KCSE 2025 TOP SCHOOLS MOCKS

PHYSICS

(MOCK EXAMS 1-10)

To encourage academic excellence, top-performing national schools collaborate on the "National Schools" joint mock exam compilation. The goal of this collaborative effort is to push students and enhance their readiness for national exams through the use of challenging tests. The goal of participating schools' resource and strategy sharing is to raise student achievement and promote an achievement-focused culture.

KEY TO SUCCESS!

For Marking Schemes

Mr Isaboke 0746 222 000 / 0742 999 000

MWALIMU CONSULTANCY

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 1

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

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

FOR EXAMINER USE ONLY

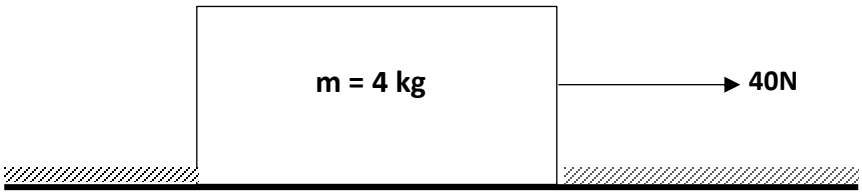
SECTION	QUESTION	MAX MARKS	CANDIDATE'S SCORE
A	1 – 14	25	
B	15	13	
	16	13	
	17	13	
	18	09	
	19	07	
	TOTAL	80	

SECTION A (25 Marks)

1. Define a free fall. **(1 mark)**

2. The figure 1 below shows a force of 40N acting on a body of mass 4kg. The coefficient of friction between the surfaces is 0.05.

Fig. 1



Determine the acceleration of the body. **(3 marks)**

3. **A** uniform bar is pivoted at a point 30cm from one end. A force of 12N at the end of the shorter side keeps the bar in equilibrium. If the length of the bar is 1 metre, determine the weight *w*, of the bar. **(2 marks)**

4. A student observed some pollen grains on the surface of water in a beaker with the help of hand lens as shown figure below.

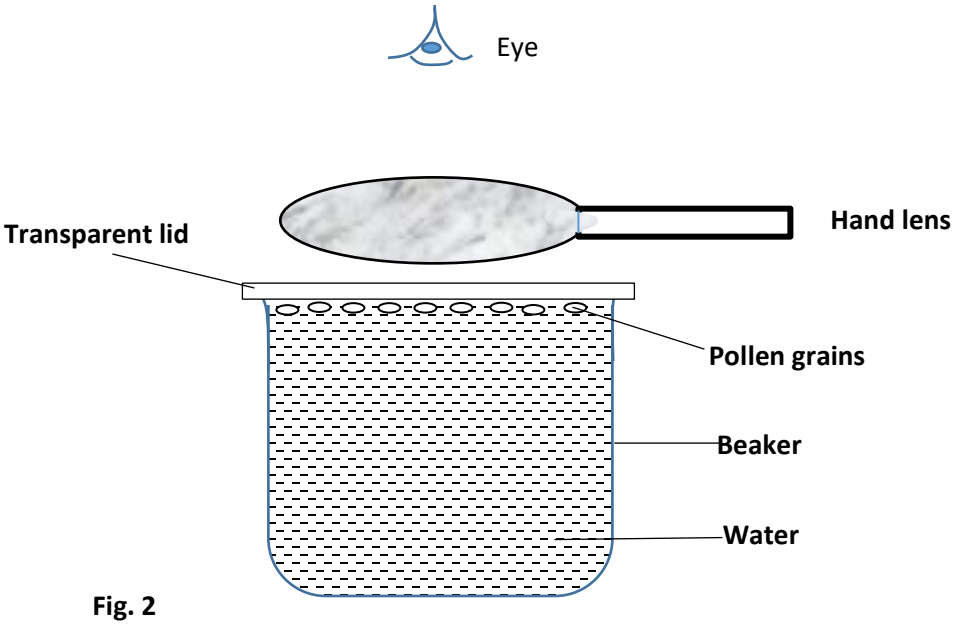


Fig. 2

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

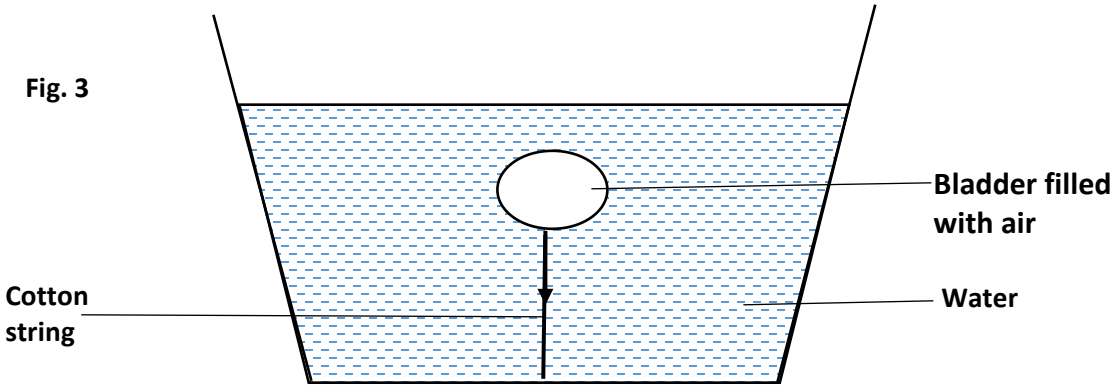
(b) Explain the observation in (a) above. **(1 mark)**

(c) What conclusion can be drawn from the above experiment? **(1 mark)**

5. An immersion heater consumes a voltage of 240V and a current of 10A. If it is used to heat 5kg of water at 20^0C, find the final temperature of water after 7 minutes. (Take the specific heat capacity of water = 4200 J/kgk) **(3 marks)**

6. The figure 3 below shows a rubber bladder filled with air and fixed at the bottom of a water container and held with a cotton string.

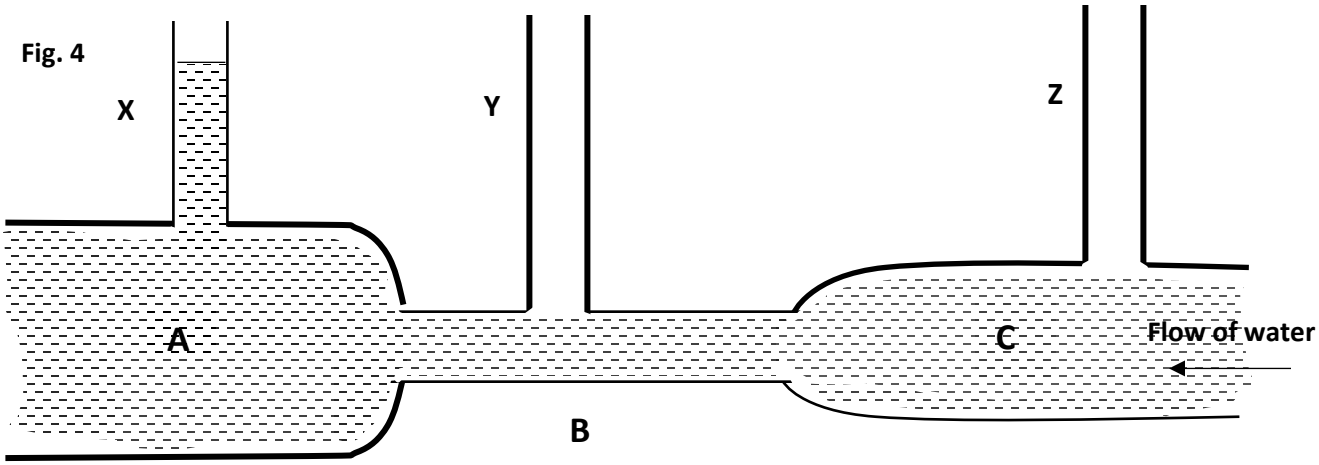
Fig. 3



State and explain the observation made when water is heated gently for a few minutes. **(2 marks)**

7. The figure 4 below shows a pipe of varying cross-section. Three vertical tubes X, Y and Z of same diameter are fixed to the section A, B and C of the pipe respectively as shown below.

Fig. 4



Given that the water flows in the direction shown by the arrow, indicate on the diagram the relative levels of water in Y and Z. **(1 mark)**

8. A smooth wooden plane is inclined at an angle of 30^0 to the horizontal as shown in Figure 5 below. An object of mass 10kg is pulled steadily up the plane by a force of 60N. Determine;

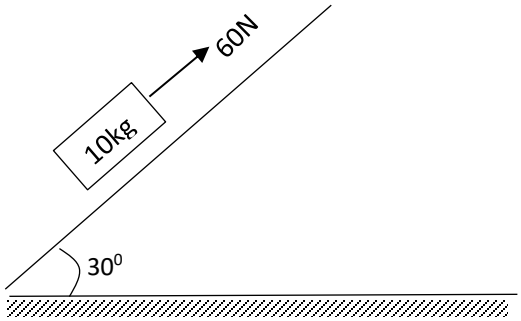


Fig. 5

(a) the velocity ratio of the inclined plane. **(2 marks)**

(b) efficiency of the system. **(2 marks)**

9. The Figure 6 below shows a spiral spring when not compressed and when compressed by a mass of 4.0kg.



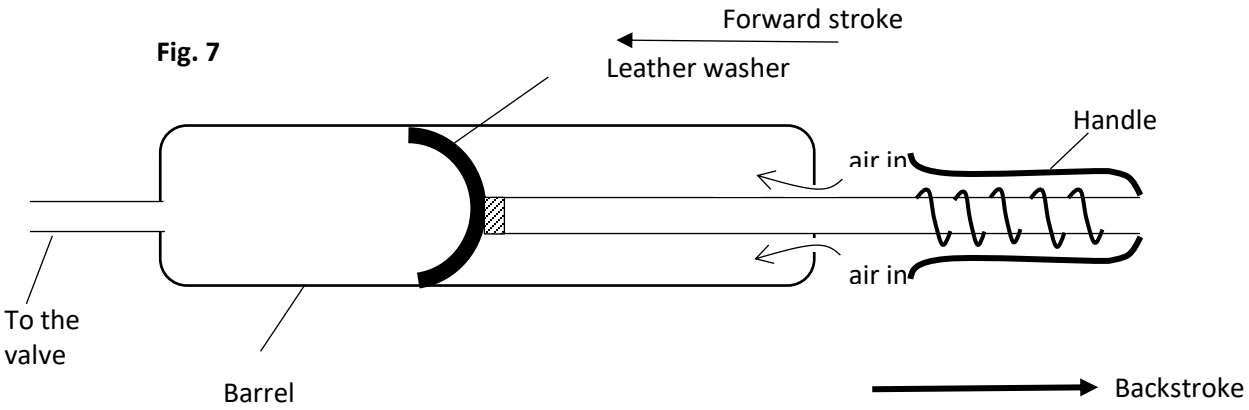
Fig. 6

(a) uncompressed spring **(b)** Compressed spring

Determine the elastic potential energy stored by the compressed spring in (b). **(3 marks)**

10. The bicycle pump shown in Figure 7 below is one of the applications of pressure in gases.

Fig. 7



Explain how the leather washer functions during; **(2 marks)**

(a) backstroke

(b) forward stroke

11. Explain how greenhouse effect increases the average temperate of the earth. **(2 marks)**

SECTION B (55 MARKS)

12.(a) The Figure 8 below shows a planet Venus orbiting the sun in a circular orbit at constant speed.

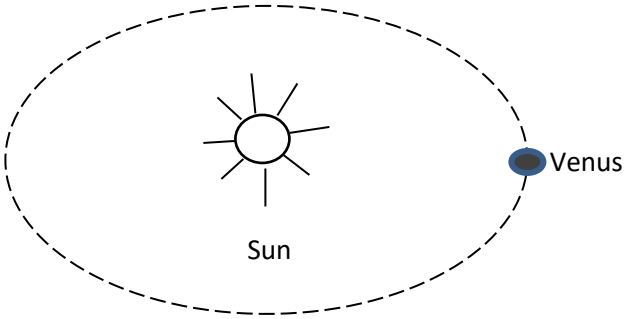


Fig. 8

(i) State what provides the centripetal force. **(1 mark)**

(ii) Indicate the direction of centripetal force on the planet. **(1 mark)**

(b)A stone is thrown with a horizontal velocity ***u*** from the top of a building of height 125m so as to hit a target on the ground 75m from the base of the building as shown in Figure 9 below.

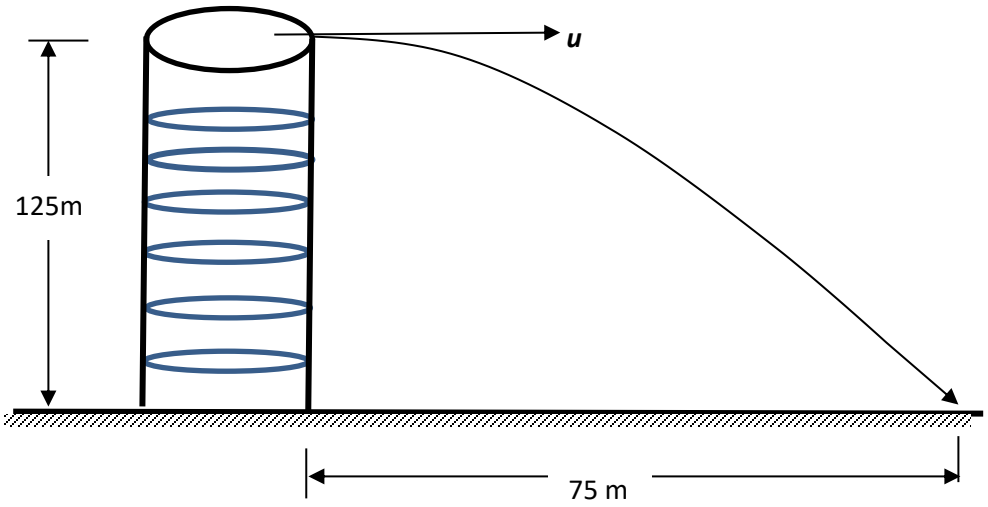


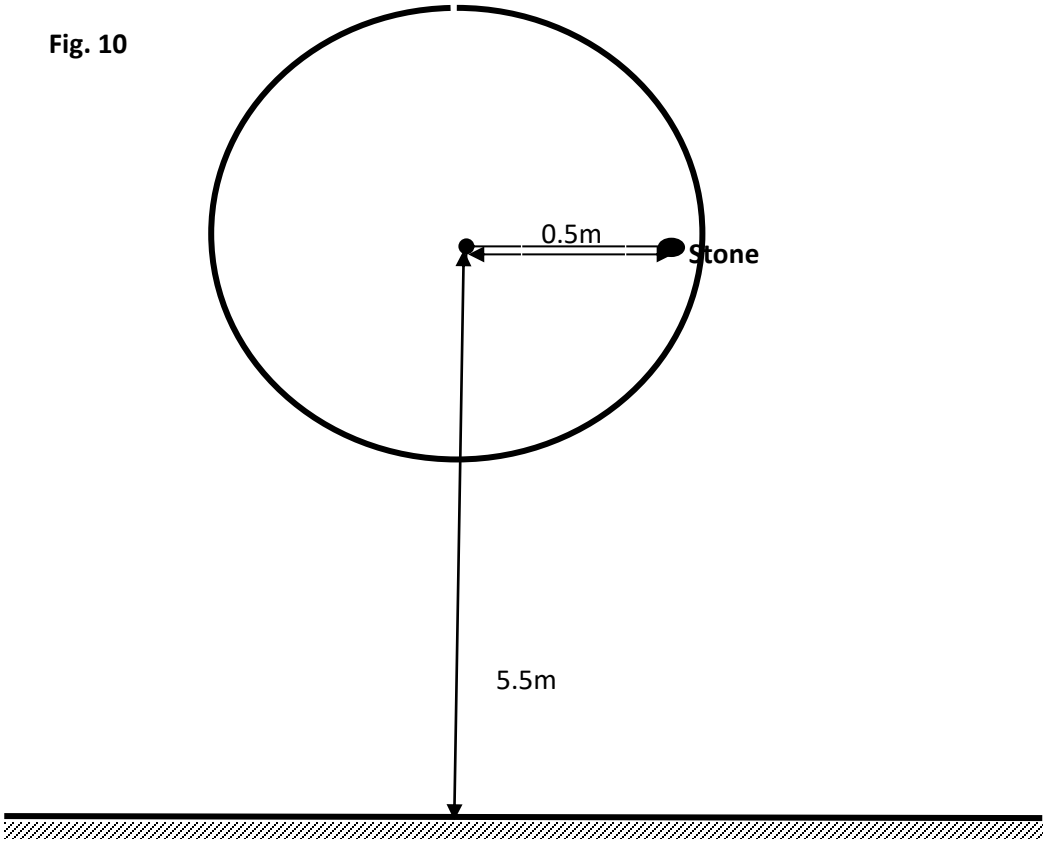
Fig. 9

Calculate: **(i)**the time taken for the stone to hit the target. **(2 marks)**

(ii)the horizontal velocity, **u**, of the stone. **(2 marks)**

(c)A stone of mass 0.5kg is attached to a string of length 0.5m which will break if the tension exceeds 20N. The stone is whirled in a vertical plane, the axis of rotation being above the ground, as shown in the Figure 10 below.

Fig. 10



The angular velocity is gradually increased until the string breaks.

(a) In what position is the string most likely to break? **(1 mark)**

(b) At what angular velocity, ***w***, will the string break? **(3 marks)**

13(a) Define the term atmospheric pressure. **(1 marks)**

(b)The Figure 11 below shows a hydraulic lift supporting a load of 150kg. Its cross-sectional areas A_1 and $A_2$are $0.02m^2$ and $0.4m^2$ respectively. The length of the effort arm is 1m and the length of the plunger from the pivot is 0.4m.

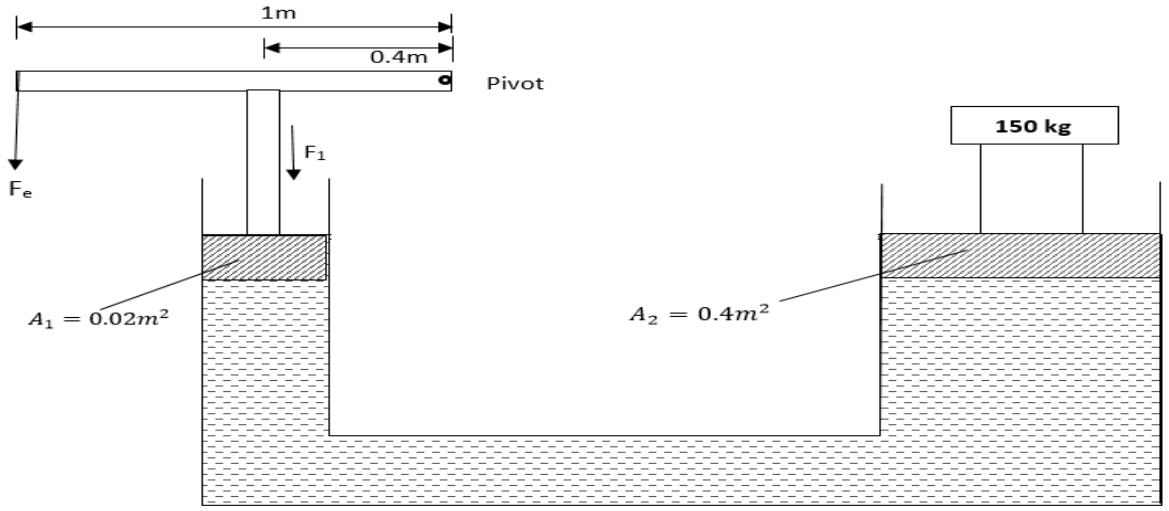


Fig. 11

Determine:

(i) the pressure exerted by 150kg mass. **(1 mark)**

(ii) the pressure exerted by F_1 on the smaller piston. **(1 mark)**

(iii) the force F_1. **(2 marks)**

(iv) the applied force, Fe. **(2 marks)**

(v) the mechanical advantage. **(2 marks)**

(vi) the velocity ratio of the system. **(2 marks)**

(v) the efficiency of the system. **(2 marks)**

14.(a) An unknown amount of kerosene was heated using a heater rated 240V, 100W. The temperature of kerosene was recorded at 2 minutes intervals. The graph OMN in the Figure 12 below was plotted.

(iv) Determine the mass of kerosene that was used in the experiment.(Assume heat gained by the beaker and the surrounding is negligible) **(3 marks)**

Take specific heat capacity of kerosene to be 2200 $JKg^{-1}K^{-1}$.

(b) The Figure 13 below shows a velocity-time graph for a steel ball falling through a viscous fluid.

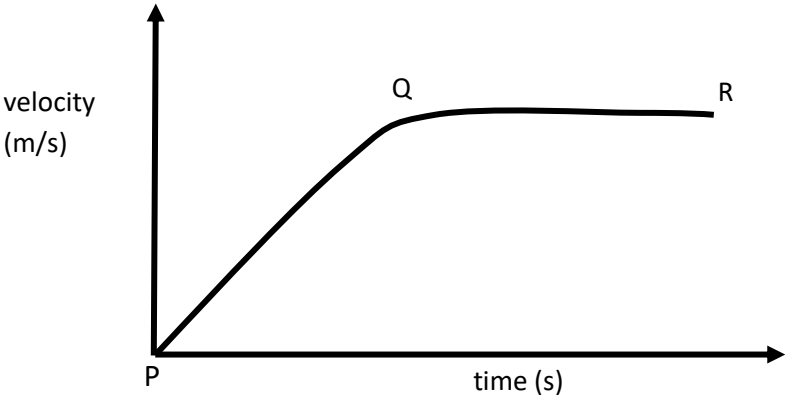


Fig. 13

Explain the nature of the curve in;

(i) section PQ. **(1 mark)**

(ii) section QR. **(1 mark)**

(iii) If the graph shown above is of a ball falling through water, sketch on the same axis a graph for the ball falling through glycerine. **(1 mark)**

15.(a) A student constructed the simple thermometer shown in the figure 14 below.

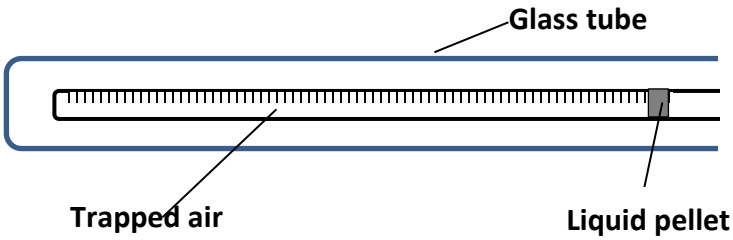


Fig. 14

(i) Why must the tube be made of thin glass? **(1 mark)**

(ii) Assuming that the weight of the pellet is negligible, what will the pressure of the trapped air be when the tube is vertical? Explain. **(2 marks)**

(b) She placed the thermometer in water which was at various temperatures and obtained the graph shown in Figure 15 below.

(i) Which of the gas laws does this set-up apply? Verify. **(1 mark)**

(c)(i) State the SI unit of momentum as used in Physics. **(1 mark)**

(ii) A bullet of mass 2g is fired horizontally into a block of wood of mass 498g. The block is suspended by a light inextensible string so that it is able to move in a vertical plane. The block and the bullet move together through a vertical distance of 8.6cm as shown in figure 16 below.

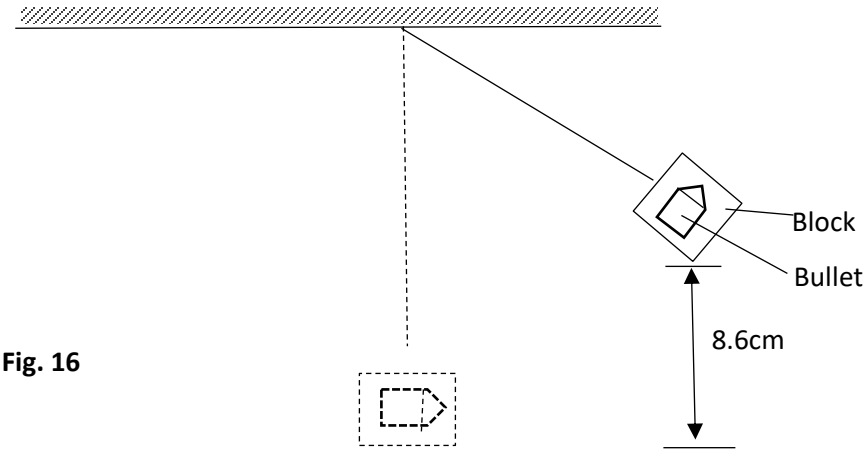


Fig. 16

I. Calculate the change in gravitational potential energy of the block and bullet. **(2 marks)**

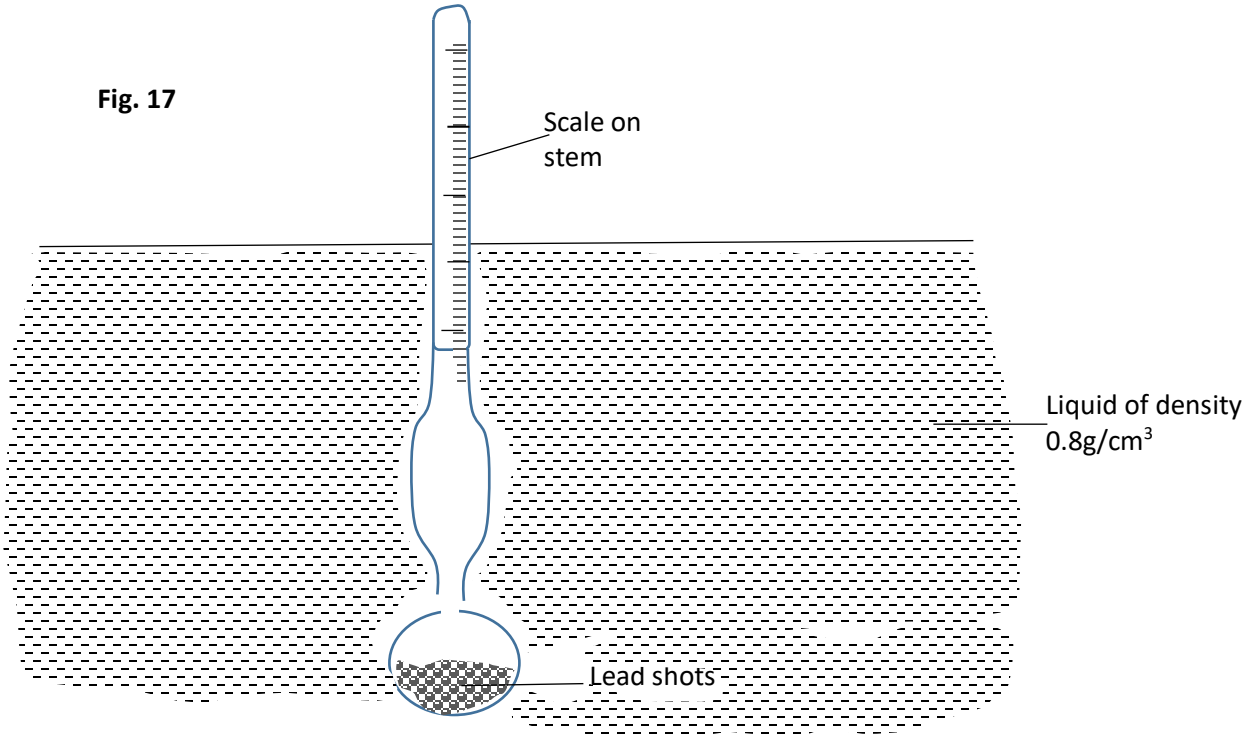
II. Calculate the initial velocity of the block and bullet after they start moving together. **(2 marks)**

III. Determine the speed of the bullet before the impact with the block. **(2 marks)**

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

(b) The densities of liquids may be measured using hydrometers. The hydrometer in the Figure 17 consists of a weighted bulb with a thin stem , and is floating to the depth shown when it is immersed in a liquid whose density is $0.8g/cm^3$.

Fig. 17



The hydrometer is then floated in two liquids whose densities are $1.0g/cm^3$ and $1.25g/cm^3$.

(i) On the diagram, mark with letters M and N the positions on the scale of the $1.25\ g/cm^3$ and $1.0g/cm^3$ respectively. **(1 mark)**

(ii) The hydrometer has a mass of 165g and the stem has a uniform cross-sectional area of $0.75\ cm^2$. Calculate;

I. the change in the submerged volume of the hydrometer when it is first placed in a liquid of density $1.00\ g/cm^3$ and then in the liquid of density $1.25\ g/cm^3$. **(3 marks)**

II. the distance on the stem between the $1.0\ g/cm^3$ and $1.25\ g/cm^3$ graduations. **(2 marks)**

(iii) State **two** ways of improving the sensitivity of the above hydrometer. **(2 marks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 1

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:

*(a) Write your **Name** and **Index Number** in the spaces provided **above**.*

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

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

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

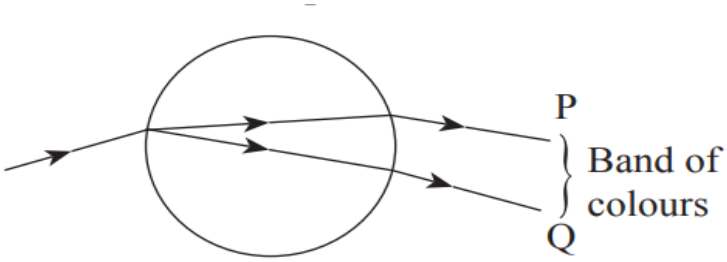
(e) All workings must be clearly shown.

FOR EXAMINER'S USE ONLY:

Section	Question	Max Score	Candidate's Score
A	1 – 12	25	
	13	11	
	14	12	
B	15	13	
	16	10	
	17	09	
Total Score		80	

SECTION A (25 MARKS)

1. Figure 1 below shows the formation of a band of colors when white light traverses a drop of water:



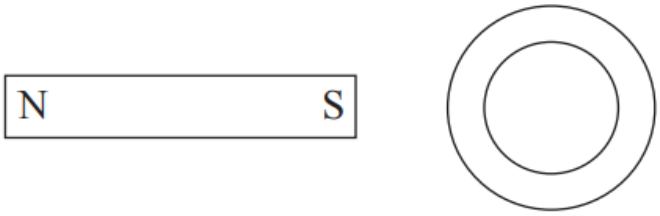
(i) Why does it split into different colors between P and Q**?** **(1 mark)**

(ii) What natural phenomenon is associated with the above**?** **(1 mark)**

2. An electric iron is rated at 1.5 KW, 240 V. Calculate the resistance of the element. **(2 marks)**

3. A model preparing for beauty contest stands 70 cm away from a concave mirror of focal length 90 cm. State two characteristics of the image observed. **(2 marks)**

4. The diagram below shows a soft iron ring lying next to the south-pole of a magnet.



(a) Complete the diagram to show the magnetic field patterns between the magnet and the ring. **(1 mark)**

(b) State a practical application of the above effect**.** **(1 mark)**

5. A boy standing in front of a high wall claps his hands once and hears an echo after 0.64 seconds. If he moves 20 m farther away from the wall and claps again, he hears the echo after 0.76 seconds. Calculate the speed of sound**.** **(3 marks)**

6. The table shows part of the electromagnetic spectrum.

Gamma	X-rays	UV	Visible Light	Infra red	Radio waves

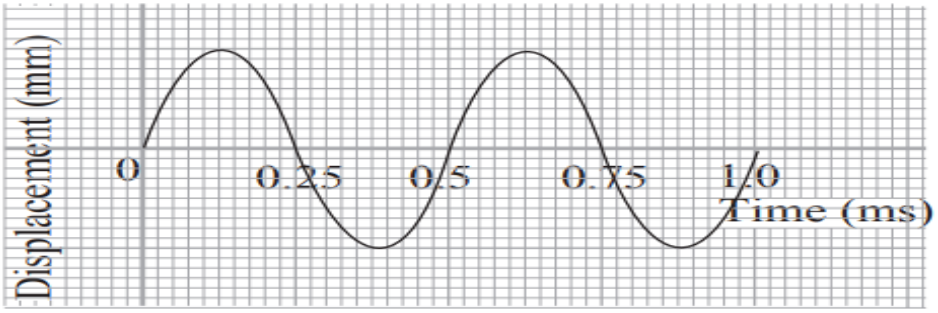
(a) What happens to photo energy as one moves across the spectrum from gamma to radio waves? **(1 mark)**

(b) What part of the electromagnetic spectrum does a TV remote control gadget make use of? **(1 mk)**

7.Explain why sound from a distance source is heard more clearly at night than during the day. **(2 mk)**

8. Explain why the resistance of a metal conductor increases with increase in temperature.**(1 mark)**

9. Figure 4 below shows a graph of displacement against time for a particular point in a wave.



(a) From the graph, determine the frequency of the wave**.** **(3 marks)**

10. Using a ray diagram, illustrate the use of a lens as a magnifying glass. **(3 marks)**

11. State ONE advantage of the lead-acid accumulator over the dry cell**.** **(1 mark)**

12. State the two functions of the earth-pin on the three-pin plug**.** **(2 marks)**

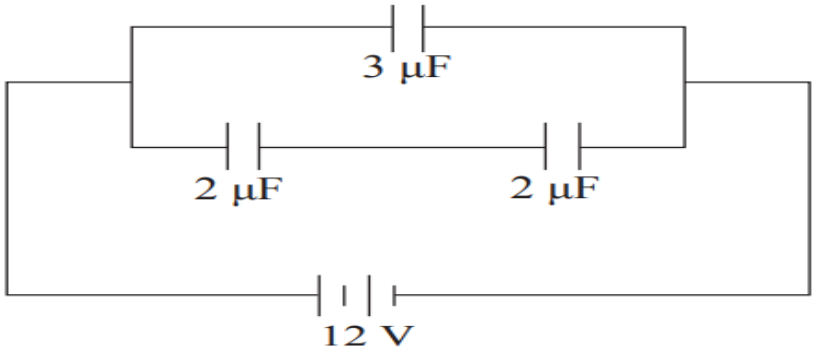
SECTION B (55 MARKS)

Answer ALL the questions in this section in the spaces provided

13. (a) Define the term capacitance of a capacitor**.** **(1 mark)**

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

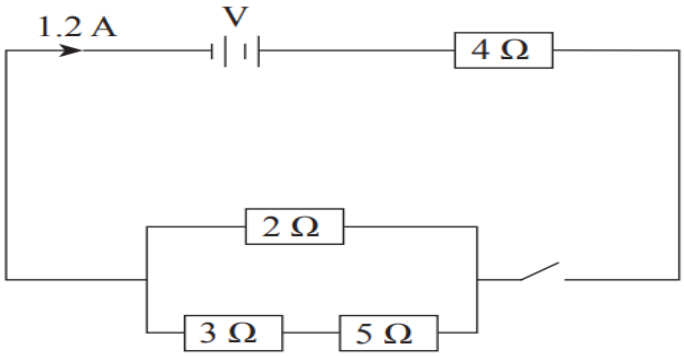
(c) Figure 5 below shows an arrangement of capacitors connected to a 12 V D.C. supply



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

(ii) Calculate the charge through the 3 μF capacitor**.** **(2marks)**

(d) The following figure shows an electrical circuit with a network of resistors connected to a battery



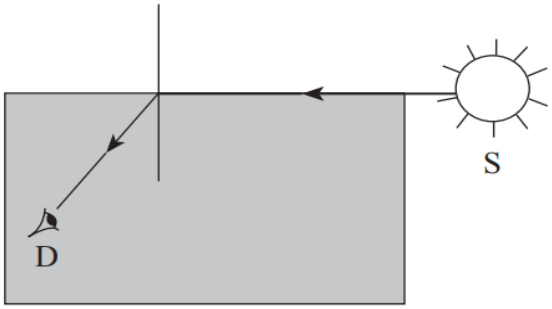
A current of 1.2 A flows through the 4 Ω resistor when the switch is closed. Determine:

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

ii) the voltmeter reading**.** **(2 marks)**

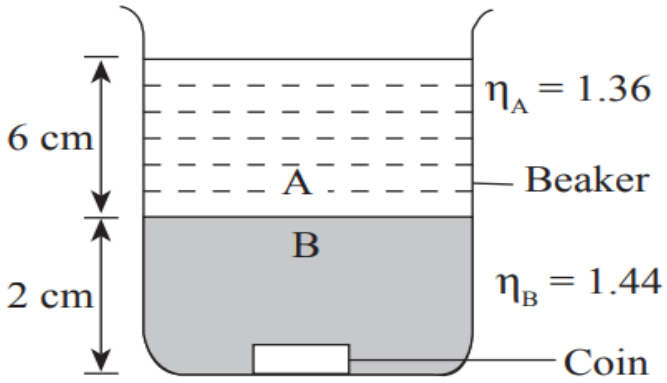
14. (a) State two conditions necessary for total internal reflection to occur. **(2 marks)**

(b) The figure shows a diver positioned at point D below the water surface, and a setting sun S.



In what direction above the horizontal surface of the water will the diver see the setting sun? (Refractive index of water = 1.33). **(3 marks)**

(c) A coin is placed at the bottom of a beaker containing two immiscible liquids A and B of refractive indices ηA = 1.36 and ηB = 1.44 respectively as in the diagram below.



Calculate the apparent depth of the coin as seen by an observer from the top. **(4 marks)**

(d) A tree of height 7.5 m is focused on the screen of pinhole camera made using a box of length 15 cm. If the height of the image is 10 cm, determine the distance of the tree from the camera. **(3 mks)**

15. (a) State ONE way of minimizing power loss during transmission. **(1 mark)**

(b) A step-down transformer with turns ratio 12:1 and efficie ncy 95% has 2 000 turns in the primary coil. When the primary circuit is connected to a 240 V a.c. source, the power delivered to a load is found to be 500 W.

Determine:

(i) the number of turns in the secondary coil. **(2 marks)**

(ii) the input power. **(2 marks)**

(iii) The secondary voltage. **(2 marks)**

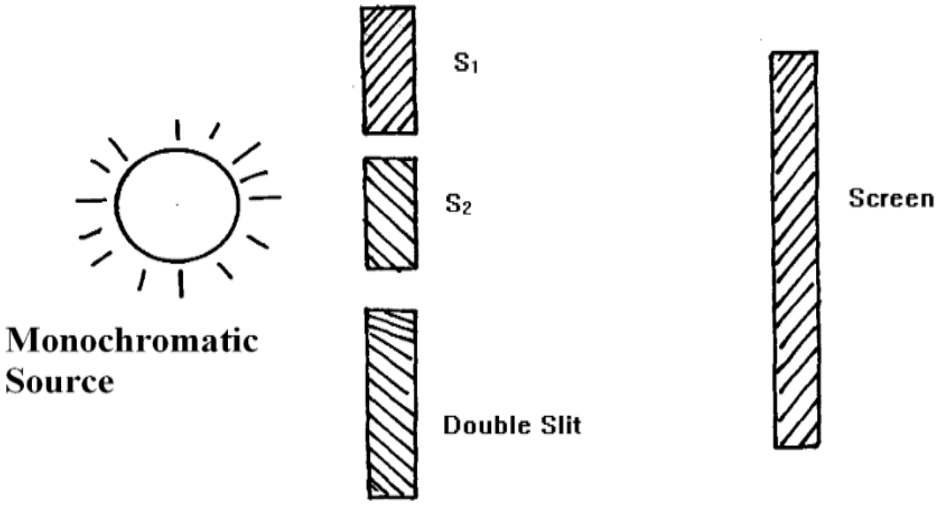
(iv) the secondary current. **(2 marks)**

(b) A consumer uses the following electrical appliances daily: four 60 W bulbs working for 3½ hours, two 75 W bulbs working for 3 hours 45 minutes, an electric blender rated 500 W working for 15 minutes, and a television set rated 100 W working for 12 hours.

(i) Calculate the total number of units consumed in a day. **(2 marks)**

(iii) If the appliances are used for 30days, determine the total cost if the cost per unit is 4.80 cents. **(2 marks)**

16. (a) In an experiment to observe interference of light waves a double slit is placed close to the source. See figure 7



(i) State the function of the double slit **(1mark)**

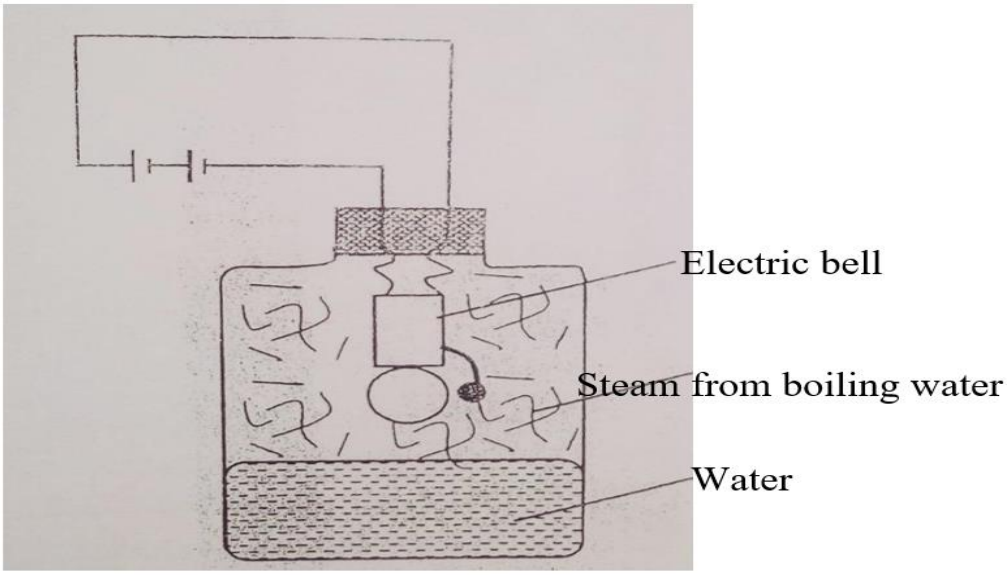
(ii) Describe what is observed on the screen **(2 marks)**

(iii) State what is observed on the screen when

I). The slit separation S1 S2 is reduced **(1mark)**

II) White light source is used in place of monochromatic source **(1mark)**

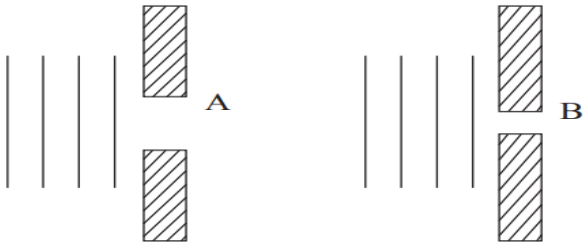
b) Figure 8 below shows a set up made by a Form 2 student to study an aspect of a wave.



(i) State what happens to the sound from the bell as the bottle and its contents are cooled to 0°C **(1 mark)**

Explain the observation in (i) above **(2 marks)**

c) Water waves of same wavelength are incident on different apertures A and B as shown below.



Complete the diagrams to show the pattern of the waves beyond the apertures in each case.**(2 mks)**

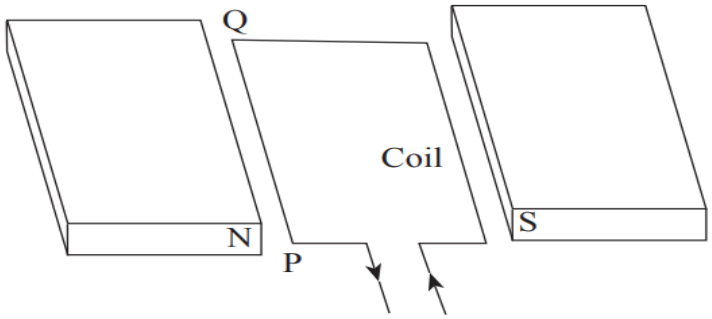
17. You are provided with the following apparatus: connecting wires, a soft iron rod, a battery of 3 cells, a switch, a long insulated copper wire and a rheostat.

(a) Using a suitable diagram, show how an electromagnet can be made with the given apparatus. **(3 marks)**

(b) State two ways by which the strength of an electromagnet can be increased **(2 marks)**

(c) (i) State Flemings left hand **rule** **(1 mark)**

(ii) The figure below shows current flowing in coil placed in a magnetic field.



(I) Show on the diagram the direction of the force acting on the coil labelled P and Q. **(1 mark)**

(II) State two ways of increasing the force on the coil**.** **(2 marks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 2

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

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FOR EXAMINER USE ONLY

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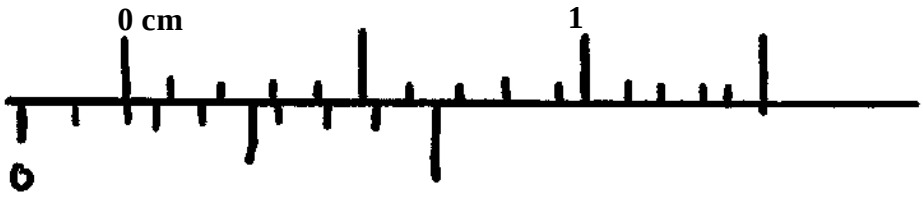
SECTION A: (25 MARKS)

Answer all questions in this section.

1. A partially inflated balloon at sea level becomes fully inflated at higher altitudes. Explain this observation **(2mks)**

2. Xcm^3 of substance A of density 800kgm^{-3} is mixed with 100cm3 of water of density 1000kgm^{-3}. The Density of the mixture is 960kgm^{-3}. Determine the value of **x.** **(3mks)**

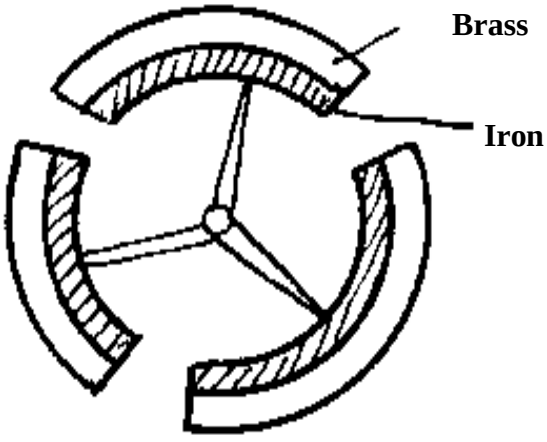
3.The figure below shows part of a vernier caliper when the jaws are closed without an object between the jaws



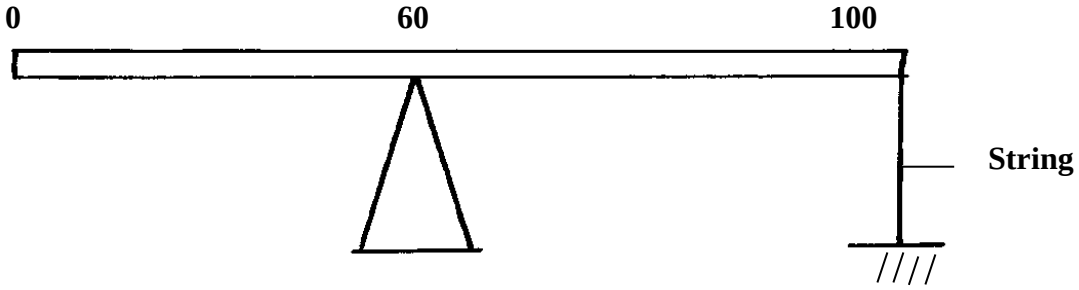
(a) What is the value of the zero error of the callipers? **(1mk)**

(b) A student used the same vernier calipers in (a) above to measure the diameter of a test tube whose actual diameter is 2.15cm. what was the reading shown by the calipers. **(1mk)**

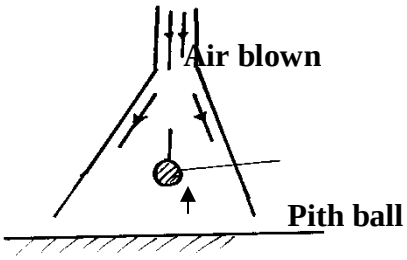
4.The figure below shows a bimetallic wheel whose diameter is not affected by changes in temperature. Briefly explain how the diameter of the wheel remain unchanged as the temperature increases **(3mks)**



5.A uniform meter rule of mass 40g is pivoted at the 60cm mark and held horizontally with a vertical String shown below. Determine the tension in the string. **(3mks)**



6.The figure below shows a pith ball being lifted into the funnel by blowing air into the funnel



Explain this observation **(2mks)**

7.Explain why a hole in a ship near the bottom is more dangerous than the one near the top**(1mk)**

8.A bullet of mass log travelling at a speed of 400ms-1 hits a tree trunk, it penetrates the tree trunk and stops inside the trunk after 4 cm.

(a) Calculate the average resistance force offered by the trunk to the bullet. **(3mks)**

(b) State the energy changes that takes place. **(1mk)**

9.State the effect on motion of smoke particles when the temperature inside the smoke cell is lowered. **(1mk)**

10.(a) Explain the washing effect of soap. **(1mk)**

(b)State one way of making surface tension of water stronger. **(1mk)**

SECTION B (55 MKS)

Answer all questions in this section

11.(a) A modern car has a strengthened passenger cage but with front and back regions which can collapse in a crash. Explain how this collapsible regions should reduce injury in a car crash. **(3mk)**

(b) An object of mass 150kg moving at 20m/s collides with a stationery object of mass 90kg. They couple after collision. Determine;

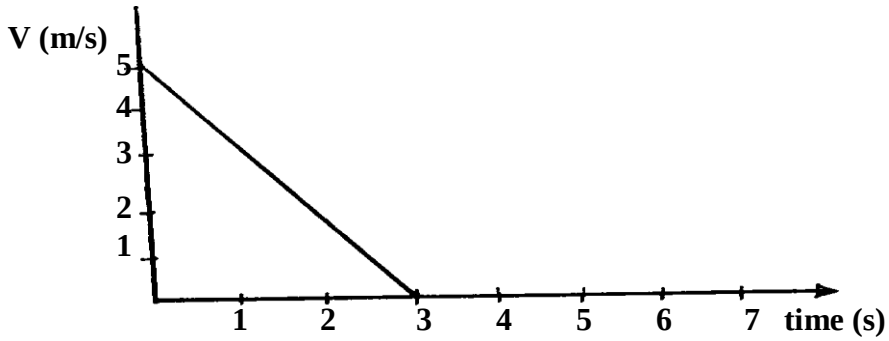
(i) The total momentum before collision **(2mks)**

(ii) Total momentum after collision **(1mk)**

(iii) Their common velocity after collision **(2mks)**

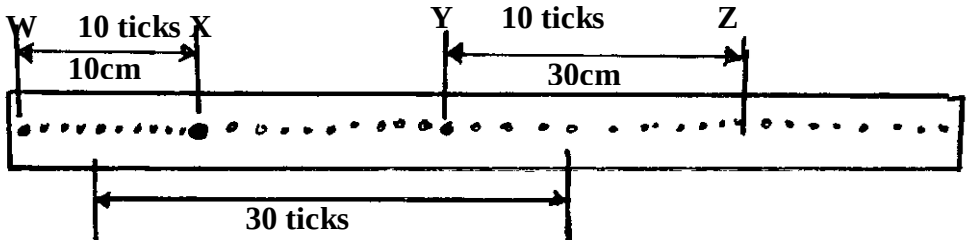
12.(a) Distinguish between velocity and speed. **(1mk)**

(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 **(3mks)**

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



Calculate;

(i) The average velocity of the trolley between points

1. WX **(2mks)**

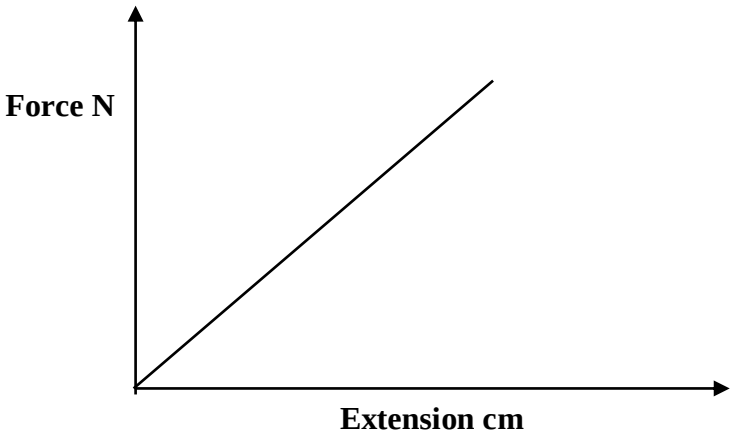
2. YZ **(2mks)**

(ii) Find the acceleration of the trolley. **(2mks)**

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

(b) The figure below shows the variation force with extension for a steel coil spring.

(i) On the same axes, sketch the variation of force with extension for a wire form which the spring is made. **(1mk)**



Explain the difference between the two lines drawn **(2mks)**

(c) A stone of mass 5g is released from a catapult. The catapult is stretched by 10cm. If the constant of elasticity is 100N/cm. **Calculate;**

(i) The horizontal velocity with which the stone is released **(3mks)**

(ii) Sketch a graph of horizontal velocity against time from the time the stone is released to when it reaches the ground. **(1mk)**

(d) The following results were obtained in a experiment to verify Hooke's law when a spring was extended by hanging various loads on it.

Load (N)	0.00	1.00	2.00	3.00	4.00	5.00	6.00
Length of spring in cm	10.00	11.50	13.00	14.50	16.00	18.00	24.00
Extension	0.00						

(I) Complete the table for the extension e above. **(1mk)**

(II) Plot a graph of load (y-axis) against extension **(3mks)**

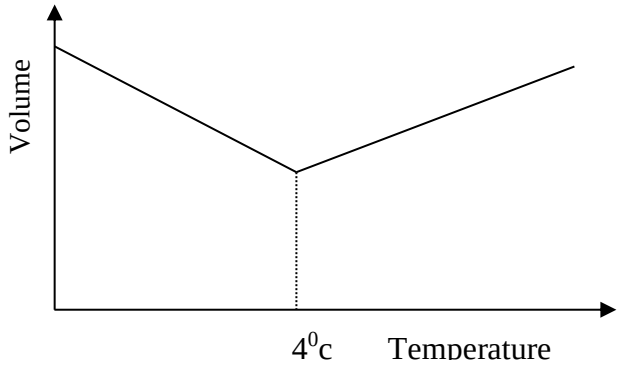
(III) From the graph determine the springs constant. **(2mks)**

(IV) Calculate the energy stored when the spring is stretched to 16 cm. **(3mks)**

14. (a) State **two** advantages of mercury over alcohol as a thermometric liquid. **(2 mks)**

(b) When making the fixed points on a thermometer it is observed that at 0^0c the mercury thread is of length 2 cm and 8 cm at 100^0c. What temperature correspond to a length of 6 cm. **(3 mks)**

(c) (i) The figure below shows how volume of a given mass of water varies with temperature.

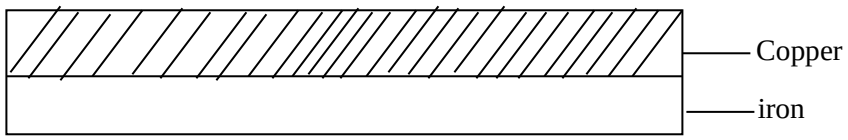


On the graph provided, sketch a graph of density against Temperature.



(ii) Sate and explain **one** effect of the anomalous expansion of water. **(2 mks)**

(d) The figure below shows a bimetallic strip made of copper and iron at room temperature.



If copper expands more than iron. Identify **A** and **B** if the bimetallic strip is placed in a refrigerator whose temperature is -70^0c. **(1 mk)**

15. The figure below shows a system used to draw water from a well. An effort is applied on the handle which turns on a radius of 70 cm. As the handle turns a rope is wound on the drum of diameter 28 cm, thus raising a bucket of water from a well.

(a) If an effort of 10N is needed to lift a bucket full of water of mass 4 kg.

Calculate:

i) The energy gained by the water and bucket when the drum turns through one revolution. **(3 mks)**

ii) The work done by the effort during this one revolution. **(3 mks)**

(b) Calculate the **velocity ratio** of the system. **(1 mk)**

(c) Calculate the **efficiency** of the system. **(3 mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 2

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS

1. This paper consists of **two** sections, Section **A** and **B.** Answer **ALL** the questions in both sections in the spaces provided in this paper.
2. **ALL** working must be clearly shown.
3. KNEC mathematical tables and non-programmable silent electronic calculators **may be** used.

Note: Take acceleration due to gravity g = 10m/s²

FOR EXAMINER'S USE:

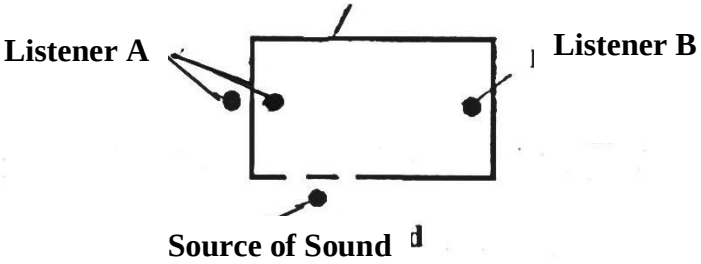
SECTION	QUESTION	MAXIMUM SCORE	STUDENTS SCORE
A	1-12	25	
B	13	12	
	14	11	
	15	13	
	16	08	
	17	11	
	TOTAL	80	

SECTION A (25 MARKS)

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

1. State any **one** condition under which a pinhole camera may form an image on its screen which has the same size as the object. **(1 mark)**

2. The source of sound and two listeners are positioned close to a tall building as shown in the figure below.

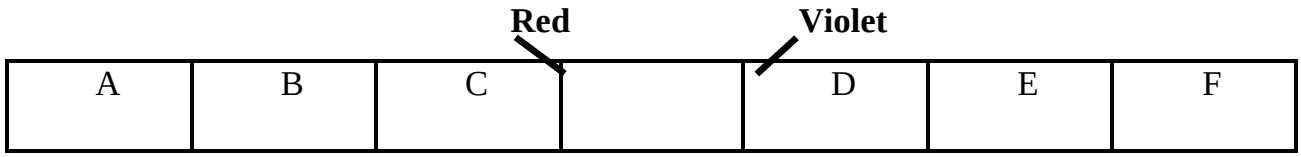


i) State the property of sound by which Listener A is able to hear the sound produced. **(1 mark)**

ii) Listener **B** is moving directly towards Listener **A** and has a problem hearing the sound produced. Explain. **(2 marks)**

3. Give **two** differences between a transformer and induction coil. **(2 marks)**

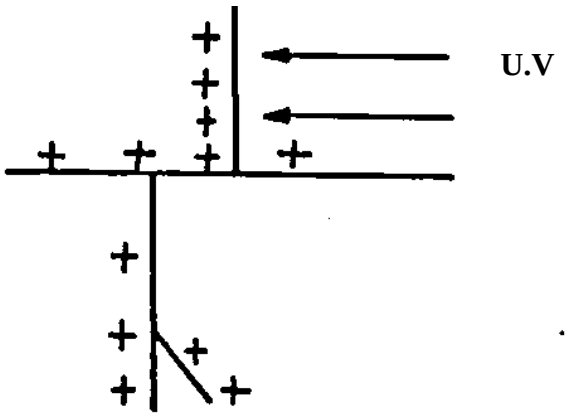
4. The figure below shows some region of part of the electromagnetic spectrum.



i) Name the region that is detected by a blackened bulb thermometer. **(1 mark)**

ii) State **one** use of the E-M wave in the region labelled **B.** **(1 mark)**

5. The figure below shows ultraviolet light striking a clean Zinc plate on a positively charged leaf electroscope.



Explain the following observations:

i) The leaf does not fall. **(1 mark)**

ii) When the same experiment is carried with a negatively charged electroscope, the leaf falls. **(1 mark)**

6. 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. **(2 marks)**

7. The ammeter in the circuit in figure 3 has negligible internal resistance. The cell has an internal resistance of 0.5Ω and an electromotive force of 3.0V.

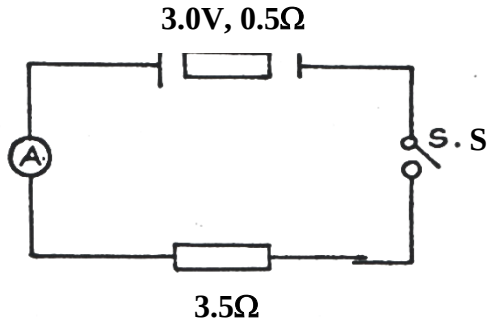


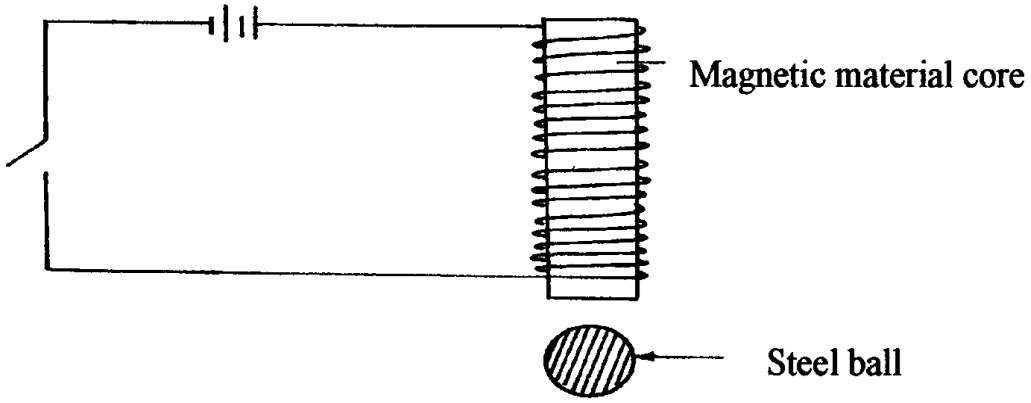
Figure 3

Determine the value of current the ammeter registers when switch S is closed. **(2 marks)**

8. An electric heater is rated 3 kW. Find the electrical energy in kWh(kilo watt- hours) consumed by the heater when used on a 240V supply for 180 minutes. **(2 marks)**

9. 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 sea bed**.** **(2 marks)**

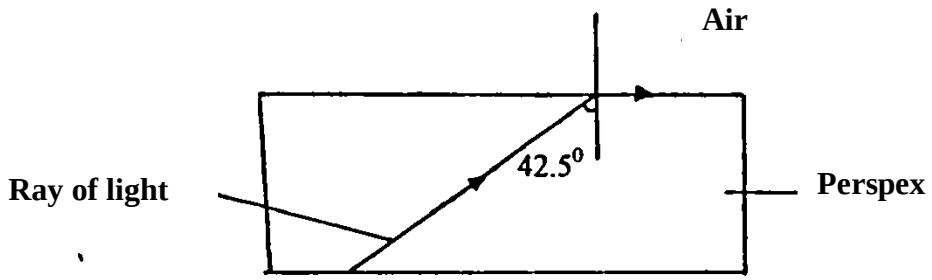
10. The set up in figure 4 below can be used in a laboratory for lifting and releasing a steel ball.



i) State the material which is suitable for use in the core. **(1mark)**

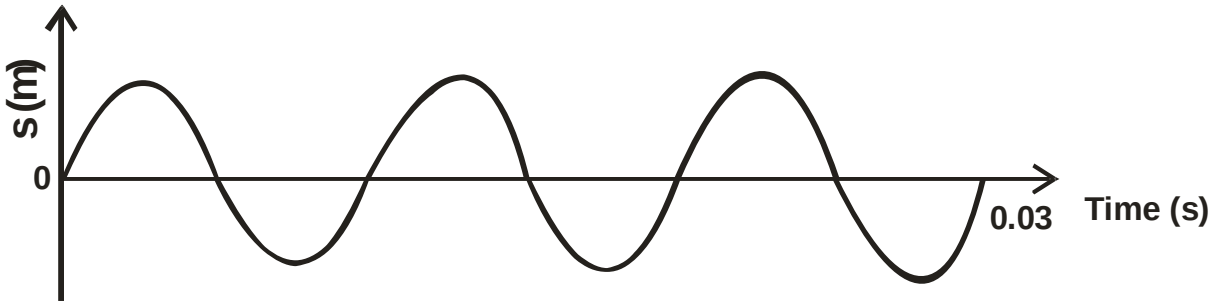
iii) If a slightly larger ball is to be lifted, it is necessary to make an electromagnet stronger. Name **two** ways of increasing the strength of the magnet. **(2 marks)**

11. The figure 5 below shows the path of a ray of light passing through a rectangular block of Perspex placed in air.



Calculate the refractive index of Perspex. **(2 marks)**

12. The sketch shown below is a displacement-time graph of a wave traveling at $320ms^{-1}$



Find the wavelength of the wave. **(2 marks)**

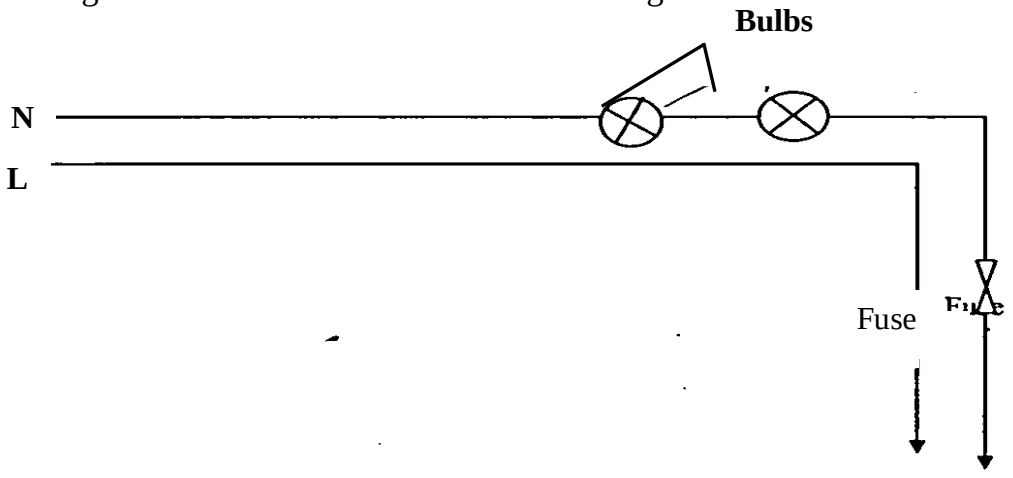
SECTION B (55 MARKS)

Answer ALL the questions

13. a) The mains electricity is transmitted through high tension voltage (H.T).

State **one** danger of this transmission. **(1 mark)**

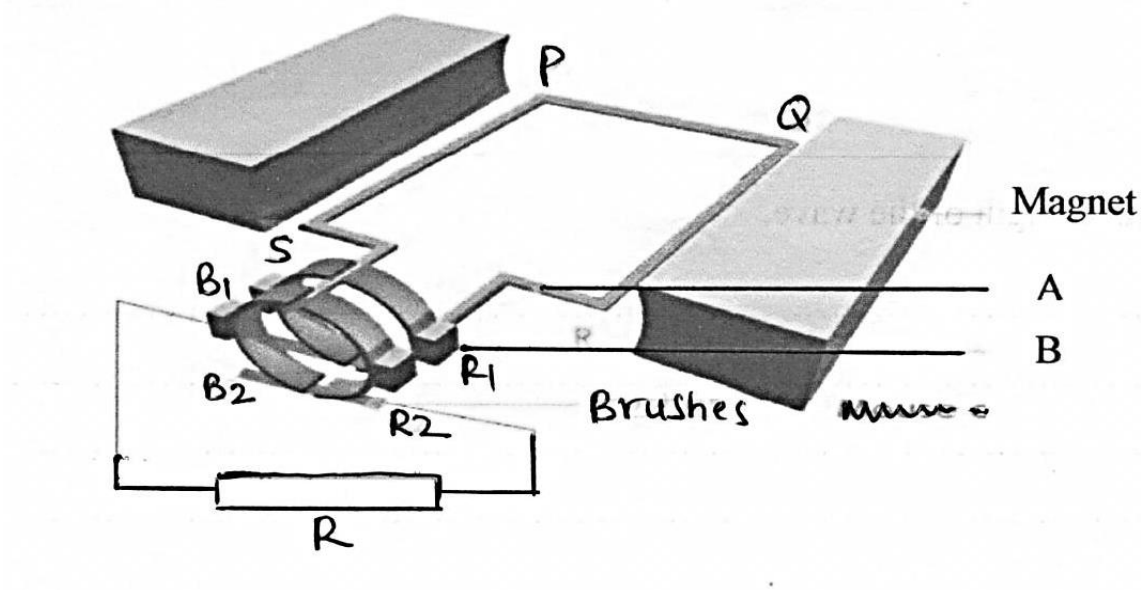
b) The figure shows a section of a domestic wiring.



i) Identify **two** serious mistakes in the circuit. **(2 marks)**

ii) Explain why the circuits in domestic wiring should be connected in parallel with the main supply. **(2 marks)**

c) Study the figure shown below

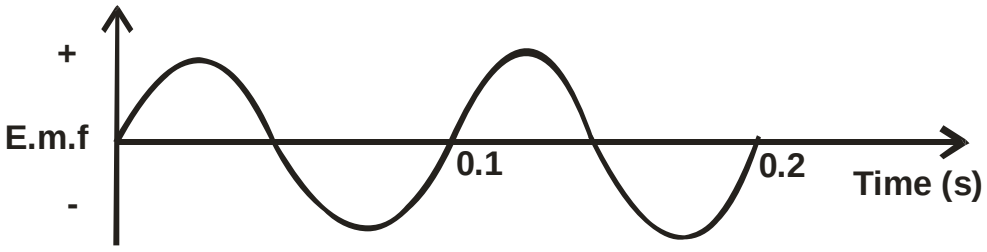


i) State the name of the machine shown in figure above. **(1 mark)**

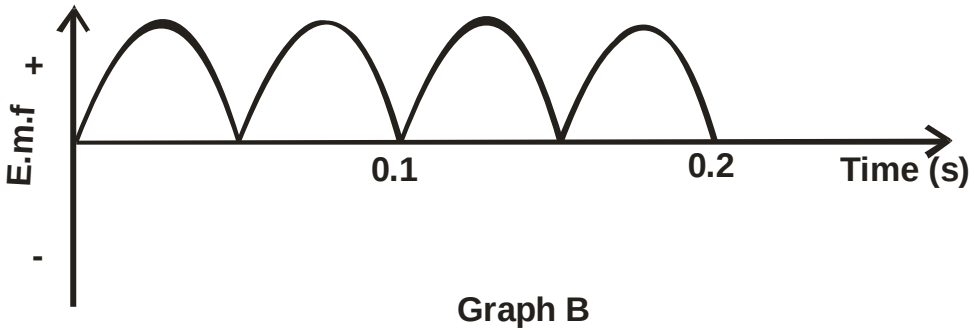
ii) What are the names of the parts labelled A and B? **(2 marks)**

What would be the effect of doubling the number of turns of the coil if the speed of rotation remained unchanged? **(1 mark)**

d) The voltage-time signals obtained is as shown in the diagram below in graph A



Graph A

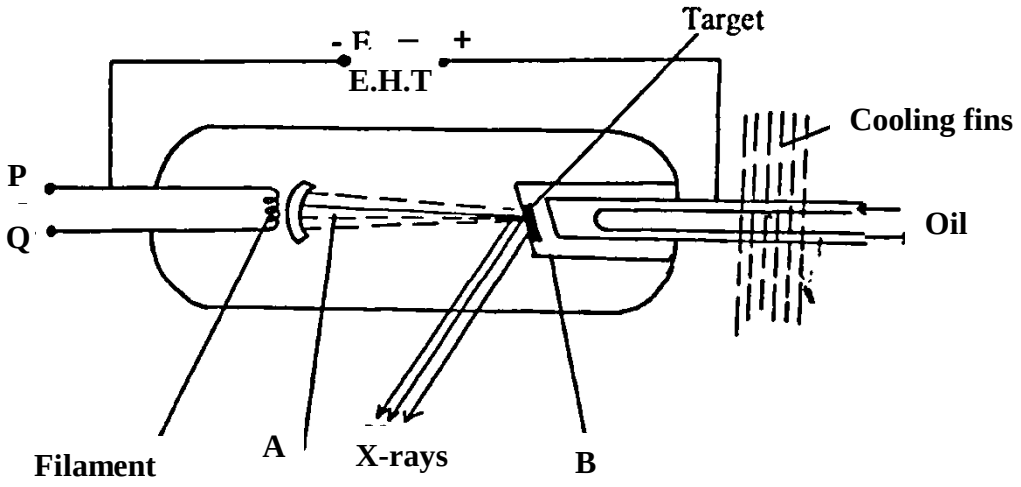


Graph B

i) Find the frequency of the alternating E.m.f shown by graph A. **(2 marks)**

ii) What alterations have been made to the machine in c) above to produce the emf represented by graph B? **(1 mark)**

5. The figure below shows the features of an X- ray tube tube



6. a) Name the parts labelled A and B. **(1 mark)**

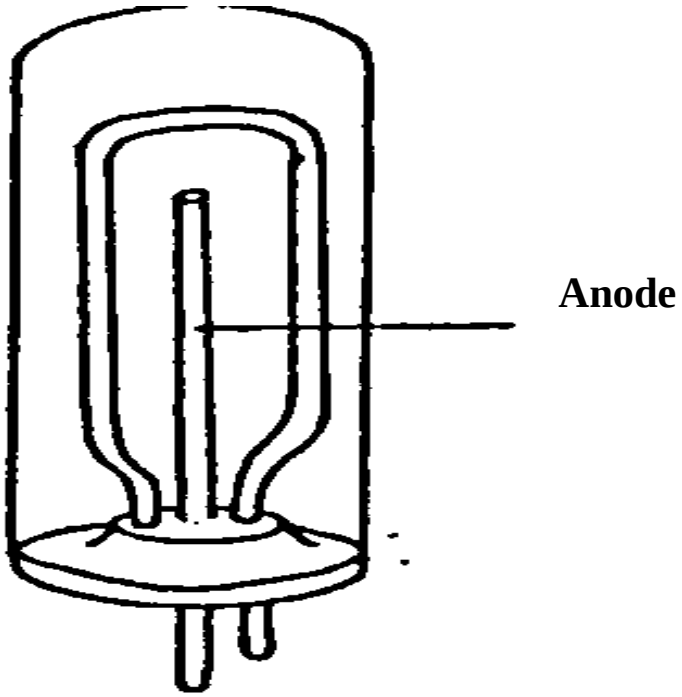
b) Explain how a change in the potential across PQ changes the intensity of the X-rays produced in the tube. **(2 marks)**

c) What property of lead makes it suitable for use as shielding material? **(1 mark)**

d) In an X-ray tube operating at 100kV,the tube current is 20mA. Determine the number of electrons hitting the target every second. **(2 marks)**

(Charge of an electron = 1.6×10^{-19}C)

The figure below shows a cell. Use it to answer questions that follow:



i) Name the type of cell. **(1 mark)**

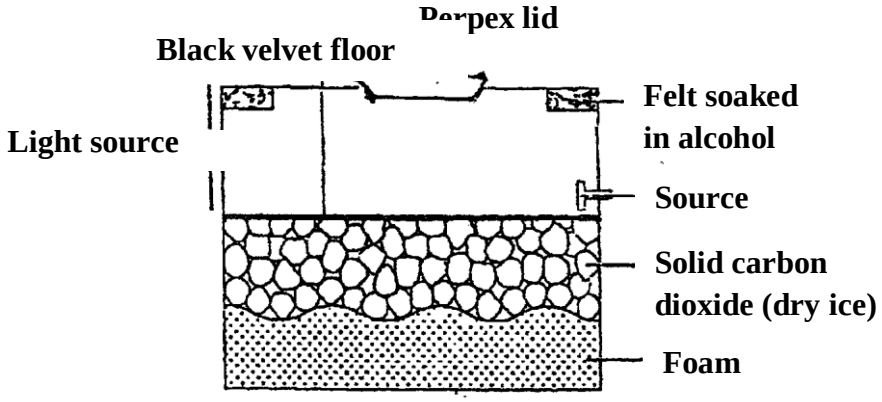
ii) Label the cathode. **(1 mark)**

iii) The maximum kinetic energy of the photo-electrons emitted from a metal surface is 9.95×10^{-20}J. If the threshold frequency of light required to cause photo-electric emission with this metal is 5×10^{14} Hz. Calculate the frequency of the incident radiation. (Plank's constant = 6.63×10^{-34} JS) **(3 marks)**

7. a) i) Explain why carbon -14 ($^{14}_{6}C$) is radioactive while carbon ($^{12}_{6}C$) is not**.** **(1 mark)**

ii) A radioactive isotope showed a count rate of 82 counts per second initially. After a time of 210 seconds, the count rate dropped by 19 counts per second. The average background count remained constant at 10 counts per second. What is the half-life of the material**?(2 mks)**

b) The figure below shows features of a diffusion cloud chamber used for detecting radiations from a radioactive source.



Explain how the chamber works when a radioactive particle is introduced at the source.(**2 marks)**

c) i) What is the purpose of solid carbon (IV) oxide. **(1 mark)**

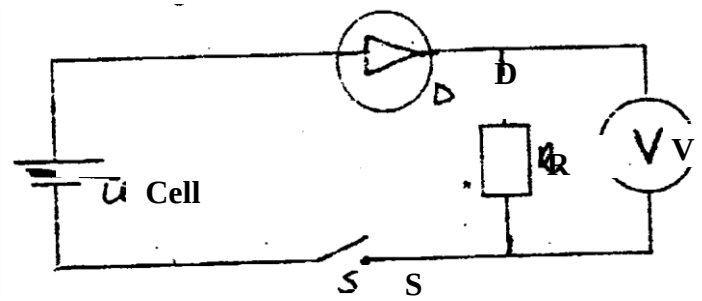
ii) State **one** advantage of the cloud chamber over a G.M tube as a detector of radioactive radiations. **(1 mark)**

d) P-type and n-type semiconductors are made from a pure semiconductor by a process known as "doping".

i) State what is meant by doping. **(1 mark)**

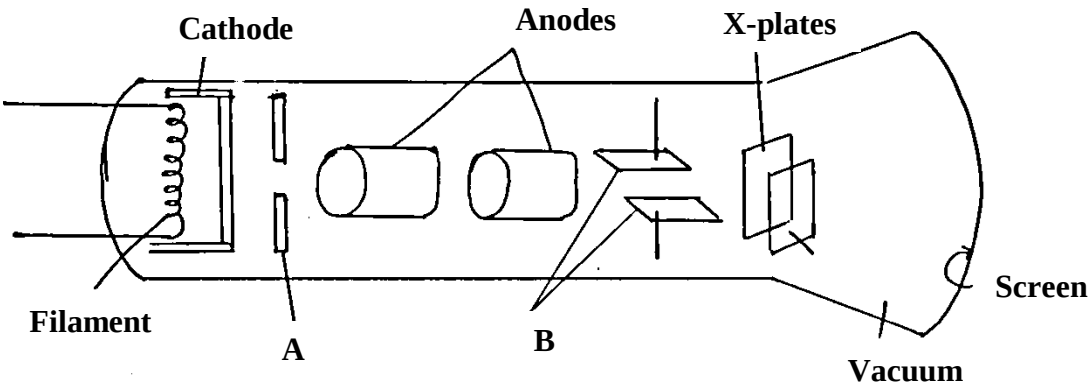
ii) Explain how the doping produces an n-type semi-conductor. **(2 marks)**

e) In the circuit in the figure below, when the switch S is closed, the voltmeter shows a reading.



When the cell terminals are reversed and the switch is closed, the voltmeter reading is zero. Explain these observations. **(2 mrks)**

8. a) The figure below shows the features of a cathode ray oscilloscope;-

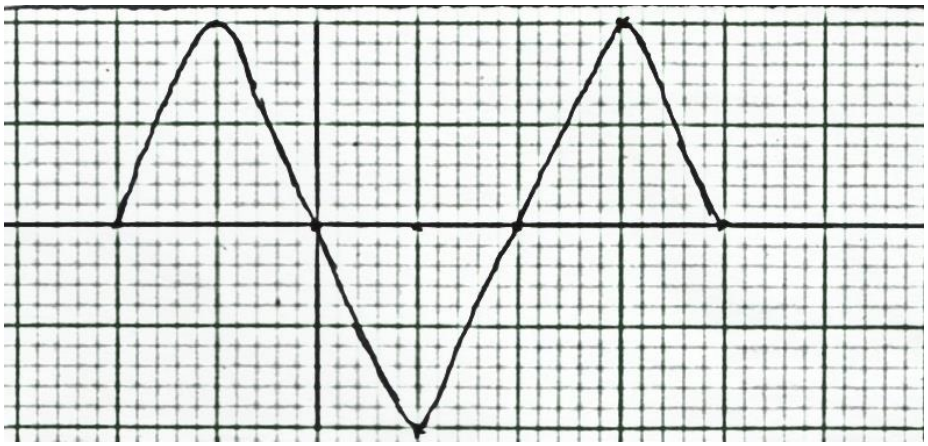


i) Name the parts A and B. State the role played by each of the parts A and B. **(2 marks)**

ii) Explain how electrons are produced. **(2 marks)**

iii) State the factors considered when choosing the material for the cathode. **(1 mark)**

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/division.



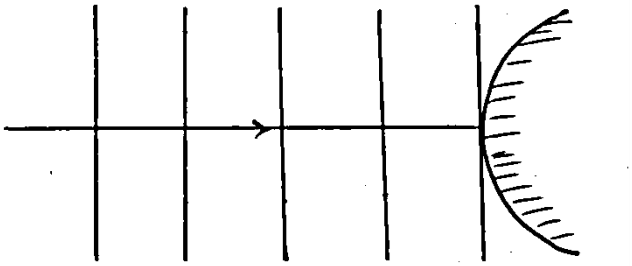
Determine:

i) The frequency of the a.c signal. **(2 marks)**

ii) The peak voltage of the input signal. **(2 marks)**

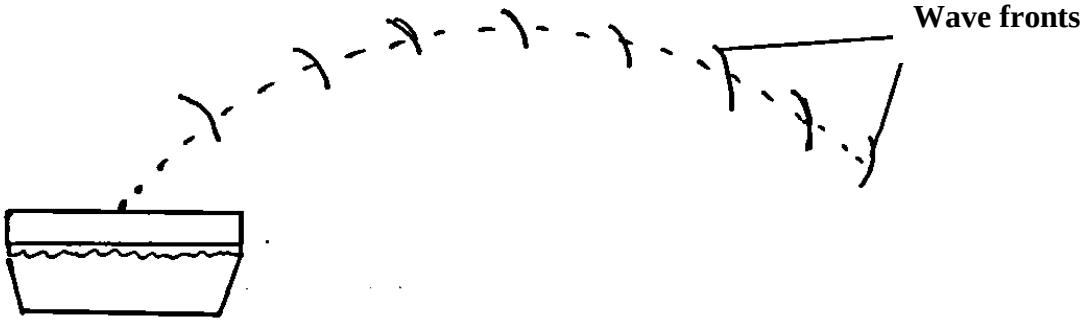
9. a) The figure below shows straight wavefronts incident on convex reflector.

Complete the diagram to show the reflected wavefronts. **(1 mark)**



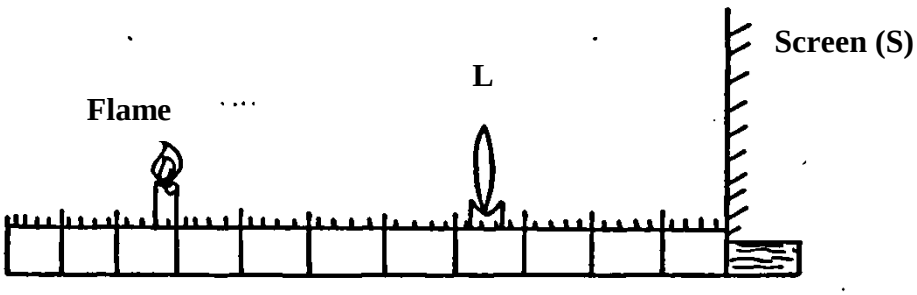
b)Narrow slits cannot be used to demonstrate interference of sound waves. Explain. **(1 mark)**

c) The figure below shows sound waves emitted by a drum struck.



Explain why the wave fronts are directed to the ground. **(2 marks)**

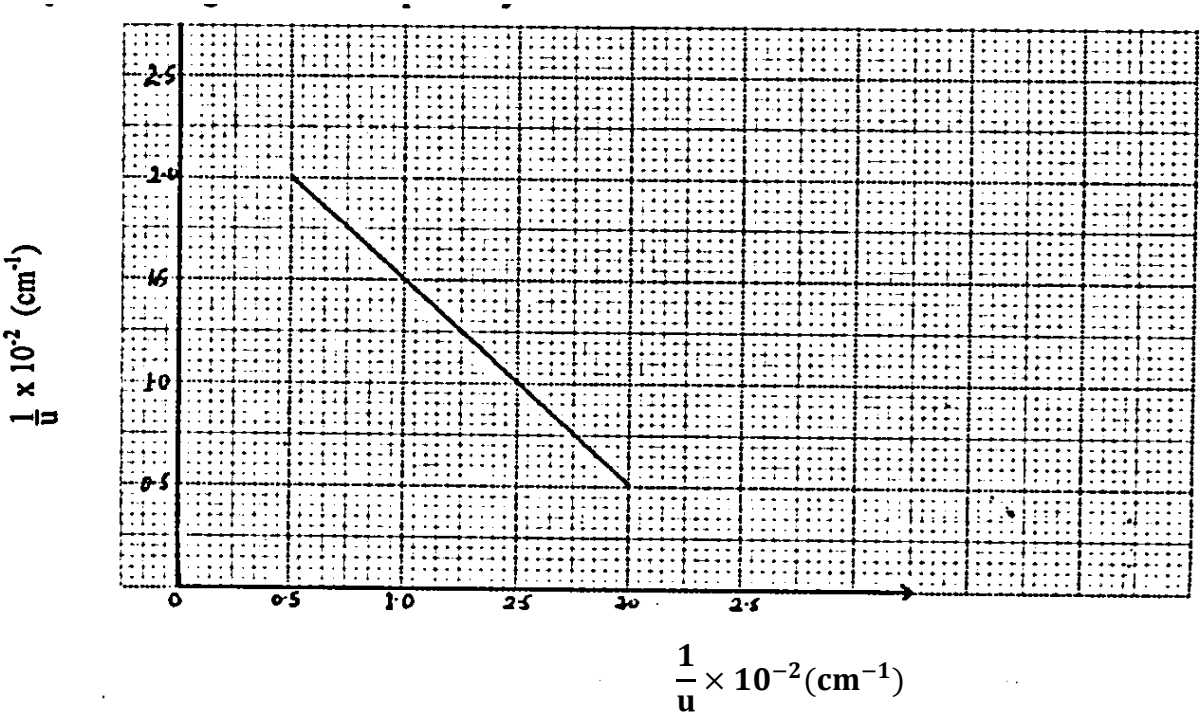
d) Figure below shows an experimental set up consisting of a mounted lens, I, A screens, a metre rule and a candle



i)Describe how the set up may be used to determine the focal length f, of the lens.**(3 marks)**

ii) State why the set up would not work if the lens were replaced with a diverging lens.**(1 mark)**

e) The graph figure below shows the relationship between $\frac{1}{u}$ and $\frac{1}{v}$ for a converging lens where u and v are the object and image distances respectively.



From the graph, determine the focal length, f of the lens. **(3 marks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 3

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

a) *Write your* ***name, admission number*** *and* ***class*** *in the spaces provided above.*
b) Sign and write the date *of examination in the spaces provided above.*
c) *This paper consists of* ***TWO*** *sections:* ***A*** *and* ***B****.*
d) *Answer* ***ALL*** *the questions in sections* ***A*** *and* ***B*** *in the spaces provided.*
e) ***ALL*** *working* ***MUST*** *be clearly shown.*
f) *Non-programmable silent electronic calculators and KNEC mathematical tables may be used.*

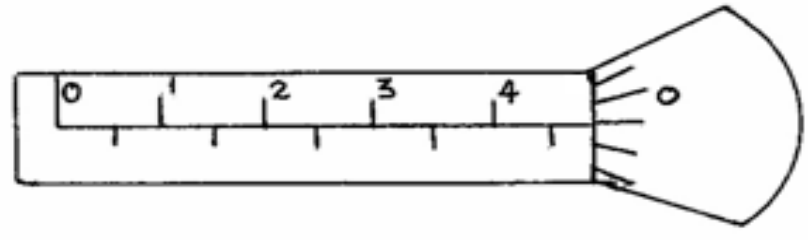
FOR EXAMINER'S USE ONLY

Section	Question	Maximum Score	Candidate's Score
A	1 – 8	25	
B	9	09	
	10	12	
	11	10	
	12	10	
	13	07	
	14	07	
	Total Score	80	

SECTION A (25 MARKS)

Answer all questions in this section in the spaces provided:

1. The diagram **below** shows a micrometer screw gauge used by a student to measure the thickness of a wire. If it has a zero error of 0.06mm, what is the actual thickness of the wire? **(2mks)**

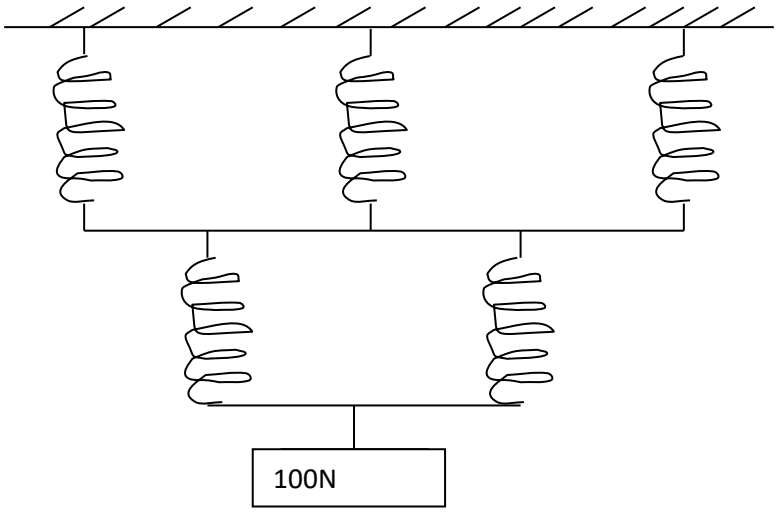


2. (a). State two differences between heat transfer by convection and radiation **(2mks)**

(b). Give a reason why a thick glass bottle cracks when boiling hot water is suddenly poured inside it **(1mk)**

3. An aircraft 300m from the ground, travelling horizontally at 400 m/s releases a parcel. Calculate the horizontal distance covered by the parcel from the point of release. (Ignore air resistance) **(2mks)**

4. **A** single spring stretches by 2.0 cm when supporting a load of 50N. If in the system below the springs are identical and have negligible weight;



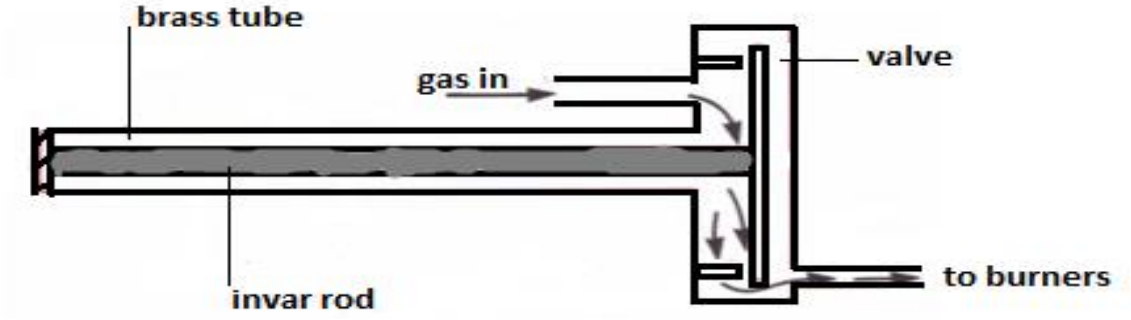
Find:

a) The total extension of the system. **(2mks)**

b)The total spring constant. **(2mks)**

5. (a) The distance between the ice point and steam point on a liquid in glass thermometer is 30cm. what temperature is recorded when the mercury thread is 12cm above the ice point? **(2mks)**

b) The diagram below shows a gas cooker thermostat



Briefly explain how the thermostat works **(3mks)**

6. The figure below shows a uniform plank AB of length 10m weighing 500N. Two masses measuring 25kg and 60kg are loaded on its ends.



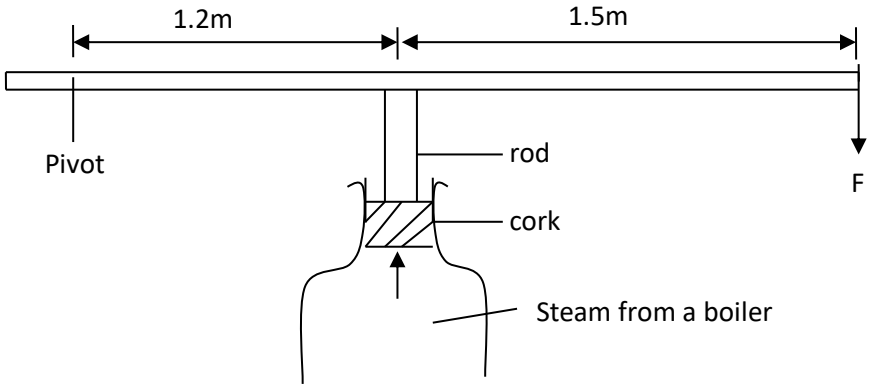
Determine the distance from point A where a support should be placed for the plank to balance horizontally. **(3mks)**

7. In an experiment to determine the thickness of an oil molecule, an oil drop of volume 3.60 x 10^{-6} m^3 was observed to form a circular patch of diameter 0.016m on the surface of water covered with lycopodium powder

i). Explain why the oil drop forms a circular patch. **(1mks)**

ii) Determine the thickness of the oil molecule **(2mks)**

8. A cork enclosing steam in a boiler is held down by the system shown.



If the area of the cork is 15 cm^2 and a force (F) of 500N is needed to keep the cork in place, determine the pressure of the steam in the boiler. **(3mks)**

SECTION B

Answer all questions in this section in the spaces provided:

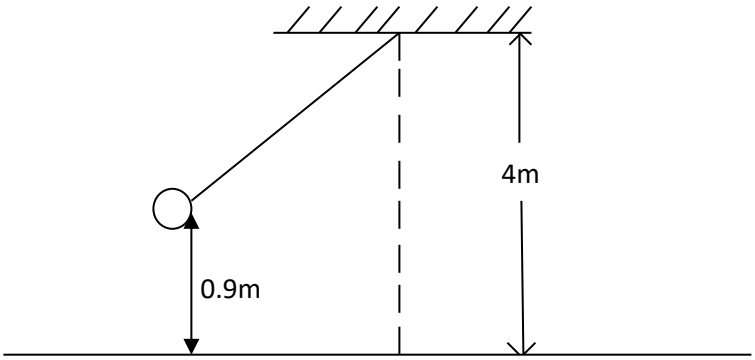
9. (a) An electric crane lifts a load of 2000kg through a vertical distance of 3.0m in 6s. Determine:

i) Work done **(1mk)**

ii) Power developed by the crane **(2mks)**

iii) Efficiency of the crane if it is operated by an electric motor rated 12.5 Kw **(2mks)**

b) A bob of mass 20kg is suspended using a string of 4m from a support and swings through a vertical height of 0.9m as shown below:

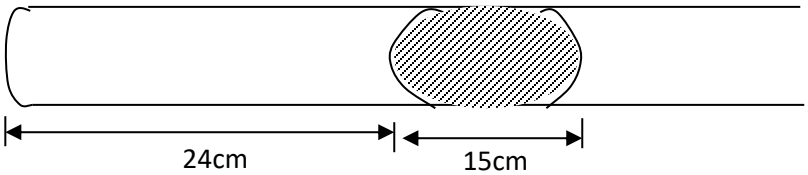


Determine:

i) The potential energy of the body at its position. **(2mks)**

ii) Speed of the body when passing through the lowest point. **(2mks)**

10. (a) A glass capillary contains enclosed air by a thread of mercury 15cm long when the tube is horizontal, the length of the enclosed air column 24cm as shown.



i) What is the length of the enclosed air column when the tube is vertical with the open end uppermost if the atmosphere pressure is 750mmHg? **(2mks)**

ii) Explain why the mercury does not run out when the tube is vertical with the closed end uppermost. **(1mk)**

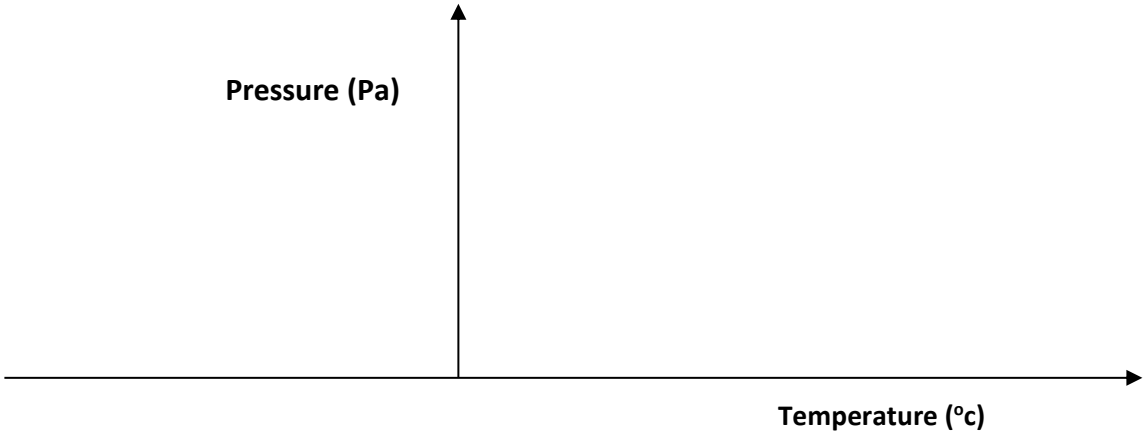
b) Explain why an air bubble increase in volume as it rises from the bottom of a lake to the surface. **(1mk)**

c) When an inflated balloon is placed in a refrigerator it is noted that its volume reduces, use the kinetic theory of gases to explain this observation. **(2mks)**

d) A certain mass of hydrogen gas occupies a volume of $1.6m^3$ at a pressure of 1.5×10^5 Pa and a temperature of 22^0c. Determine the volume when the temperature is 0^0c at a pressure of 0.8×10^5 Pa. **(3mks)**

e) i)State the pressure law **(1mk)**

ii)On the axis provided, sketch a graph of pressure against temperature on the celcius scale. On the same axis sketch another graph for a gas of a larger volume. **(2mks)**



11 (a) in a hydraulic press, a force of 200N is applied to a master piston of area $25cm^2$. If the press is designed to produce a force of 5000N, determine the area of the slave piston. **(2mks)**

(b) The barometric height in a town is 70cmHg. Given that the standard atmospheric pressure is 76cmHg and the density of mercury is $13600kg/m^3$, determine the altitude of the town. (density of air is $1.25kg/m^3$) **(3mks)**

(c) In an experiment to determine atmospheric pressure, a plastic bottle is partially filled with hot water and the bottle is then tightly corked. After some time the bottle starts to get deformed.

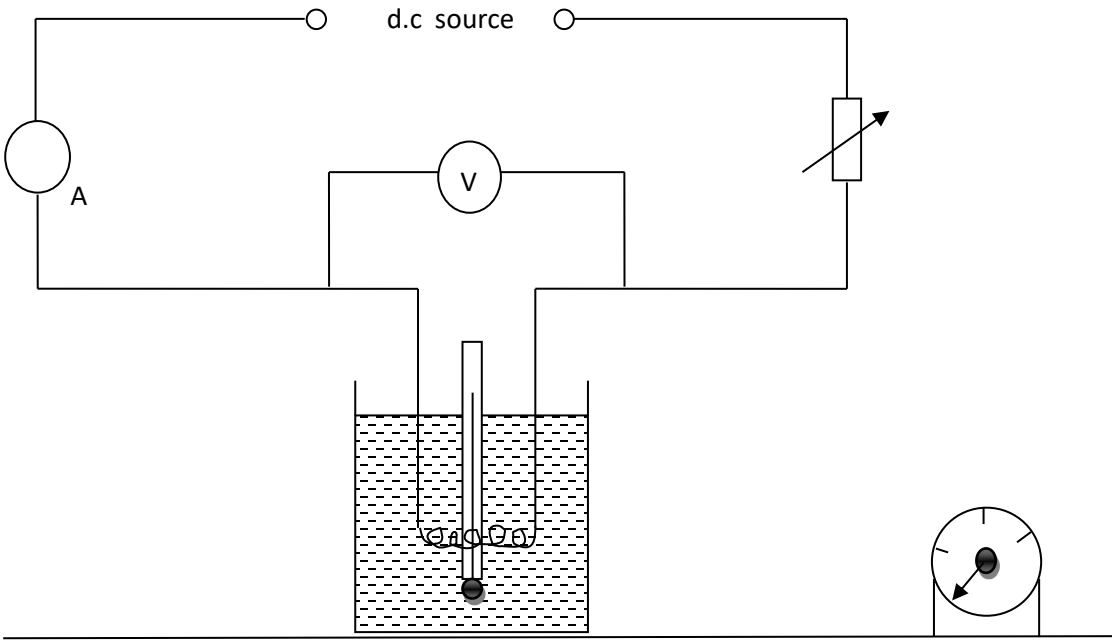
(i) State the purpose of the hot water. **(1mk)**

(ii) State the reason why the bottle gets deformed. **(2mks)**

(d) A hole of area $2.0cm^2$ at the bottom of a tank 5m deep is closed with a cork. Determine the force on the cork when the tank is filled with sea water of density $1.2g/cm^3$. **(2mks)**

12. (a) Define specific latent heat of vaporization **(1mk)**

b) The illustration below is used to produce a measured rise in temperature of a liquid using electrical energy.



Explain why;

(i) The liquid will tend to be warmer at the top of the container than at the bottom. **(1mk)**

(ii) The temperature will eventually stop rising even though the current is still passing through the heating coil. **(1mk)**

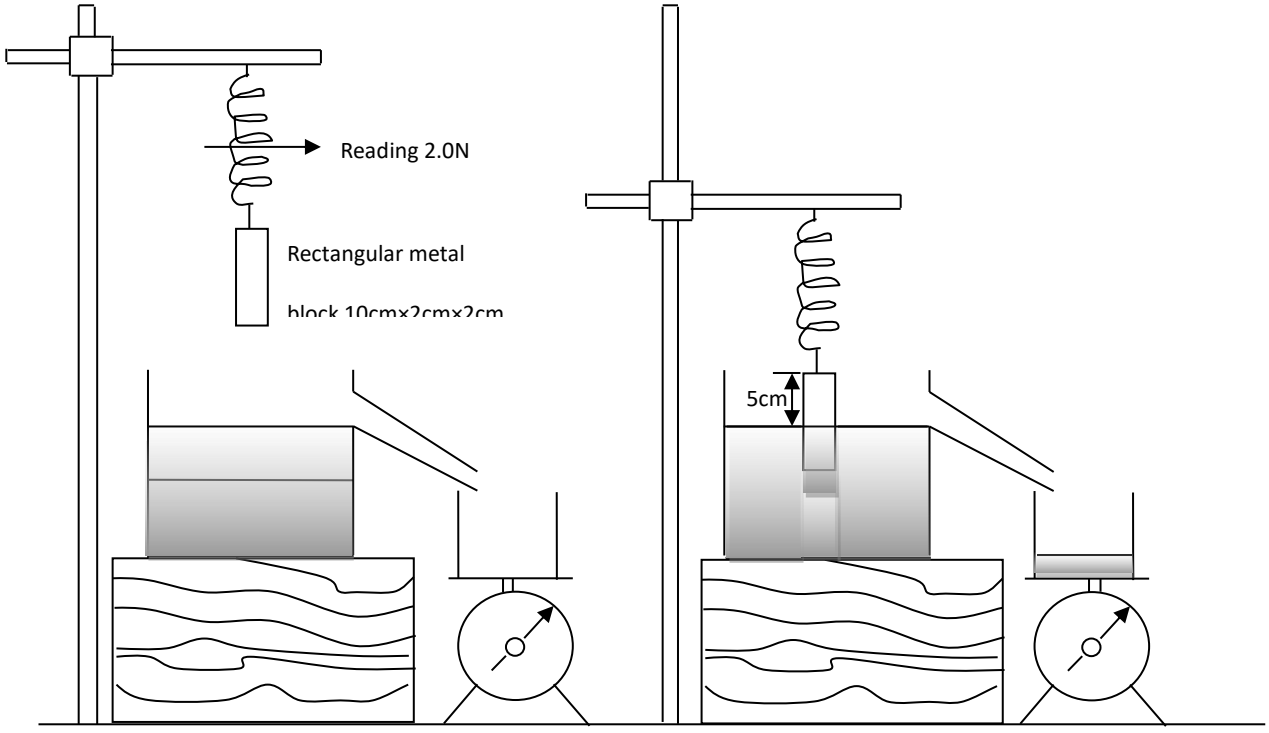
iii) if the apparatus is used to determine the specific heat capacity of the liquid, the accuracy of the experiment will be increased if the liquid is first cooled to about 5^{o}c below room temperature and the current passed until the temperature is about 5^{o}c above room temperature. **(2mk)**

(c). A 50W heating coil is totally immersed in100g of water contained in an insulated flask of negligible heat capacity. The initial temperature of water in the flask is 20^{o}c.

(i) Determine how long it takes for the water to boil at 100^{o}C when the heater is switched on **(2mks)**

(ii) After the water has been boiling for 15 minutes, it is found that the mass of water in the flask has decreased to 80g. Assuming no external heat losses, calculate a value for the specific latent heat of vaporization of water **(3mks)**

13. (a) The figure below shows details of an experiment performed by a student and the results taken. (take the density of water as $1.0g/cm^3$)



Compression balance reading 4N

i) Calculate the volume of the metal block below the water **(1mk)**

ii) Calculate the new reading on the compression balance after the block is halfway immersed **(2mks)**

iii) Calculate the reading you would expect to obtain on the spring balance **(2mks)**

iv) Give a statement of the principle you have used in part (iii) above **(1mk)**

b). Explain why the narrow stem of a hydrometer provides greater sensitivity than a wide one **(1mk)**

14 (a) (i) A car goes round a flat circular bend whose radius is 100m at a constant speed of 30m/s. Calculate its acceleration **(2mks)**

(ii) if the mass of the car is 1500kg, calculate the frictional force required to provide this acceleration. **(2mks)**

(b) (i) Calculate the maximum speed at which the car can go round the bend without skidding if the coefficient of friction between the tyres and the ground is 0.5. **(2mks)**

(ii) Give a reason why the driver of the car has to move through the same bend at a lower speed during a rainy day. **(1mk)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 3

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

(a) *Write your* ***name, index no*** *and* ***class*** *in the spaces provided above.*

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

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

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

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

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

For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A	1 – 8	25	
B	9	12	
	10	12	
	11	12	
	12	12	
	13	07	
	Total Score	80	

SECTION A (25 marks)

1. Describe the changes that can be observed during discharging process of a lead –acid accumulator **(2mks)**

2. a) Define power of a lens and give its units **(2mks)**

b) An object whose height is 24cm is placed 20cm in front of a diverging lens of focal length 20cm.

Determine the image distance **(3mks)**

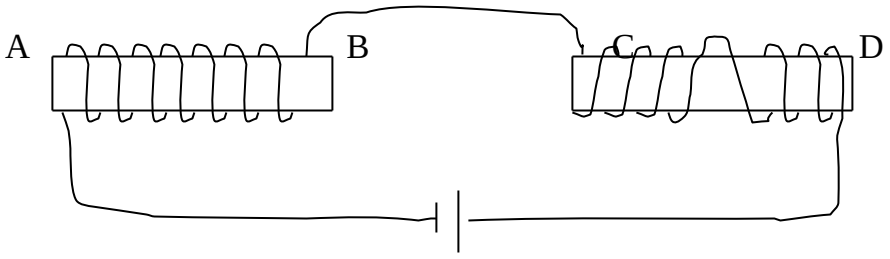
3. a) Give one property of sound waves **(1mk)**

b) a person claps his hands at approximately 0.5s intervals in front of a wall 90m away. He notices that each echo produced by the wall coincides with the next clap.

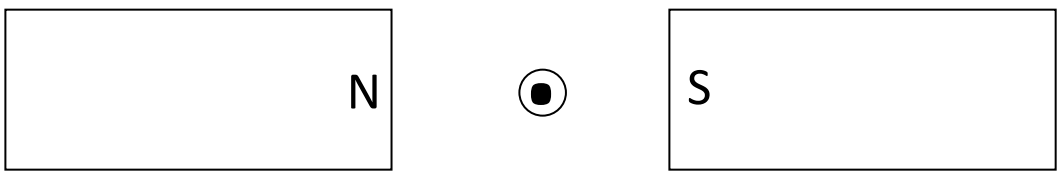
i) Calculate the approximate speed of sound **(3mks)**

ii) if the results obtained above were used as a basis for an experimental method to determine the speed of sound, what procedure should be adopted to obtain high accuracy in the timing part of the experiment? **(1mk)**

4. Identify the magnetic poles A, B, C and D in the diagram below. **(2mks)**



5. The diagram below shows a current carrying conductor placed in a magnetic field.



i)show on the diagram the direction of force on the conductor **(1mk)**

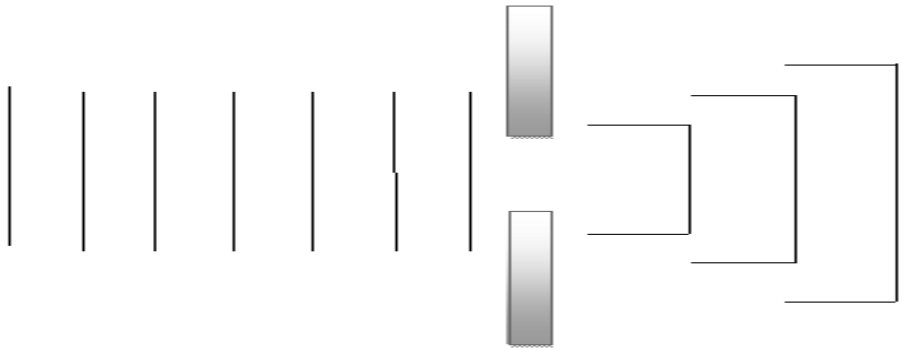
ii) if the current through the conductor is reduced, state and explain what happens to the force in (i) above. **(2mks)**

6. Gamma, radio, infrared, x-rays are part of the electromagnetic spectrum.

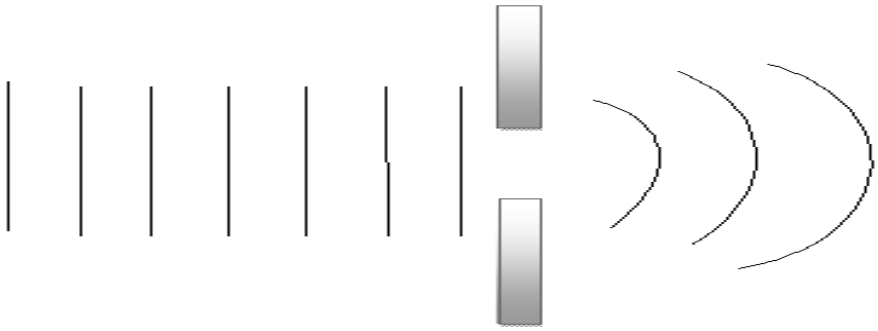
i) Arrange these radiations in order of increasing energy **(1mk)**

ii) State how radio waves are detected **(1mk)**

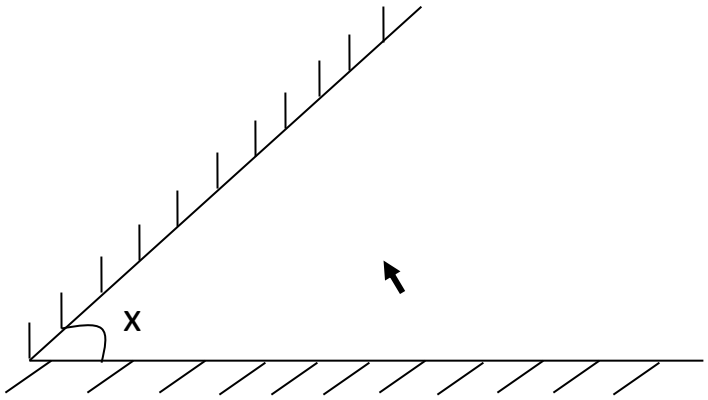
7. The diagram below shows waves being diffracted.



What adjustments should be done to obtain the wave form below? **(2mks)**



8. The diagram below shows an object placed in front of two mirrors inclined to each other at an angle x

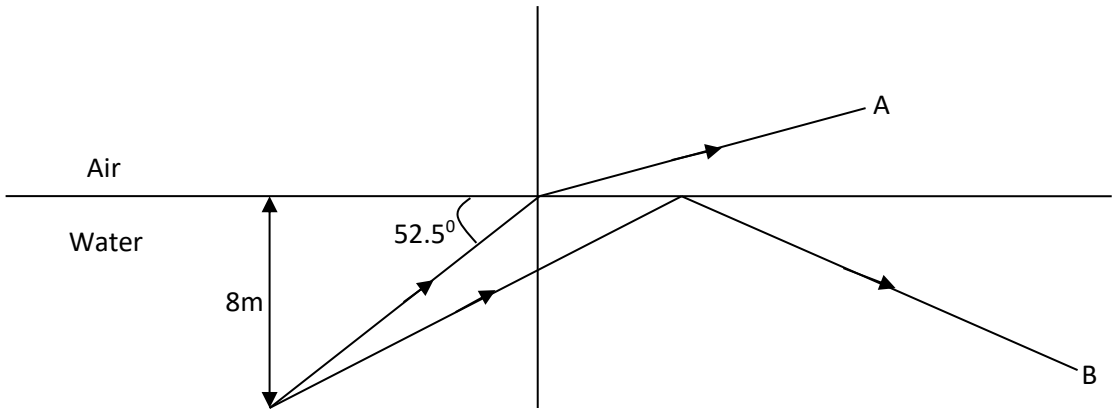


An observer sees five images, determine the value of angle x? **(2mks)**

SECTION B (55 marks)

9. a) State Snell's law **(1mk)**

b) The figure below shows a ray of light incident on a water-air interface from a source 8m deep.



i) Ray A is observed to bend as it enters the air. Give a reason why this occurs **(1mks)**

ii) If the refractive index of water is 1.35, calculate the angle of refraction of ray A **(3mks)**

iii) Find the critical angle of water **(3mks)**

iv) Give a reason why ray B is not travelling out of water **(1mk)**

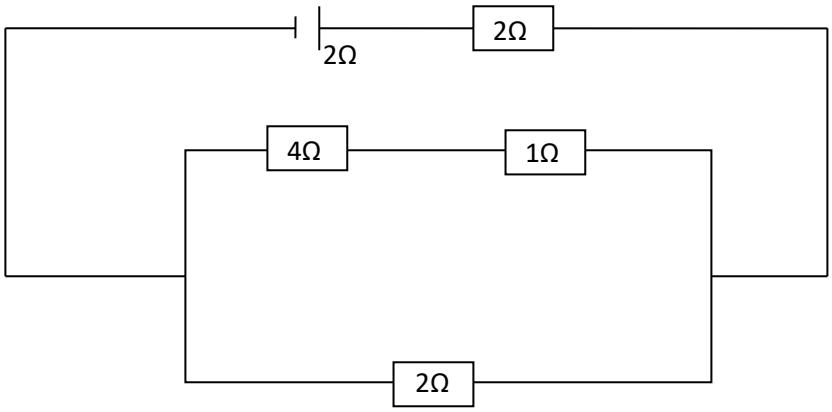
v) a fish is placed at the source of light ray. Calculate the maximum area of view on the surface of water **(3mks)**

10. a) Define local action **(1mk)**

b) a charge of 4.8C flows through a lamp every second. Calculate the number of electrons involved per second. **(3mks)**

c) Give two differences between a primary and a secondary cell **(2mks)**

d) The circuit set up shown below makes a current of 1A to flow through the 4Ω resistor

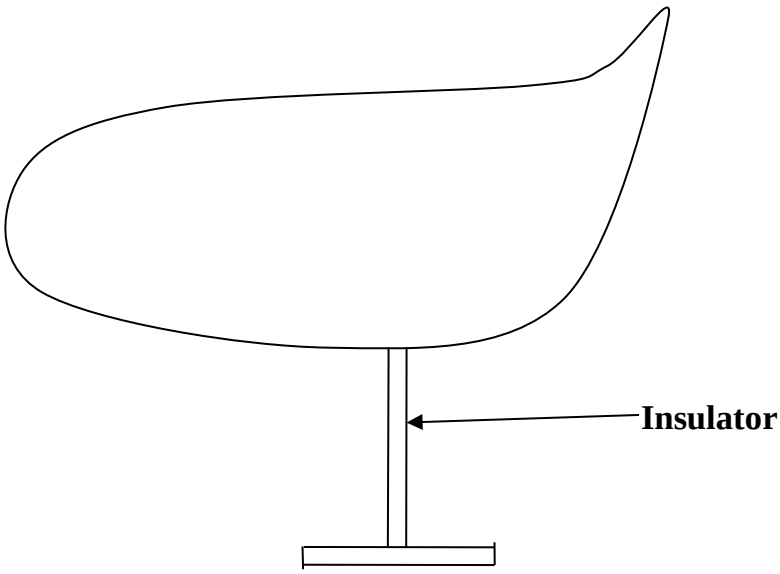


Calculate;

i) The current through the resistor **(3mks)**

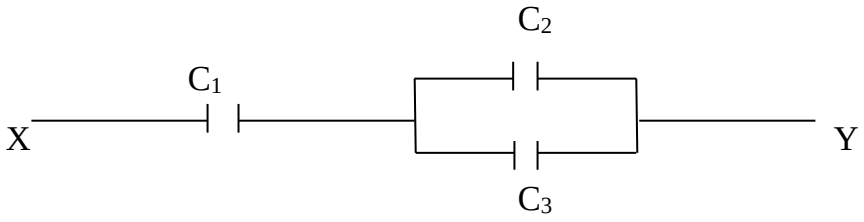
ii) the E.M.F of the cell given that the internal resistance is negligible **(3mks)**

11. Show the charge distribution on the hollow conductor shown below if it is positively charged. **(1mk)**



b. State three factors affecting capacitance of a parallel plate capacitor. **(3mks)**

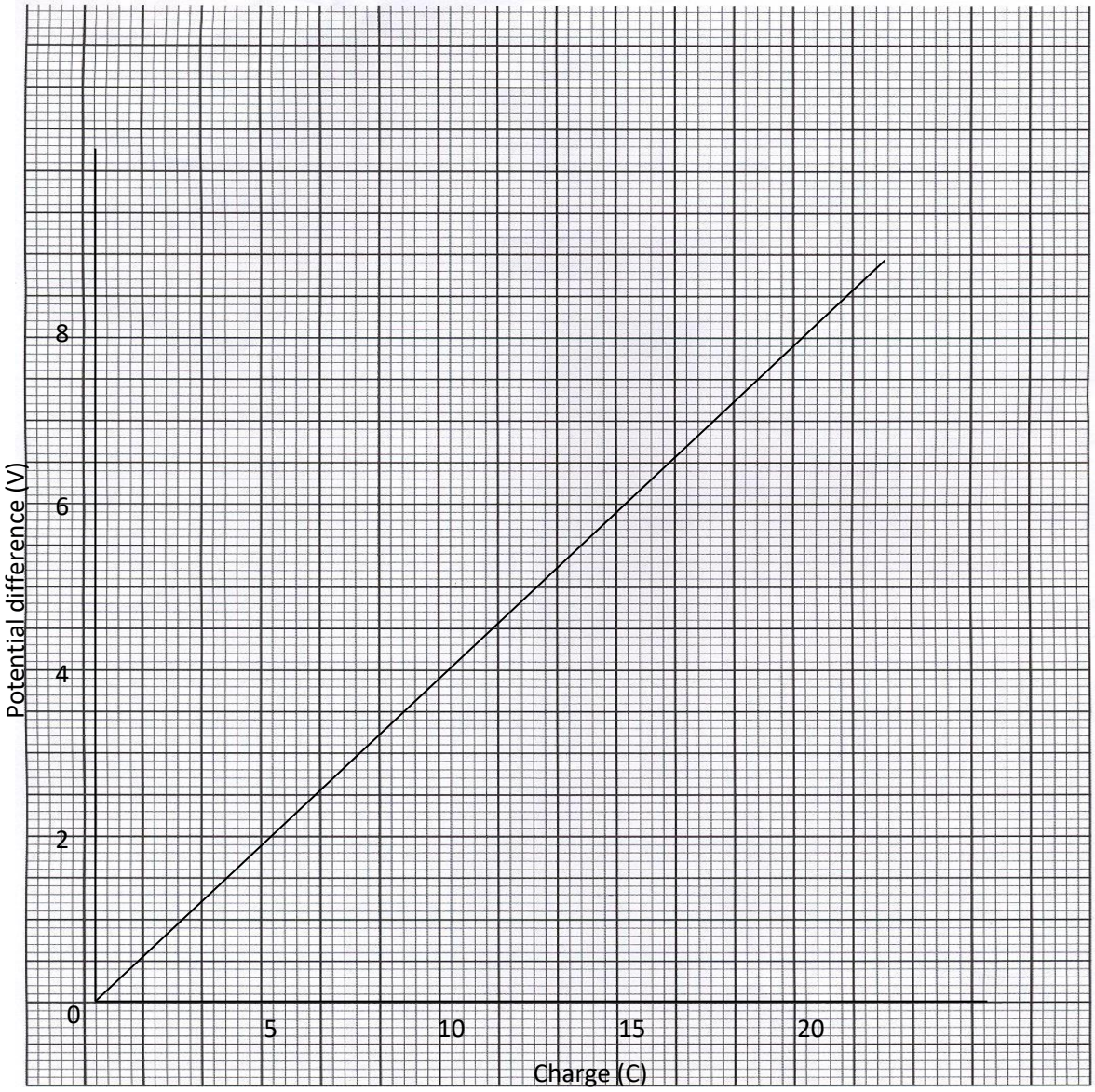
c) The diagram below shows a circuit containing three capacitors.



i) Write an expression for effective capacitance between X and Y. **(2mks)**

i) If c_1=6μF, c_2=4.5μF and c_3=5 μF, calculate the charge stored when point XY is connected in series with a battery of 6V **(3mks)**

d) The graph below shows the relationship between the voltage drop across a certain capacitor and the charge stored in the capacitor.



From the graph calculate the capacitance of the capacitor. **(3mks)**

12. a) State two factors that determine the magnitude of an induced e.m.f in a conductor **(2mks)**

(b) A Power station has an input of 30kw at a potential difference of 5kv.A transformer with a secondary coil of 1000 turns is used to step down the voltage to 1000v for transmission along a grid .Assuming there are no power loses in the transformer .calculate.

(i) current in the primary coil **(3mks)**

(ii) the number of turns in the primary coil **(3mks)**

(iii) The current in the secondary coil **(2mks)**

(iv) State which of the coils is thick and why **(2mks)**

13. a) Define magnification **(1mk)**

b) State two differences between a concave and a convex reflectors **(2mks)**

c) a concave mirror of focal length 20 cm forms a real image three times the size of the object. If the object height is 4cm; determine, using graphical method, the:

(i)object distance **(3mks)**

(ii) The image distance **(1mk)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 4

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES:

- *Write your **name and index number** in the spaces provided above.*
- *Answer **all** the questions both in section **A** and **B** in the spaces provided below each question*
- *All workings **must** be clearly shown; marks may be awarded for correct steps even if the answers are wrong.*
- *Mathematical tables and silent electronic calculators may be used.*

(Take acceleration due to gravity g= 10ms^{-2} Density of water 1g/m^{-3})

FOR EXAMINERS' USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
Section A	1-12	25	
Section B	13	09	
	14	14	
	15	14	
	16	09	
	17	09	
	18	**10**	
	TOTAL	**80**	

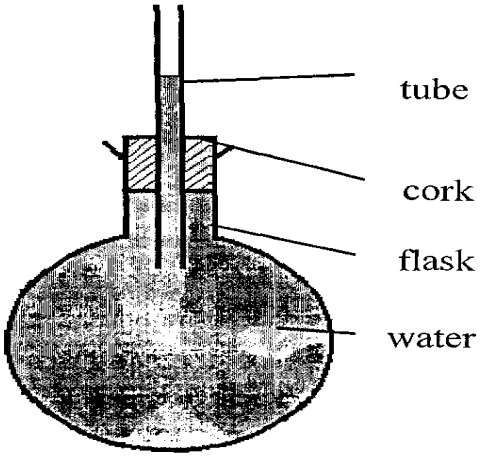
SECTION A (25 MARKS)

Answer all questions in this section in the spaces provided

1. State Pascal's principle of transmission of pressure in fluids **(1mk)**

2. Water is known to boil at 100^{o}C . a student heated some water and noticed that it boiled at 101^{o}C. State two possible reasons for this observation **(2mks)**

3. Fig 1. Shows a flask filled with water. The flask is fitted with a cork through which a tube is inserted. When the flask is cooled, the water level rises slightly, then falls steadily.



Explain the observation **(3mks)**

4. A pipe of radius 4mm is connected to another pipe of radius 6mm. if water flows in the wider pipe at the speed of 5ms^{-1}, what is the speed in the narrower pipe? **(3mks)**

5. The system in figure2 is in equilibrium

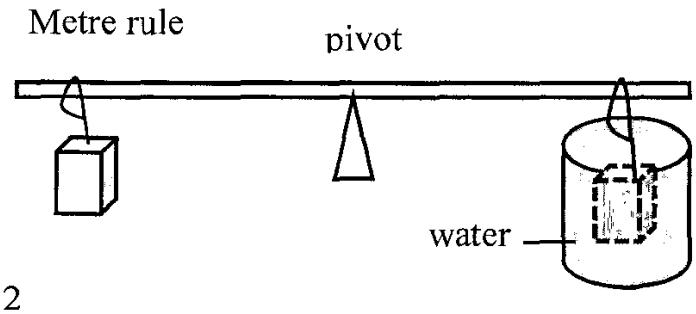


Figure 2

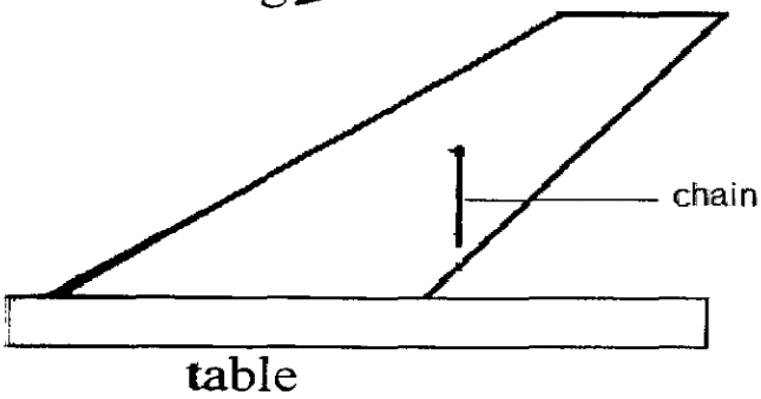
When the temperature of the water is raised the system is observed to tilt to the right, state the reason for this observation **(2mks)**

6. Explain why a glass container with glass walls is more likely to crack than one with a thin wall when a very hot liquid is poured into them. **(2mks)**

7. State two ways in which the stability of a body can be increased **(2mks)**

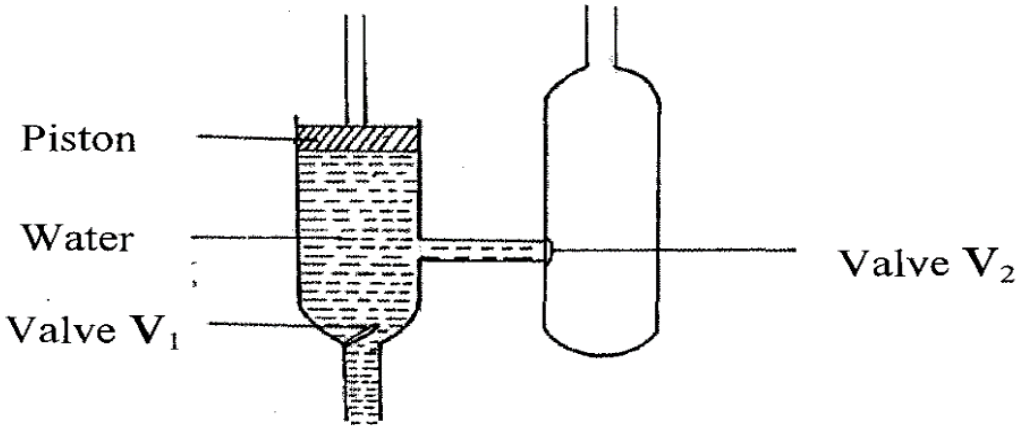
8. The object in figure 3 is placed on a horizontal table with a chain hanging from its centre of gravity. State the type of equilibrium for the object **(1mk)**

Fig 3



9. A ball is thrown upwards and returns to its starting point after 6 seconds. Calculate the maximum height reached($g=10m/s^2$) **(3mks)**

10. The figure below shows a force pump



Explain how the water gets past valve V2 **(2mks)**

11. When calibrating a liquid in glass thermometer, it is normally not advisable to dip the bulb in boiling water when getting the upper fixed point. Explain why it is so **(2mks)**

12. Convectional and diffusion both involve motion of fluid molecules. Distinguish between the two **(2mks)**

SECTION B (55 MKS)

13. **(a)** Define the term heat capacity **(1mk)**

(b) You are provided with the apparatus shown in Fig 5 and stop watch

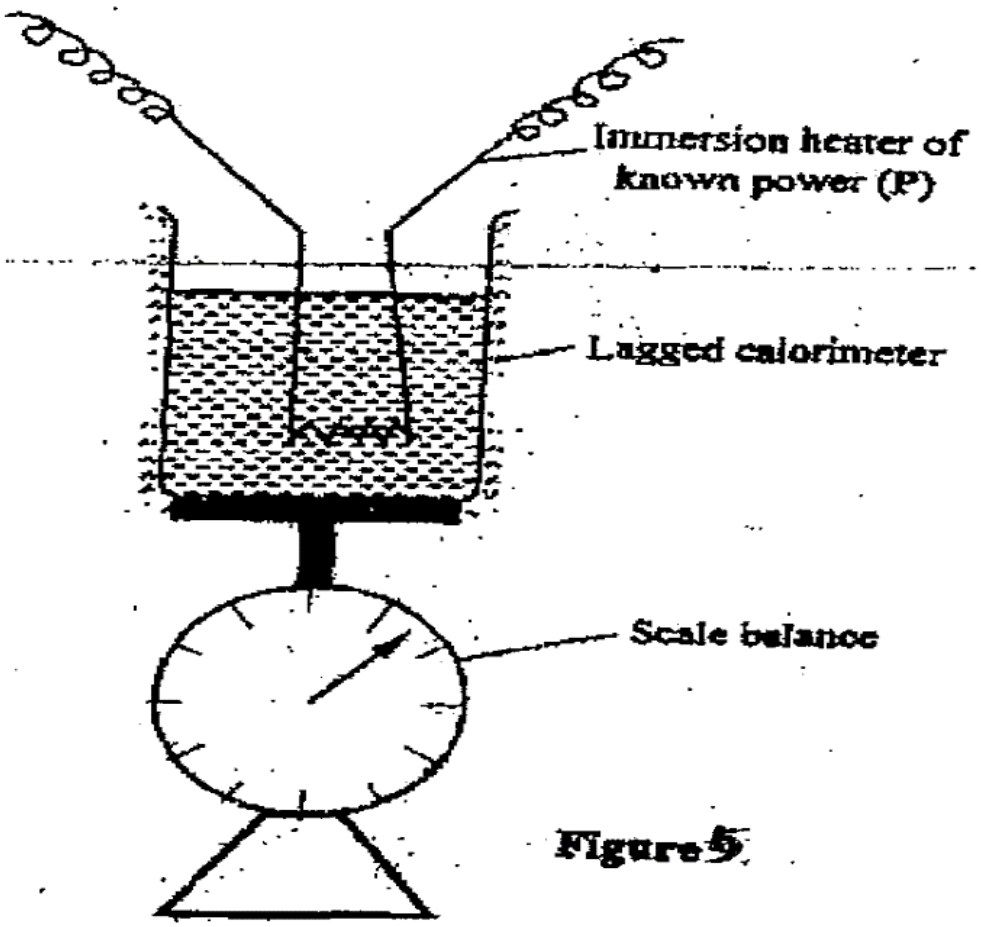


Figure 5

Describe an experiment to determine the specific latent heat of steam, using the set up. In your answers clearly explain the measurements to be made and how these measurements could be used to determine 1 **(6mks)**

(c) A block of metal of mass 150g at 100°C is dropped into a lagged calorimeter of heat capacity 40JK^{-1} containing 100g of water at 25°C. The temperature of the resulting mixture is 34°C. (Specific heat capacity of water=4200JK^{-1})

Determine:

(i) Heat gained by calorimeter; **(2mks)**

(ii) Heat gained by water; **(1mk)**

(iii) Heat lost by the metal block; **(1mk)**

(iv) Specific heat capacity of the metal block **(3mks)**

14.(a) Distinguish between solid and liquid states of matter in terms of intermolecular forces**(1mk)**

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

Determine

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

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

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

(c) State

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

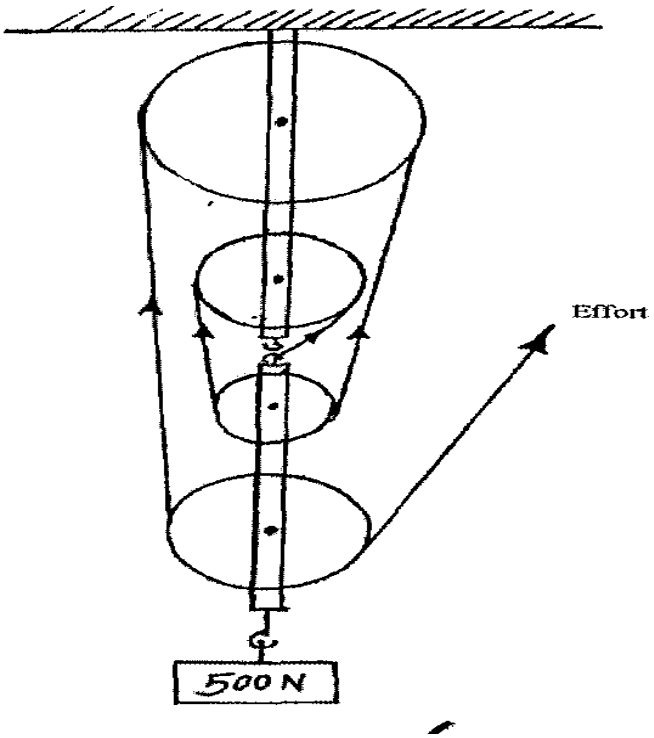
(ii) Two possible sources of errors in this experiment **(2mks)**

15.(a) State what is meant by centripetal acceleration (**1mk)**

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

16. (a) Define the term velocity ratio as used in machines **(1mk)**

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



(i) Determine the velocity ration of the machine **(1mk)**

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

(iii) In the space provided below, sketch a graph of efficiency against load for the system. **(2mks)**

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

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

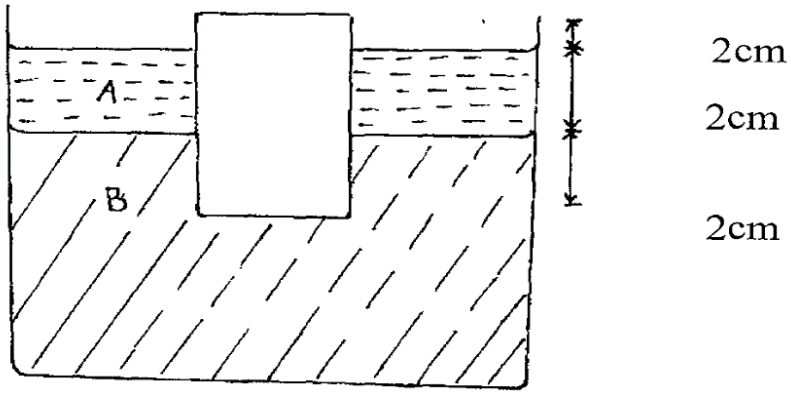
(b) Calculate the impulsive force on the minibus **(3mks)**

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

18.(a)(i) State the law of floatation **(1mk)**

(ii) Explain why a hollow metal sphere floats on water while a solid metal sphere of the same material sinks in water. **(2mks)**

(b) The figure 7 below shows a uniform block of uniform cross-sectional area of 6.0cm^2 floating on two liquids A and B. The lengths of the block in each liquid are shown. Given that the density of liquid A is 800kg/m^3 and that of liquid B is 1000kgm^{-3} determine the:



(i) Weight of liquid A displaced **(2mks)**

(ii) Weight of liquid B displaced **(2mks)**

(iii) Density of block **(3mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 4

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

1) *Write your name and index number in the spaces provided above.*
2) *Sign and write the date of the examination in the spaces provided above*
3) *This paper consists of **two** sections **A** and **B**.*
4) *Answer **all** the questions in section **A** and **B** in the spaces provided*
5) *All working **MUST** be clearly shown in the spaces provided in this booklet.*
6) *Non programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.*

Take: Speed of light in vacuum C = 3.0 x 10^8m/s Acceleration due to gravity g = 10N/S^2

FOR EXAMINER'S USE ONLY

Section	Question (s)	Max. Score	Candidates Score
A	1 – 12	25	
B	13	12	
	14	8	
	15	11	
	16	12	
	17	12	
	Total	80	

SECTION A (25 MARKS)

Answer all the questions in the spaces provided.

1. Figure 1 below shows a ray of light incident to the first of the two mirrors placed at an angle of 60^0

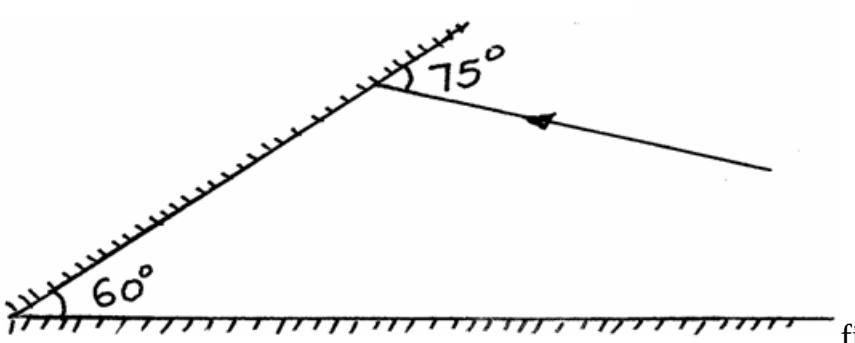


fig 1

Complete the path of the ray after reflection from the mirrors. **(1mk)**

2. Figure 2 below shows a positive charge near a plate carrying negative charge.

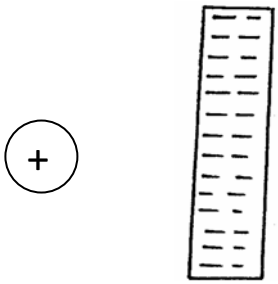


fig 2

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

3. Two pins are hanging from a magnet as shown in the diagram below (figure 3)

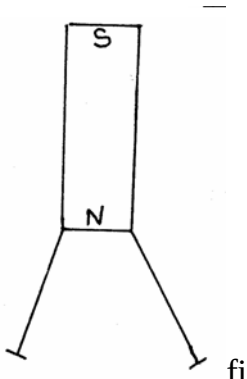


fig 3

Explain why they do not hang vertically downwards. **(2mks)**

4. Draw the diagrams to illustrate what happens when plane waves are incident on a slit.

i) When the width of the slit is large compared with the wavelengths of the waves. **(2mks)**

ii) When the width of the slit is small compared with wavelength of the waves. **(2mks)**

5. What energy conversion occurs in a photocell? **(1mk)**

6. i) Arrange the following waves in order of decreasing wavelength; infrared, X-rays, micro-waves and visible light **(1mk)**

ii) State one application of visible light. **(1mk)**

7. State two advantages of an alkaline battery over lead acid battery. **(2mks)**

8. A girl shouts and ears an echo after 0.6 seconds later from a cliff. If velocity of sound is 330m/s, calculate the distance between her and the cliff. **(3mks)**

9. What is dispersion of light? **(1mk)**

10. Determine the reading of an ammeter in figure 4 below **(2mks)**

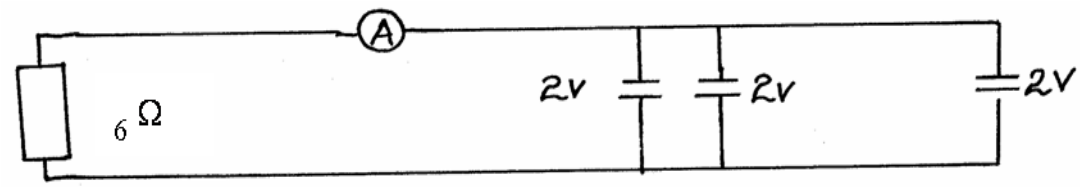


fig 4

11.A ray of light is incident on a glass oil interface as shown in figure 5 below. Determine the value of r (Take refractive index of glass and oil as 3/2 and 6/3 respectively) **(3mks)**

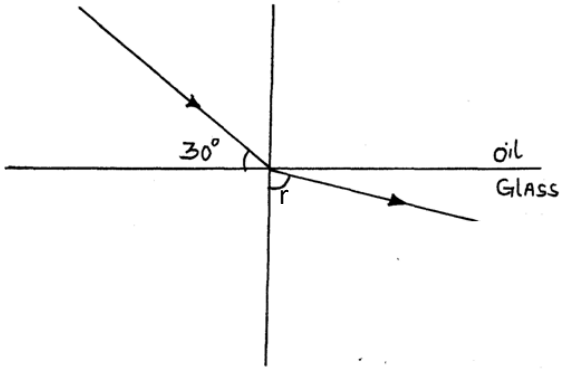


fig 5

12. State two factors that affect the capacitance of a parallel plate capacitors. **(2mks)**

SECTION B (55 MARKS)

13.(a)State Ohm's law. **(1 mark)**

(b) You are provided with the following apparatus:

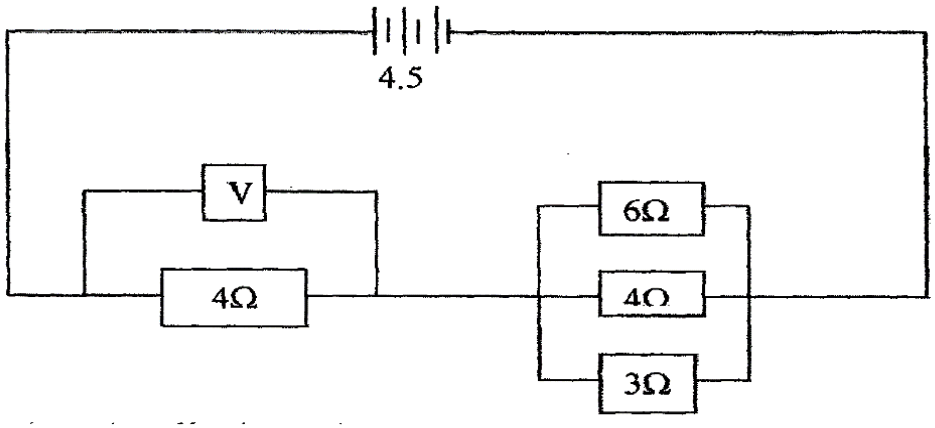
- Connecting wires
- An ammeter
- Fixed resistor
- A voltmeter
- A variable resistor
- Switch

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



(i) Calculate the effective resistance of the circuit. **(3marks)**

(ii) Find the voltmeter reading. **(2marks)**

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

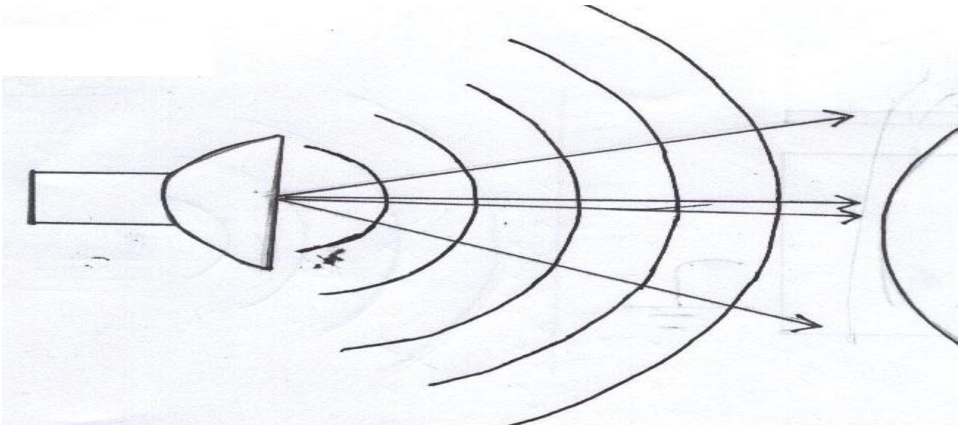
(i) What two measurements would need to be made in order to determine the speed of sound? **(2mks)**

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

(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)**

(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)**

(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)**

c) Figure 15 shows the set up used to demonstrate interference of sound

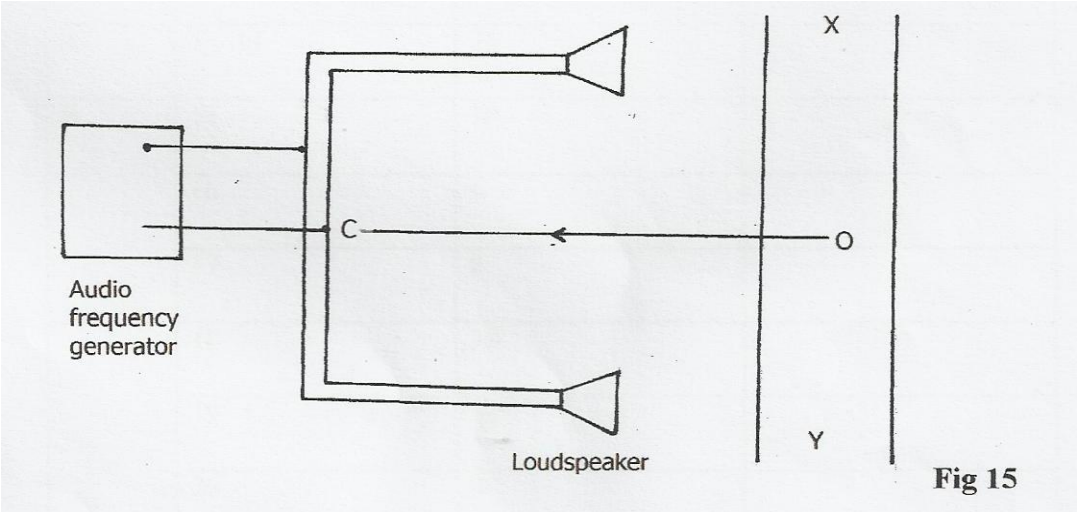


Fig 15

i) An observer O, moves along XY.

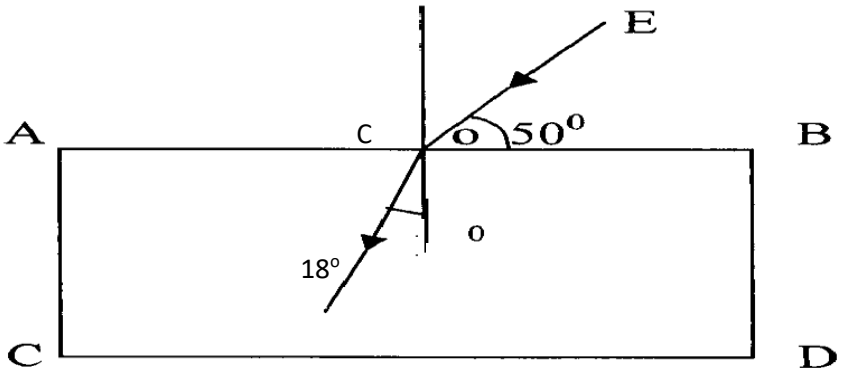
State the observation(s) made. **(1 mark)**

(ii) State what would be observed if a cathode ray oscilloscope is moved along line XY.**(1 mark)**

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

15. (a) State the conditions to be satisfied for total internal reflection to occur. **(2marks)**

(b) A ray of light traveling in the direction EO in air enters a rectangular block as shown in the diagram. The resulting angle of refraction is 18°.

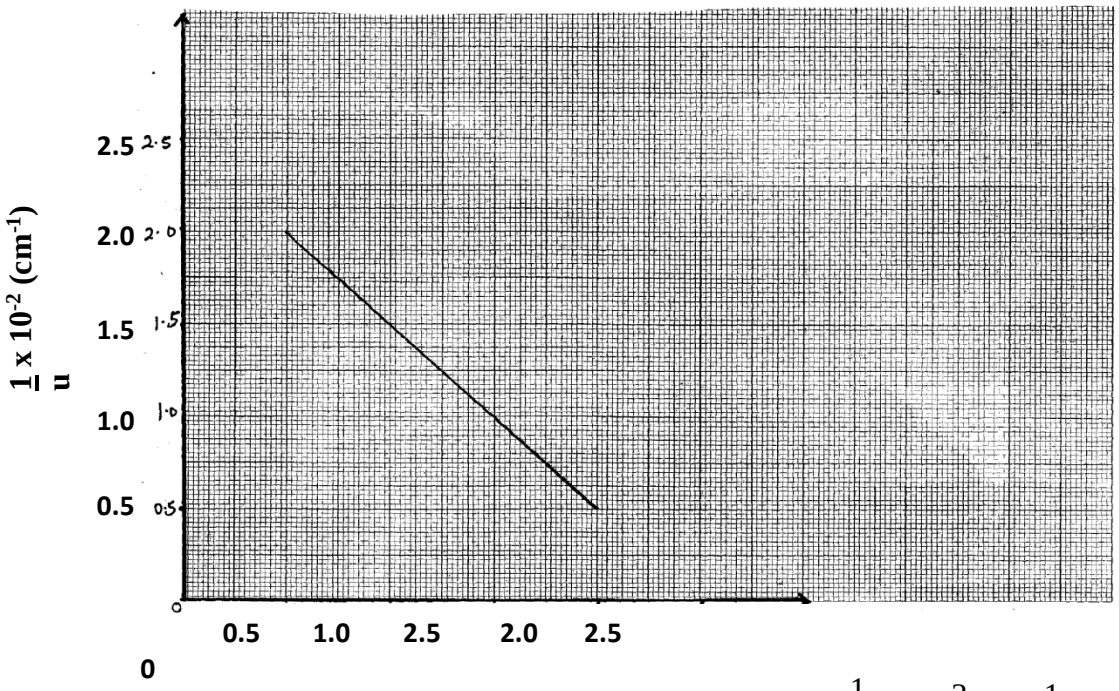


Find:

(i) The refractive index of the block. **(2marks)**

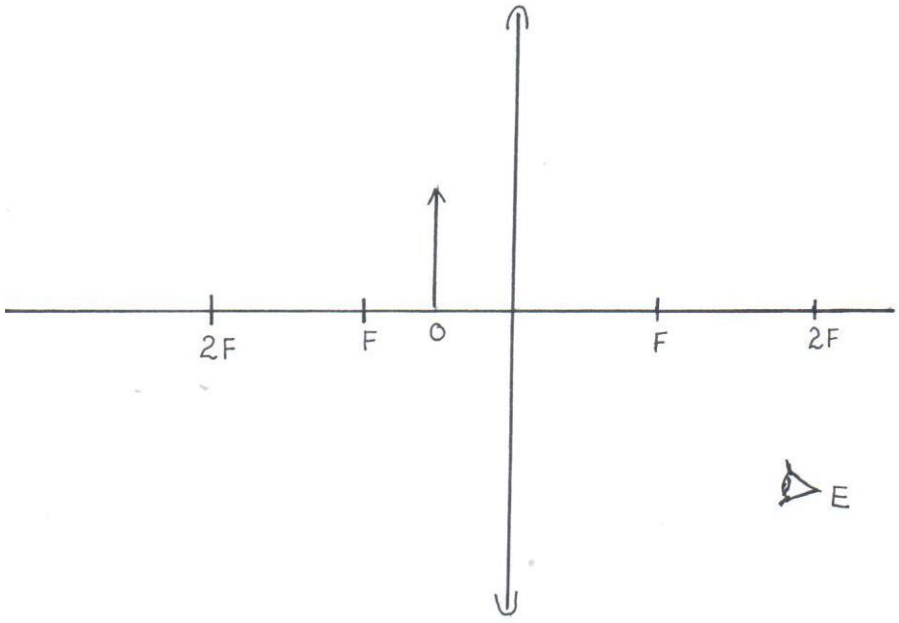
(ii) The critical angle C of the block. **(3marks)**

16. (a) The graph below shows the relationship between $^1/_u$ for $^1/_v$for a converging lens where u and are the object and image distances respectively.



From the graph, determine the focal length f, of the lens. **(3 mks)**

17.(a) The figure below shows an object in front of lens.



(i) Using rays locate the image as seen by observer, E. **(2 marks)**

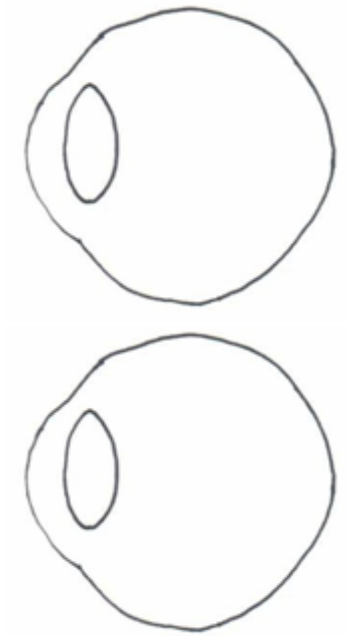
(ii) Give **one** application of such a lens as used above. **(1 mark)**

(iii) Write **three** similarities between an eye and a camera. **(3 marks)**

(b) Figure (a) and (b) show diagrams of the human eye.

(a)

(b)



(i)In figure (a), sketch a ray diagram showing long sightedness**.** **(1 mark)**

(ii) In figure (b), sketch a ray diagram showing how lens is used to correct long sightedness. **(2 marks)**

(d) An object of height 10.5cm stands before a diverging lens of focal length 20cm and a distance of 10cm from the lens. Determine;

(i) image distance. **(3 marks)**

(ii) height of the image. **(3mark)**

(iii) magnification. **(2 mark)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 5

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

a) *Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections;* ***A*** *and* ***B.***

b) *Answer* ***ALL*** *the questions in the spaces provided.*

c) *Mathematical tables and electronic calculator may be used.*

d) *You may use the following constants where necessary:-*

e) *Candidates should answer the questions in English.* *g = 10 N/kg, or m/s²*

FOR EXAMINER'S USE ONLY

SECTION	QUESTIONS	MAXIMUM SCORE	SCORE
A	1 – 11	25	
B	12	10	
	13	13	
	14	10	
	15	13	
	16	9	
TOTAL SCORE			

SECTION A (25 MARKS)

Attempt all the questions in the spaces provided.

1. The figure 1, below shows a section of a tape measure used for measuring the circumference of a cylindrical water tank.

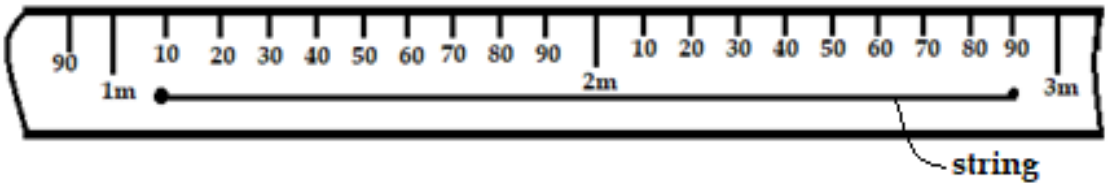


Figure 1

i. State the accuracy of the tape **(1 mark)**

ii. Determine the diameter of the tank **(2 marks)**

2. Figure 2, shows a metal bolt which is threaded. Explain how a metre-rule may be used to measure the pitch (distance between adjacent peaks) of the threading **(2 marks)**

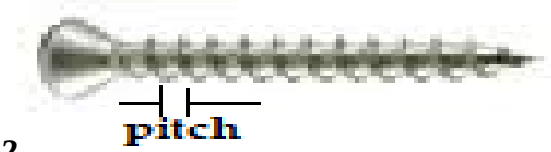


Figure 2

3. State the advantage of fitting wide tyres on a vehicle that move on earth roads **(1 mark)**

4. It may not be possible to suck liquid into your mouth using drinking straw on the surface of the moon. Explain **(2 marks)**

5. A drop of blue ink is introduced at the bottom of a beaker containing water. It is observed that after sometime, all the water in the beaker turns blue. Name the process that takes place.

(1 mark)

6. In the set-up shown below, water near the top of the boiling tube boils while at the bottom it remains cold. Give a reason for this. **(2 marks)**

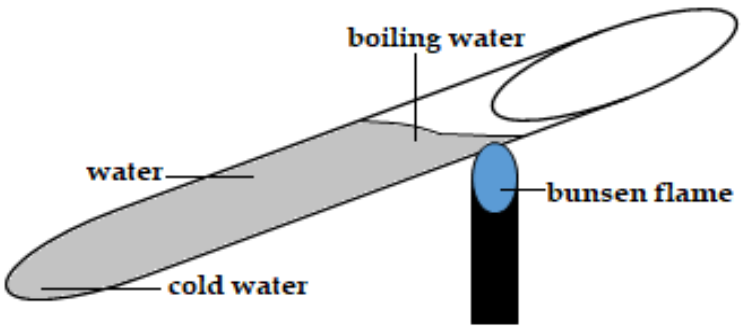
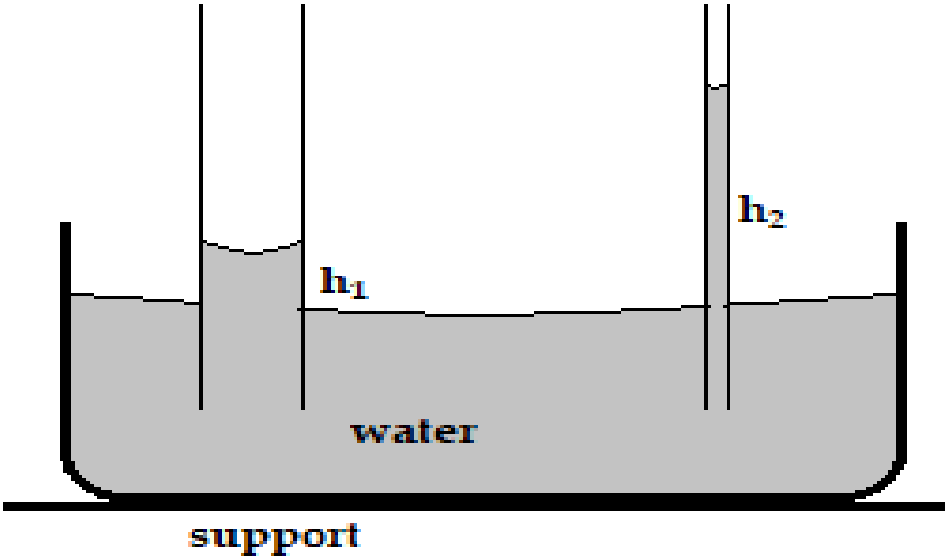


Figure 3

7. The diagram below shows two glass-tubes of different diameters dipped in water. Explain why h_2 is greater than h_1 **(3 marks)**



8. A solid copper sphere will sink in water while a hollow copper sphere of the same mass may float. Explain **(2 marks)**

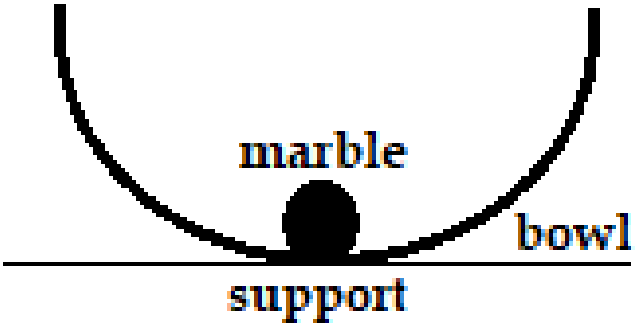
9. Name the instrument that would be most suitable for measuring the thickness of one sheet of this question paper **(1 mark)**

10.

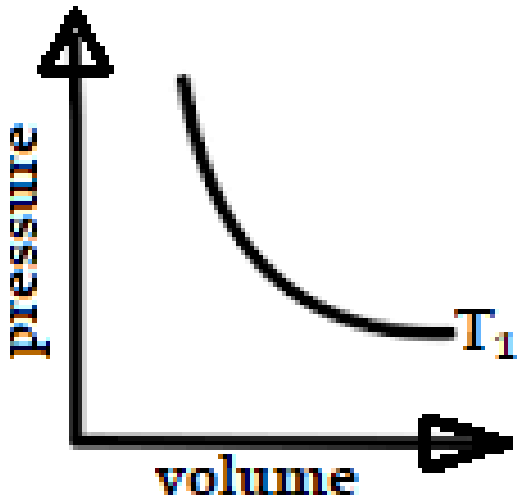
a) State how pressure of a moving fluid varies with the speed of the fluid **(1 mark)**

b) State Bernoulli's principle **(1 mark)**

11. The solid marble shown below is in a stable equilibrium. On the space provided, sketch the same marble in a neutral state of equilibrium **(1 mark)**

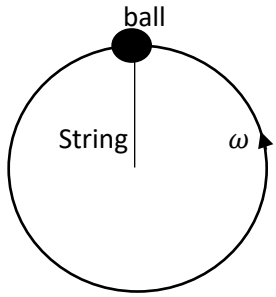


12. The figure below shows how pressure and volume of a fixed mass of a gas vary at constant temperature. Sketch on the same axes, a graph for the same mass of gas at temperature,T_2 such that $T_2 < T_1$ **(1 mark)**



13. The figure below shows a ball being whirled in a vertical plane. Sketch on the same figure the path followed by the ball if the string cuts when the ball is in the same position shown.

(1 mark)



14. A spring extends by 6cm when supporting a mass of 0.06kg on earth. When the spring is used to support the same mass on moon, it extends by 1 cm. determine the moon's gravitational strength **(3 marks)**

SECTION B (55 MARKS)

15.

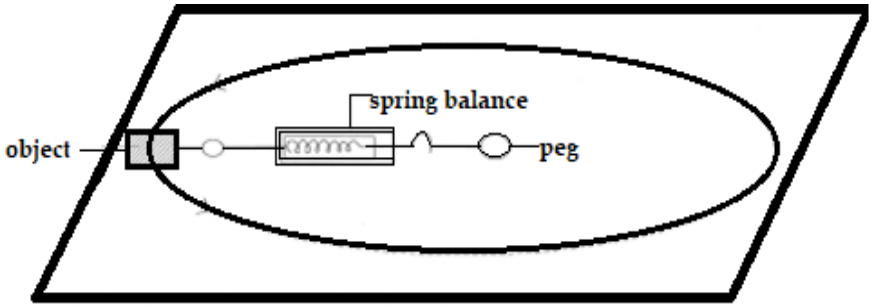
a) Define the following terms:

i. Angular velocity **(1 mark)**

ii. Centripetal acceleration **(1 mark)**

b) State **two** ways in which the centripetal force on a body of mass m can be increased **(2 marks)**

c) **Figure 8** shows an object at the end of a light spring balance connected to a peg using astring. The object is m oving in a circular path on a smooth horizontal table with a constant speed.



i. State what provides the centripetal force **(1 mark)**

ii. On the same diagram Indicate with an arrow the direction of the centripetal force **(1 mark)**

iii. State a reason why the object is accelerating while its speed remains constant **(1 mark)**

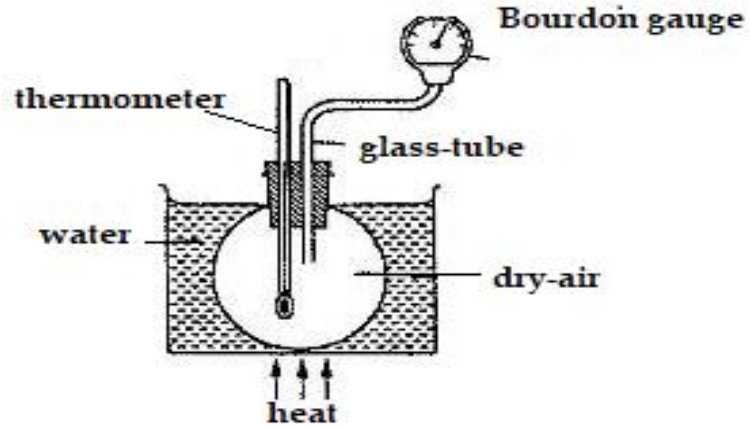
iv. The mass of the object is 0.5kg and it is moving at a speed of 8m/s at a radius of 2m. determine the reading on the spring balance **(3 marks)**

d) A body moving with uniform angular velocity found to have covered an angular distance 170 radians in t seconds. Thirteen seconds later it is found to have covered a total angular distance of 300 radians. Determine t **(3 marks)**

16.

a) State the pressure law for an ideal gas **(1mark)**

b) The set up shows an arrangement to determine the relationship between temperature and pressure of a gas constant volume.



(i) Describe how measurements are obtained in the experiment. **(3marks)**

(ii) Explain how the result form the experiment can be used to determine the relationship between temperature and pressure. **(2marks)**

c) A bicycle tire is pumped to a pressure of 2.2×10^5pa at23^0C. After a race the pressure is found to be 2.6×10^5 pa. Assuming the volume of the tyre did not change, what is the temperature of the air in the tyre. **(3marks)**

d) Air is trapped inside a glass tube by a thread of mercury 240 mm long. When the tube is held horizontally the length of the air column is 240mm.

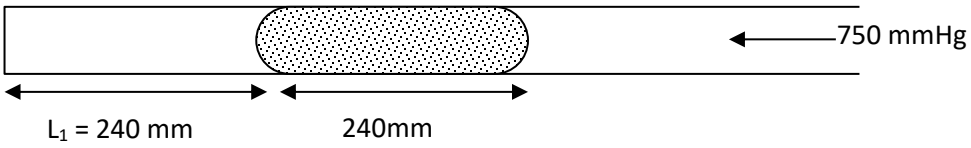


Figure 4

Assuming that the atmospheric pressure is 750mm Hg and the temperature is constant; calculate the length of the air column when the tube is vertical with open end down. **(3marks)**

e) What is an 'ideal gas?' **(1 mark)**

17.

a) Define the following terms:

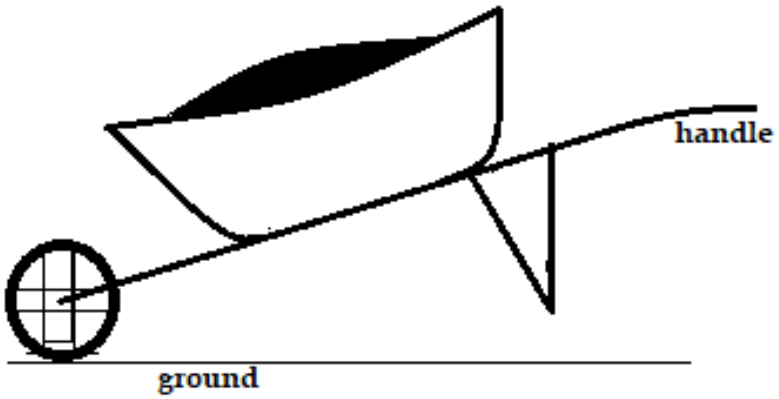
i. Mechanical advantage **(1 mark)**

ii. Velocity ratio **(1 mark)**

b) Sketch a labeled diagram to show how an arrangement of a single pulley may be used to provide a mechanical advantage of 2. **(3 marks)**

c) The figure 11, below shows a loaded wheelbarrow.

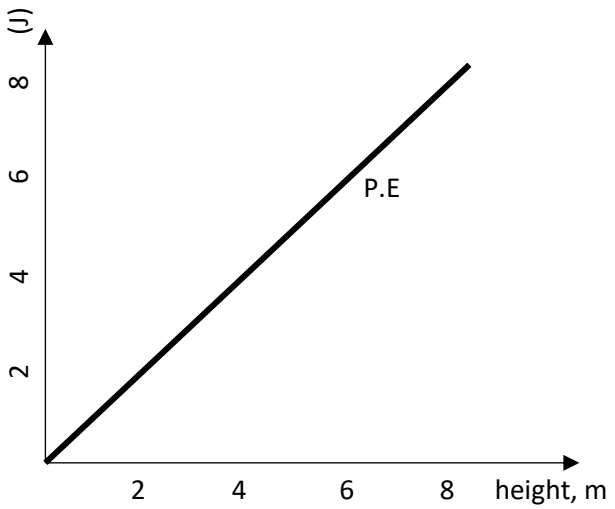
i. Indicate and label on the diagram three forces acting on the wheelbarrow when a worker is just about to lift the handle. **(3 marks)**



ii. Suppose the handle-bars of the wheelbarrow were extended, which force(s) would change? Explain **(2 marks)**

d) A ball rolls on a table in a straight line. A part from the transitional kinetic energy, state the other form of kinetic energy possessed by the ball. **(1 mark)**

e) The figure 12, below shows how the potential Energy (P.E) of a ball thrown vertically upwards.



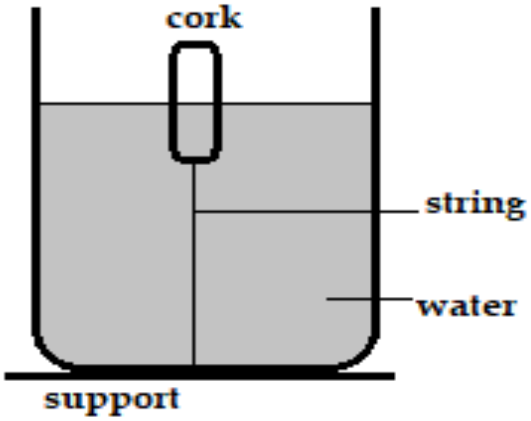
On the same axes, plot a graph of kinetic energy of the ball. **(2 marks)**

18.

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

b) When a piece of metal is placed on water, it sinks. But when the same piece of metal is placed on a block of wood, both are found to float. Explain this observation. **(2 marks)**

c) Figure 13 shows a cork floating on water and held to the bottom of the beaker by a thin thread



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

ii. Describe how each of the forces mentioned in (i) above changes when water is added into the beaker until it fills up. **(3marks)**

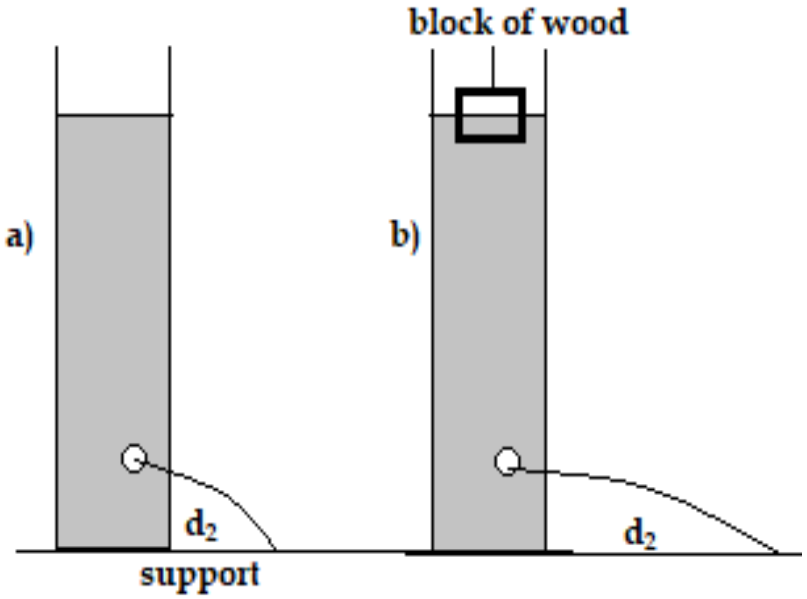
19.

a) Water flows in a horizontal smooth pipe. State the changes that would be observed in the nature of flow if the speed of water is steadily increased from low to high value **(2 marks)**

b) A pipe of radius 6mm is connected to another pipe of radius 9mm. if water flows in the wider pipe at a speed of 2m/s, what is the speed in the narrower pipe? **(3 marks)**

c) State the reason why it may not be possible to suck liquid into your mouth using drinking straw on the surface of the moon **(1 mark)**

d) A can with a hole on the side is filled with water to a certain height. Water jets out as shown below (figure 14, a). A second identical can is filled with water to the same height and a block of wood floated on the water as shown (figure 14, b). give a reason why the water jet in (b) is longer than that in (a). **(1 mark)**



KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 5

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

(a) *Write your name and index number in the spaces provided above.*
(b) *Sign and write the date of examination in the spaces provided above.*
(c) *This paper consists of **two** sections: **A** and **B**.*
(d) *Answer ALL the questions in sections A and B in the spaces provided.*
(e) *ALL working MUST be shown clearly*
(f) *Mathematical tables and silent electronic calculators may be used..*

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	SCORE
A	1 – 13	25	
B	14	11	
	15	12	
	16	09	
	17	10	
	18	12	
TOTAL SCORE		**80**	

SECTION A (25 MARKS)

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

1. (a)Distinguish between real and virtual Image **(1mark)**

b)A pinhole camera forms an image of size 10cm. The object is 5m tall and 20m away from the pinhole. Find the length of the pinhole camera. **(2marks)**

2.Why is it safer to carry explosive fuels in metal cans instead of plastic can**?** **(1mark)**

3.The **figure 1** below shows a cross section of a dry cell.

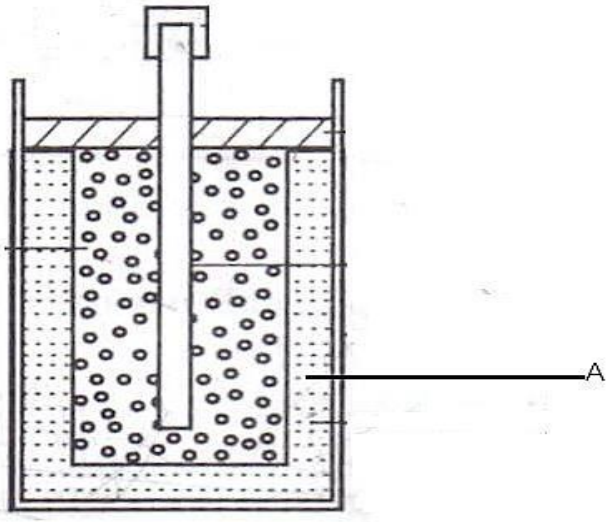


Figure 1

(i) Name the part labeled A **(1 mark)**

(ii) State the use of manganese (iv) oxide in the cell **(1 mark)**

4.a) The **figure 2** below shows a soft iron bar that's placed in a coil near a free suspended magnet.

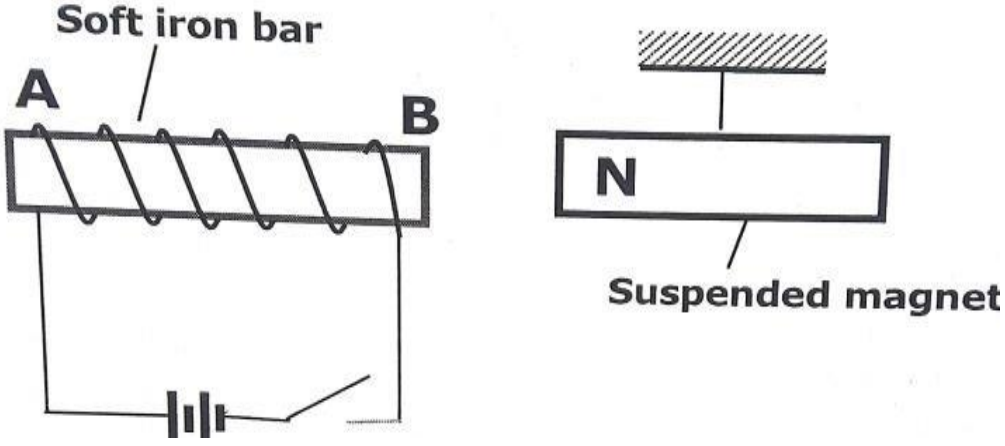


figure 2

State and explain the observation made when the switch is closed. **(2marks)**

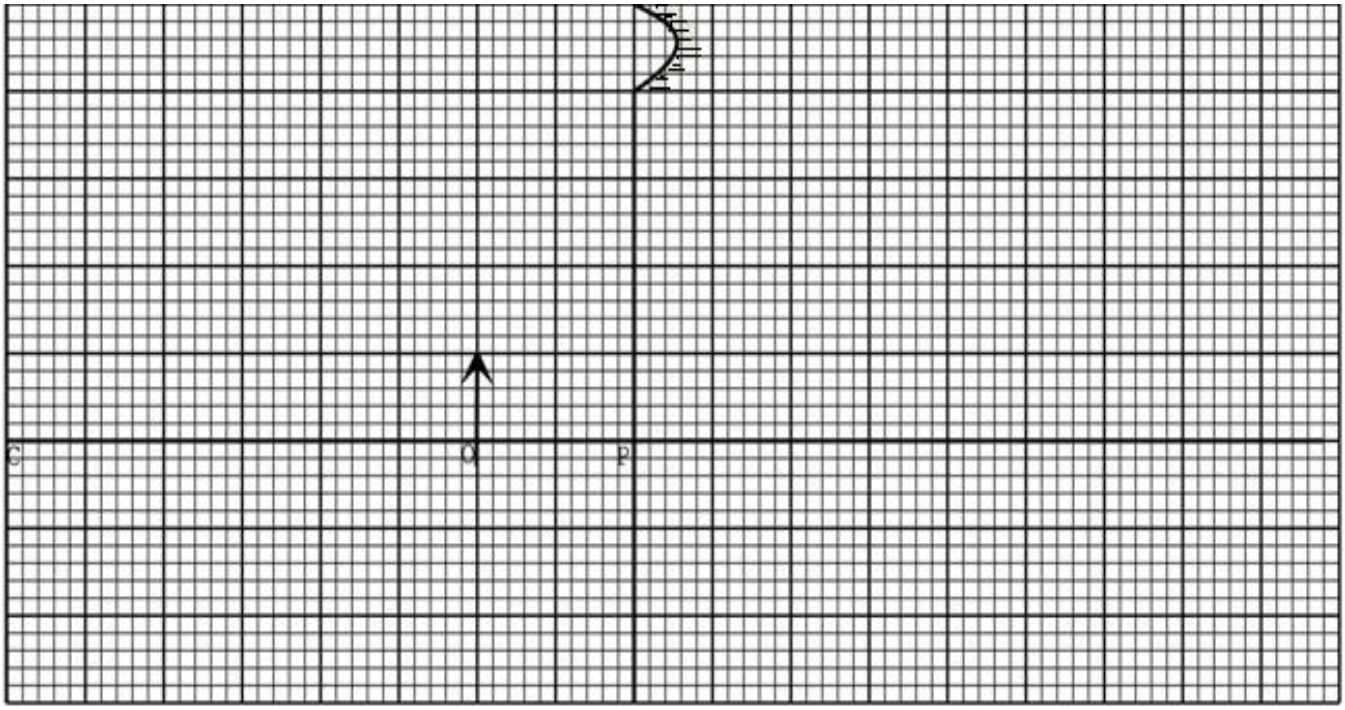
b.) Give a reason why attraction in magnetism is not regarded as a reliable method of testing for polarity**.** **(1mark)**

5.Explain the termwavelength in terms longitudinal **wave** **(1mark)**

6.(a) State the effect of pressure on the speed of sound in air**.** **(1mark)**

(b)A boy stands 190m from a high wall and claps his hands. If he hears an echo1.3 Seconds later, calculate the speed of sound in air. **(2marks)**

7.Figure 3below shows an object, O placed 10 cm in front of a concave mirror whose radius, C is 40 cm.



On the same figure, draw a ray diagram to show the position of the image formed**.** **(3 marks)**

8.State any factor that determine the heating effect by an electric current. **(1mark)**

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

P	**x-rays**		**Q**	**Infra-red**		

a). Identify the radiation marked **(1mark)**

Q. –

b) State the application of radiation marked **P** **(1mark)**

10.Light travels from glass to air as shown in **figure 5**. The refractive index of glass 1.5

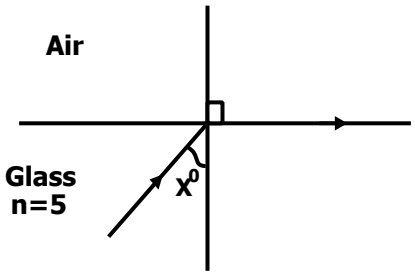


figure 5.

(a) Determine angle **x** **(2marks)**

11.**Figure 6** shows air molecules in front of a hollow, wooden box B set vibrating by a tuning fork.



figure 6

i)State the reason of mounting the tuning fork on the box which is open at one end. **(1mark)**

What is the name given to this kind of wave**?** **(1 mark)**

12. The **figure 7** below shows an isolated negative charge placed closer to a negatively charged plate. Draw the electric field patterns. **(1mark)**

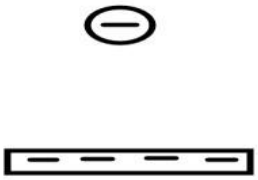


figure 7

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

SECTION B(55MARKS)

14.(a) State **two** ways in which the speed of rotation of a motor can be increased **(2marks)**

b)The **figure 8** below shows a simple electric bell circuit

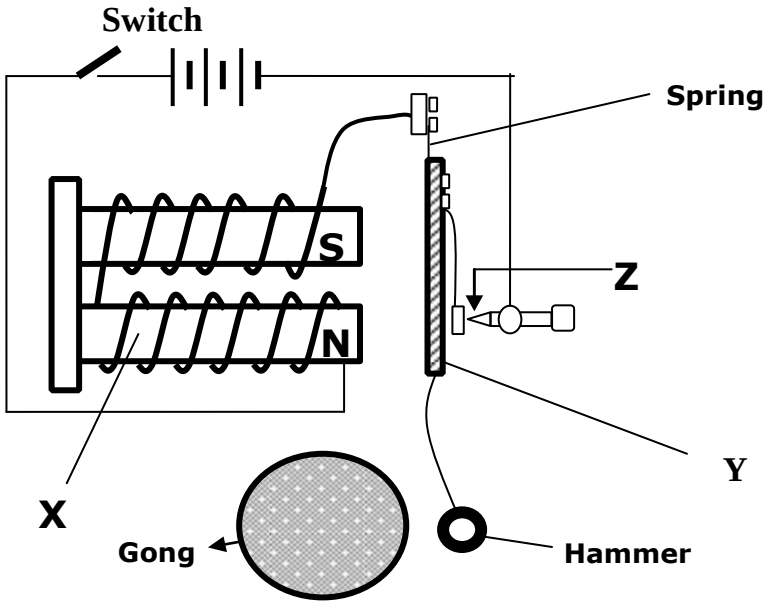


figure 8

i) Name the parts labeled. **(2marks)**

I) **X…….**

II) **Y …….**

ii) When the switch is closed, the hammer hits the gong repeatedly. Explain why:

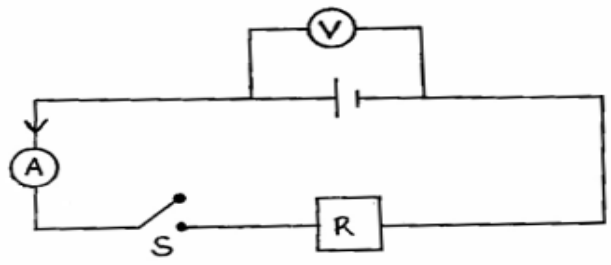
I) The hammer hits the gong. **(2marks)**

II) The hammer hits the gong repeatedly **(2marks)**

iii) If the armature is made of steel metal, it is observed that the bell will take longer to ring. Explain this observation **.** **(1 mark)**

iv) Name two adjustment should be done to the system to make it operate effectively with a lower voltage battery? **(2mark)**

15.(a) In an experiment to determine the internal resistance of a cell, the following circuit was used.



It was noted that when S is open, the voltmeter reads 1.5V and when S is closed the voltmeter reads 1.3V and ammeter reads 0.2A.

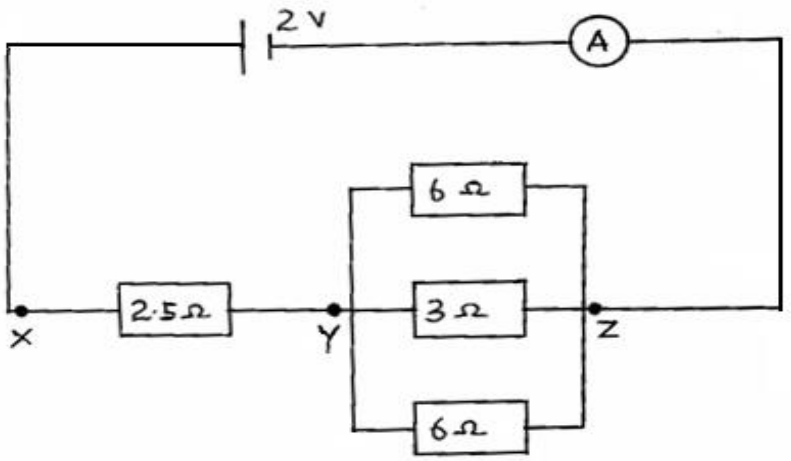
(i) Define the term e.m.f of the cell. **(1mark)**

(ii) Determine the lost voltage. **(1mark)**

(iii) Determine the value of R. **(2marks)**

(iv) Determine the internal resistance of the cell. **(3marks)**

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



(i) Determine the effective resistance of the circuit. **(3marks)**

(ii) Determine the p.d between X and Y. **(2marks)**

16.(a) (i) Define capacitance of **capacitor** **(1mark)**

(ii) A positively charged rod with a pointed end is brought near a candle flame as shown **fig. 9**.

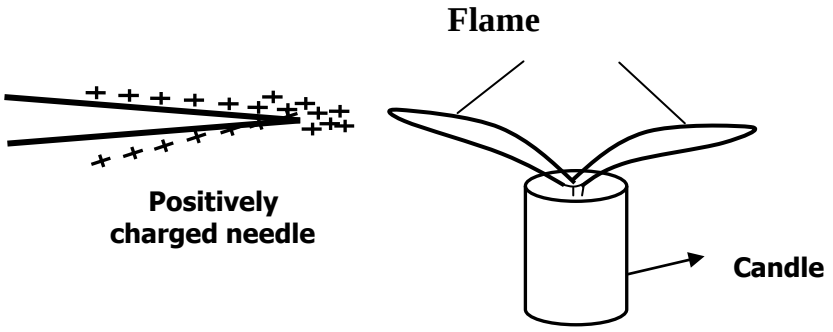


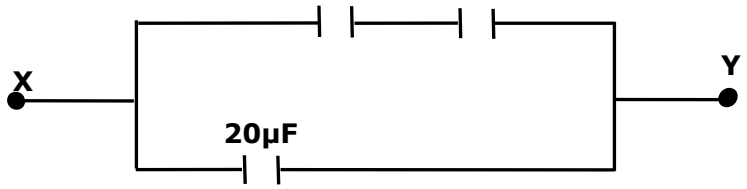
fig.9

Explain why the flame burns in the direction shown **(1mark)**

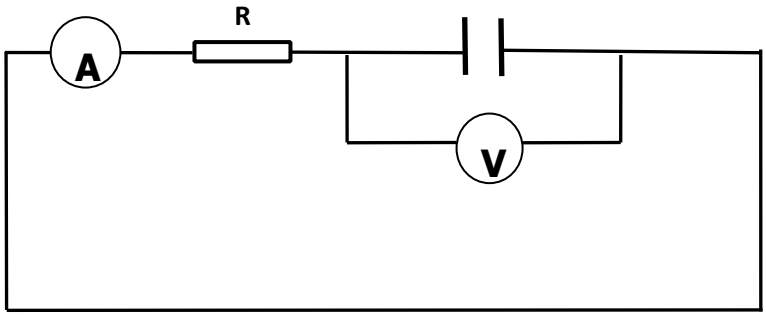
b). One of the factors which affect the capacitance of a parallel plate capacitor is the area of overlap of the plates. Name **two** other factors. **(2marks)**

c). Calculate the effective capacitance of the capacitors shown across points X and Y. **(3marks)**

60µF **30µF**



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



(2 marks)

17.(a)Water waves from a given source move from a deeper a shallow to end. What effect would this have on the;

(i) Frequency **(1mark)**

(ii) Wavelength **(1mark)**

(iii) Velocity of the **wave** **(1mark)**

(b).The **figure 10** shows wave fronts approaching a wide opening

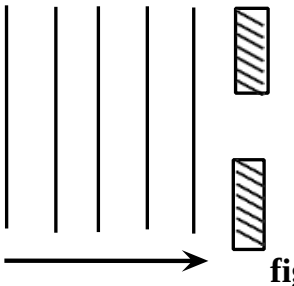


figure 10

i)Complete the diagram to show the appearance of the wave fronts after crossing the opening**(2mk)**

(ii) State what would be observed on the pattern if the gap was made smaller **(1mark)**

c.) Figure 11 below shows light rays from two coherent sources S_1 and S_2 falling on screen. Dark and bright fringes are observed between A and B

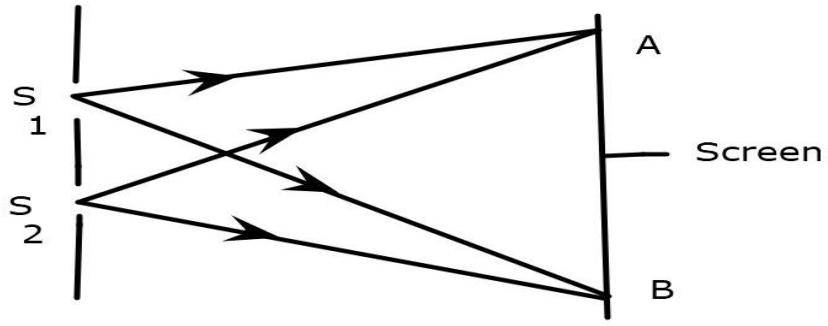


figure 11

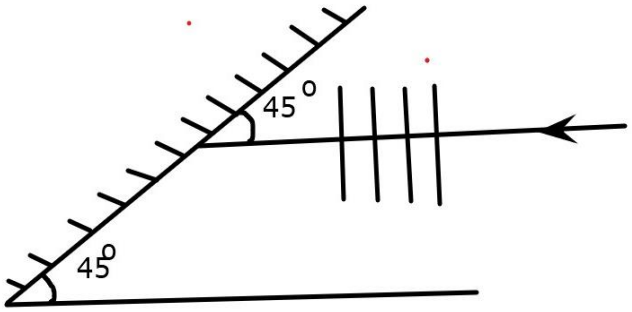
i) State the function of S_1 and S_2 **(1mark)**

ii) State how

I. Bright fringes are formed **(1mk)**

II. Dark fringes are formed **(1mark)**

c). **Figure12** below shows plane water waves incident on a plane reflector placed at an angle to the path of the waves.

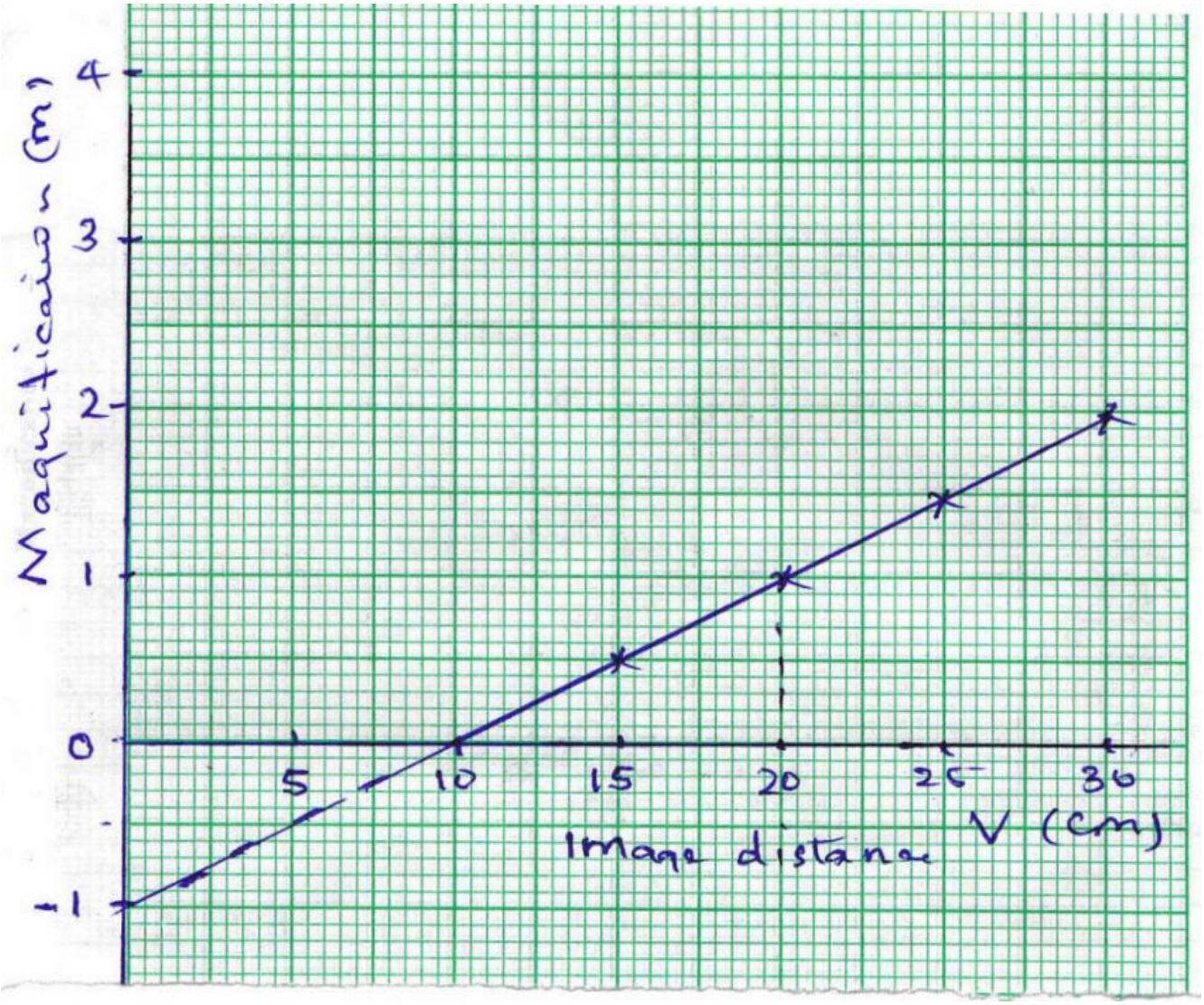


Complete the diagram to show the reflected waves **(2marks)**

18. (a) Define the term principal focus for in converging lens **(1mark)**

b) Sketch on a diagram to illustrate how a convex lens is used as a magnifying glass. **(3 marks)**

(c) In an experiment to determine the focal length of a converging lens using lensformula, several values of image distance corresponding to value of object distance u were determined and a graph of magnification m against image distance v, plotted as shown in **Figure 13**



The equation of the graph can be represented by the equation $m = \frac{v}{f} - 1$

(i) State the significance of the gradient of the graph **(1mark)**

(ii) From the graph, determine the focal length of the lens. **(3marks)**

(iii) Determine the value of object distance for which the image is not magnified**.** **(1mark)**

(iv) An object of height 10.5cm stands before a diverging lens of focal length 20cm and a distance of 10cm from the lens. Determine the image distance. **(3 marks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 6

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS

1. *Write your name, school and index number in the spaces provided above.*
2. *Sign and write the date of examination in the spaces provided above.*
3. *This paper consists of **two** sections, **section A** and **B**.*
4. *Answer **ALL** the questions in **section A** and **B** in the spaces provided.*
5. ***ALL** answers and working **MUST** be clearly shown.*

Where necessary take - *$g = 10\ ms^{-2}$* *Specific heat capacity of copper = 400 $Jkg^{-1}k^{-1}$*

- *Specific heat capacity of oil = 2400 $J/kg^{-1}k^{-1}$*
- *Specific latent heat of fusion of ice = 336000 Jkg*

FOR OFFICIAL USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1–13	25	
B	14	12	
	15	12	
	16	11	
	17	11	
	18	09	
	TOTAL	80	

SECTION A (25 MARKS)

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

1. The micrometer screw gauge represented in figure 1 below has a thimble scale of 50 divisions.

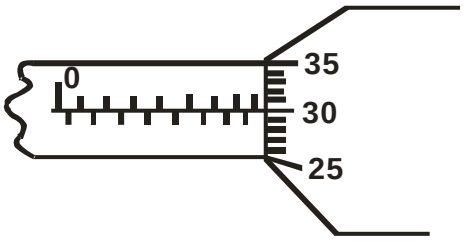


Figure 1

What is the reading shown? **(1 mark)**

2. Two identical tubes A and B held horizontally contain air and water respectively. A small quantity of coloured gas is introduced at one end of A while a small quantity of coloured water is introduced to one end of B. State with reasons the tube in which the colour will reach the other end faster. **(2 marks)**

3. In the study of free fall, it is assumed that the force F acting on a given body of mass, m, is gravitational, given by F = ma. State **two** other forces that act on the same body.**(2 marks)**

4. Figure 2 below shows a uniform metre rule of weight, 1N with two weights of 0.18N and 0.12N suspended from its ends.

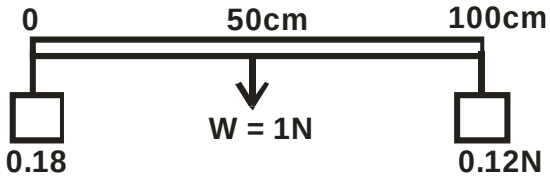


Figure 2

Determine how far from the 0.18N a pivot should be placed in order to balance the metre rule. **(3 marks)**

5. Sketch a velocity time graph for a body moving down a viscous fluid. **(1 mark)**

6. State the reason why banking of a circular part of road is necessary. **(1 mark)**

7. A lady of mass 80kg walks up a flight of 10 stairs each 20cm high in 5 seconds.

Determine the power she develops. **(3 marks)**

8. Figure 3 shows a fire alarm circuit.

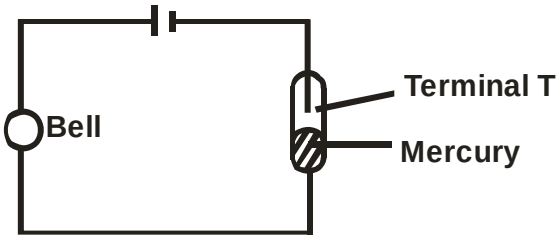


Figure 3

Explain how it works. **(3 marks)**

9. A light spiral spring extends by 4mm when loaded with a weight W. The spring is connected in series with an identical spring. The combination is loaded with weight W.

Determine the extension of the combination. **(2 marks)**

10. In an experiment to demonstrate atmospheric pressure, a plastic bottle is partially filled with hot water and the bottle is then tightly corked. After some time the bottle starts to get deformed.

i) State the purpose of hot water. **(1 mark)**

ii) State the reason why the bottle gets deformed. **(1 mark)**

iii) Explain your answer in (ii) above. **(2 marks)**

11. Define the term angular velocity. **(1 mark)**

12. Tall buildings are built with lighter materials at the upper part. Explain. **(1 mark)**

13. State how the pressure in a moving fluid varies with speed of the fluid. **(1 mark)**

SECTION B (55 MARKS)

Answer ALL questions in this section in the spaces provided.

14. a) When a bullet of mass 0.02kg was fired into a block of ballistick pendulum of mass 1.98kg, the block rose through a height of 15cm as in the figure 4 below.

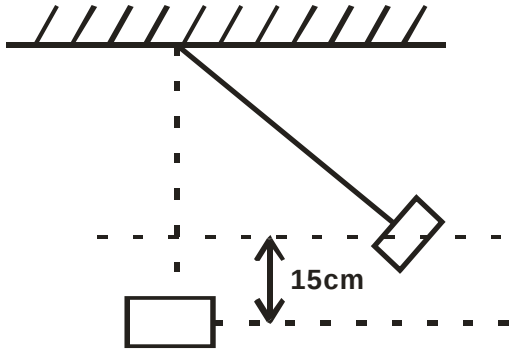


Figure 4

Determine:

i) The potential energy of the block and the bullet. **(2 marks)**

ii) The velocity of the bullet and block. **(2 marks)**

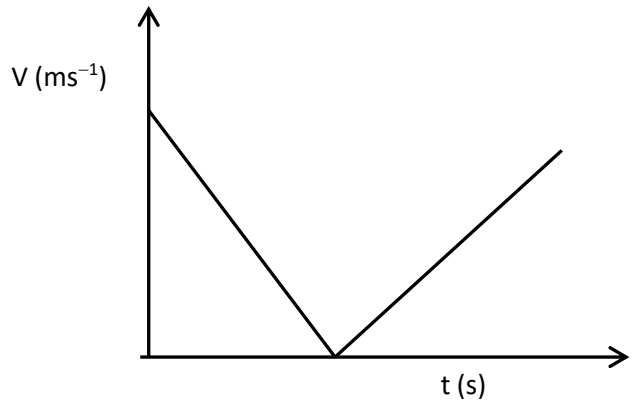
b) A trolley of mass 1kg moving at 1 ms^{-1} collides with a stationary block of wood of mass 2kg. If the trolley and the block of wood are stuck together and moved a distance of 0.1m before coming to rest. Find the,

i) Velocity of the system after collision. **(2 marks)**

ii) Kinetic energy after collision. **(2 marks)**

iii) The frictional force. **(2 marks)**

c) In the figure 5 below shows a velocity time graph for an object in a certain motion.



Describe the motion of the body. **(2 marks)**

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

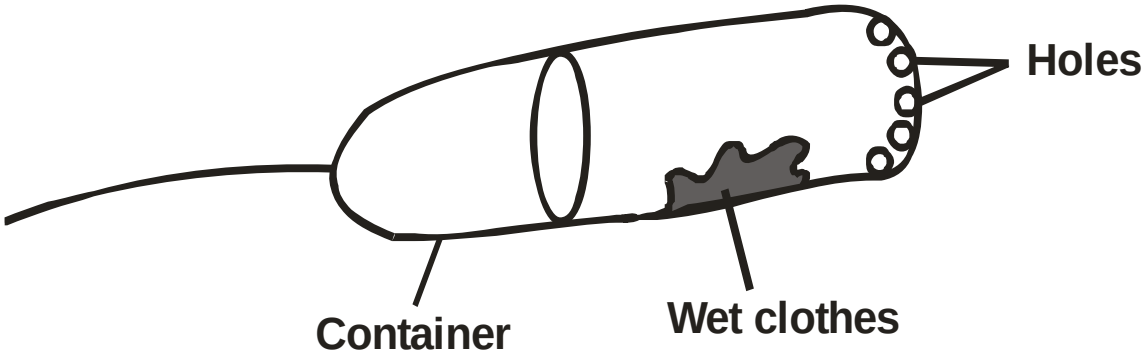
b) A particle moving along a circular path of radius 5m describes an arc length 2m every 2 seconds. Determine:

i) Its angular velocity. **(2 marks)**

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

c) A stone of mass 40g tied to the end of a string of 50cm and whirled in a vertical circle at 2 revolutions per second. Calculate the maximum tension in the string. **(3 marks)**

d) Figure 6 below shows a container with small holes at the bottom in which wet clothes have been put.



When the container is whirled at high speed, it is observed that the clothes dry faster.

Explain how the rotation of the container causes the clothes to dry faster. **(2 marks)**

e) State **two** factors affecting centripetal force. **(2 marks)**

16. a) Distinguish between heat capacity and specific heat capacity. **(2 marks)**

b) Figure 7 below shows a set up that may be used to determine specific heat capacity of the liquid.

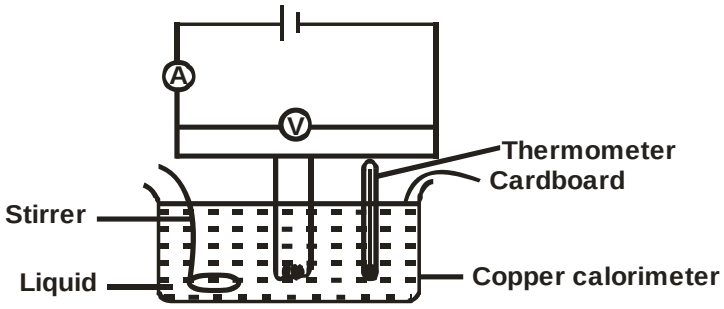


Figure 7

i) Outline the measurements that should be taken in the experiment. **(2 marks)**

ii) Explain how the measurements in (i) above are used to determine the specific heat capacity of the liquid. **(3 marks)**

iii) State **one** precaution one would take in modifying the setup for accurate results. **(1 mark)**

c) An electric heater rated 2kW is used to heat a 400g aluminium container filled with 1kg of water. Assuming no heat is lost to surrounding; calculate the time taken to raise the temperature of the water by 10^oC. Take specific heat capacity of aluminium as $900Jkg^{-1}k^{-1}$ and that of water as $4200Jkg^{-1}k^{-1}$. **(3 marks)**

17. a) Define the term work and state its SI units. **(2 marks)**

b) A crane lifts a load of 500kg through a vertical distance of 4m in 8 seconds. Determine

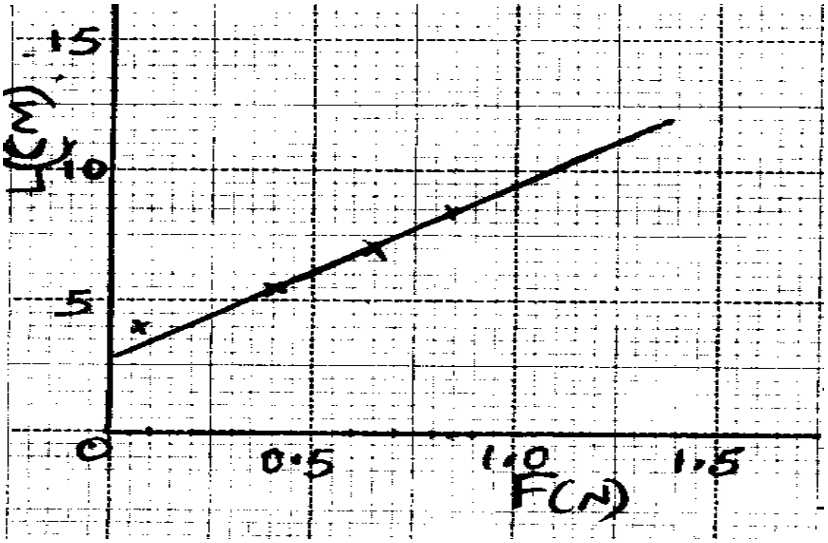
i) Work done by the crane. **(2 marks)**

ii) Power developed by the crane. **(2 marks)**

iii) Efficiency of the crane given that it's operated by an electric motor rated 2.8kW. **(3 marks)**

iv) State **two** factors that contribute to the efficiency being less than 100%. **(2 marks)**

18. The graph below shows force F applied to a spring and the corresponding length h of the spring.



a) Use the graph above to find;

i) The length of the unloaded spring. **(1 mark)**

ii) The gradient of the graph. **(2 marks)**

iii) The spring constant in SI unit. **(2 marks)**

b) A body weighing 25N displaces 1.4kg of water when totally immersed in it.

Find the reading of a spring balance supporting the body in water. **(2 marks)**

c) When a stone is placed on water, it sinks. But when the same stone is placed on a block of wood, both are found to float. Explain this observation. **(2 marks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 6

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

1. *Write your name and index number in the spaces provided above.*

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

3. *This paper consists of two sections**, section A** and **B**.*

4. *Answer **all** the questions in **section A** and **B** in the spaces provided.*

Where necessary take: - g = 10N/kg

- Plank's constant, h = 6.63×10^{-34} J.S Speed of light, C = 3.0×10^{8} ms^{-1}

FOR EXAMINER'S USE ONLY

Section	Question	Maximum score	Candidate's score
A	1–13	25	
B	14	11	
	15	09	
	16	14	
	17	11	
	18	10	
	Total	80	

SECTION A (25 MARKS)

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

1. An object 10cm tall is placed 20cm infront of a diverging lens of focal length 15cm. Determine the nature, position and magnification of the image by calculation. **(3 marks)**

2. Explain why the image formed in a pinhole camera gets blurred when the hole is enlarged. **(1 mark)**

3. Figure 1 shows a cell of e.m.f 2.5V connected in series with a resistor R and a switch S. Voltmeter, V_1 and V_2 are connected across the cell and the resistor respectively.

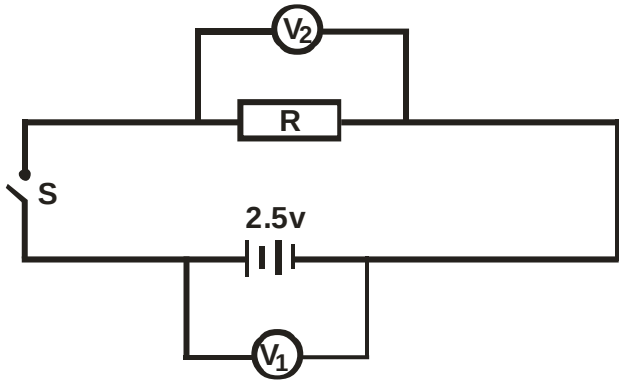
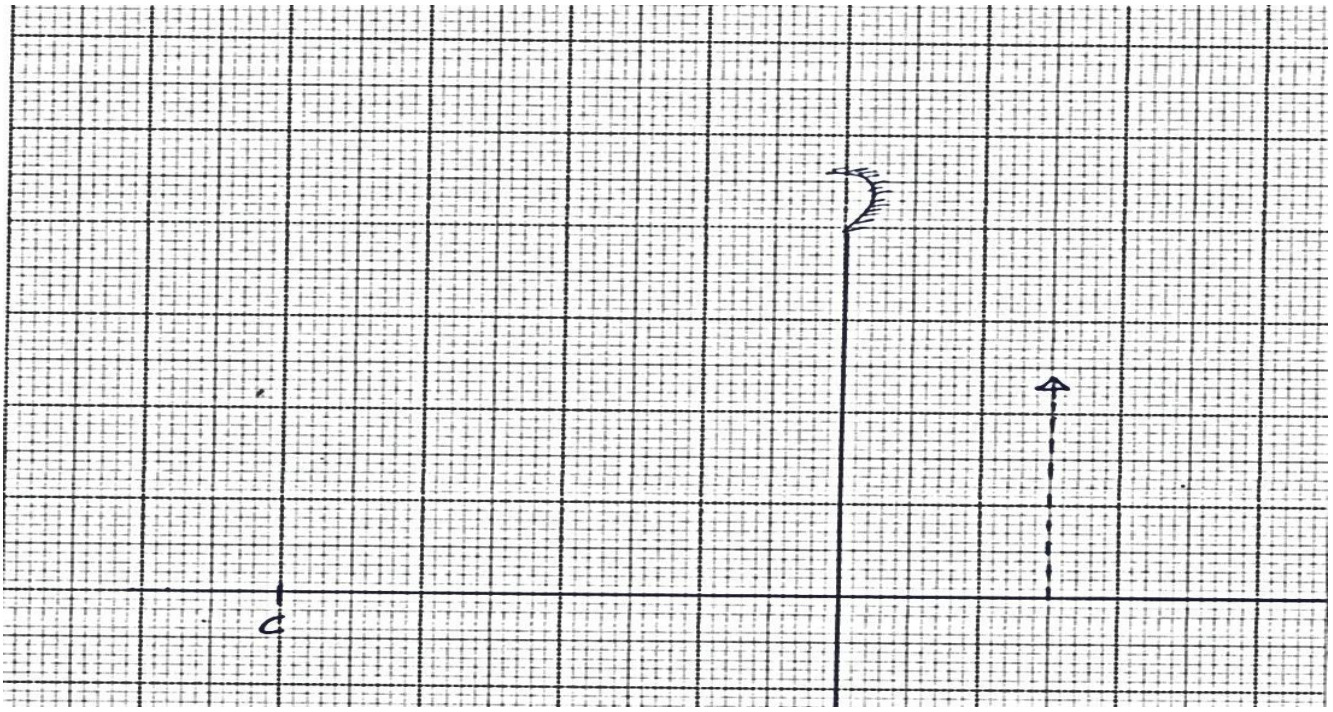


Figure 1

a) State the reading of V_1 with S open. **(1 mark)**

b) With S closed, V_1 reads 1.6V. State the reading of V_2. **(1 mark)**

4. Figure 2 shows the image of an object formed by reflection in a converging mirror. C is the centre of curvature of the mirror.



Complete the diagram to show:

a) How incident rays are reflected to form the image. **(2 marks)**

b) The object position. **(1 mark)**

5. The equation below represents a nuclear reaction in which two deuterium nuclei fuse to form helium and X.

$${}^{2}_{1}H + {}^{2}_{1}H \longrightarrow {}^{4}_{2}He + {}^{a}_{b}X$$

a) Determine the values of a and b. **(1 mark)**

b) Identify X. **(1 mark)**

6. Figure 3 shows a simple transformer connected to a 24v a.c source and an a.c voltmeter.

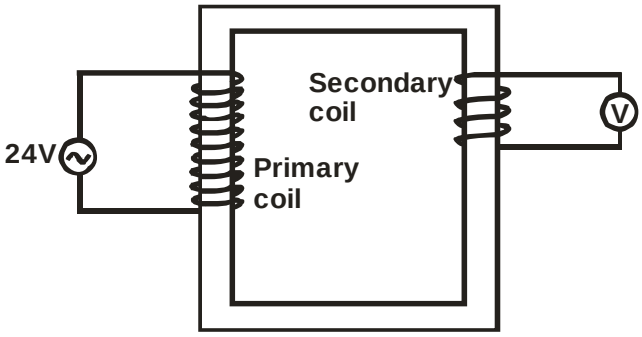


Figure 3

By counting the number of turns in each coil, determine the reading on the voltmeter.

(2 marks)

7. In domestic wiring systems lamps in the lighting circuit are required to be in parallel and not in series. Sate **two** reasons for this requirement. **(2 marks)**

8. Figure 4 shows a narrow beam of x-rays passing between two metal plates in air.

The plates are connected in series with a switch, a cell and a milliameter.

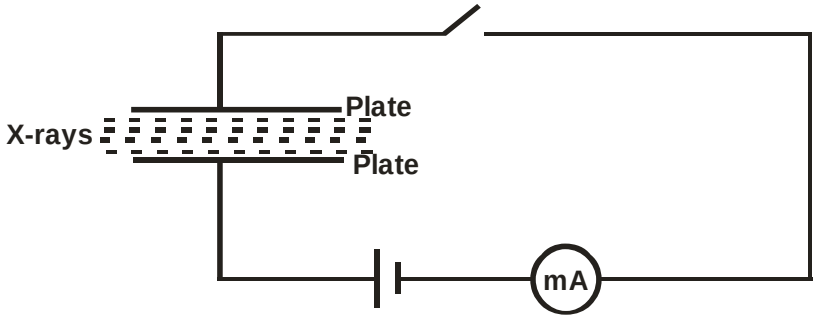


Figure 4

It is observed that when the switch is closed a current flows in the milliameter.

Explain this observation. **(2 marks)**

9. The anode of an x-ray tube becomes hot when the tube is in use. State the reason for this.

(1 mark)

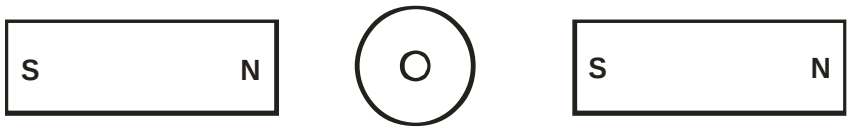
10. Draw a ray diagram to show how a ray of light may be totally internally reflected two times in an isosceles right-angled glass prism. (Assume that the critical angle of glass is 42°C.)

(2 marks)

11. Given that the velocity of sound in air is $330ms^{-1}$.

Calculate the wavelength of sound produced by a turning fork rated 0.44 kHz. **(2 marks)**

12. Figure 5 below shows two bar magnets and soft iron ring placed between the magnets.



Complete the diagram to show the magnetic field pattern through the soft iron ring. **(1 mark)**

13. Determine the power of a lens whose focal length is 40cm. **(2 marks)**

SECTION B (55 MARKS)

Answer ALL questions in this section in the spaces provided.

14. a) Explain how a negatively charged electroscope gets discharged when the cap is touched with a finger using a simple diagram. **(2 marks)**

b) Figure 6 shows capacitors A and B connected in series with a battery of e.m.f 4V.

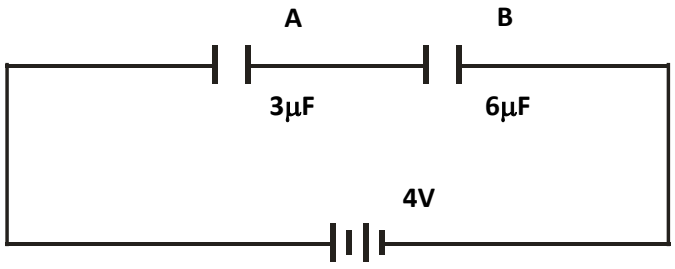


Figure 6

Determine:

i) The effective capacitance of the circuit. **(3 marks)**

ii) The quantity of charge in capacitor A. **(3 marks)**

iii) The quantity of charge in capacitor B. **(1 mark)**

c) Figure 7 shows an isolated positive point charge Q.

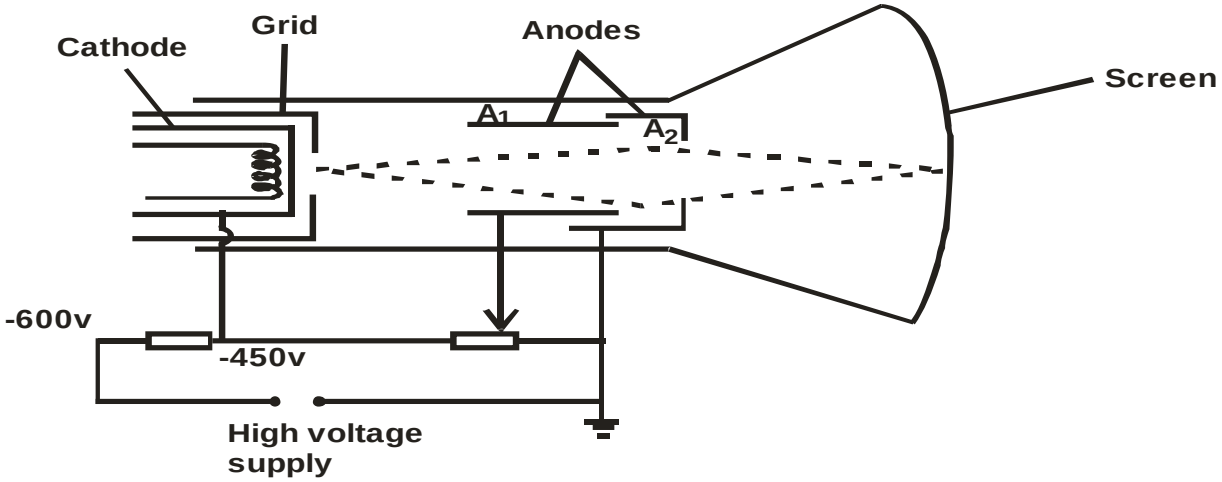


Figure 7

On the figure, sketch the electric field pattern around the charge. **(2 marks)**

15. a) Figure 8 below shows a cathode ray tube in which a beam of electrons is cast on the screen.

Figure 8



i) State how the electrons are produced in the tube. **(1 mark)**

ii) State how the electron beam is detected. **(1 mark)**

iii) State the reason for having a variable potential difference (p.d) at the:

I. grid **(1 mark)**

II. anodes **(1 mark)**

b) Figure 9 below shows the wave form of a signal applied at the y-plates of an oscilloscope whose time base is switched to the scale of 20 milliseconds per centimeter.

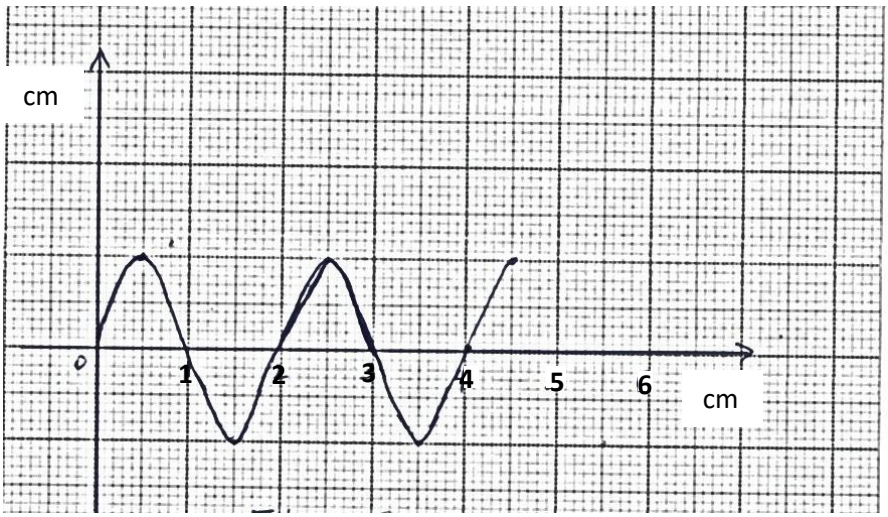


Figure 9

Determine:

i) The period of the signal. **(2 marks)**

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

16. An X-ray tube requires an anode potential of 10^5V and a current of 0.02A to operate.

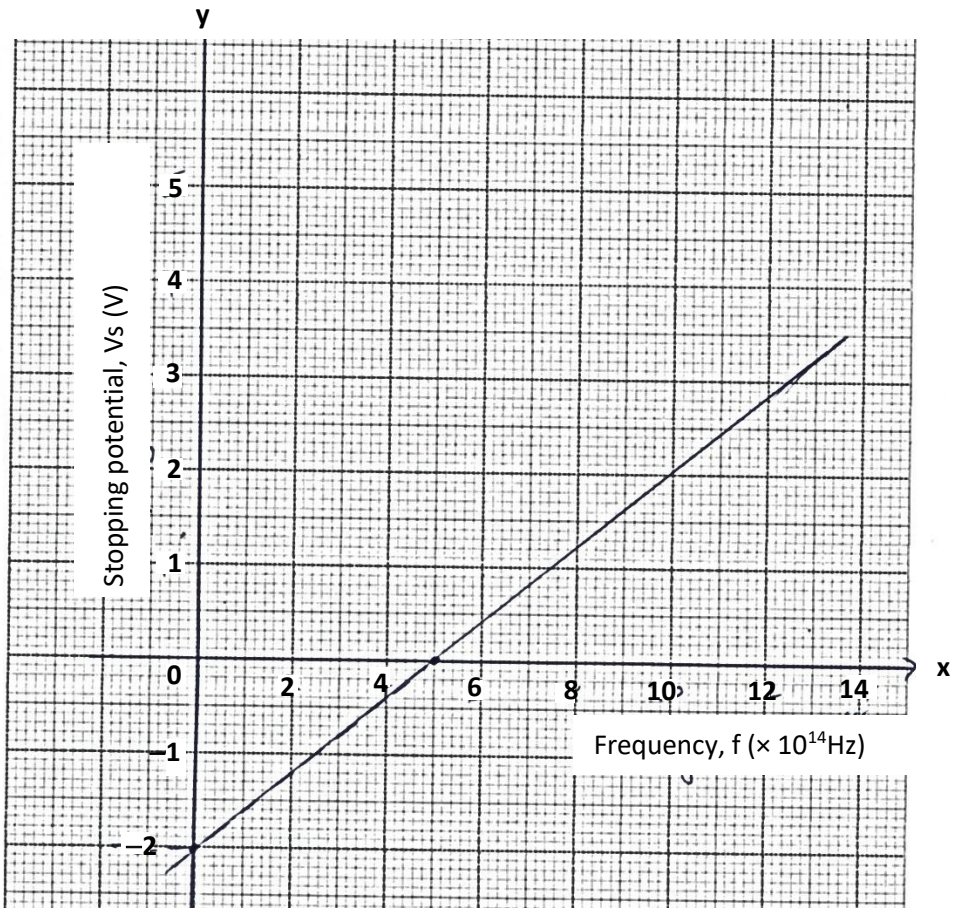
Determine:

a) The number of electrons hitting the target per second. **(3 marks)**

b) The velocity with which the electrons hit the target.

($e = 1.6 \times 10^{-19}c$, $Me = 9.0 \times 10^{-31}kg$) **(2 marks)**

c) In an experiment to investigate the relationship between energy of radiation and stopping potential, the results were shown in a graph below. (Velocity of light = 3×10^{8} ms^{-1} and $e = 1.6 \times 10^{-19}c$).



From the graph determine:

i) The threshold frequency. **(1 mark)**

ii) The threshold wavelength. **(2 marks)**

iii) Planck's constant. **(3 marks)**

iv) The work function. **(3 marks)**

17. a) A ray of light is incident on a plane mirror as shown in figure 9 below.

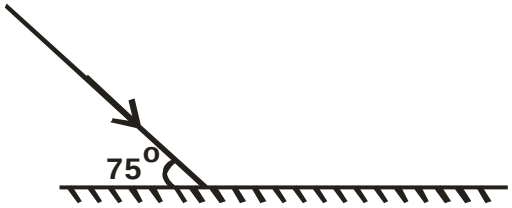


Figure 9

What is the angle of reflection? **(1 mark)**

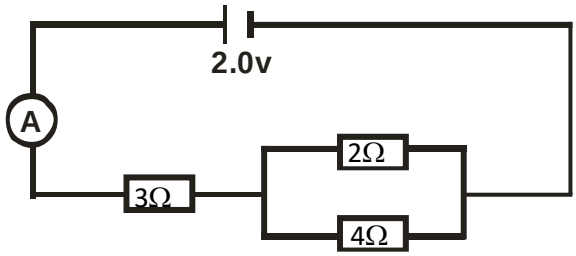
b) The mirror is then rotated clockwise through 20°. Determine:

i) The angle through which the reflected ray is turned. **(2 marks)**

ii) The angle between the incident ray and new reflected ray. **(2 marks)**

c) Explain **two** ways in which power loss is reduced in transmission of mains electricity.**(2 marks)**

d) The diagram below shows resistors connected in a circuit diagram.

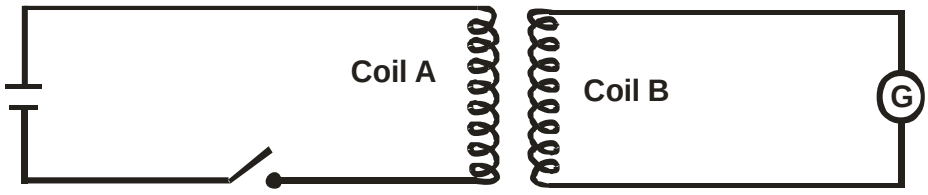


i) Determine the effective resistance of the above circuit. **(2 marks)**

ii) Determine the ammeter reading. **(2 marks)**

18. a) The figure 10 shows two coils A and B placed close to each other.

A is connected to a steady D.C supply and a switch, B is connected to a sensitive galvanometer.

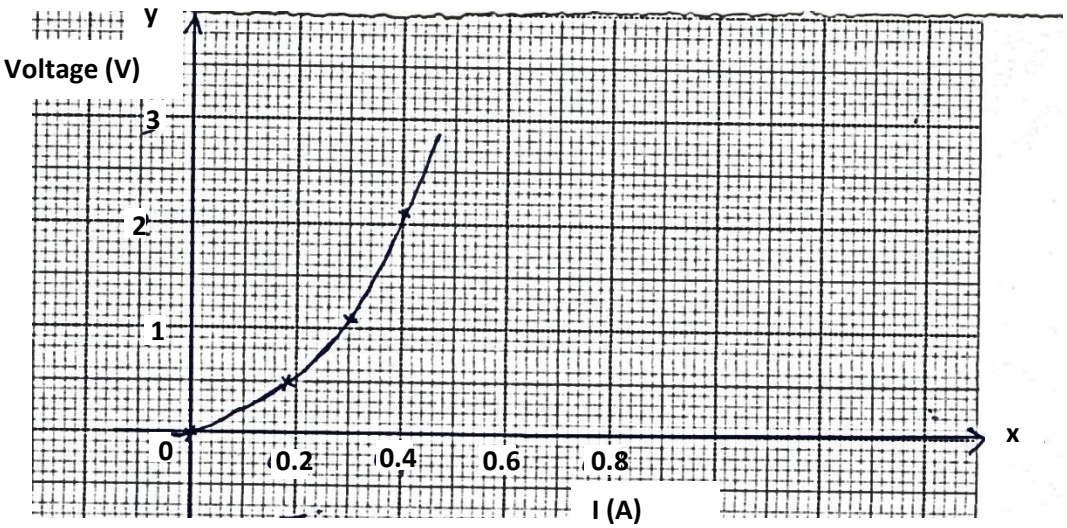


i) The switch is now closed. State the observation made on the galvanometer. **(1 mark)**

ii) State what would be observed if the switch is then opened. **(1 mark)**

b) Define the term electromotive force (e.m.f) of a cell. **(1 mark)**

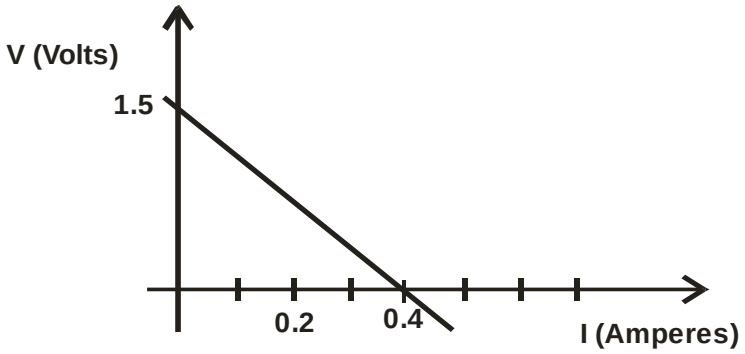
c)The graph in figure 11 shows how the voltage, v, varies with the current, I for a filament lamp.



i) From the graph, determine the resistance of the lamp when a current of 0.4A flows. **(2 marks)**

ii) State with a reason whether the device is ohmic or non-ohmic. **(1 mark)**

d) Figure12 shows the variation of voltage against current.



Given that E = V + Ir

Find from the graph,

i) The e.m.f, E of the cell. **(1 mark)**

ii) The internal resistance, r, of the cell. **(3 marks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 7

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

a) *Write your name and index numbers in the spaces provided above.*

b) *This paper consists of TWO sections: A and B*

c) *Answer All the questions in section A and B in the spaces provided*

d) *ALL working MUST be clearly shown*

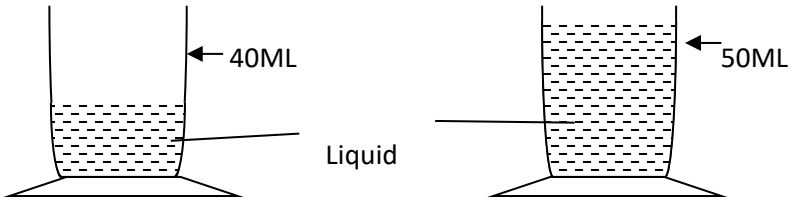
e) *Mathematical tables and electronic calculators may be used.*

FOR EXAMINERS USE ONLY

Section	question	Maximum score	Candidate's score
A	1-14	25	
B	1516	13	
	16	12	
	17	12	
	18	18	
	Total Score	**80**	

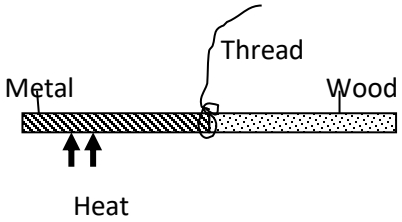
SECTION A: 25 MARKS

1. A stone of mass 40g was completely immersed in a liquid. The level of liquid are shown in the figure



Determine the density of the stone in SI units **(2mks)**

2. The following figure shows a rod made of wood on one end and metal on the other end suspended freely with a piece of thread so that it is in equilibrium.



The side made of metal is now heated with a Bunsen flame. State with a reason, the side to which the rod is likely to tilt **(2mks)**

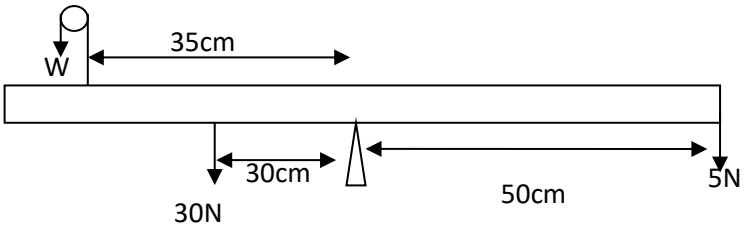
3. Estimate the size of an oil molecule if a drop of oil of volume 6.0×10^{-10} m^3 forms a patch of 32 on a water surface. **(2mks)**

4. Other than oil patch being monolayer, sate any one other assumption in the oil drop experiment. **(1mk)**

5. An immersion heater rated at 180W is placed in a liquid of mass 2kg. When the heater is switched on for 7.5 minutes the temperature of the liquid rises by 400C. Determine the specific heat capacity of the liquid. **(3mks)**

6. Other than temperature state one other factor that affects the surface tension of water. **(1mk)**

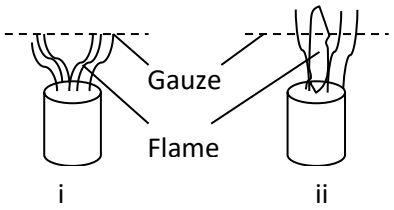
7. The figure below shows a uniform bar pivoted at its centre and is at equilibrium.



Determine the value of w. **(3mks)**

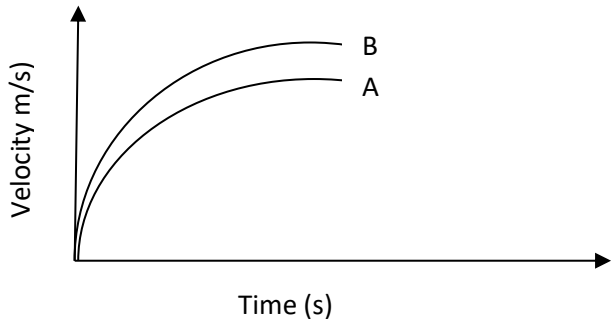
8. When a Bunsen burner is lit below wire gauze, it is noted the flame initially burns below he gauze as shown in

(i) After sometime, the flame burns below as well as above the gauze as shown in



(ii) Explain this observation **(2mks)**

9. The figure shows the velocity time graph of two identical spheres released from the surfaces of two liquids A and B.

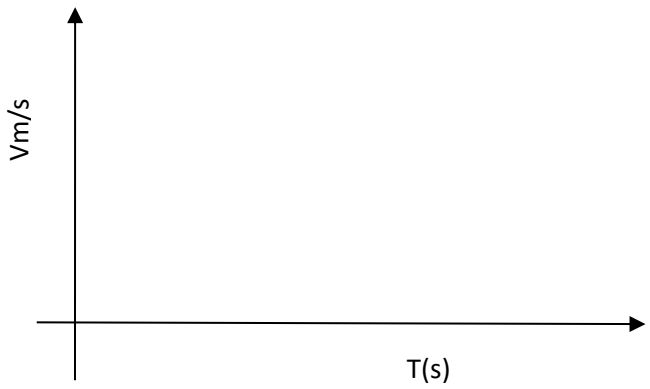


Give a reason why the terminal velocity of the sphere In B is higher than in A. **(1mk)**

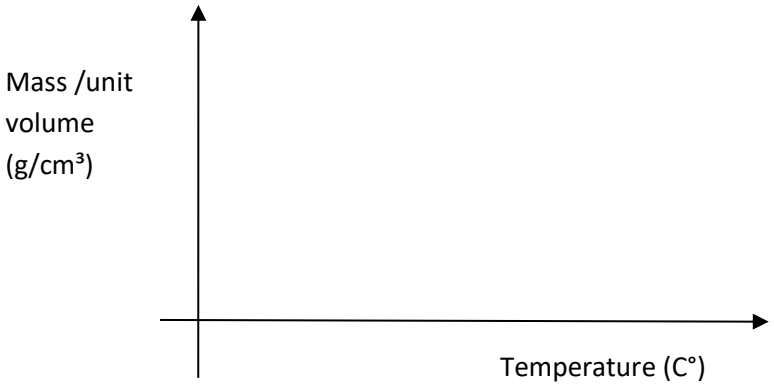
10. A box of mass 500g is dragged along a level ground at a speed of 12m/s. if the force of friction between the box and the floor is 2000N, calculate the power developed. **(2mks)**

11. State how heat losses by convection and radiation are minimized in a thermos flask. **(2mks)**

12. On the axes provided sketch a graph of velocity (v) verses time (t) for uniformly accelerated motion given that t=0,v is greater than zero. (1mk)



13. Sketch on he axes provided a graph to show how mass per unit volume of water varies with temperature when water is heated from 0^0 to 20^0 **(2mks)**

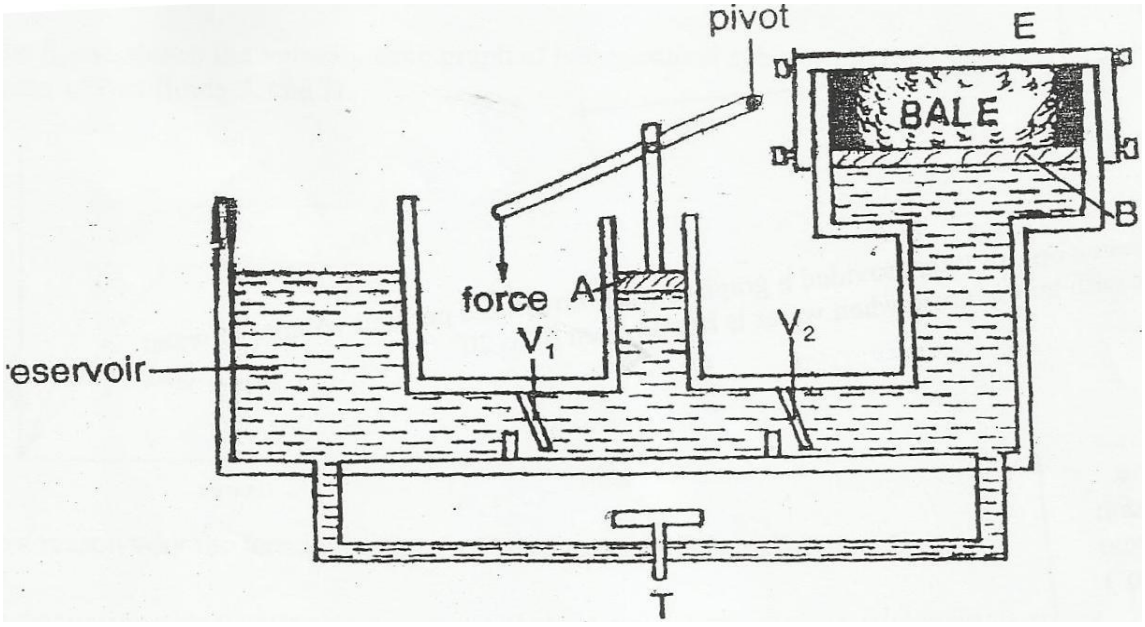


14. State how the velocity of a moving fluid varies with pressure. **(1mk)**

SECTION B (55 MARKS)

15. (a) When a fountain pen is taken in a high aero plane, it leaks. A ball point pen does not have this problem. Explain how the ball point is able to overcome this problem. **(1mk)**

(b) The fig below shows a hydraulic press used to compress a bale



(i) Explain briefly ho a force applied on the lever compresses the bale. **(4mks)**

(ii) Given that the area of piston B is $18cm^2$ and that of piston A $3.0cm^3$. A force of 2N is applied to piston A, find the force produced on the larger piston B that compresses the bale. **(2mks)**

(c) A 180W heater is immersed in a copper calorimeter of mass 100g containing 200g of alcohol. When he heater is switched on after 36 seconds the temperature of calorimeter and its contents rises t 12^0. If S.H.C of water and copper is 4200 J/kgk and 400j/Kgk respectively.

Determine:

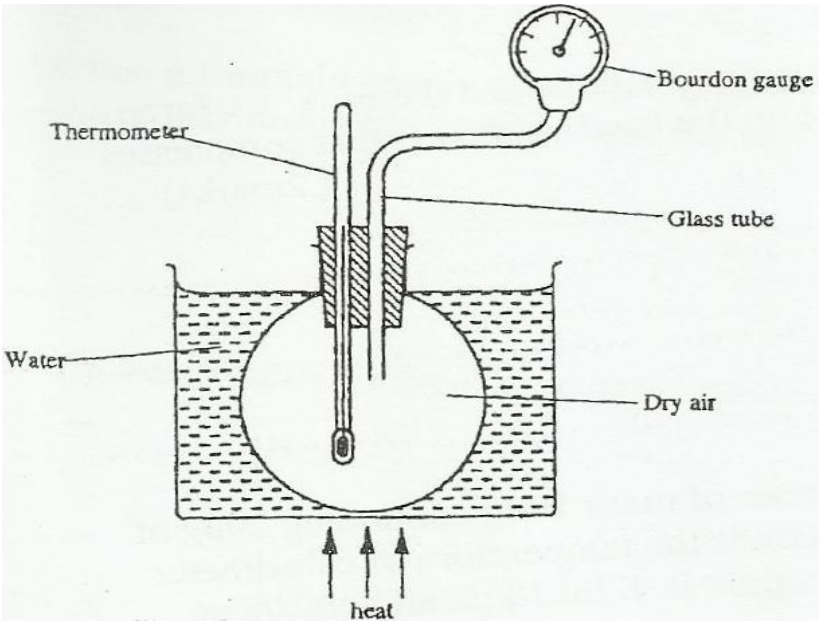
(i) Heat lost by the heater **(2mks)**

(ii) Heat gained by calorimeter and alcohol, if the specific heat capacity of alcohol C_u. **(2mks)**

(iii) The value of specific heat capacity of alcohol **(1mk)**

16. (a) State the pressure law for an ideal gas **(1mk)**

(b) The set up shows an arrangement to determine the relationship between temperature and pressure of a gas constant volume.

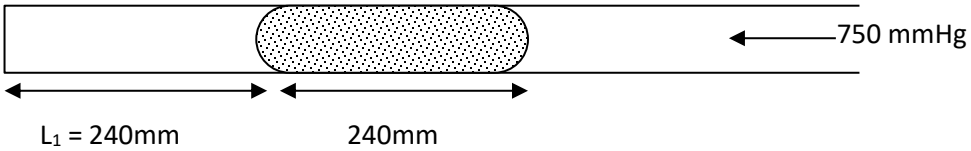


(iii) Describe how pressure measurements are obtained in the experiment. **(3mks)**

(iv) Explain how the result form the experiment can be used to determine the relationship between temperature and pressure. **(2mks)**

(c) A bicycle tire is pumped to a pressure of 2.2×10^5pa at23^0C. After a race the pressure is found to be 2.6×10^0 pa. Assuming the volume of the tire did not change, what is the temperature of the air in the tire. **(3mks)**

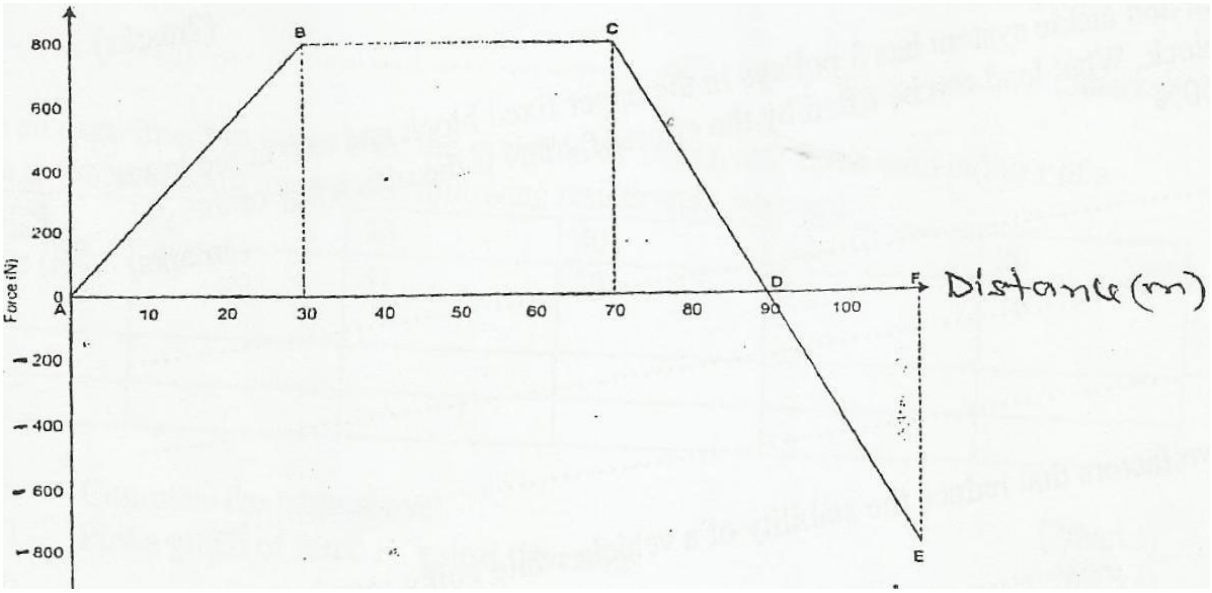
(d) Air is trapped inside a glass tube by a thread of mercury 240 mm long. When the tube is held horizontally the length of the air column is 240mm.



Assuming that the atmospheric pressure is 750mm Hg and the temperature is constant; calculate the length of the air column when the tube is vertical with open end down. **(3mks)**

17. (a) Define the term work **(1mk)**

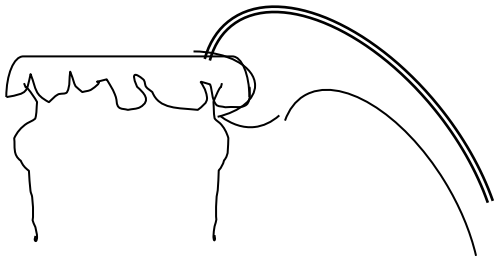
(b) The figure shows a force-distance graph for a car towed on a horizontal ground



(i) Calculate the total work done **(3mks)**

(ii) If the velocity just before reaching point C is 0.6m/s, calculate the power developed by the agent providing the force at this point. **(3mks)**

(c) **The** figure below shows a bottle top opener

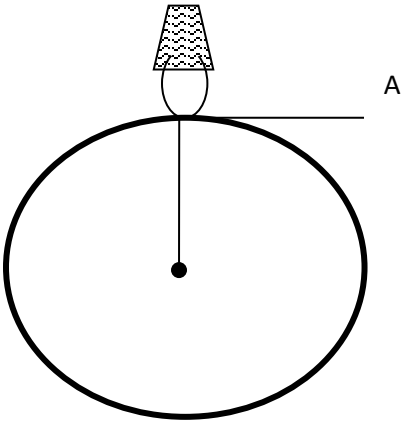


Indicate on the diagram the direction of the load and effort. **(2mks)**

(d) A block and tackle system has 3 pulleys in the upper fixed block and two in the lower movable block. What load can be lifted by the effort of 200N if the efficiency of the system is 60%**(3mks)**

18.(a) State two factors that reduce the stability of a vehicle while going round a banked bend.**(2mks)**

(b) The figure shows a bucket filled with water of mass 5kg tied on a string 2.0 m long being rotated in a vertical circle with a constant speed V m/s.



Calculate the minimum speed the bucket takes to rotate in position A so that the water remains in the bucket. **(3mks)**

(c) A car of mass 6000kg is driven round a horizontal curve of radius 250m. if the force of friction between the tyres and the road is 21000N, what is the maximum speed that the car can be driven at on the curve without going off the road. **(3mks)**

(d) In an experiment to investigate the variation of centripetal force with radius r of a circle in which a body rotates, the following results were obtained.

Mass(g)	60	50	40	30	20
Radius® cm	50	41	33	24	16
F(N)					
R(m)					

(i) Complete the table above **(2mks)**

(ii) Plot a graph of force F against the radius **(5mks)**

(iii) Given that mass of the body is 100g, use the graph to determine the angular velocity. **(3mks)**

(e) State one application of circular motion **(1mk)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 7

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

232/2

PHYSICS

(THEORY)

PAPER 2

TIME: 2 HOURS

Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES:

1. *Write your name, school, admission number and index number is the spaces provided above.*
2. *Sign and write the date of examination in the spaces above.*
3. *Answer **ALL** the questions in section A and B in the spaces provided.*
4. *All working **MUST** be clearly shown.*
5. *Non-programmable silent electronic calculators and KNEC mathematical tables may be used.*

SECTION A: (25 MARKS)

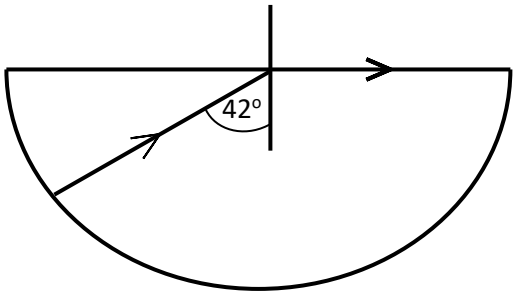
*Answer **ALL** questions this section in the spaces provided.*

1. What property of light is suggested by the formation of shadows? **(1mark)**

2. Why are audio recording hall walls covered with soft materials. **(1mark)**

3. A highly negatively charged rod is gradually brought close to the cap of a positively charged electroscope. It is observed that the leaf collapses initially and then diverges. Explain this observation. **(3marks)**

4. The figure **below** shows a ray of light incident on a face of semicircular prism. Determine the refractive index of the glass prism. **(3marks)**



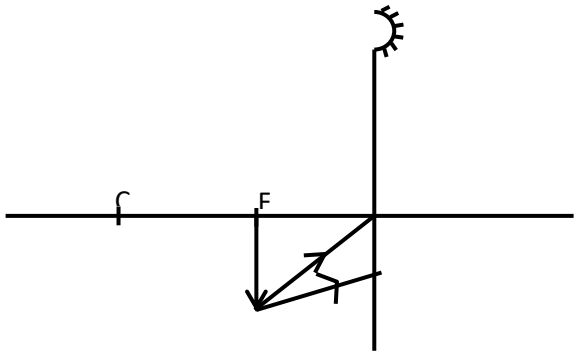
5. Explain why repulsion is the only sure test for polarity of a magnet. **(1mark)**

6. State the use of manganese (IV) oxide in a dry cell. **(1mark)**

7. A lamp of height 6cm stands infront of pin-hole camera at a distance of 24cm from the pin-hole. The camera screen is 8cm from the pinhole. Calculate the height of the image formed on the screen. **(3marks)**

8. A car accumulator is rated 40Al and is expected to supply a constant current for 120 minutes. Calculate the amount of current delivered. **(2marks)**

9. The figure **below** shows two incident rays on a concave mirror from the top of an object. Complete the ray diagram showing the reflected rays. **(2marks)**



10. An electric bulb rated 40W is operated on240V mains. Determine the resistance of its filament. **(3marks)**

11. **The** force on a straight conductor carrying current in a magnetic field can be varied by changing, among others, the magnitude of the current and the magnetic field strength. Name the other factors that can be changed to vary the force. **(2marks)**

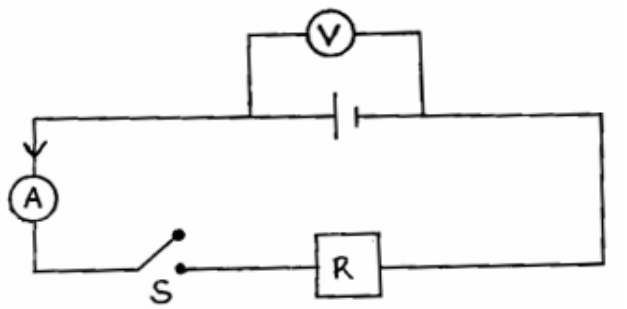
12. **(i)** Distinguish between transverse and longitudinal waves. **(1mark)**

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

SECTION B: (55 MARKS)

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

13.(a) In an experiment to determine the internal resistance of a cell, the following circuit was used.



It was noted that when S is open, the voltmeter reads 1.5V and when S is closed the voltmeter reads 1.3V and ammeter reads 0.2A.

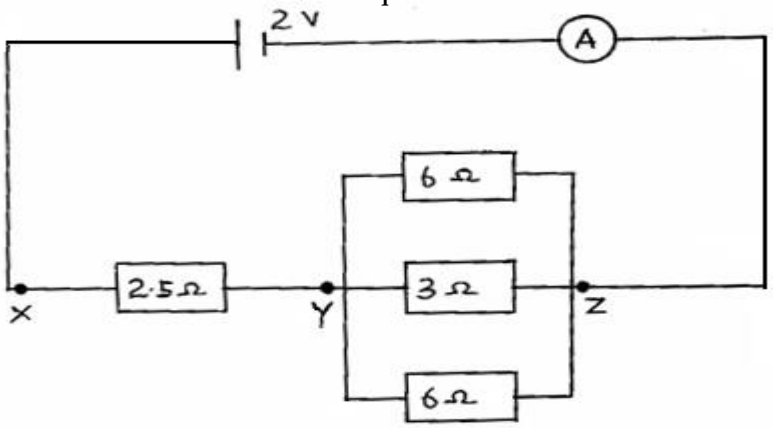
(i) What is the e.m.f of the cell. **(1mark)**

(ii) Determine the lost voltage. **(1mark)**

(iii) Find the value of R. **(2marks)**

(iv) Find the internal resistance of the cell. **(2marks)**

(c) Study the circuit **below** and answer the questions that follow.



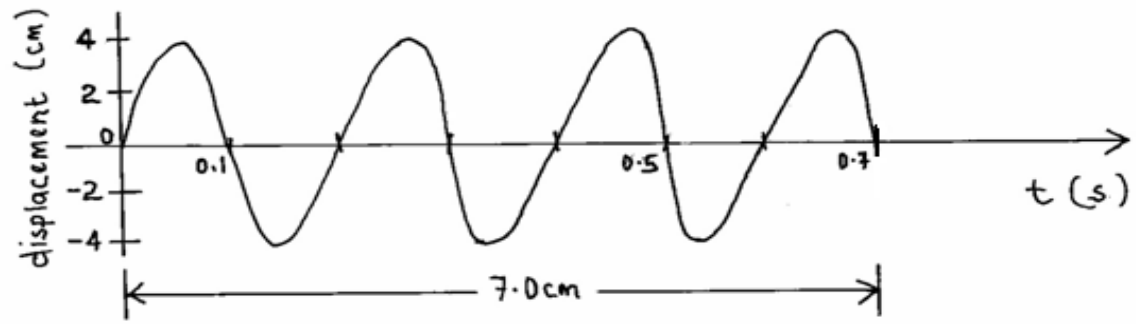
(i) Determine the effective resistance of the circuit. **(2marks)**

(ii) Find the ammeter reading. **(2marks)**

(iii) Find the p.d between X and Y. **(2marks)**

(iv) State the factors that affect the resistance of a conductor. **(3marks)**

14. The diagram **below** represents a wave motion.



(i) What is the amplitude of the wave in metres. **(1mark)**

(ii) How many cycles are made. **(1mark)**

(iii) Calculate the wavelength, λ, of the wave. **(2marks)**

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

(v) Calculate the velocity of the wave. **(2marks)**

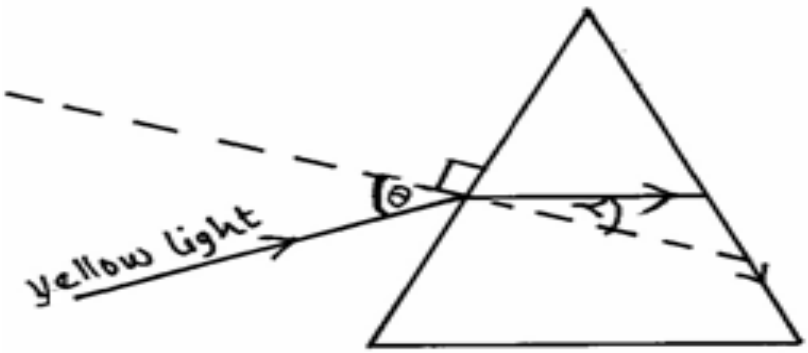
(b) **(i)** The echo sounder of a ship receives the reflected wave from a sea-bed after 0.2 seconds. What is the depth of the sea bed if the velocity of sound in water is 1450m/s. **(3marks)**

(ii) State **two** factors that affect the speed of sound in air. **(2marks)**

15. **(a)** State **two** conditions necessary for total internal reflection to occur. **(2marks)**

(b) Define the term critical angle as used in refraction of light. **(1mark)**

(d) The figure **below** shows the path of a ray of light through a glass prism. The speed of yellow light in the prism is 1.88×10^8m/s.



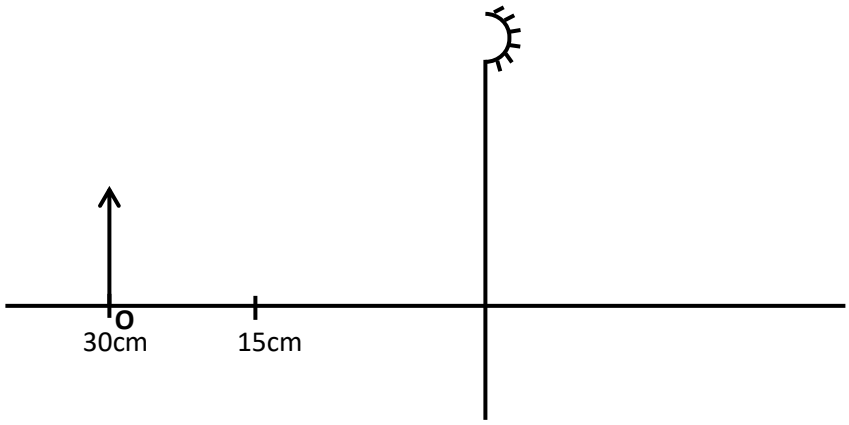
(i) Determine the refractive index of the prism material for the light (speed of light in vacuum, c = 3.0×10^8m/s. **(3marks)**

(ii) Show on the figure, the critical angle, c, and determine its value. **(4marks)**

(iii) Given that r = 21.2º, determine the angle θ. **(3marks)**

16. (a) State the advantages of using a convex mirror as a driving mirror. **(2marks)**

(b) The figure **below** shows an object **O** placed infront of a converging mirror of local length 15cm.

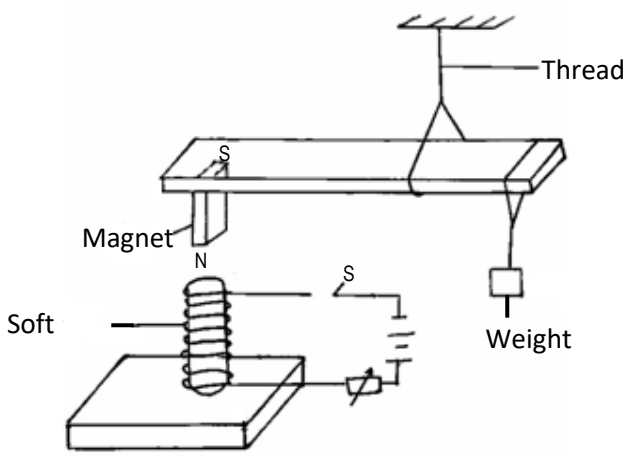


Draw on the figure a ray diagram to locate the image formed. (**3marks)**

(c) State why parabolic reflection is used in car headlights.

17. (a) State **three** factors that affect the strength of an electromagnet. **(3marks)**

(b) In the set up **below**, the suspended metre rule is in equilibrium balanced by the magnet and the weight shown. The iron core is fixed to the bench:



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

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

(c) The figure **below** shows two parallel current carrying conductors **A** and **B** placed close to each other. The direction of the current is into the plane of the paper.



On the same figure.

(i) Sketch the magnetic field pattern. **(1mark)**

(ii) Indicate the force F due to the current on each conductor. **(1mark)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 8

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

- *Write your **Name, Adm no., class** and **date** in the spaces provided at the top of the page.*
- *This paper consists of two sections **A** and **B.***
- *Answer all the questions in the two sections in the spaces provided after each question*
- *All working must be clearly shown.*
- *Electronic calculators, mathematical tables may be used.*
- ***Take g=10ms^{-2} and Specific Heat capacity of water=4,200JKg^{-1}K^{-1}***

SECTION	QUESTION	MAX MARKS	CANDIDATE'S SCORE
A	1 – 13	25	
B	14	11	
	15	13	
	16	12	
	17	08	
	18	11	
TOTAL		80	

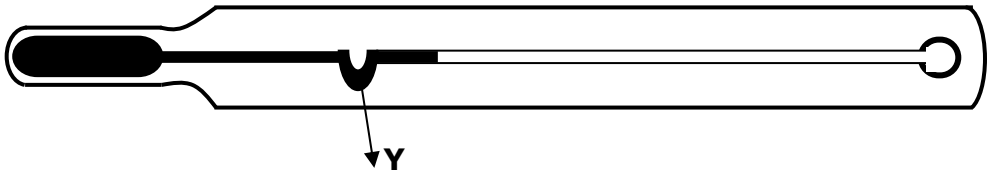
SECTION A: 25 MARKS

Answer All the Questions in this Section.

1. On the space provided below sketch a micrometer screw gauge clearly showing the reading **14.43mm.** (*Take the pitch of the screw gauge as 0.5mm*) **(2mks)**

2. Distinguish between Cohesive and Adhesive forces. **(2mks)**

3. The **fig.1** below shows a liquid-in-glass thermometer.



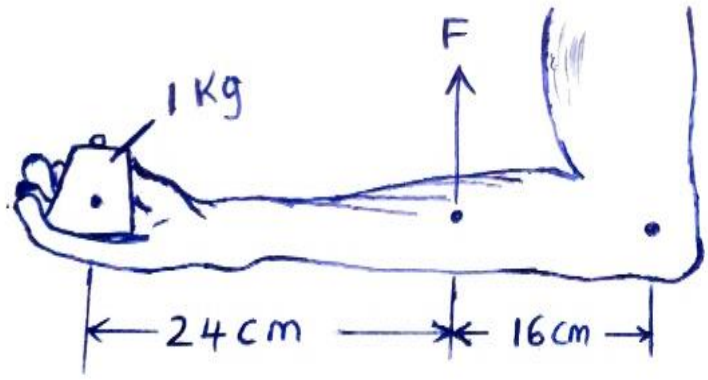
a) Name the:

Thermometer…… **(1mk)**

: Part labeled Y……..…….. **(1mk)**

b) State the change that can be made to the capillary bore in order to make the thermometer more sensitive. **(1mk)**

4. A form four student lifts on his palm a mass of 1Kg as shown in as shown in **fig.2**



Determine force **F** required to keep holding the mass horizontally as shown**.** **(3mks)**

5. Give a reason why pollen grains placed on the surface of clean water are seen moving continuously and randomly. **(1mk)**

6. In the **Fig.3** below, the cardboard is pulled suddenly. State the reason why the coin falls into the beaker**.** **(1mk)**

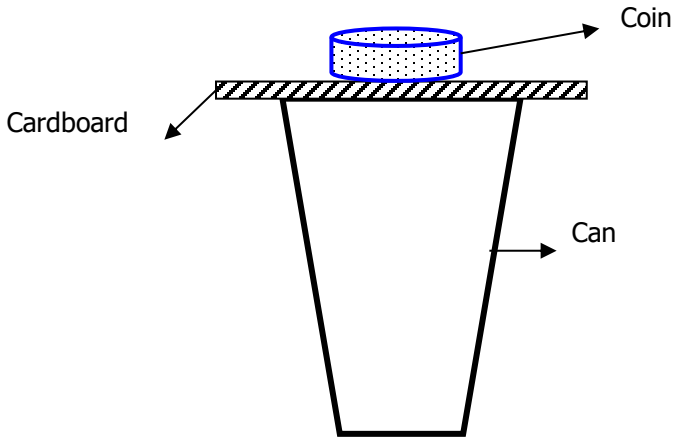
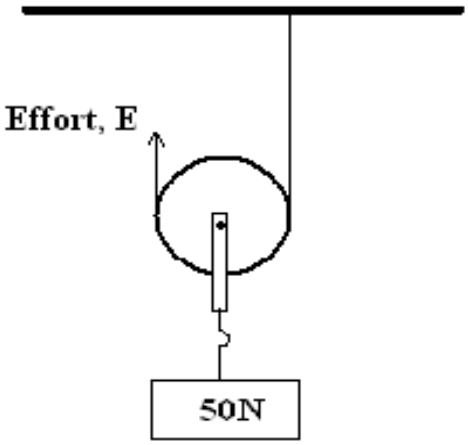


Fig. 3

7. Fig.4 below shows a single movable pulley used to raise a load of 50N.



i) State the velocity ratio of this arrangement. **(1mk)**

ii) Assuming that friction experienced is negligible and the weight of the pulley wheel is 7.5N, determine the minimum force required to raise the load at a constant speed. **(1mk)**

8. State the pressure law of gases. **(1mk)**

9. A block of copper mass 0.5Kg and specific Heat capacity $400JKg^{-1}K^{-1}$ initially at 80°C is immersed in water at 20◦C. If the final temperature is 21◦C, determine the mass of the water. **(3mks)**

10. State the reason why heat transfer by radiation is faster than conduction. **(1mk)**

11. A dripless candle is weighted slightly on the bottom so that it floats upright in a container filled with water as shown in **Fig. 5** below.

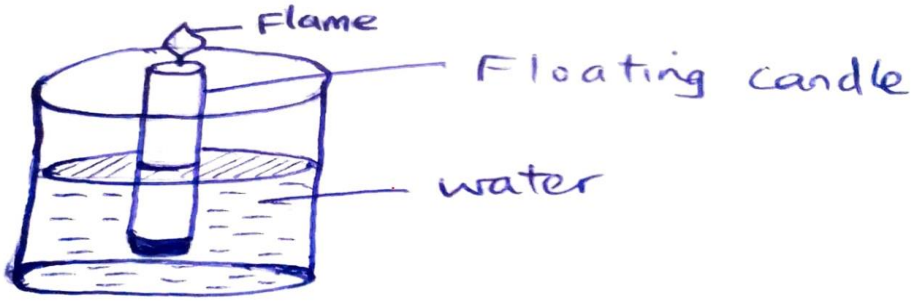


Fig.5

State and explain what happens as the candle burns**.** **(2mks)**

12. Determine the least pressure that can be exerted by a 20kg solid of dimensions 10cmx20cmx40cm on a horizontal surface. **(3mks)**

13. State the SI unit of the quantity amount of substance. **(1mk)**

SECTION B: 55 Marks.

14. a) State the Archimedes' principle. **(1mk)**

b)Fig.6 below shows a simple hydrometer.

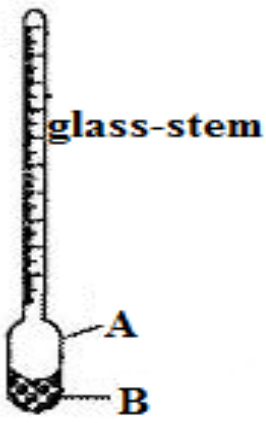


Fig.6

A…….. (1mk)

B…….....…… (1mk)

i) Identify the parts labelled A and B.

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

iii) How the hydrometer would be made more sensitive. **(1mk)**

c) A weather balloon of volume $1.2m^3$ is tied to a rigid support while being filled with helium gas. The mass of the fabric making the balloon is 0.30kg. Determine the maximum tension on the string tying the balloon to the rigid support.

(Density of air is $1.25kgm^{-3}$ and density of helium is $0.18kgm^{-3}$**).** **(4mks)**

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

15. a) State Hooke's law. **(1mk)**

a) A student carried out an experiment to investigate the relationship between the force and extension produced on a spiral spring. The student tabulated his results as shown 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) y-axis against Force (N**)** **(5mks)**

ii) Determine the spring constant. **(4mks)**

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

iv) What extension is produced by:

i) A force of 5.5N…… **(1mk)**

ii) A mass of 700g…… **(1mk)**

16. a) Define a radian as applied in circular motion. **(1mk)**

b) A car negotiating a corner at a constant speed is said to have a change of momentum. Explain this observation**.** **(1mk)**

b) The **Fig.7** below shows a ball being whirled in a vertical plane.

Sketch on the same figure the path followed by the ball if the string cuts when the ball is at the position shown in the figure. **(1mk)**

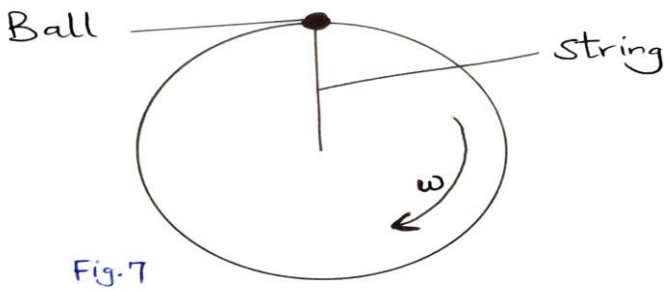


Fig.7

c) State the purpose of banking roads at bends**.** **(1mk)**

d) A boy whirls a stone of mass 0.2kg tied to a string of length 0.4m in a vertical plane at a constant speed of 2rev/s. (Take $g=10ms^{-2}$)

i) State two forces acting on the stone when it is at the highest point. **(2mks)**

ii) Determine the :

I angular velocity of the stone; **(3mks)**

II tension in the spring when the stone is at the highest point; **(3mks)**

17. a) State Bernoulli's principle. **(1mk)**

b) **Fig.8** below shows a tube of varying cross-sectional area. $V_1V_2V_3$ and V_4 represents the velocities of water as it flows steadily through the sections of the tube.

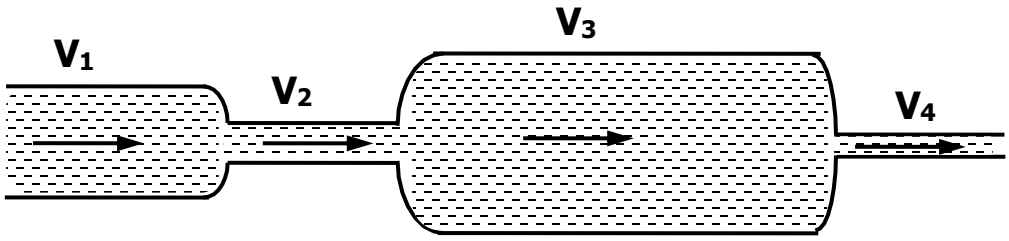
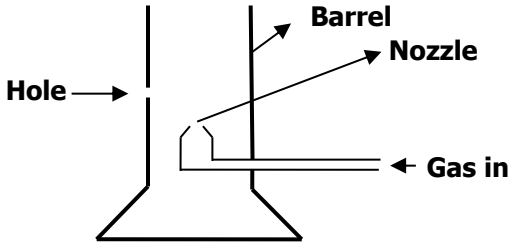


Fig. 8

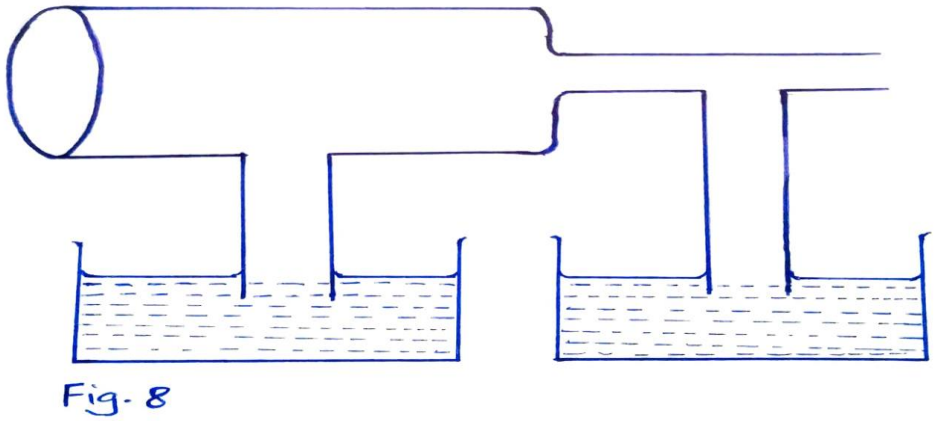
Arrange the velocities V_1, V_2, V3 and V_4 in descending order. **(1mk)**

c)The diagram below shows a Bunsen burner



Explain how air is drawn into the barrel **(2mks)**

d)The **Fig.8** below shows air being blown through a tube of a varying cross-sectional area.



Using the information in the diagram

i) Calculate the outlet velocity v_2. **(2mks)**

ii) Show the relative water levels in the two capillary tubes. **(2mks)**

18. a) **Fig.9** below shows the path of a light ball projected horizontally.

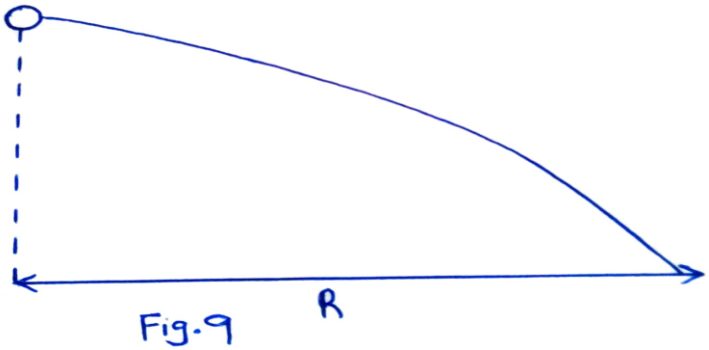


Fig.9

The ball is then made to spin in an anticlockwise direction as it moves;

On the same axis, sketch the new path of the ball. **(2mk)**

b) Using the definition of impulsive force, show that F=ma. **(3mks)**

c) Two stationary trolleys A and B are separated by a compressed spring and held together by a thread. The mass of trolley A is 2.0kg and that of B is 1.0kg. When the thread is cut the trolleys move rapidly apart.

i) What is the cause of movement of trolleys when the thread is cut? **(1mk)**

ii) What is the total momentum of the trolleys just before the thread is cut. **(2mks)**

iii) If trolley A moves off with a speed of 0.25m/s. Calculate the speed with which trolley B moves off. **(3mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 8

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:

(a) *Write your name, index number in the spaces provided above.*
(b) *Sign and write the date of the examination in the spaces provided.*
(c) *This paper consists of **TWO** Sections: **A** and **B**.*
(d) *Answer **ALL** the questions in section **A** and **B** in the spaces provided.*
(e) *All working **MUST** be clearly shown.*
(f) *KNEC mathematical tables and silent non-programmable electronic calculators may be used.*

FOR EXAMINERS USE ONLY

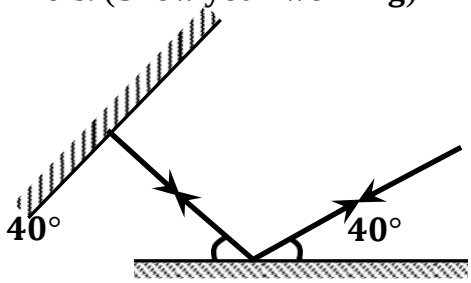
Section	Question	Maximum score	Candidate's score
A	1 – 12	25	
B	13	09	
	14	15	
	15	15	
	16	9	
	17	07	
	TOTAL SCORE	80	

SECTION A (25 MARKS)

Answer All the questions in this section in the spaces provided

1. **Figure 1** shows the path of a ray of light after striking two mirrors at an angle. Determine the angle between the two mirrors. (**Show your working**) **(1 mark)**

Figure 1



2. Polarization is a defect of a primary cell.

(a) Define polarization **(1 mark)**

(b) State the other defect. **(1 mark)**

3. Determine the time it will take a ray of light to traverse a transparent glass block of length 20 cm given that the velocity of light in air is $3.0 \times 10^8\ ms^{-1}$. (Take the absolute refractive index of glass as 1.5) **(3 mrks)**

4. State one other factor that increases the speed of sound in solid a part from increase in temperature. **(1 mark)**

5. **Figure 2** shows an object placed at the center of curvature of a concave mirror. Draw a ray diagram to show how the image of the object is formed by the mirror. **(2 marks)**

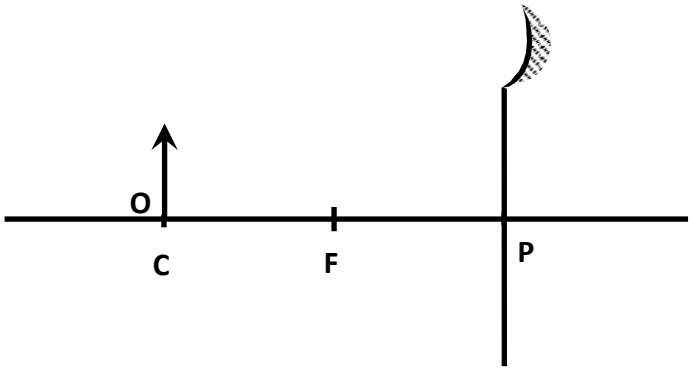


Figure 2

6. A charge of 240 μC flows through a conductor of resistance 4 $k\square$ in 2 $minutes$. Determine the work done to move the charge through the conductor. **(3 marks)**

7. State the reason why radio signals have clear reception than television signals in area that is surrounded by hills. **(1 mark)**

8. A physics student dipped a bar magnet into iron fillings during an experiment in the lab. When

9. the student lifted the bar magnet, the distribution of iron fillings around the bar magnet was as shown in **Figure 4**.

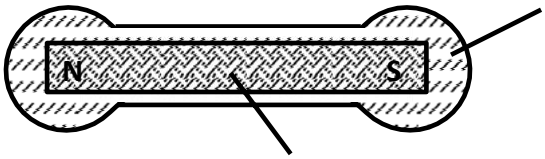


Figure 4

Bar magnet

State the conclusion the student made. **(1 mark)**

10. **Figure 3** shows a copper rod AB lying across two metal rods L and M which are fixed onto a plastic support and also connected to a battery.

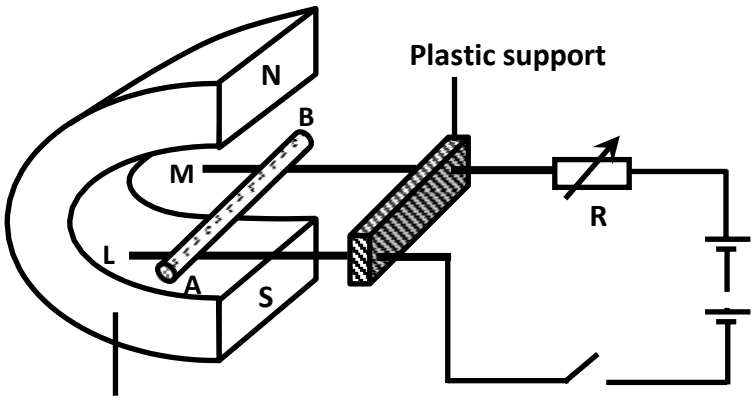


Figure 3

U-shaped magnet

(i) Indicate on the diagram the direction of force experienced on the copper rod AB. **(1 mark)**

(iii)State the direction of force on copper rod AB if the direction of both current and magnetic field are reversed simultaneously. **(1 mark)**

(iv)State one way of increasing the force on the copper rod AB. **(1 mark)**

11. State one advantage and one disadvantage of using a convex mirror as a driving mirror. **(2 marks)**

Advantage:

Disadvantage:

12. Give a reason why a pinhole camera forms a blurred image of an object in front of it if the diameter of the pinhole is reduced to less than 1.00 *mm*. **(1 mark)**

13. **Figure 5** below shows a ferromagnetic material PQ being magnetized.

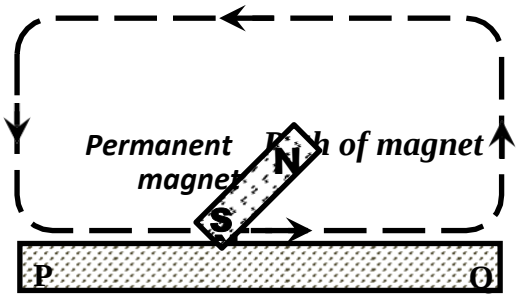
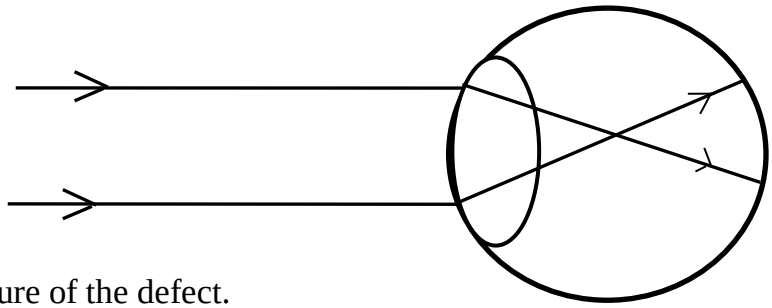


Figure 5

(I)State the method of magnetization being used. **(1 mark)**

(II)State the pole acquired at P. **(1 mark)**

(b) The figure below shows how a distant object is focused in a defective eye.



i) State the nature of the defect. **(1mark)**

ii) On the same diagram, sketch the appropriate lens to correct the defect and sketch rays to show the effect of the lens. **(2 mrks)**

SECTION B (55 MARKS)

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

14. (a) When current flows through a coil of nichrome wire in an electrical circuit, the wire becomes very hot.

(i) Give a reason why the nichrome wire becomes very hot. **(1 mark)**

(ii) Give a reason why heat is produced only across nichrome wire and not across other devices in the circuit. **(1 mark)**

(iii) State one factor that determines the amount of electrical energy converted to heat energy by nichrome wire. **(1 mark)**

(b) **Figure 6** shows a workman using a cordless electric drill.

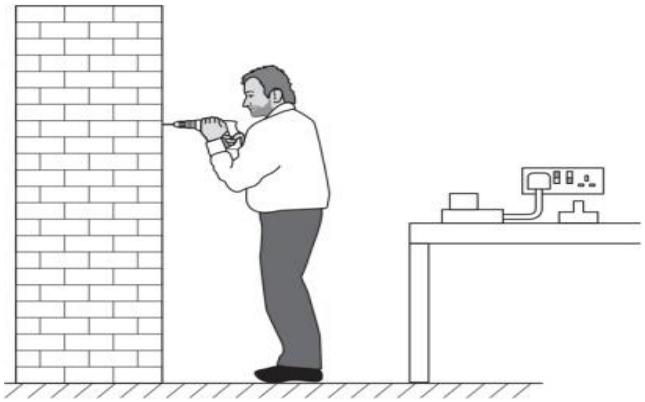


Figure 6

The motor of the drill is powered by a rechargeable battery with an e.m.f. of 23 V. When the drill is used, the power supplied to the motor is 550 W. The workman uses the drill for 1 hour and 30 minutes. Calculate;

(i) The electrical energy supplied to the motor. **(3 marks)**

(ii) The charge that the battery supplies. **(3 marks)**

15. (a) (i) Distinguish between a transverse wave and a longitudinal wave. **(1 mark)**

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

Transverse wave: ……

Longitudinal wave: ……

(b) **Figure 7 (a)** shows a wave profile for a pendulum bob X released from point P and allowed to swing through Q to R and back a number of times as shown in **Figure 7 (b)**.

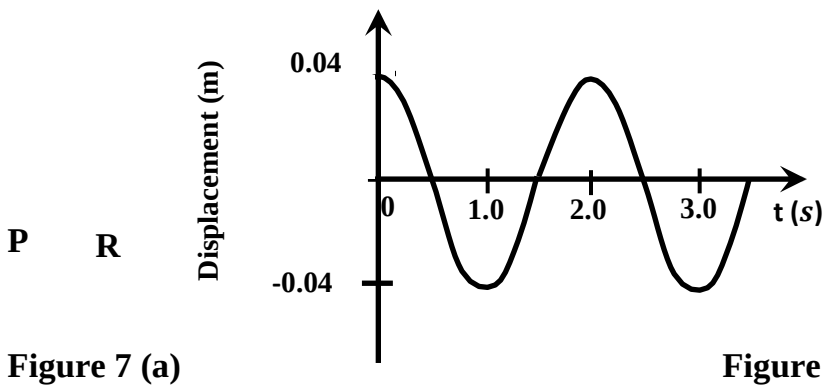


Figure 7 (a)

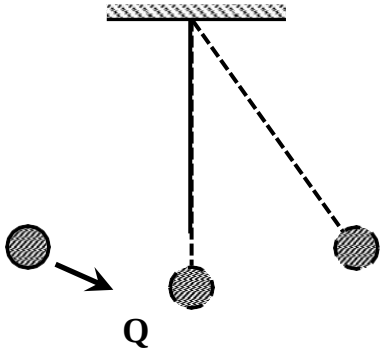


Figure 7 (b)

(i) Determine the amplitude of the wave. **(1 mark)**

(ii) Calculate the frequency of the wave. **(3 mrks)**

(iii) Sketch a wave profile on the same axes for a similar pendulum bob Y released from

point R and oscillating on its own path through Q to P and back a number of times at the same frequency but with half-amplitude as the pendulum bob X. **(2 marks)**

(c) In an experiment to observe the interference of light waves, a double slit was placed close to the source of monochromatic light as shown in **Figure 8**.

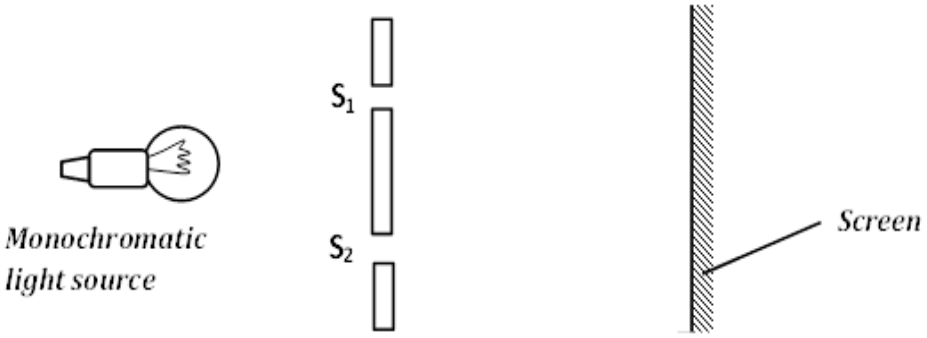


Figure 8

(i) State one condition for interference to occur. **(1 mark)**

(ii) State the function of the double slit. **(1 mark)**

(iii) **State** the observation made on the screen. **(1 mark)**

(iv) Explain the observation made on the screen. **(2 mrks)**

(v) State what would happen if the monochromatic light source was replaced with white light source. **(1 mark)**

16. (a) Define critical angle. **(1 mark)**

(b) There are two conditions necessary for total internal reflection to occur. One is that the ray of light must be moving from an optically denser medium to a rarer medium. State the other condition. **(1 mark)**

(c) **Figure 9** shows the interface between water and diamond.

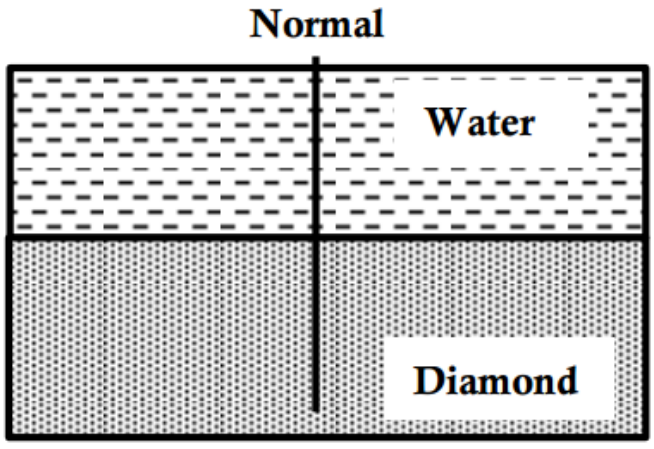


Figure 9

(i) Draw on the figure a ray diagram to illustrate the critical angle C. **(2 marks)**

(i) Calculate the critical angle C given that $n_{aw} = \frac{4}{3}$ and $n_{ad} = 2.42$. **(3 marks)**

(d) **Figure 10** shows a small piece of an optical fibre cable.

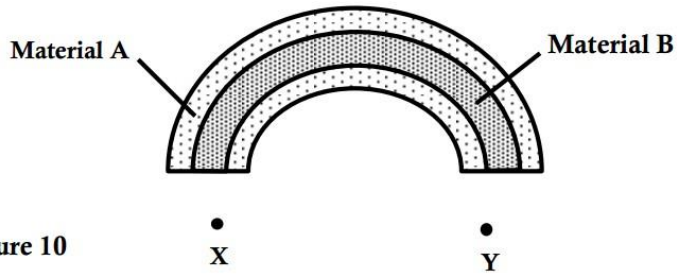


Figure 10

(i)State which material has a higher refractive index. **(1 mark)**

(ii)A ray of light enters the optical fibre at X and emerges from Y.

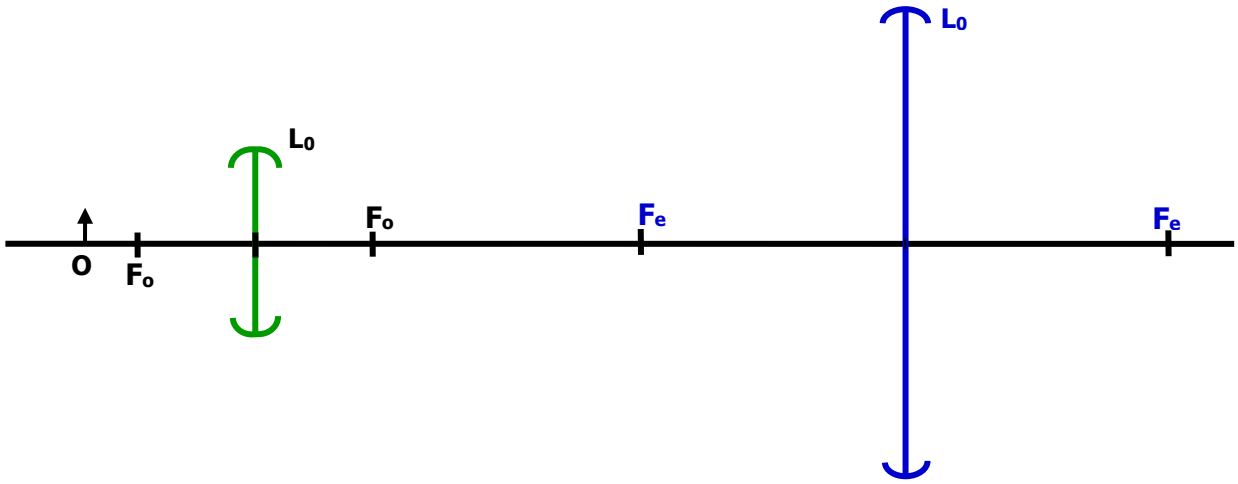
I. Sketch the path of the ray through the optical fibre. **(1 mark)**

II. State the reason why light travels through the fibre as in (i) above. **(1 mark)**

(iii) State one advantage of optical fibre over conventional copper cables as used in telecommunication. **(1 mark)**

(iv)Apart from its use in telecommunication, state any other application of optical fibre cable. **(1 mark)**

(e) The diagram shows an arrangement of lenses; L_o and L_e used in a compound microscope F_0 and F_e are principal foci of L_0 and L_e respectively. Draw the rays to show how the final image is formed in the microscope. **(3 marks)**



16.(a) Define electromotive force (e.m.f) of a cell. **(1 mark)**

(b) **Figure 11** shows ammeters, resistors and a voltmeter connected to a battery of e.m.f E and internal resistance r of 0.25 Ω. The reading of ammeter A_2 is 2.0 A.

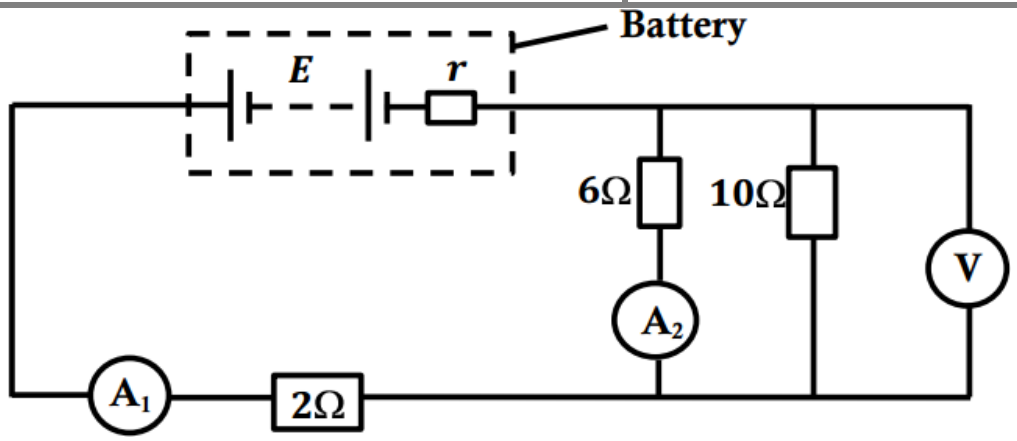


Figure 11

Calculate the;

(i) Total resistance of the circuit. **(2 marks)**

(ii) Voltmeter reading. **(3 marks)**

(iii) Reading of ammeter A_1. **(1 mark)**

(iv)e.m.f, E of the battery. **(2 marks)**

17(a) Define capacitance of a capacitor. **(1 mark)**

(b) **Figure 12** shows three capacitors connected to a battery of voltage 12 V.

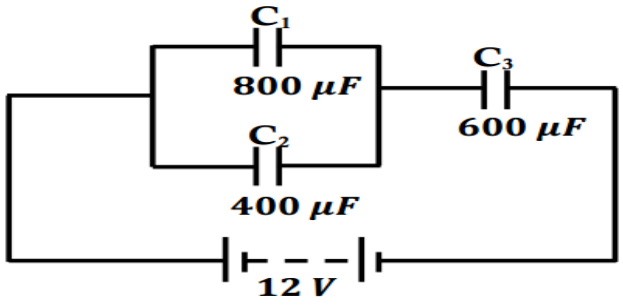


Figure 12

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

(ii) Calculate the charge on the 6 μF capacitor. **(3 marks)**

(c) The conductors A and B in **Figure 13** are positively charged and each placed on insulating stands. Show the distribution of charges on conductors A and B. **(2 marks)**

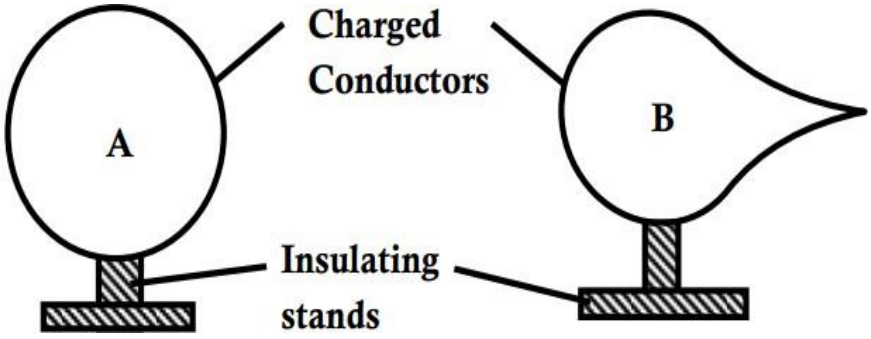


Figure 13

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 9

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:-

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

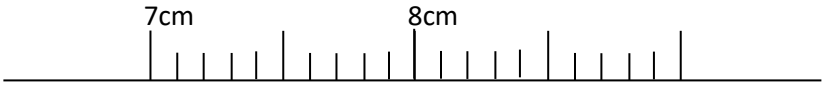
FOR EXAMINER'S USE ONLY:

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

SECTION A (25 MARKS)

Answer all questions in this section in the spaces provided.

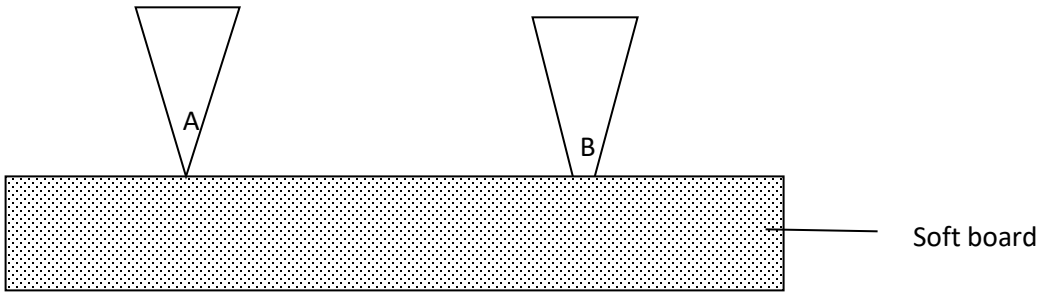
1. The figure below shows part of scales of a vernier caliper with a negative error of 0.04cm. It was used to measure the length of a wooden block whose actual length is 7.57cm.



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

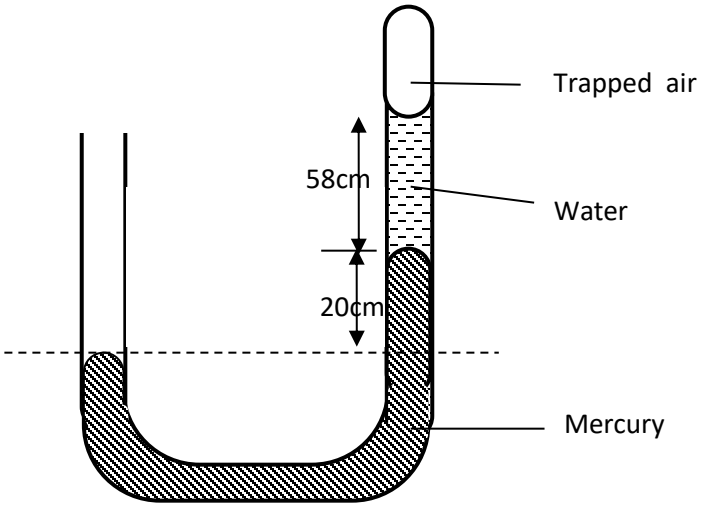
2.

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



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

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

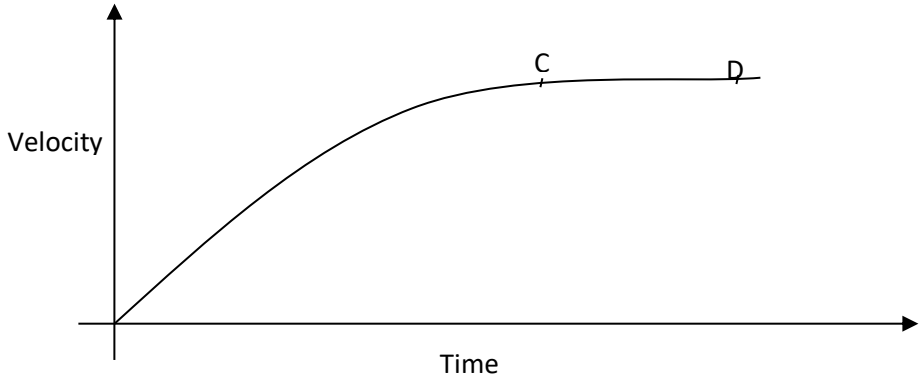


Determine the pressure of the trapped air. (Take atmospheric pressure as 75cmHg, density of mercury = 13600kg/m^3 and density of water = 1000 kg/m^3) **(3mks)**

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

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

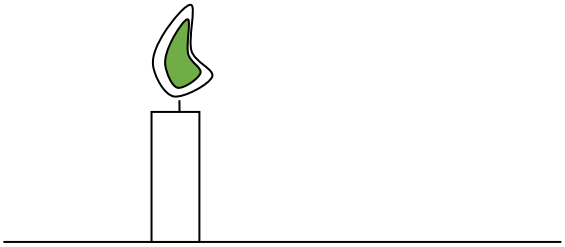
4. The figure below shows a sketch of a velocity-time graph for a body falling through a liquid.



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

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

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

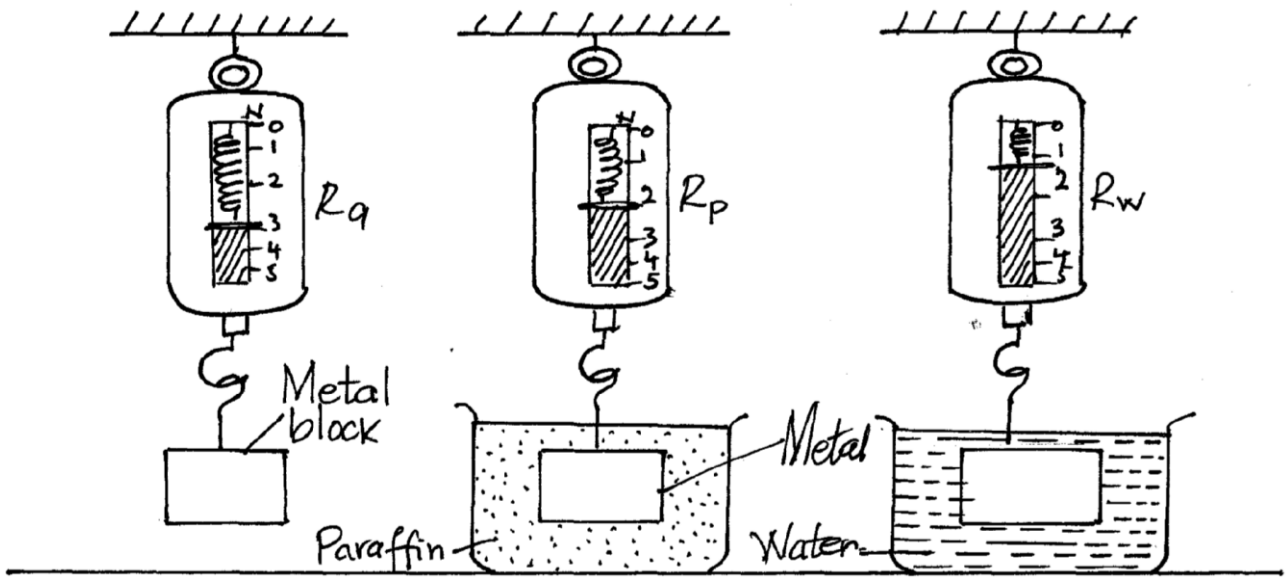


State and explain the changes in stability of the candle as it continues to burn. **(2mks)**

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

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

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



Calculate the density of paraffin given that the density of water is 1000kg/m^3.

(Take g = 10 m/s^2) **(3mks)**

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



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

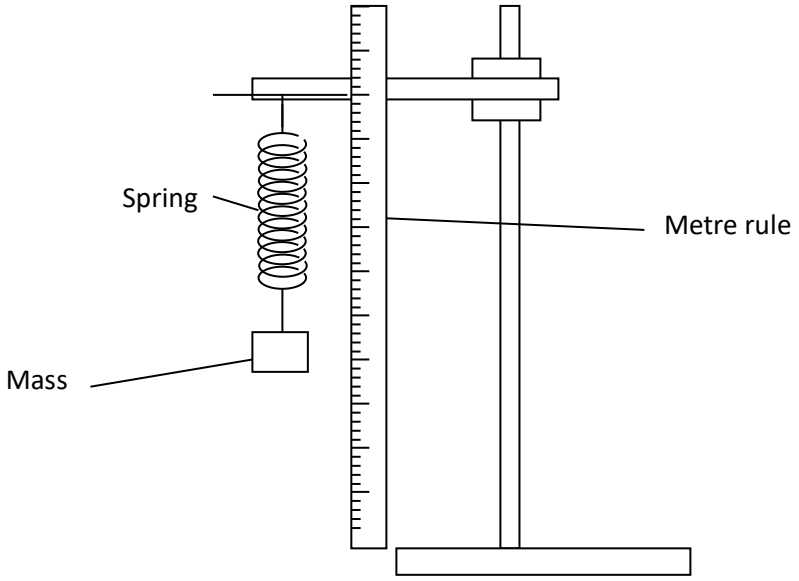
11. Differentiate between conduction and convection modes of heat transfer in terms of molecules. **(1mk)**

SECTION B (55 MARKS)

Answer all questions in this section in the spaces provided.

12.

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



If the student had access to several other masses;

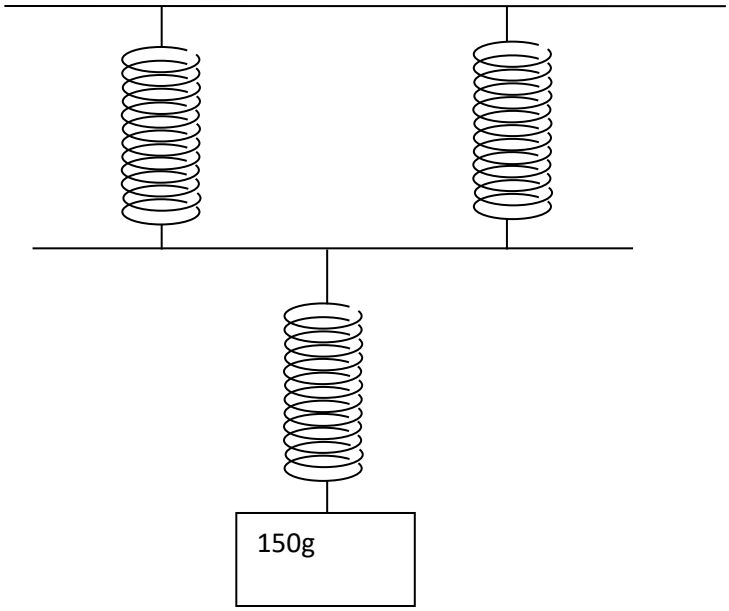
i. State what was missing in the set up. **(1mk)**

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

iii. Other than extension of the spring, state one other measurement that should be determined. **(1mk)**

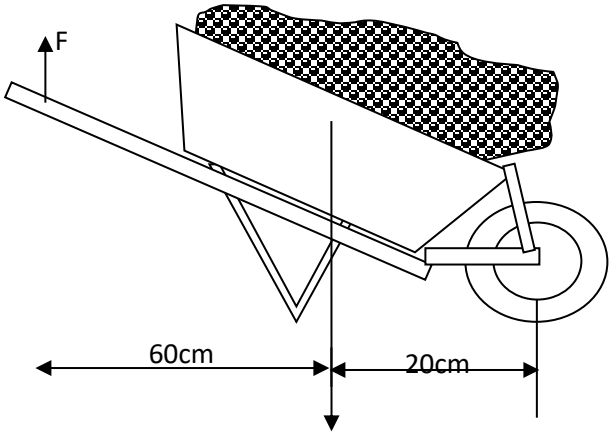
iv. Considering the measurements above, describe how the above set up can be used to verify Hooke's law. **(3mks)**

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



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

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



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

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

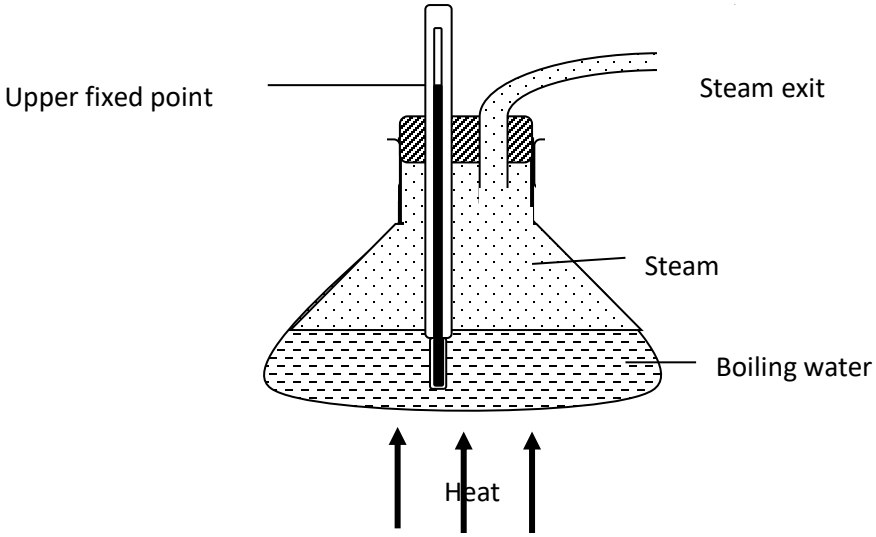
c) Determine the mechanical advantage of this machine. **(2mks)**

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

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

14.

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



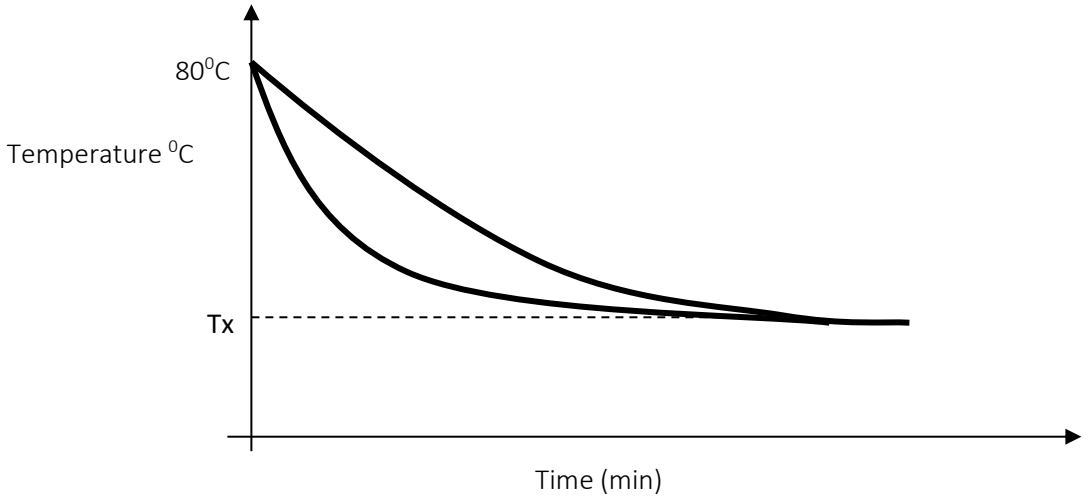
i. Identify the mistake in the set up. **(1mk)**

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

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

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

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



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

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

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

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

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

15.

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

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

Determine the;

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

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

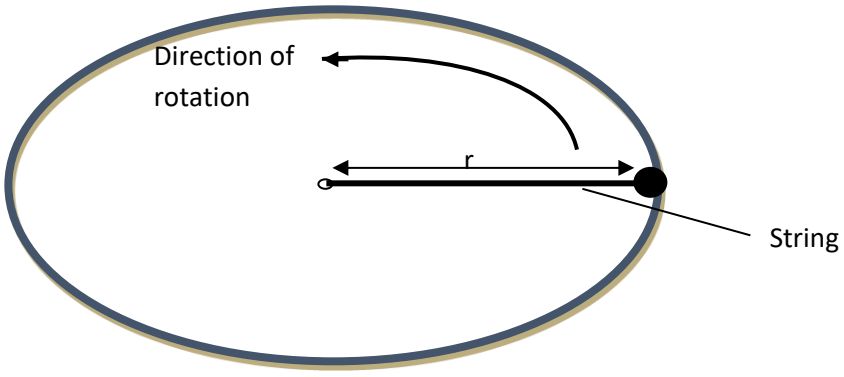
iii. Mass **m** of ice that melted at 0^0. **(3 mks)**

16.

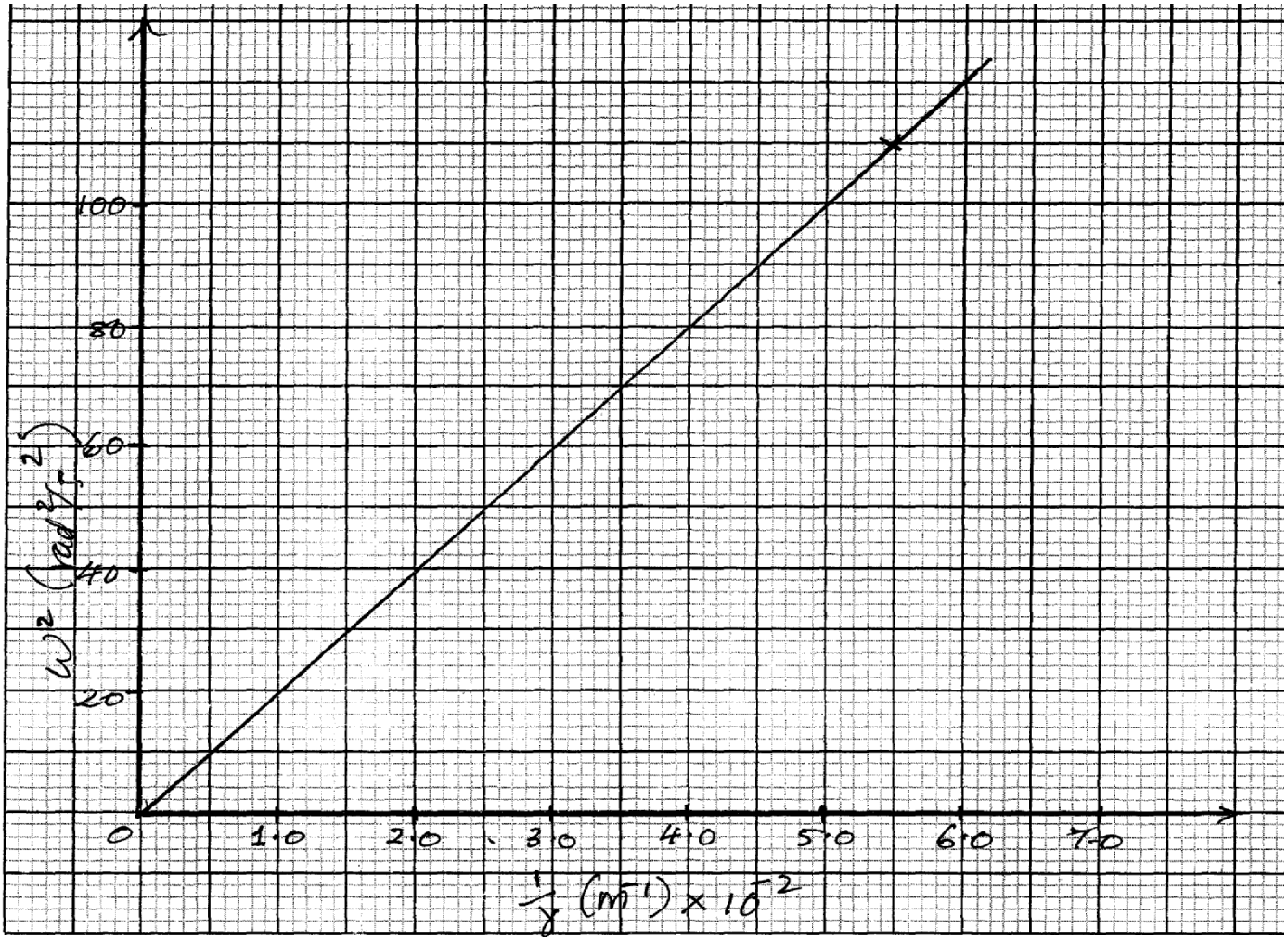
a) The moon goes round the earth at constant speed. Explain why it is true to say that the moon is accelerating. **(1mk)**

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

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



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



From the above graph.

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

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

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

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 9

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:-

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

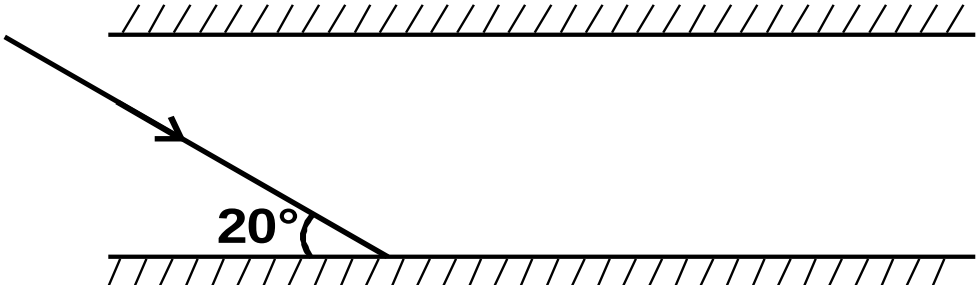
FOR EXAMINER'S USE ONLY:

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

SECTION A (25 MARKS)

Answer all questions in this section in the spaces provided.

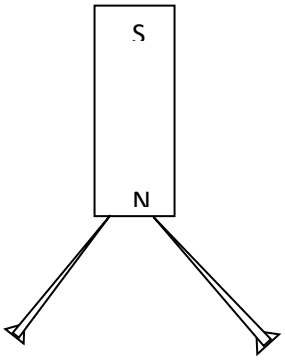
1. The diagram below shows two parallel mirrors M_1 and M_2 and a ray of light being incident on one of the mirrors as shown.



Trace the ray of light through the mirrors and indicate the angle of incidence on M1

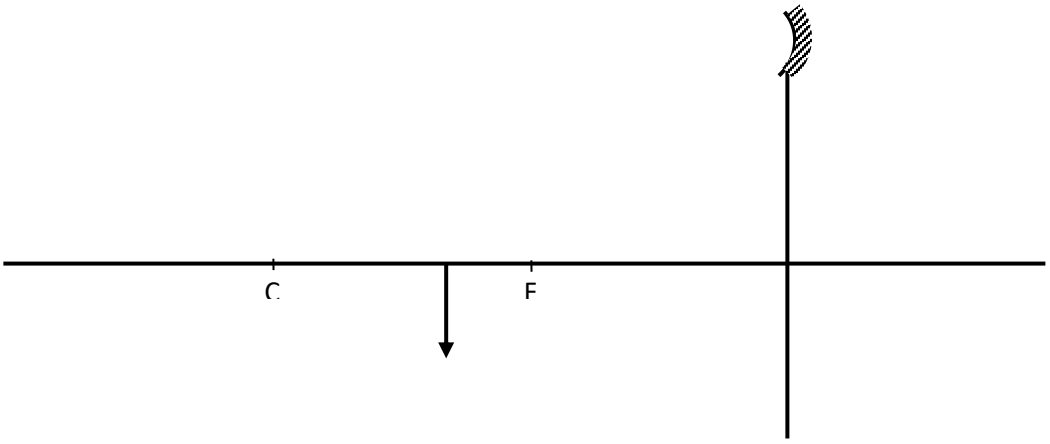
(2 mks)

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



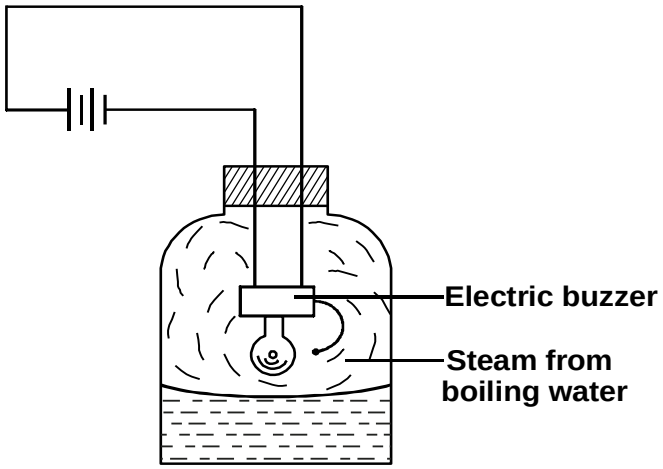
Explain why the pins spread as shown in the diagram. **(2mks)**

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



Draw to locate the correct position of how the image is formed.

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

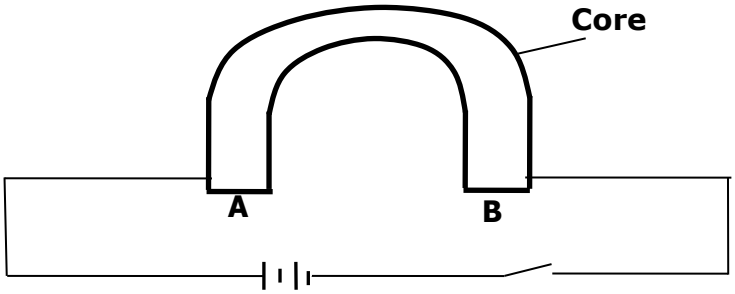


State and explain what happens to the sound from the buzzer as the bottle and its contents are cooled to 0°C. **(2 mks)**

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

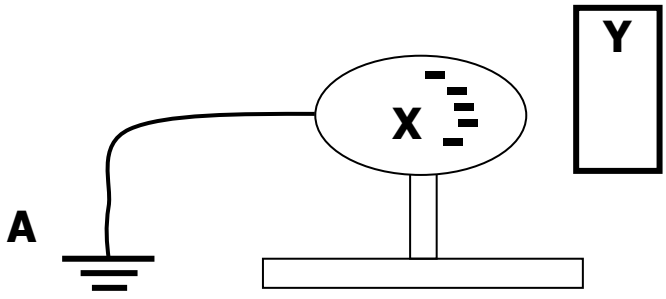
Infrared, X-rays, Microwaves, Radio waves, Red light.

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



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

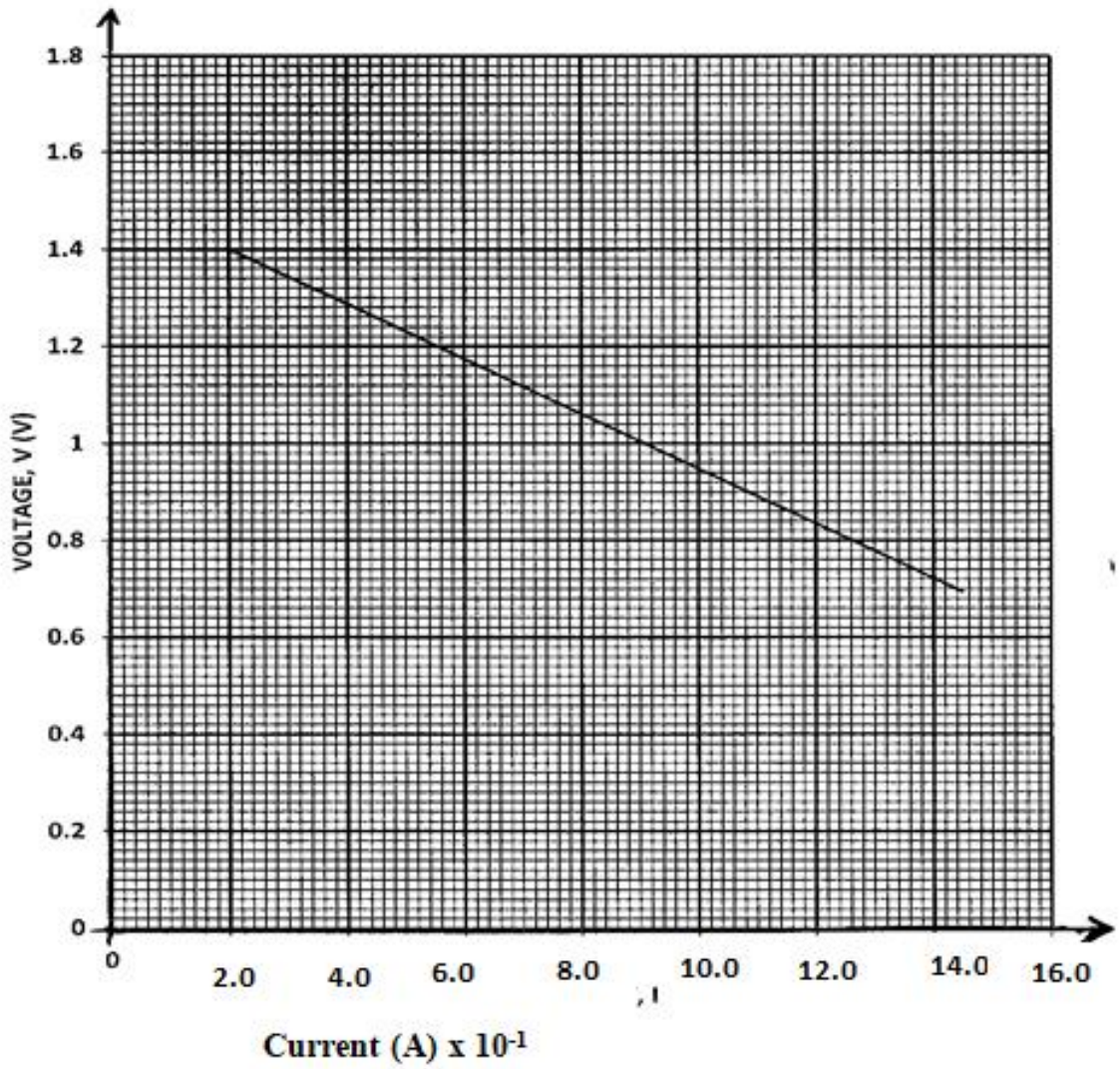
7. Figure represents a step in charging a material **B** negatively by induction.



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

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

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

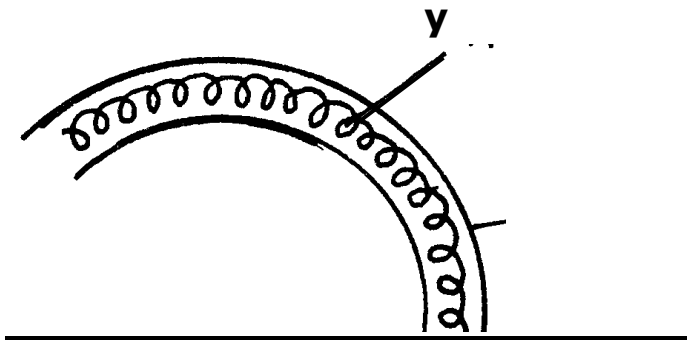


a) Use the graph to determine the electromotive force (emf) of the cell. **(1mk)**

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

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

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



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

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

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

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



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

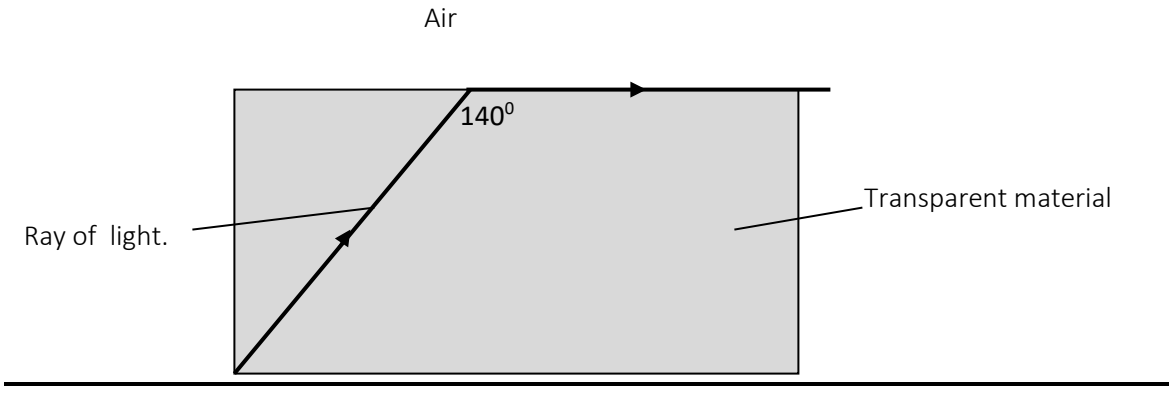
(ii) Show on the diagram the direction of the force, F acting on the conductor **(1mk)**

SECTION B (55 MARKS)

Answer all questions in this section in the spaces provided.

13.

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



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

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

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

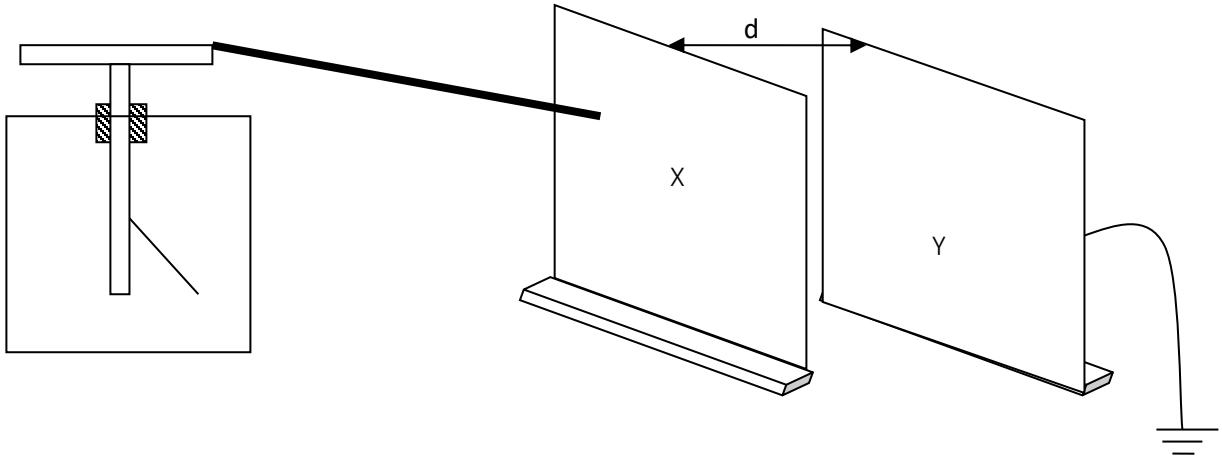
c) You are provided with the following apparatus to determine the focal length of a lens.

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

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

14.

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

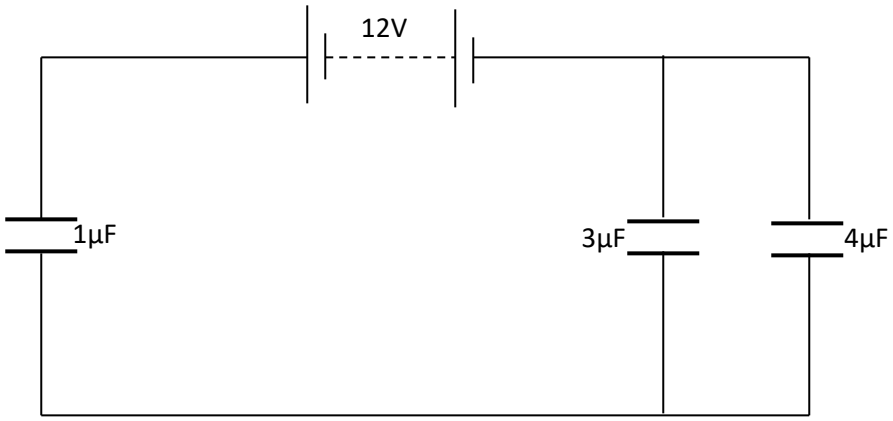


If plate Y is moved away from plate X,

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

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

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



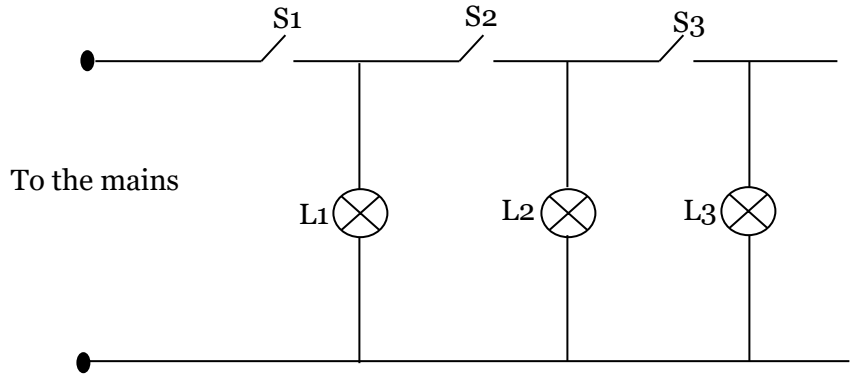
Determine:

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

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

15.

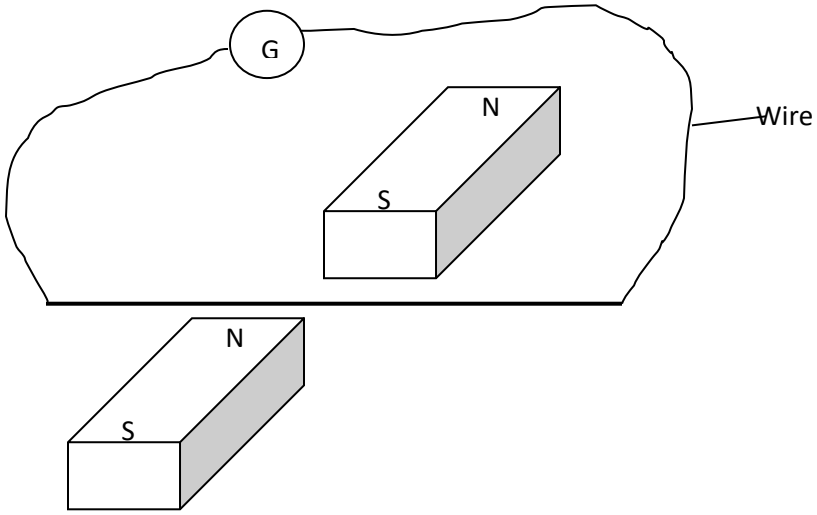
a) The figure below shows an attempt to supply each of the three lamps L1, L2 and L3 with a switch.



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

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

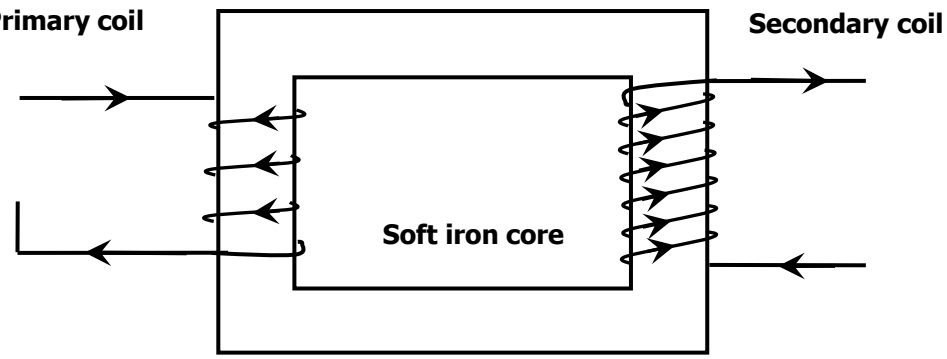
b) A wire placed between the pole of two permanent magnets is connected to a galvanometer as shown below.



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

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

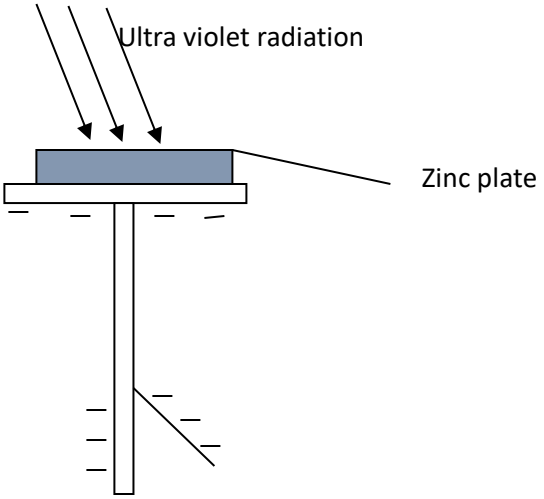
iii. The figure below shows a simple transformer. Study it and answer the questions that follow.



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

16.

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

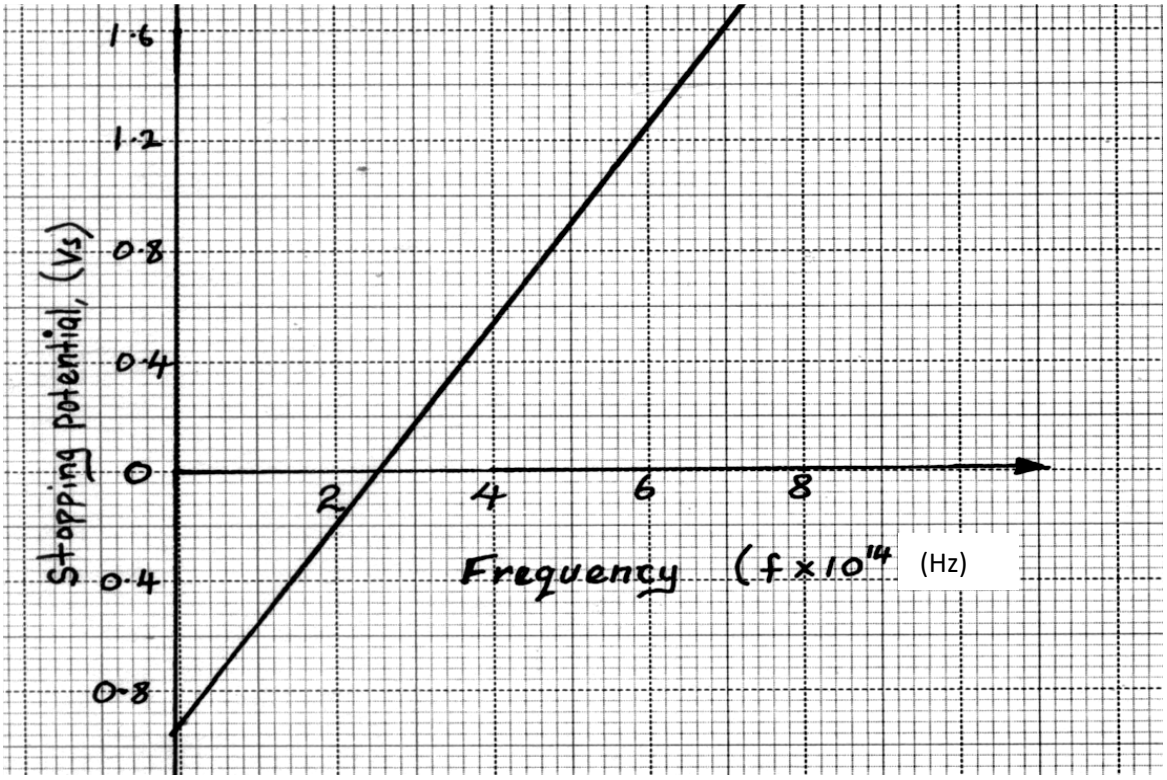


Ultraviolet radiation is made to fall on the plate as shown on the diagram.

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

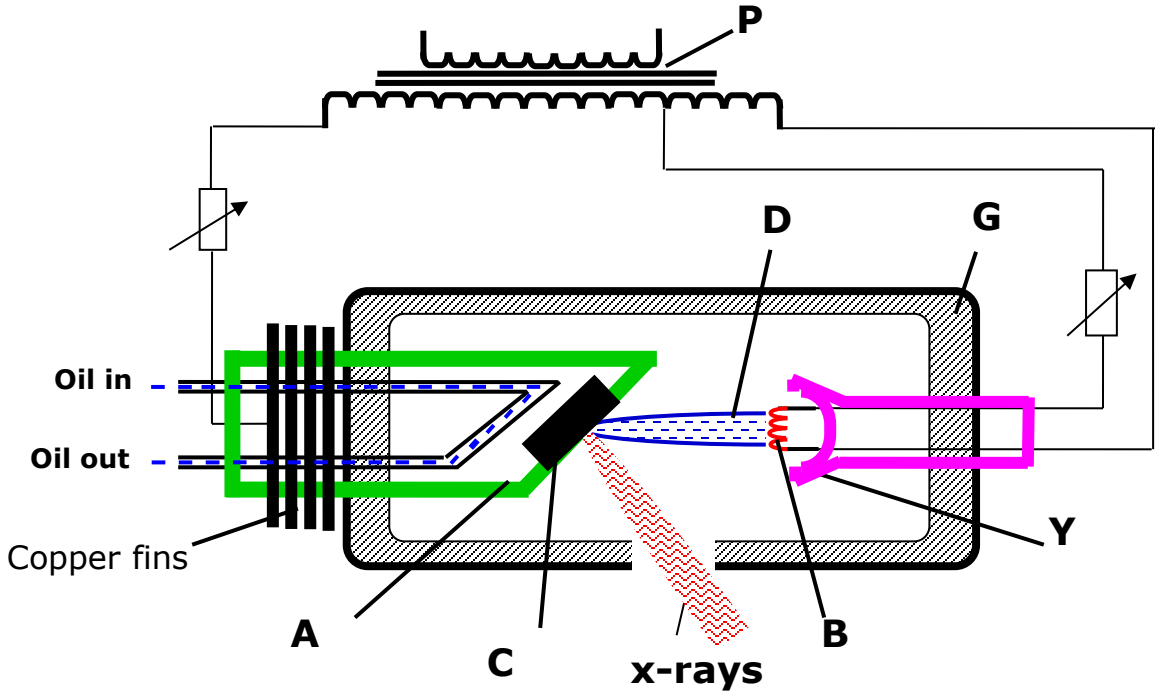
ii. What would happen if radiation was red light? **(1mk)**

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



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

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



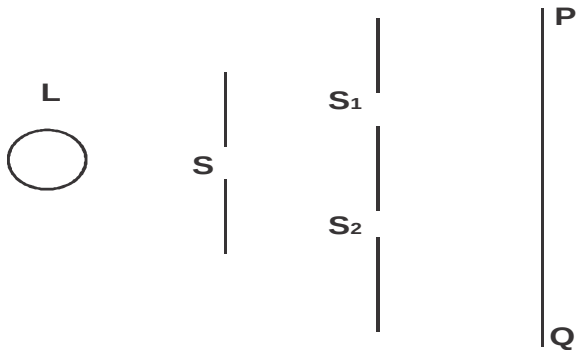
i. Explain the function of part labelled P. **(1mk)**

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

iii. Explain what is done to produce X-rays of shorter wavelength using the above X-ray tube. **(1mk)**

17.

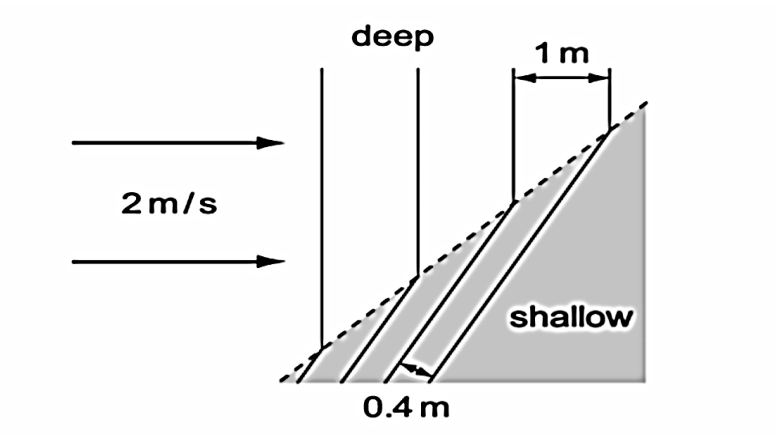
a) The figure below shows monochromatic source of light L behind a barrier with a single slit S placed behind another barrier with two identical slits S_1 and S_2. A screen PQ is placed in position as shown.



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

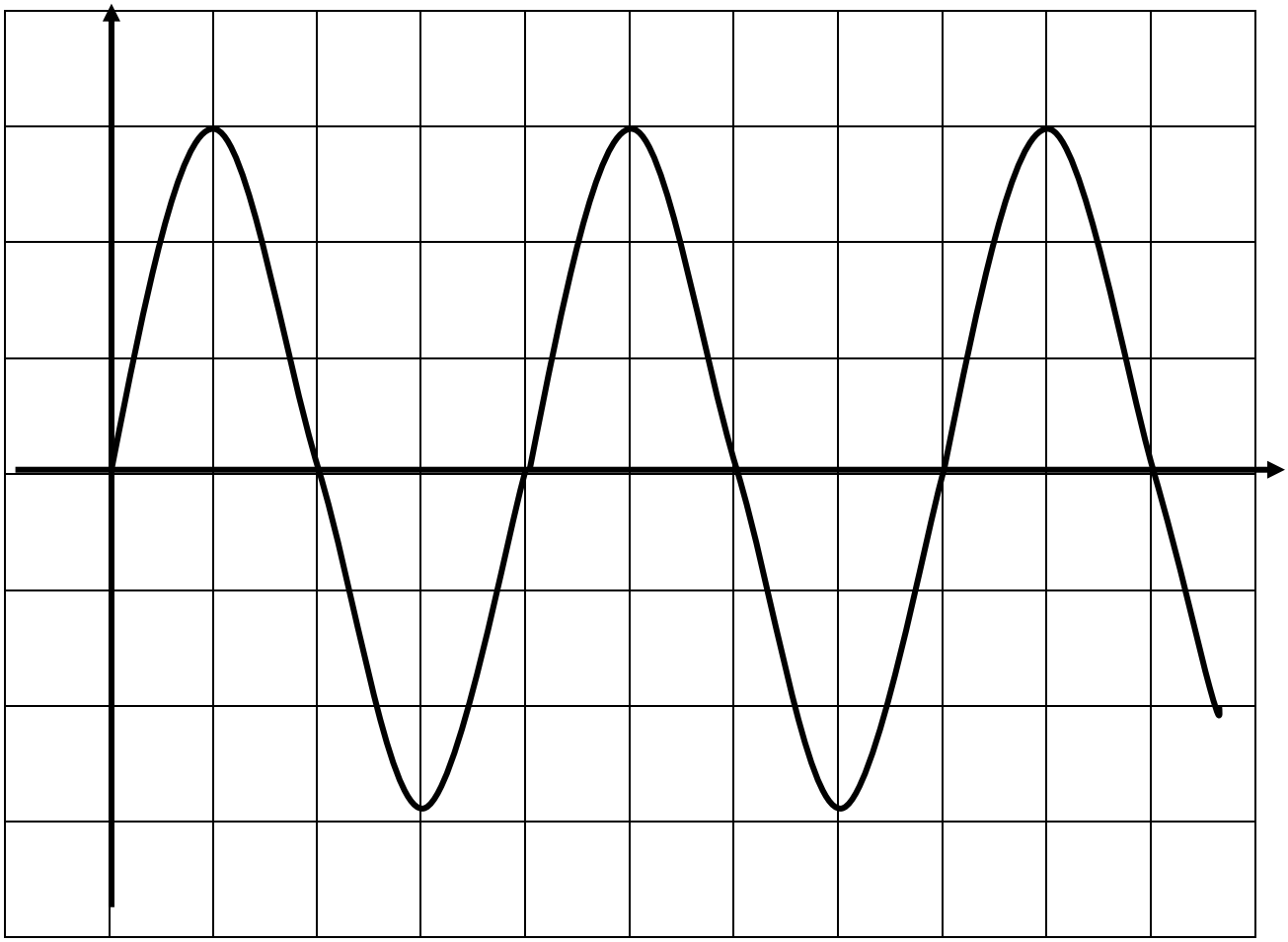
ii) Explain what is observed on screen PQ. **(2 mks)**

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



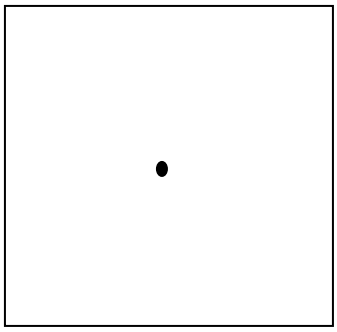
Calculate the speed of the waves in the shallow water. **(2 mks)**

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



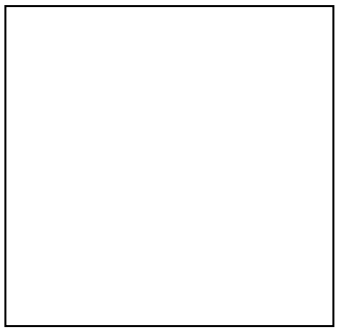
Determine the frequency of the signal given that the time base is set at 10ms/division. **(2mks)**

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

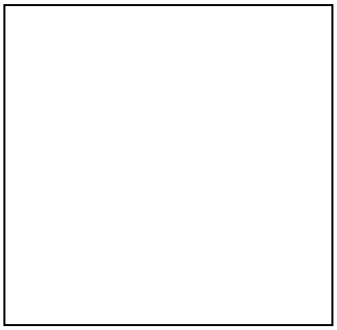


(a)

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



(b)



(c)

18.

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

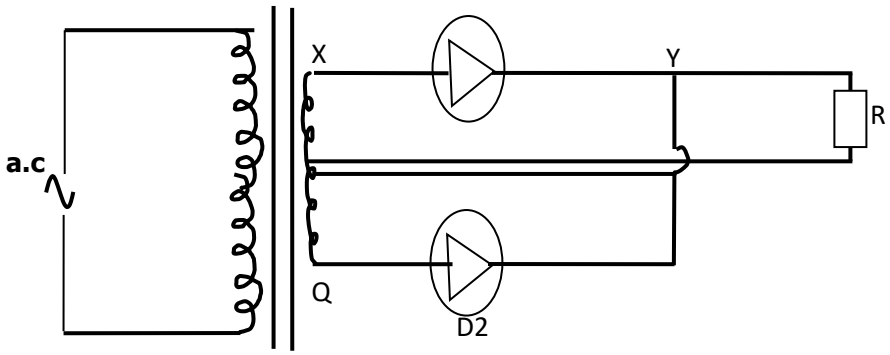
$$^{210}_{83}X \xrightarrow{r} {}^{210}_{84}Y \xrightarrow{\alpha} {}^{c}_{b}Z$$

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

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

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

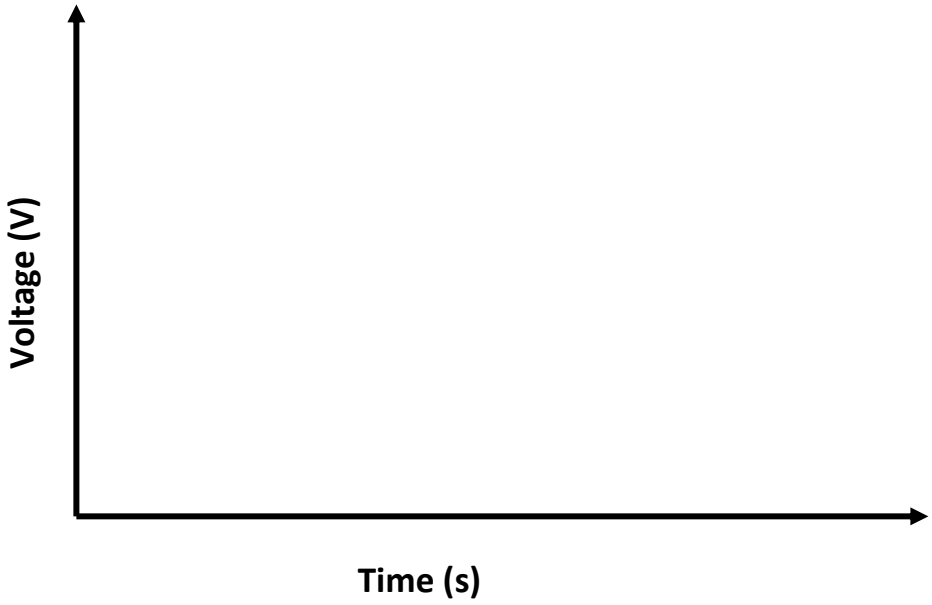
c) Study the rectification circuit below and use it to answer questions that follow.



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

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

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



KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 10

232/1

PHYSICS

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

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

b) *Answer **all** the questions in the two sections in the spaces provided after each question*

c) *All working **must** be clearly shown.*

d) *Electronic calculators, mathematical tables may be used.*

e) *All numerical answers **should be expressed** in the **decimal** notations.*

f) *You may use 'g' as 10m/s²*

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAX. SCORE	SCORE
I	1-14	25	
II	15	14	
	16	09	
	17	14	
	18	10	
	19	08	
TOTAL SCORE		80	

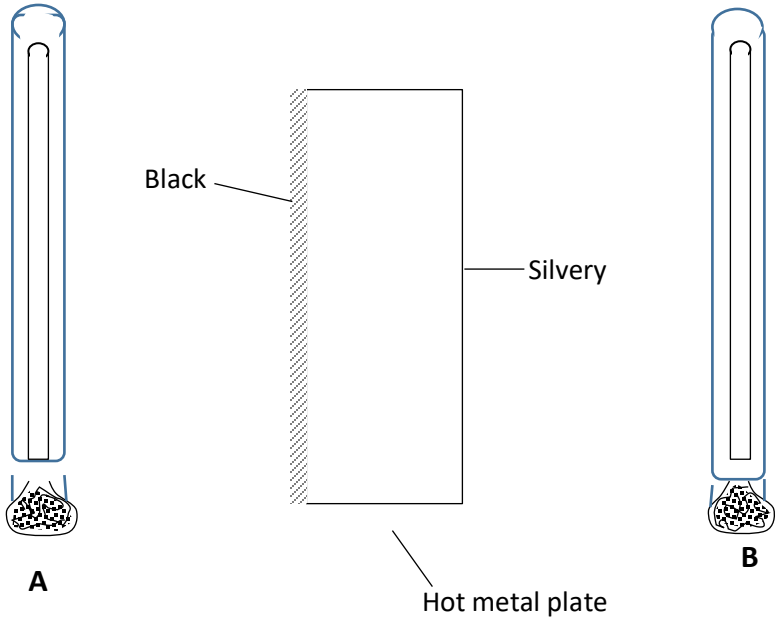
SECTION A (25 marks)

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

1 A micrometer screw gauge with a zero error –0.02mm was used to measure the diameter of a marble whose actual radius is 2.17mm. Determine the reading expected and hence draw the scale seen on the gauge (Pitch = 0.5mm). **(2 marks)**

2 Explain the variation of density of water when its temperature falls from 10^{o}C to freezing point. **(2 marks)**

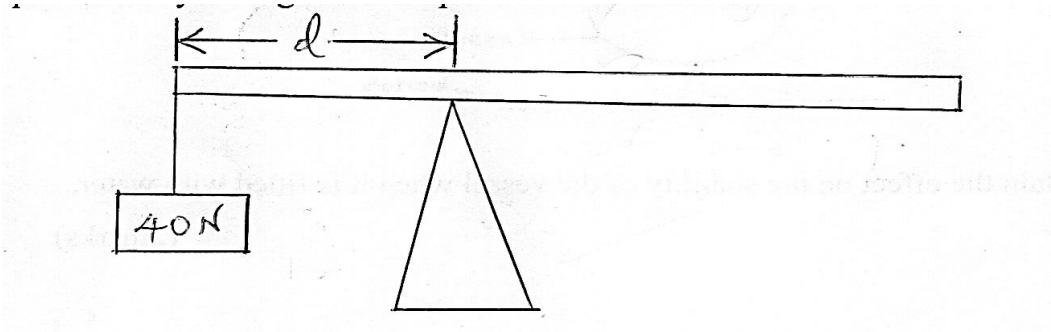
3 The figure below shows two identical thermometers **A** and **B** placed near and at equal distances on either sides of a hot metal plate painted black on the side **A** and silvery on side **B**.



State and explain the observation made on the reading of the thermometers after some minutes. **(2 marks)**

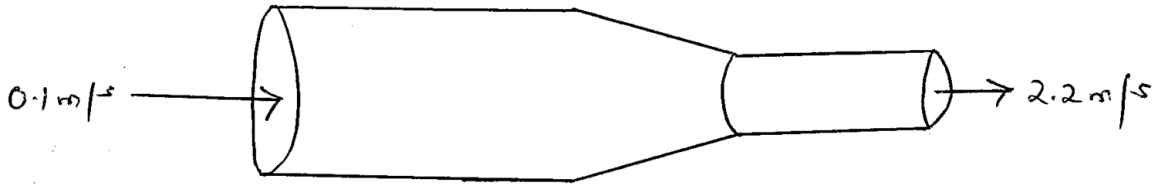
4 A body is acted upon by a force of 10N towards the right hand side and 6N towards the left hand side. Determine the resultant force. **(2marks)**

5 The figure below a uniform wooden plank of length 4m and weight 10N. The plank is held at equilibrium by a weight of 40N placed at one end as shown.



Determine the distance, d. **(3marks)**

6 The figure shows a non-viscous fluid that is not compressible moving through a pipe of varied cross-sectional area.

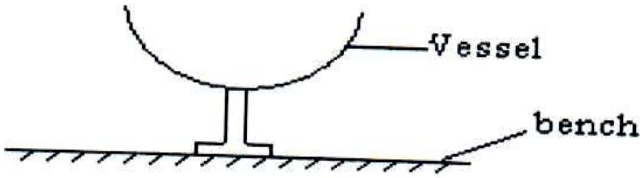


If the area of the narrower region is $0.05m^2$, determine the diameter of the wider region. **(3marks)**

7 State the S.I unit of luminous intensity. **(1mark)**

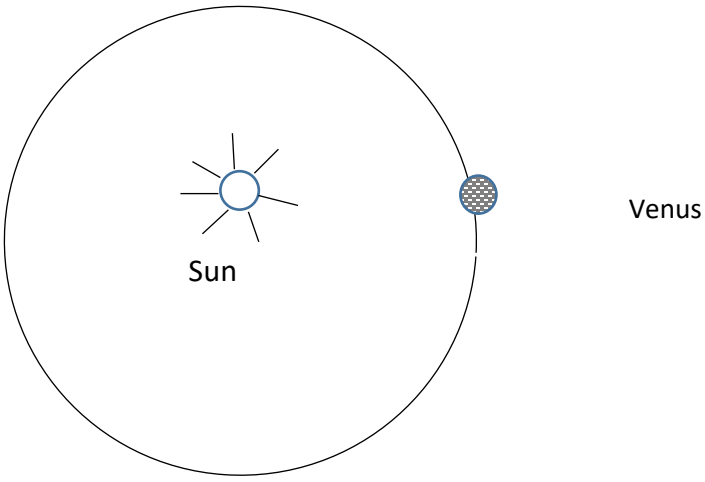
8 In terms of intermolecular forces,explain the difference between liquid and gaseous state**(2mks)**

9 The figure shows a vessel resting on a horizontal bench.



State and explain the effect on the stability of the vessel when it is filled with water.**(2marks)**

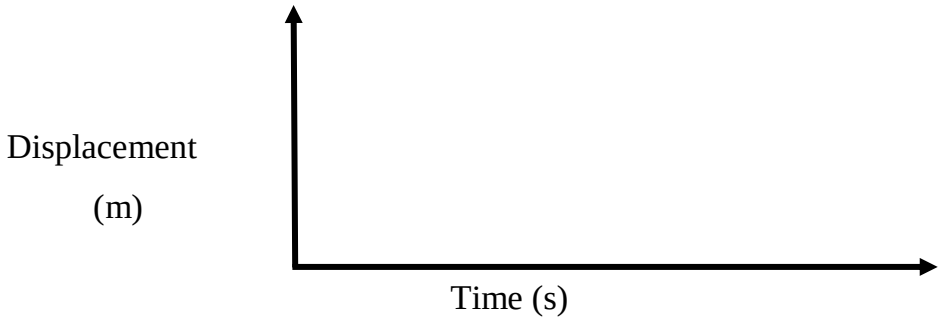
10The figure below shows a planet Venus orbiting the sun in a circular orbit at constant speed.



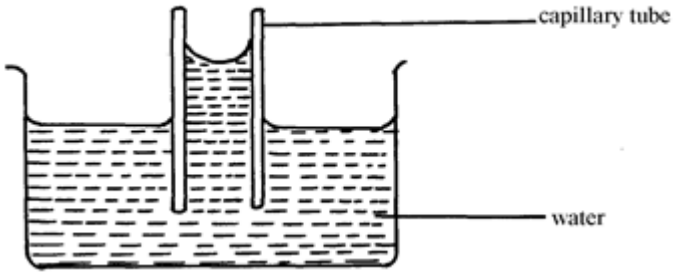
(i) State what provides the centripetal force. **(1 mark)**

(ii) Indicate the direction of centripetal force on the planet. **(1 mark)**

11.On the axes below, sketch displacement time graph for an accelerating body. **(1mark)**



12The figure shows a capillary tube dipped in water.



State **two** differences that will be observed when water is replaced with mercury in the set up above. **(2 marks)**

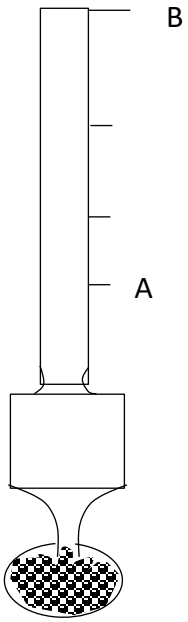
13Water is known to boil at 100^0C. A student heated some water and noticed that it boiled at 101^0C. State two possible reasons for this observation. **(2 marks)**

SECTION B (55 marks)

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

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

(b) The figure shows a hydrometer.



(i) State the reason why lead shots are fixed at the bottom of hydrometer. **(1 mark)**

(ii) State the letter in the figure which represents a greater density. **(1 mark)**

(c) An ordinary hydrometer of mass 30g floats with 4cm of its stem out of the water. The area of the cross – section of the stem is 0.90 cm^2. Taking density of water= 1.0g/ cm^3.

Determine the:

(i) mass of the water displaced. **(1mark)**

(ii) Volume of water displaced. **(1mark)**

(iii) Volume of stem above water. **(2marks)**

(iv) Total volume of the hydrometer. **(2marks)**

(v) Length of stem above the surface when it floats in a liquid of relative density 1.5. **(2marks)**

(e) A balloon is filled with a gas which is lighter than air. It is observed to rise in air up to a certain height. State a reason why the balloon stops rising. **(1 mark)**

(f) The figure shows a bucket of water.

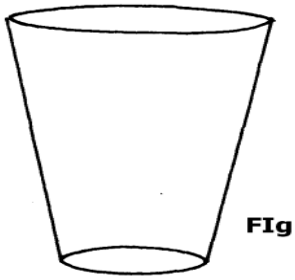


FIg 2

Explain why manufacturers prefer the shape shown above as a container for holding liquids such as water. **(2marks)**

16(a) The figure shows a block hanging at rest from a ceiling by a piece of rope.

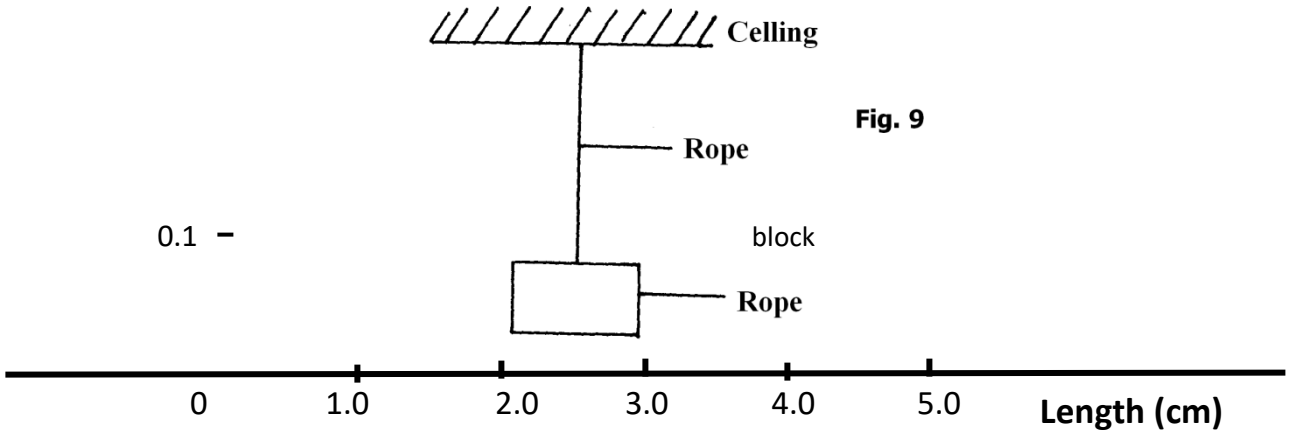


Fig. 9

Use the figure to answer question 16 (a) and (b)

(i) Both gravitational force and tensional force act on the system. State a reason for the presence of each force:

(I) Gravitational force. **(1mark)**

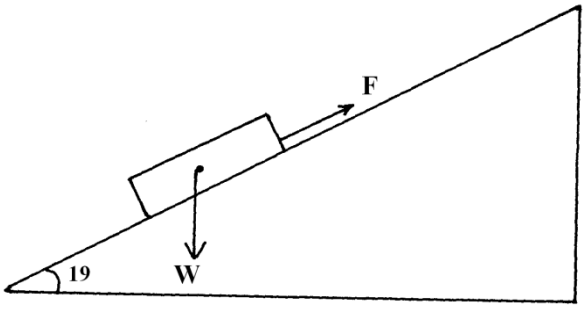
(II) Tensional force **(1mark)**

(ii) Air resistance and normal reaction are absent (do not act on the system). State a reason for each.

(I) Air resistance. **(1 mark)**

(II) Normal reaction **(1mark)**

(b) The figure shows a brick resting on an incline plane at an angle θ to the horizontal. The weight W and the frictional force, F_r are shown.

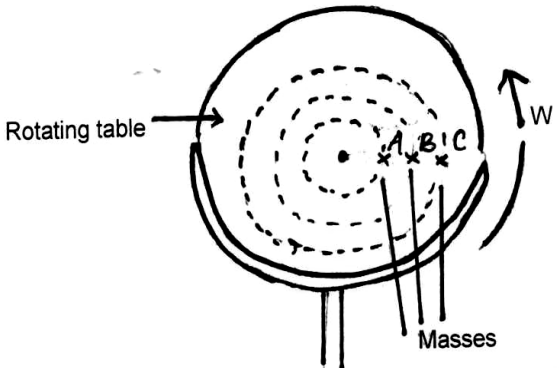


(i) On the same diagram show with an arrow one other force acting on the block and name the force. **(1mark)**

(ii) A runway for an airport is designed such that the lowest acceleration rate for the plane is $3m/s^2$. The take off speed for the plane is 65m/s. Determine the minimum length for the runway. **(2 marks)**

(c) A motor cyclist wears a helmet lined on the inside with sponge. Explain how this minimizes injuries to the motorists head when involved in an accident. **(2 marks)**

17(a) The figure below shows masses A, B and C placed at different points on a rotating table.



The angular velocity ω, of the table can be varied.

(i) State **two** factors that determine whether a particular mass slides off the table or not. **(2marks)**

(ii) It is found that the masses slide off at angular velocities ω_A, ω_B and ω_C respectively. Arrange the values of ω_A, ω_B and ω_C in decreasing order. **(1mark)**

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

(c) State pressure law of an ideal gas. **(1 mark)**

(d) When the temperature of a gas in a closed container is raised, the pressure of the gas increases. Explain how the molecules of the gas cause the increase in pressure. **(2 marks)**

(e) State **one** assumption for the experiments carried out to verify the gas laws. **(1 mark)**

(f) A constant mass of hydrogen gas occupies a volume of 4.0 cm^3 at a pressure of $2.4 \times 10^5 Pa$ and temperature of 15^0C. Determine its volume at a pressure of $1.6 \times 10^5 Pa$ when the temperature is doubled. **(3 marks)**

18(a) State what is meant by specific latent heat of vaporization. **(1mark)**

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

The following measurements were made:-

Mass of calorimeter	=	50g
Initial mass of water	=	70g
Initial temperature of water	=	5^0C
Final mass of water + Calorimeter + condensed steam	=	123g
Final temperature of mixture	=	30^0C
Specific heat capacity of water	=	4200$JKg^{-1}k^{-1}$
Specific heat capacity of copper	=	390 $JKg^{-1}k^{-1}$

(i) Determine the:-

(I) Mass of condensed steam **(2marks)**

(II) Heat gained by water and calorimeter. **(2marks)**

(ii) Given that L is the specific latent of heat of vaporization of steam:

(I) Write an expression for the heat given out by steam. **(1mark)**

(II) Determine the value of L. **(2marks)**

(c) The figure shows two similar containers with equal amounts of methylated spirit at room temperature. A draught is blown over container A and their temperatures taken after sometime.

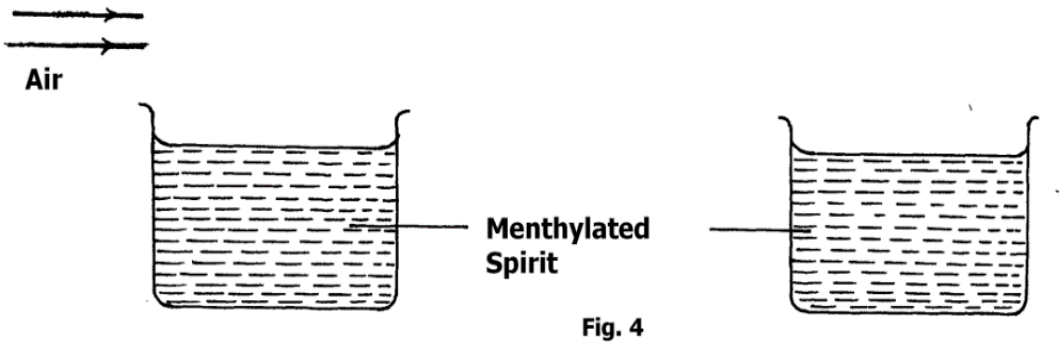


Fig. 4

State and explain one that will have a lower temperature. **(2marks)**

19(a) Two gear-wheels have 80 teeth and 20 teeth and they lock with each other. They are fastened on axles of equal diameter such that equal weight of 150N attached to the string around the axle will just raise 450N on the other axles.

Determine:

(i) the mechanical advantage. **(2marks)**

(ii) the velocity ratio. **(2marks)**

(iii) The efficiency of this machine. **(2marks)**

(b) State any **one** possible way of increasing velocity ratio of wheel and axle. **(1mark)**

(c) A Loudspeaker is a transducer. Explain. **(1mark)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 10

232/2

PHYSICS

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

Instruction to Candidates

(a) *Write your name, index number in the spaces provided above.*
(b) *Sign and write the date of examination in the spaces provided above.*
(c) *This paper consists of* **two** *sections:* **A** *and* **B**.
(d) *Answer* **all** *the questions in sections* **A** *and* **B** *in the spaces provided.*
(e) ***All*** *working* **must** *be clearly shown.*
(f) *Silent non-programmable electronic calculators may be used.*

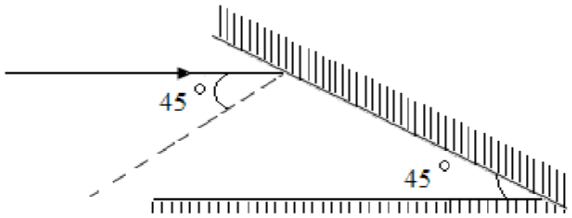
FOR EXAMINERS USE ONLY

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

SECTION A 25 MARKS

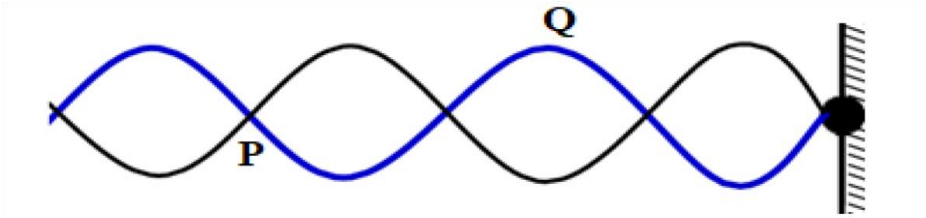
Answer all the questions in the spaces provided.

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



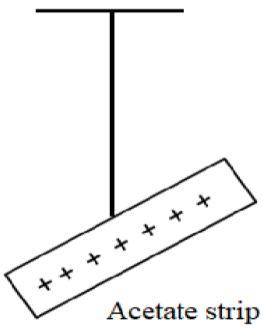
1. State any two ways of reducing the magnetic force of attraction of a magnet **(2 marks)**

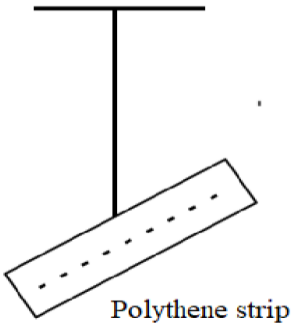
2. The figure below shows a transverse stationary wave along a string.



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

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



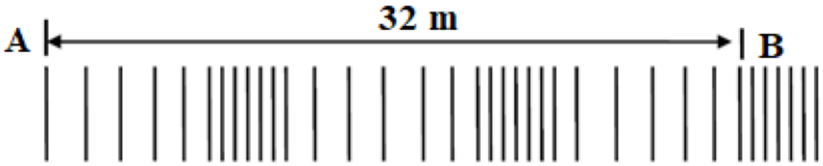


Two rods X and Y are brought up in turn to these strips. X attracts the acetate strip but repels the polythene strip. Rod Y does not repel either the acetate or the polythene. State the type of charge on each rod.

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

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

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

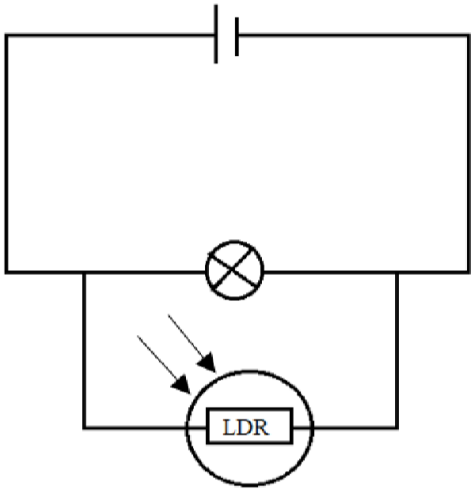


6. Name two detectors of microwave **(2 marks)**

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

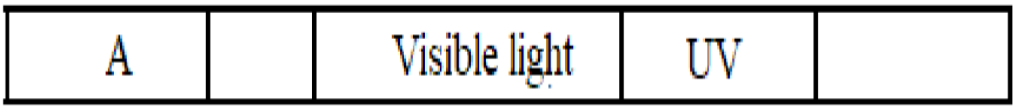
8. Give a reason why a concave mirror is not preferred as a driving mirror**.** **(1 mark)**

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



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

11. The figure below is part of electromagnetic spectrum.

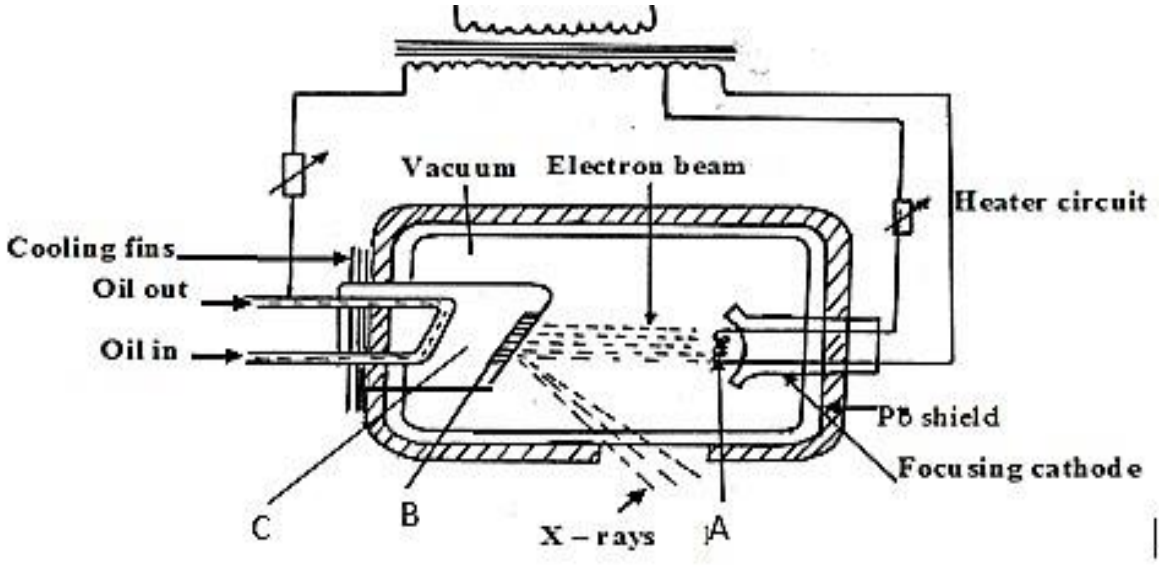


Identify radiation A and state its source. **(2 marks)**

SECTION B 55 MARKS

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

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



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

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

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

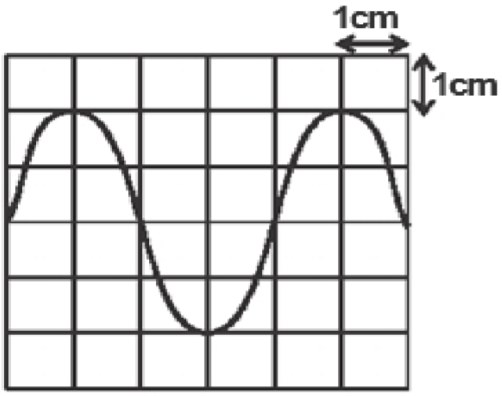
(iv) State the adjustment that can be made to vary

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

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

(v) An x-ray tube has an accelerating potential of 100KV. Determine the maximum frequency of the x-rays produced. *(Plank's constant = 6.63×10^{-34} Js, $e = 1.6 \times 10^{-19}$C)* **(3 marks)**

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



Determine:

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

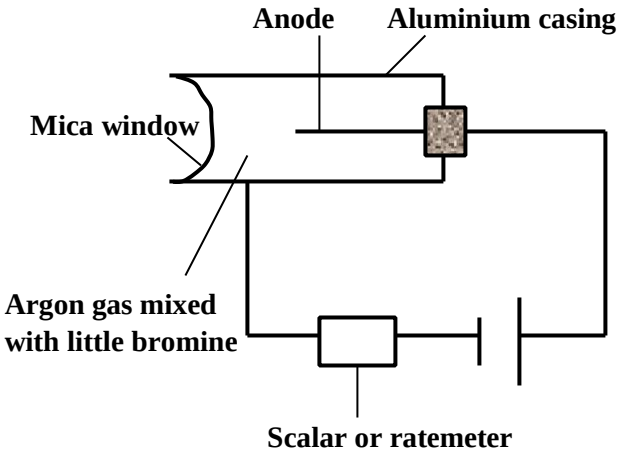
(ii) frequency of the **signal** **(2 marks)**

13. a) 88226 Ra decays into 86222 Rn by emission of an alpha particle. Write a nuclear equation for the **decay** **(1 marks)**

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

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

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



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

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

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

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

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

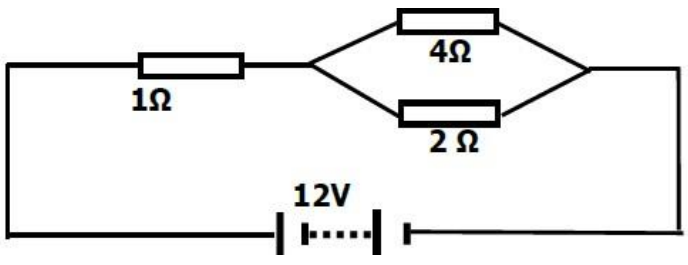
14. (a) State the Ohm's Law **(1 mark)**

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

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

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

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



Calculate

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

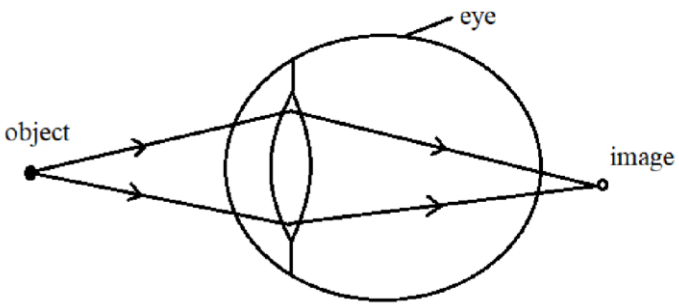
(ii) The current through the 4Ω resistor **(3 marks)**

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

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

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

d) The figure below shows a human eye defect.

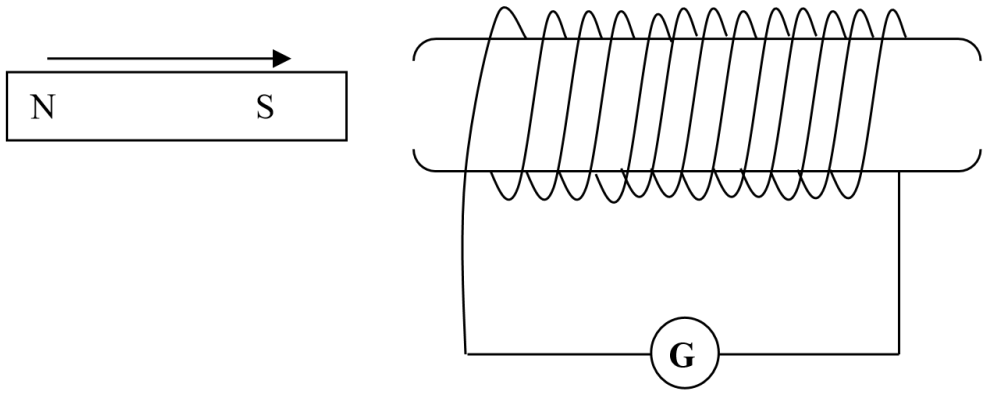


(i) State one possible cause of this defect**.** **(1 mark)**

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

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

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



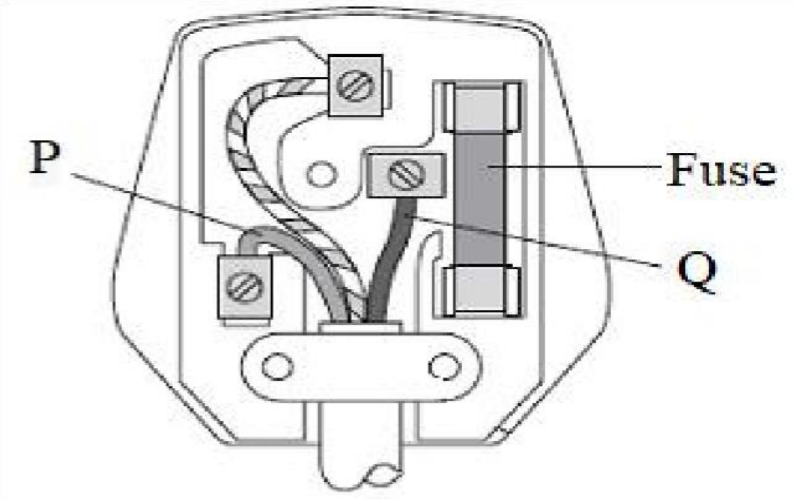
(i) Show on the figure above the direction of the induced current in the coil

(1 mark)

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

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

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



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

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

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