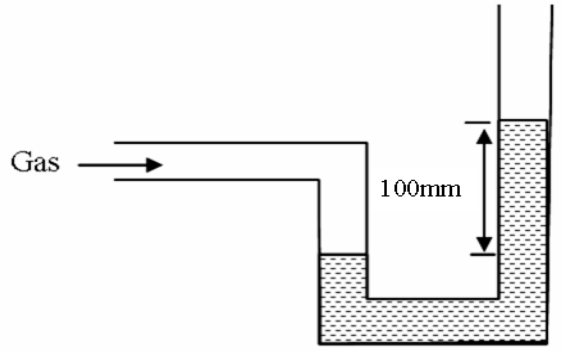


State the actual reading of the measuring instrument. (2mks)

2. Using a scale of 1cm to represent 10N, draw a diagram to show the direction and magnitude of the resultant force for two forces acting as shown below (1mk)

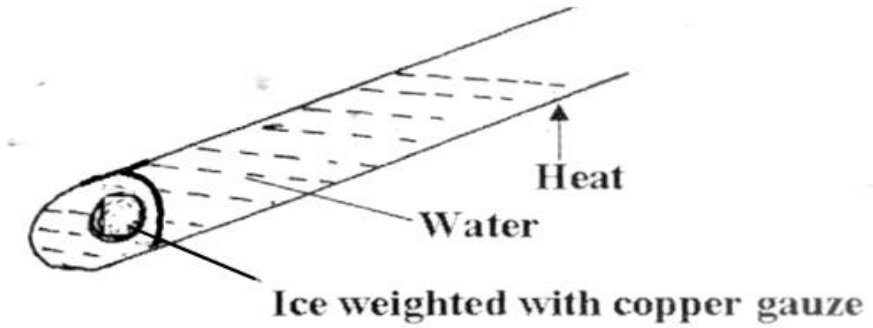


3. The figure below shows an open-ended manometer connected to a gas supply.



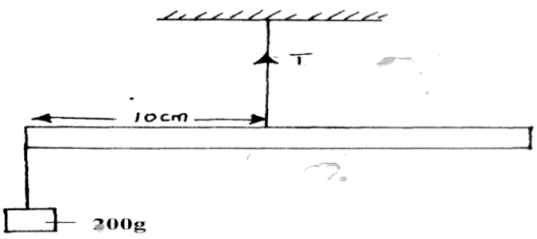
If the mercury barometer reads 760mm, calculate the pressure of gas in the cylinder (density of water = 1g/cm^3, density of mercury = 13.6g/cm^3) (3mks)

4. In an experiment to demonstrate Brownian motion, smoke was placed in an air cell and observed under a microscope. Smoke particles were observed to move randomly in the cell. Explain the observation. (1mk)
5. Aquatic animals are observed to survive in frozen ponds. Explain this observation. (2mks)
6. Ice was placed inside a test tube and water poured into it and then heated as shown below.



The ice remained intact as heating progressed. Explain this observation (1mk)

7. The figure below shows a metre rule balancing when a mass of 200g is hanged at one end as shown below.



Determine the tension T in the string (3mks)

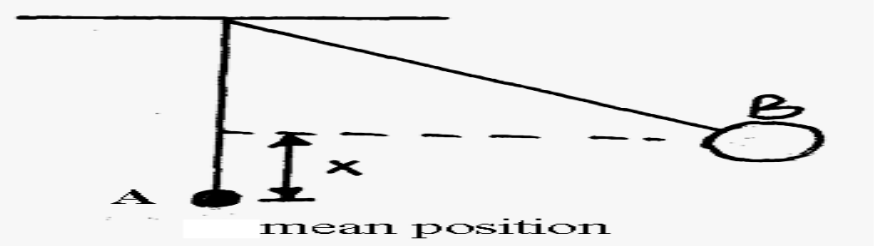
8. Suggest a reason why a person who has lost one leg is provided with crutches. (1mk)

9. A pipe of diameter 12mm is connected to another pipe of diameter 18mm. If water flows in the wider pipe at the speed of $2ms^{-1}$, what is the speed in the narrow pipe? (3mks)

10. Distinguish between uniform velocity and uniform acceleration (1mk)

11. a) A bullet of mass 20g traveling with a velocity of 30m/s penetrates a sand bag and is brought to rest in 0.05secs. Find the average retarding force of the sand. (2mks)

12. The diagram below shows a pendulum displaced by a distance X as shown below.



At what point will the potential energy be equal to kinetic energy? (1mk)

13. 500g of a metal is heated to 100^0C and then placed in 200g of water at 15^0C. If the final temperature rises to 21^0C. Calculate the specific heat capacity of the metal (Specific heat capacity of water = 4200kg/j/k). (3mks)

14. It is observed that when a bubble rises from the bottom of a glass filled with water to the top its size increases. Explain this observation. (1mk)

SECTION B (55 MARKS)

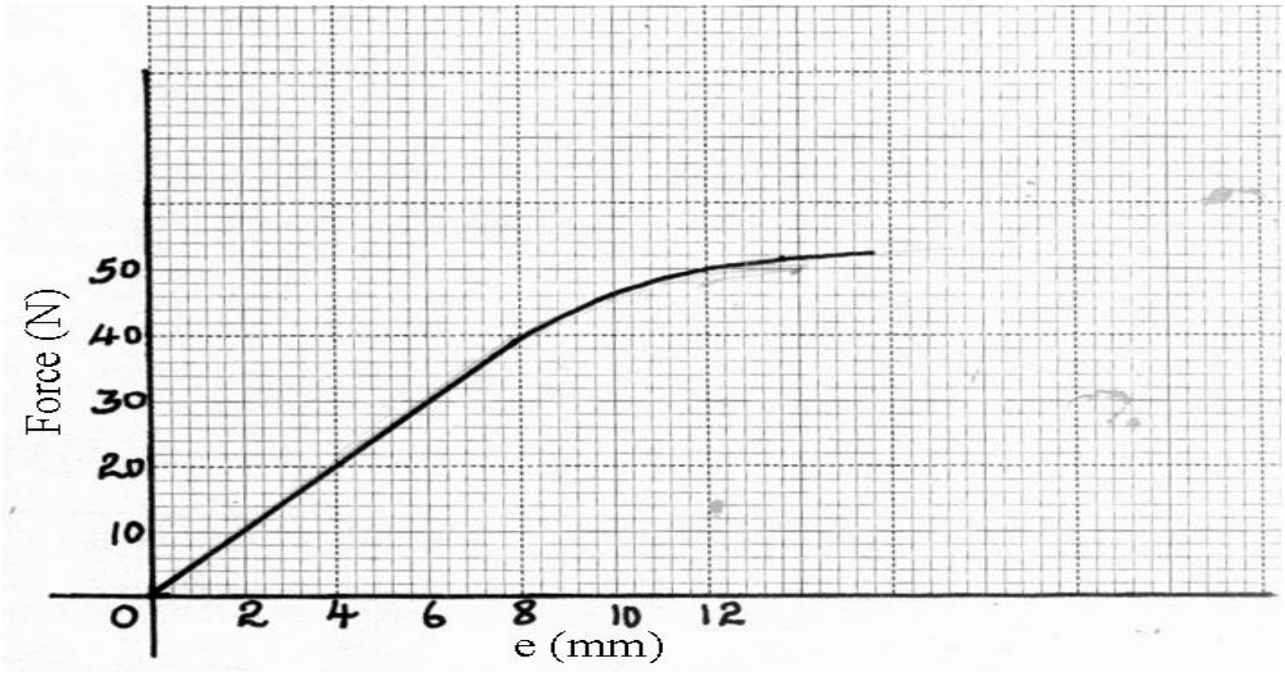
Answer ALL questions in this section in the spaces provided.

15. a) State Hooke's law (1mk)

b) i) A vertical spring of unstretched length 30cm is clamped at its upper end. When sand is placed in a pan attached to the lower end of the spring its length becomes 45cm. When 20g mass is placed on top of the sand the length increases to 55cm. Determine the mass of the sand. (3mks)

ii) If the spring in (i) above is compressed from its original length to a length of 24cm, calculate the work done in compressing the spring. (2mks)

c) The figure below shows a graph force (F)



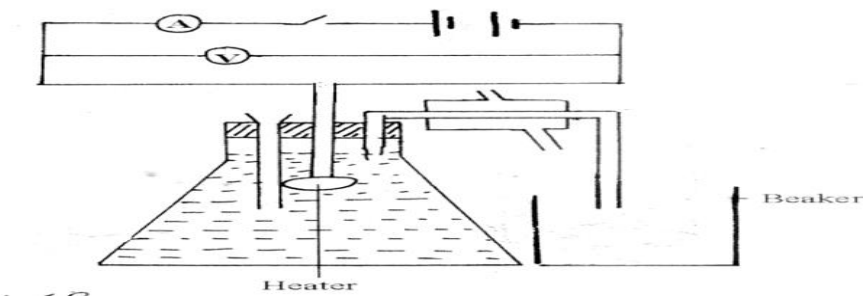
against extension (E)

Determine the spring constant of the spring used (2mks)

16. a) Define specific latent heat of fusion of a substance (1mk)

b) 2 Kilograms of water losses 184 kilojoules of heat on cooling from 15^0C to ice at -10^0C. Determine the specific latent heat of fusion of water (specific heat capacity of water 4.2 x 10^3J/Kg K, specific heat capacity of ice is 2.1 x 10^2J/Kg K.) (4mks)

c) The diagram below shows a set up used to determine specific latent heat of vaporization of water electrically.



i) State **four** important measurements you will need to determine the specific latent heat of vaporization of water. (4mks)

ii) Give an expression for specific latent heat of vaporization using the above measurements. (1mk)

iii) Differentiate between evaporation and boiling. (1mk)

17. a) Distinguish between elastic and inelastic collision (1mk)

b) A ball X of mass 0.1Kg moving with a velocity of 6m/s collides directly with a ball Y of mass 0.2Kg at rest, X rebounced back with a velocity of 2m/s in the opposite direction after collision.

Determine:-

i) The velocity of Y after collision (3mks)

ii) Kinetic energy after collision (2mks)

c) On the axes provided, sketch a velocity-time graph for a body projected vertically upwards. (1mk)



d) A stone is projected vertically upwards with a velocity of 15m/s

Determine:-

i) Time it takes to come back to the point of projection (3mks)

ii) Maximum height reached (2mks)

18. a) State Archimedes' principle (1mk)

b) Explain one application of Archimedes principle in real life situation (3mks)

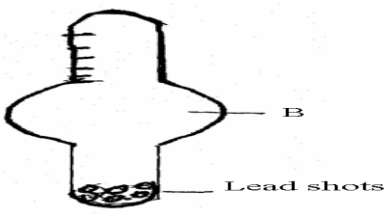
c) The mass of the fabric of a large ballon is 500Kg. The balloon is inflated with $2000m^3$ of helium. The balloon is attached to a cable fixed to the ground and released to still air (Density of air and helium are $1.3/cm^3$ and $0.18g/cm^3$ respectively)

i) Draw a diagram to show the forces acting on it (2mks)

ii) Determine the tension in the cable (3mks)

iii) What would be the acceleration of the balloon if the cable is cut? (3mks)

d) The diagram below shows a hydrometer



Why is the part marked B wider? (1mk)

19. a) Define the term angular velocity (1mk)

b) A wooden block of mass 200g is placed at a distance of 9cm from the centre of a turn table. When the turn table is rotated at constant angular velocity, the block begins to slide off the table. If the frictional force between the block and the turn table is 1.2N, determine:

i) The co-efficient of friction between the block and the turn table (2mks)

ii) The linear speed of the block (3mks)

iii) If the angular velocity is increased by 2π rad/s, What would be the force required to hold the block at the same place? (4mks)

……

c) What is meant by the term "Banking" in roads? (1mk)

KCSE MOCK TRIAL 15

PHYSICS

PAPER 2

2 HOURS

NAME…….INDEX NO……

SCHOOL…….. SIGN……

DATE…….

SECTION A (25 MARKS)
Answer ALL questions in this section in the spaces provided

1. The figure 1 below shows the image behind a mirror M.

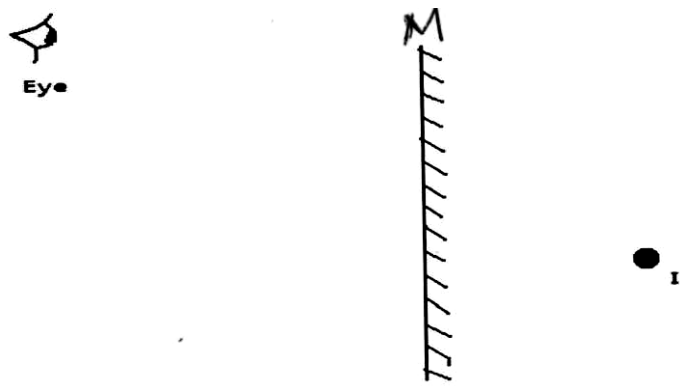


Fig. 1

By ray diagram construction, locate the position of the object.

(2mks)

2. A negatively charged rod is brought near the cap of a leaf electroscope. The cap is then earthed momentarily by touching with finger. Finally the rod is withdrawn. Sate and explain the observation made.(2

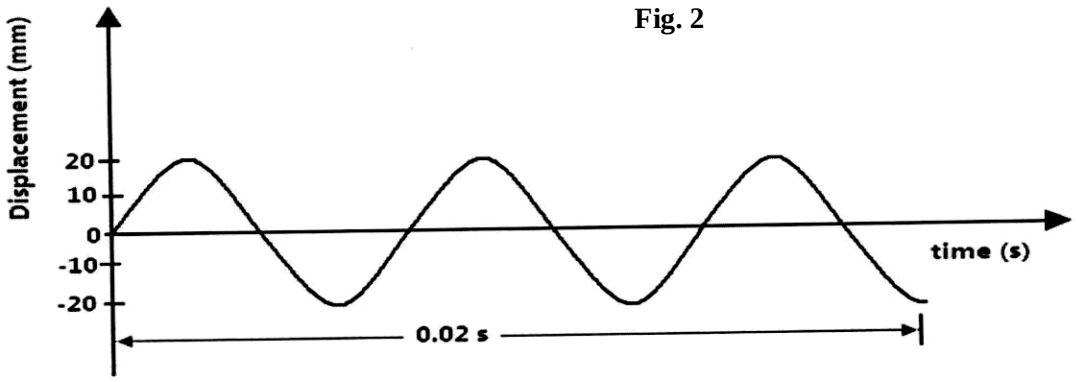
3. A boy observes his face in a concave mirror of focal length 100cm. If the mirror is 80cm away, state **one** characteristic of the image observed. (1mk)

4. The coil of an electric motor is usually wound on a soft iron armature. State **two** purposes of this armature.

5. A student stands at a distance 400m from a wall and claps two pieces of wood. After the first clap, the student claps whenever an echo is heard from the wall. Another student starts a stopwatch at the first clap and stops it after the twentieth clap. The stopwatch records a time of 50 seconds. Find the speed of sound.
(3mks)

6. The figure 2 below shows a displacement time graph for a wave motion.

Fig. 2



What is the frequency of the wave? (2mks)

7. The figure 3 below shows a series of wave fronts one wavelength apart approaching a gap between barriers in ripple tank.

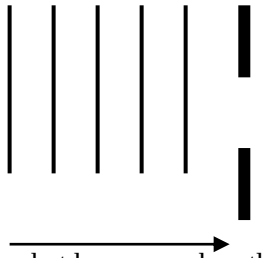


Figure 3

On the same diagram, show what happens when the waves pass through the gap. (1mk)

8. In figure 4 shown below (not drawn to scale), sketch the path of a ray till it emerges from the prism.

(

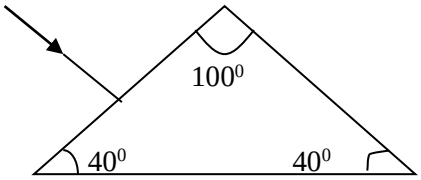


Fig. 4

9. A bulb is rated 100W, 240V. At what rate would it dissipate energy if it is connected to a 220V supply?

10. One method of producing a weak magnet is to hold a steel rod in the North South direction and then hammer it continuously for some time. Using the domain theory of magnetism, explain how this method works.

(2mks)

11. Figure 5 shows a motor connected to a magnetic switch called a relay opened by an ordinary switch S_1. Use the information in the figure to answer questions that follow.

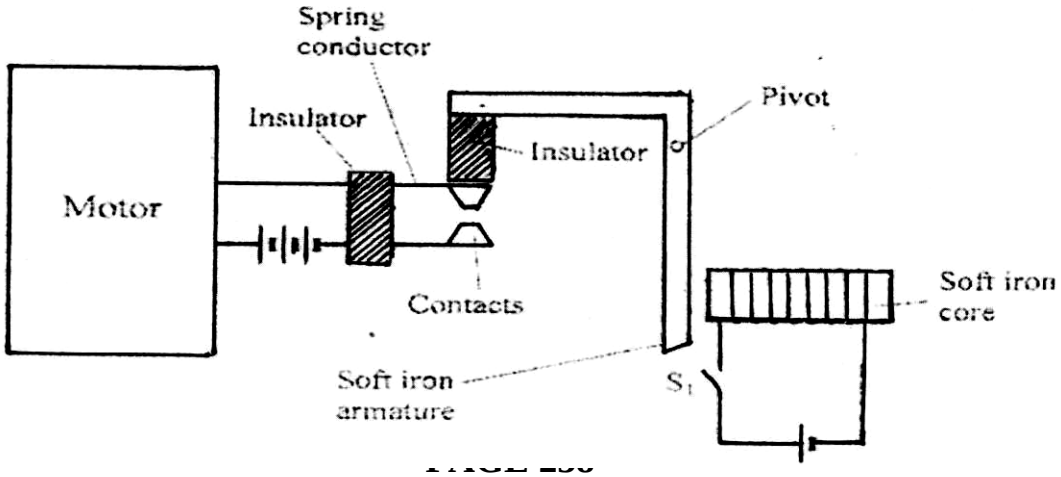


Fig. 5

(i) Explain how the relay switches on the motor when S_1 is closed. (3mks)

(ii) State with a reason the effect on the motor if the iron core is replaced with a steel core and switch S_1 is put on and then off. (2mks)

SECTION B (55 MARKS)

12. (a) State Ohms law.
(1mk)

(b) Three resistors 1Ω, 3Ω and 5Ω are connected together in a circuit. Draw a circuit diagram to show an arrangement that would give minimum resistance and determine that resistance. (3mks)

(c) The cell in the figure 6 below has an e.m.f. of 1.8V and negligible internal resistance.

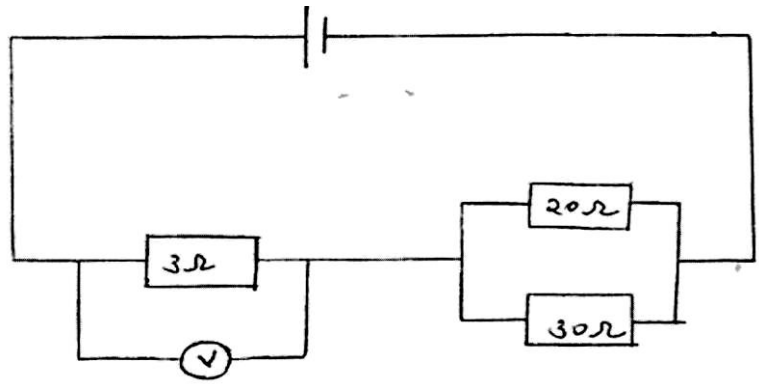


Fig. 6

Determine:-

(i) Total resistance in the circuit.

(3mks)

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

(iii) Reading of the voltmeter. (2mks)

13. (a) State **two** factors that affect the capacitance of a parallel plate capacitor. ` (2mks)

(b) The diagram below shows an arrangement of capacitors in a circuit.

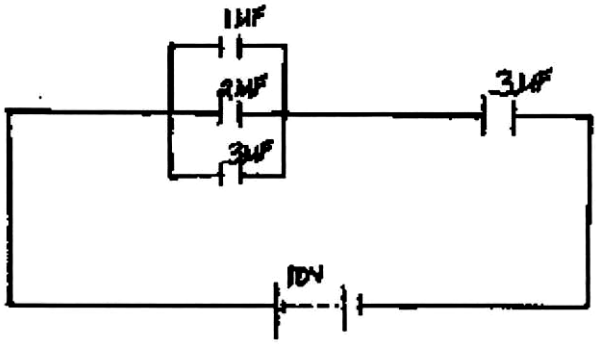


Fig. 7

Determine:-

(i) The total capacitance (3mks)

(ii) The total charge

(3mks)

(iii) The energy stored by the $2\mu F$ capacitor.

(3mks)

14. (a) The figure 8 below shows how rays from a distant and near objects are focused inside a human eye with a certain defect.

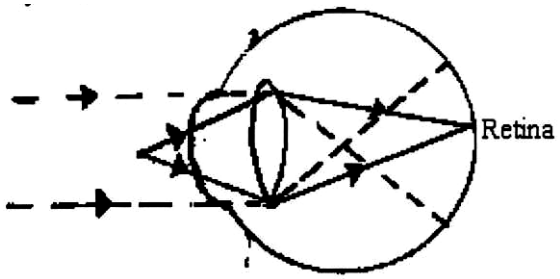


Fig. 8

(i) Name the defect.

(1mk)

(ii) State **two** causes f the defect.

(2mks)

(iii) Suggest a corrective measure to the defect.

(1mk)

(b) The figure below shows an object O placed in front of an objective lens L_o whose focal length f_o is less than f_e, the focal length of the eyepiece L_e. Complete using ray construction how the arrangement would produce a compound microscope. (3mks)

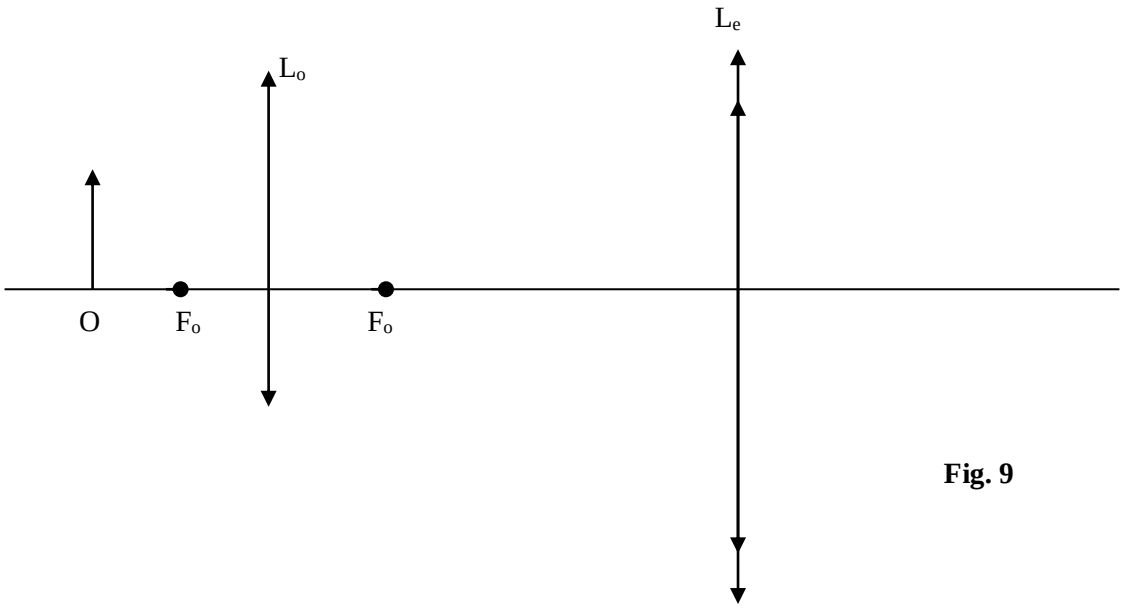


Fig. 9

(c) An object of height 10cm is placed in front of a diverging lens of focal length 25cm and at a distance of 20cm from the lens. Calculate the height of the image formed. (4mks)

15. (a) State the laws of refraction.
(2mks)

(b) When does total internal reflection occur?
(2mks)

(c) The figure 10 below represents a ray of light falling normally on the curved surface of a semi-circular glass block A at an angle of 32^0 at O and emerging into air at an angle of 48^0.

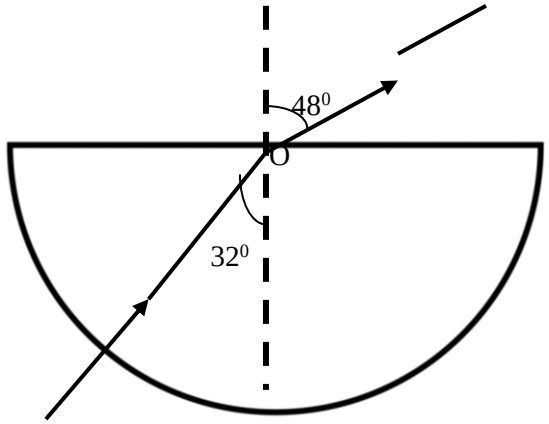


Fig. 10

Calculate the absolute refractive index of the glass of which the block is made. (Assume air is a vacuum).

(d) Explain why sound is audible at night than during the day.
(1mk)

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

(b) In the figure 11 below the bar magnet is moved into the coil.

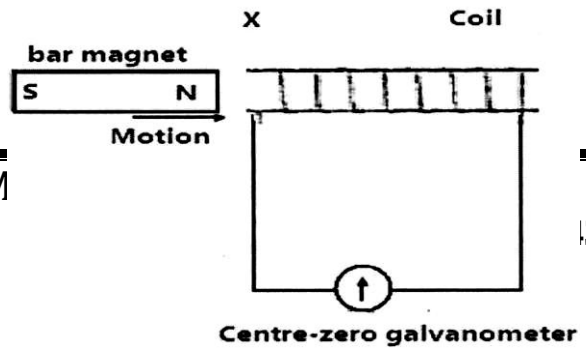


Fig. 11

(i) State and explain what is observed in the galvanometer. (2mks)

(ii) Explain briefly the source of an electrical energy in the circuit. (2mks)

(c) State any **two** ways in which power is lost from the transformer and explain how each loss is minimized. (2mks)

(d) A transformer is used to provide a potential difference of 100KV to an X-ray tube from 250V a.c mains supply. A current of 100mA flows in ht X-ray tube and the transformer is 100% efficient. Calculate:-

(i) The ratio of the number of turns of the secondary coil to the number of turns in the primary coil.

(ii) The current in the primary coil.
(2mks)

(iii) State giving reasons which of the coils of the transformer is thinner. (2mks)

FOR MARKING SCHEMES CONTACT 0707550000 / 0705525657