PHYSICS

THE KENYA CERTIFICATE OF SECONDARY EDUCATION

KCSE 2023 EXAMINER FINAL PREDICTION

A KCSE 2023 PREDICTION WITH PRECISION

This PDF Comprises of Expected KCSE 2023 Questions prepared by a panel of top KNEC writers. All the KCSE 2023 Candidates are advised to take the prediction questions therein seriously!

For Marking Schemes Contact

0724333200/ 0795491185

Mr Machuki

Confidential!!!

Kenya Educators Consultancy Wishes all the KCSE 2023 Candidates the best of Luck ahead of the KCSE National Exams.

THE KENYA CERTIFICATE OF SECONDARY EDUCATION

KCSE 2023 EXAMINER FINAL PREDICTION

232/1 PHYSICS

PAPER 1 (THEORY)

Name: …… **Index No**: ……..

Class: …… **Candidate's Sign**: ……

Date: ……

TIME: 2 HOURS

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.*

FOR EXAMINERS USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
A	1-13	25	
B	14	9	
	15	12	
	16	12	
	17	12	
	18	10	
	TOTAL SCORE	80	

SECTION A: 25marks

1. A stopwatch is used to time a runner in a race. Figure 1 show the stopwatch at the start and at the end of a lap of the race.

Fig 1

start of lap

end of lap

State how long (in SI unit) did the runner took to finish the lap of the race (1mark)

2. The front views of two cars are shown in figure 2 , drawn to the same scale.

Fig 2

family car

racing car

Suggest which car has the greater stability,and give a reason. (2marks)

3. Figure 3 below shows a micrometer screw gauge. State the reading indicated (2marks)

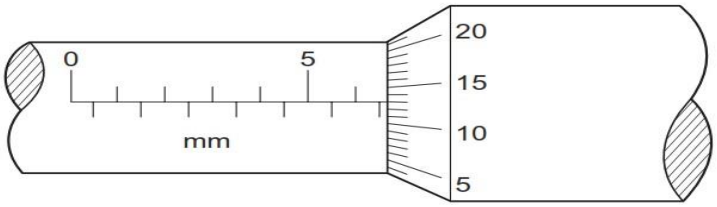


Fig 3

4. Figure 4 shows two identical springs of spring constant 3N/cm supporting a load of 30N.

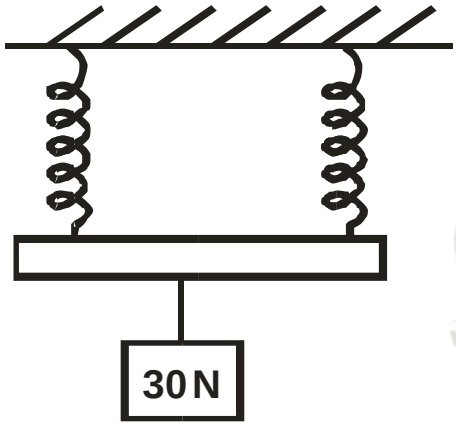


Figure 4

Determine the extension of each spring. (2 marks)

5..Figure 5 shows a system for raising a heavy piece of metal into a vertical position.

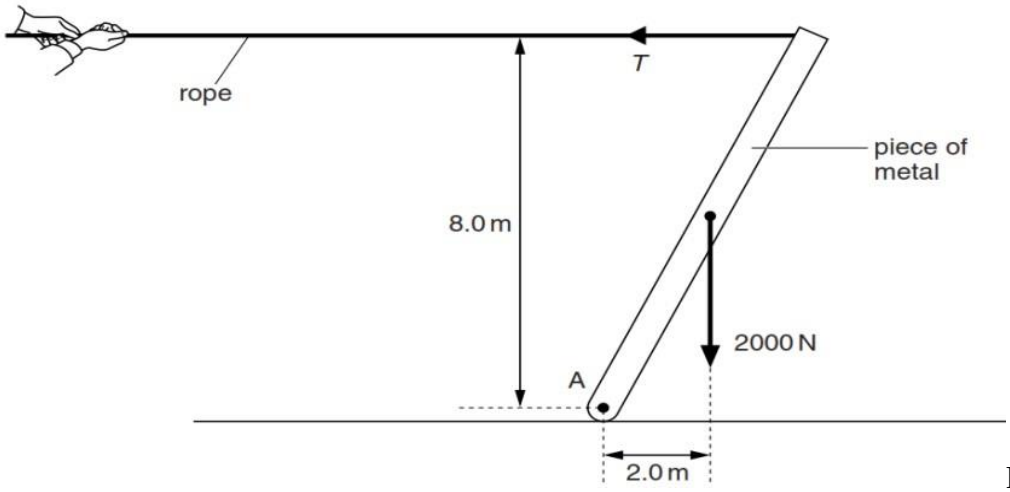


Fig 5

A man pulls on the rope with a horizontal force T. The piece of metal has a weight of 2000 N and is freely pivoted at A. The system is in equilibrium. By taking moments about A, calculate the value of T. (3marks)

6. Explain why an aeroplane is likely to take off much earlier than expected when the speed of the wind blowing in the opposite direction to its motion on the runway suddenly increases (2 marks)

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

8.A body of mass 4.0kg held at a vertical height of 500cm is released to travel a long a frictionless curved path as shown in figure 8

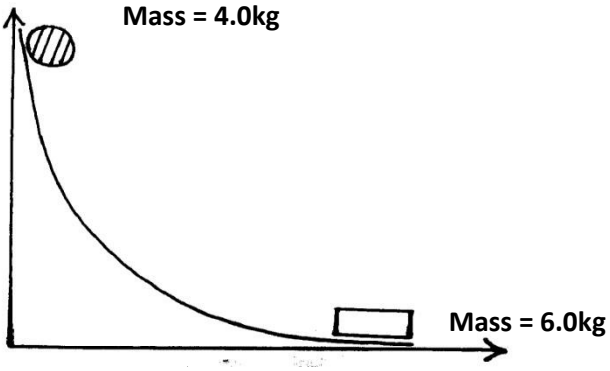


Fig 8

The 4.0kg mass strikes another body of mass 6.0kg at rest. Immediately it reaches the horizontal, the two bodies stick together and move in the same direction. Determine the velocity of the bodies immediately after collision. (3marks)

9.A tin with a hole is filled with water to a certain height. Water jets out as shown in figure 9(a) below. A second identical tin is filled with water to the same height and a block of wood floated as shown in figure 9(b).

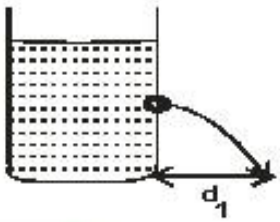


fig 9a

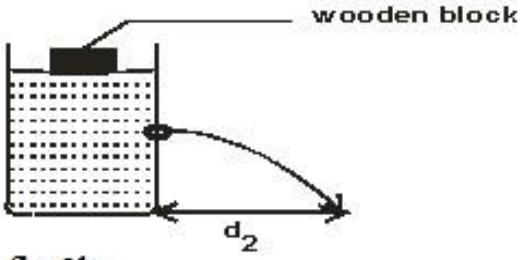
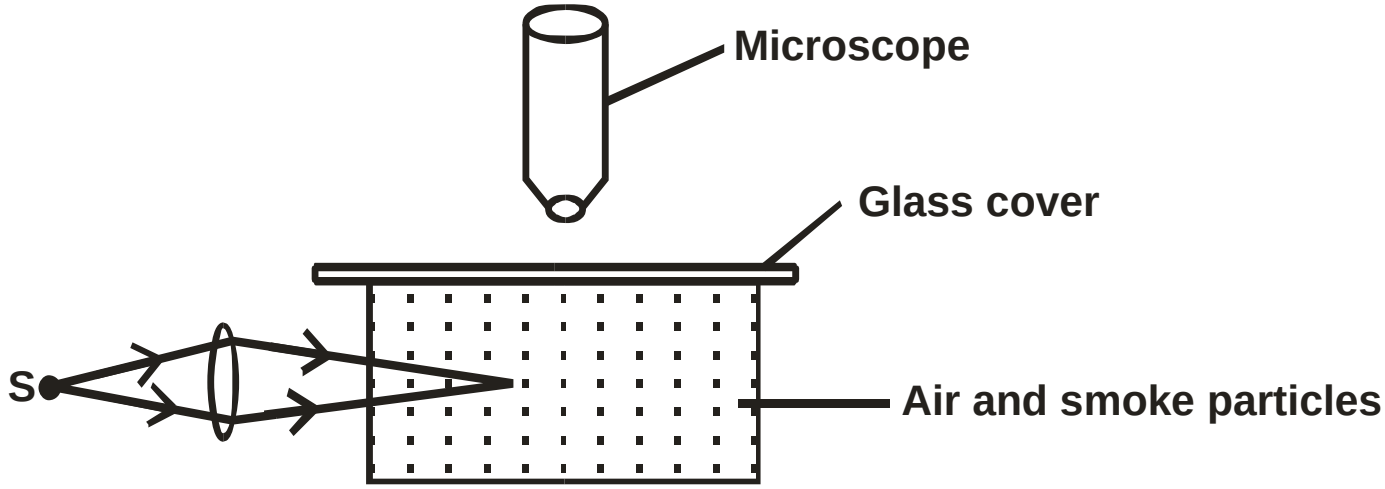


fig 9b

Fig 9

State the reason why the maximum distance of jet d_2 is greater than d_1. (1 mark)

10.The figure 2 below shows the apparatus used to observe Brownian motion using a smoke cell.

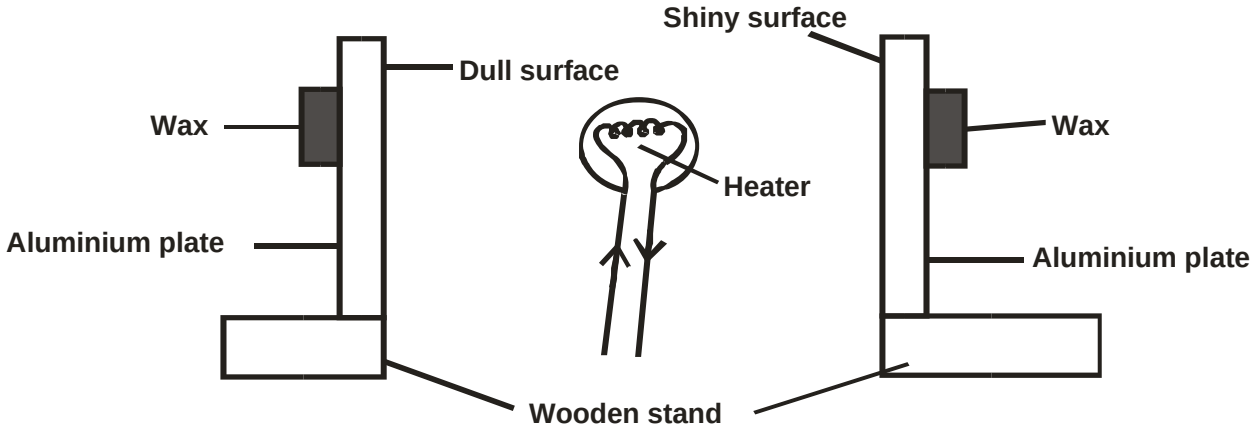


i) State the observation made in the smoke cell. (1 mark)

ii) Explain the observation made when the temperature in the smoke cell is increased. (1 mark)

11. When a mercury in a glass thermometer is used to measure the temperature of hot water, it is observed that the mercury level first drops before beginning to rise. Explain. (2 marks)

12.Figure 3 shows an arrangement of apparatus to study properties of different surfaces.



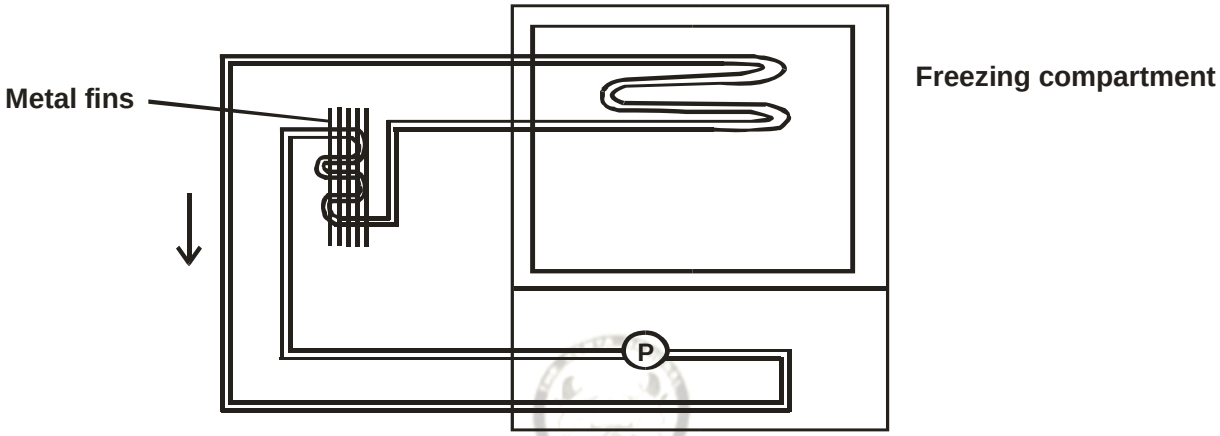
The heater is placed equidistant from the two plates. State what happens when the heater is switched on for some time. (1 mark)

.

13. Explain your answer in question 12 above (1mark)

SECTION B: 55marks

14. a) The figure below shows the features of a refrigerator.



i) What is the function of the pump P? (1 mark)

ii) What is the function of the copper fins at the back of the refrigerator? (1 mark)

iii) Explain briefly how cooling takes place in the refrigerator. (3 marks)

iv) What is the purpose of the double wall in a refrigerator? (1 mark)

b) i) Define the term latent heat of fusion of a substance. (1 mark)

ii) The figure below shows an apparatus that could be used to determine the specific latent heat of fusion of ice.

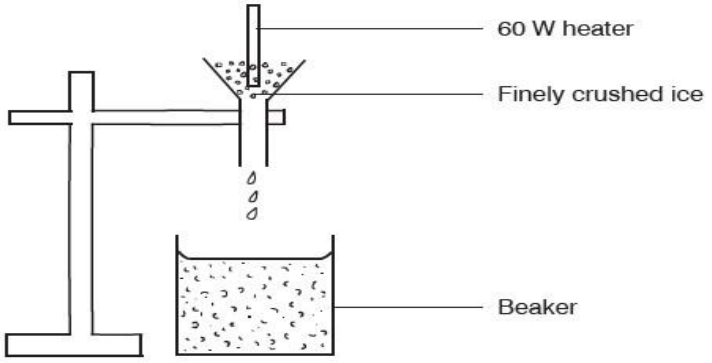


Fig 12

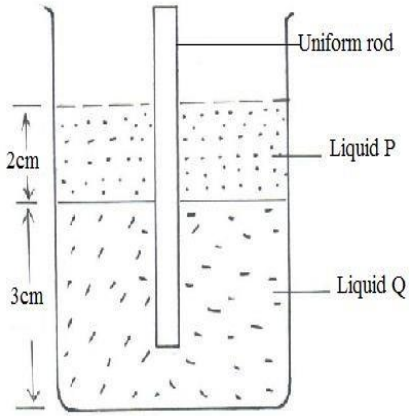
In order to obtain results that are as accurate as possible, state why it is important to:

I. wait until water is dripping into the beaker at constant rate before taking readings. (1 mark)

II. Use finely crushed ice rather than larger ones. (1 mark)

15. (a)State the law of flotation. (1 mark

(b) Figure 13 below shows a uniform rod of height 8cm floating vertically in a beaker containing two immiscible liquids P and Q. The densities of the liquids are 800kg/m^3 and 1200kg/m^3 respectively the cross-sectional area of the rod is 2cm^2.



Determine

(i). the weight of liquid P displaced by the rod. (3 marks)

(ii) The weight of liquid Q displaced by the rod. (2 marks)

(iii) The mass of the rod. (1 mark)

(iv) The density of the rod. (2 mks)

(c). Figure 14 below shows a block of volume 50 cm^3 and density 2 000 kg/m^3 submerged in a liquid and suspended from a uniform horizontal beam by means of a thread. The beam is balanced by a spherical mass of 40 g, which is suspended from it on the other side of the pivot as shown

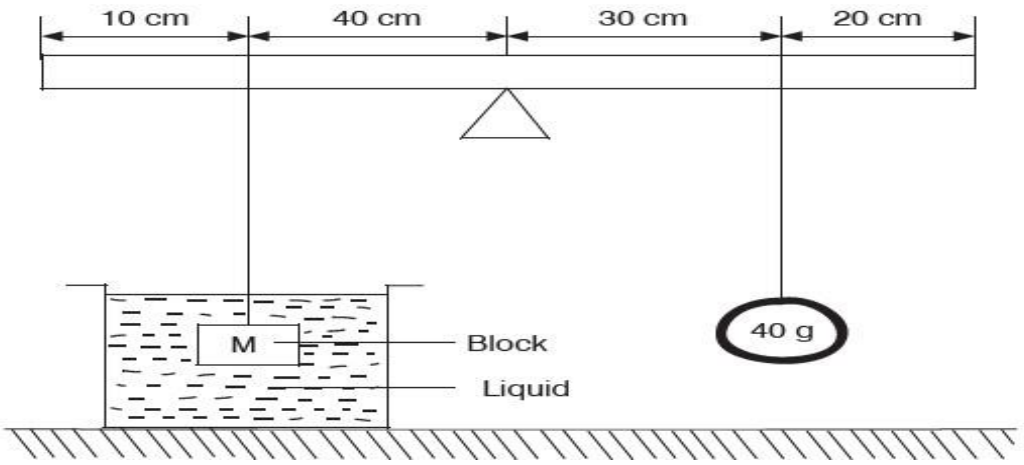


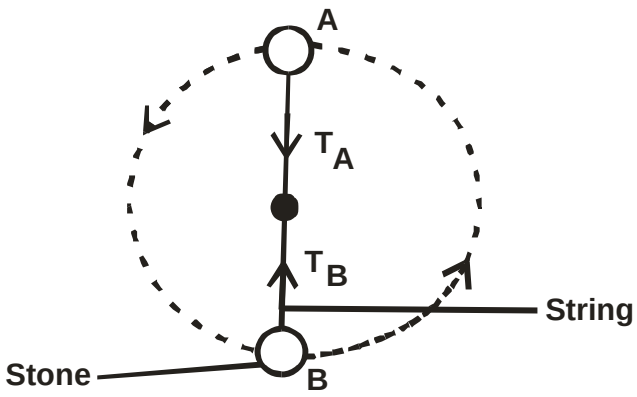
Fig 14

Determine the upthrust force acting on the block. (3 marks)

16. a) State two condition necessary for a driver to negotiate a bend on a banked road at a relatively high speed (2 marks)

(b).The figure shows stone of mass 100g whirled in a vertical circle using a thread of length 56cm.

(Take g 10N/Kg)



If the stone is whirled at a speed of 8m/s. Calculate;

i) The centripetal force experienced by the stone. (3 marks)

ii) Tension force on the string

at :

I) A (2 marks)

II) B (2 marks)

iii) calculate the angular velocity of the stone. (1mark)

(d)Figure 15 shows a centrifuge that is used to separate particles suspended in a liquid.

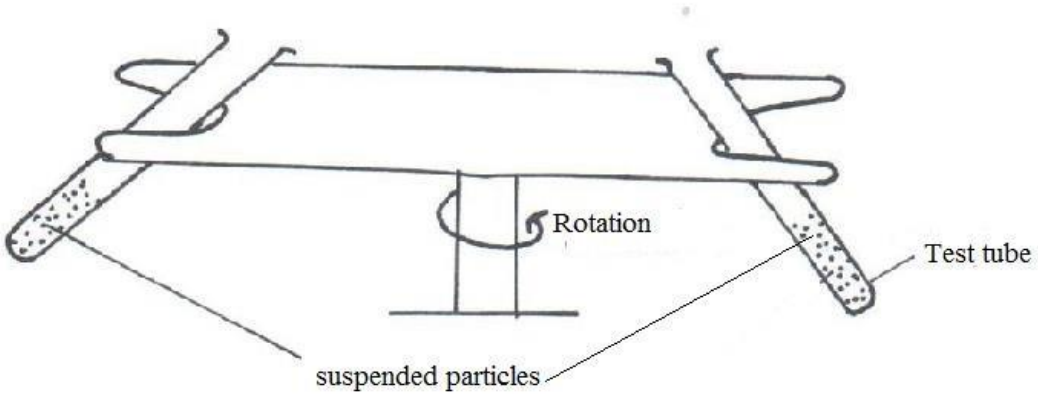


Fig 15

Particle of different mass M_1, M_2 and M_3 are suspended in a liquid which they do not dissolve. The system is then rotated in the direction shown.

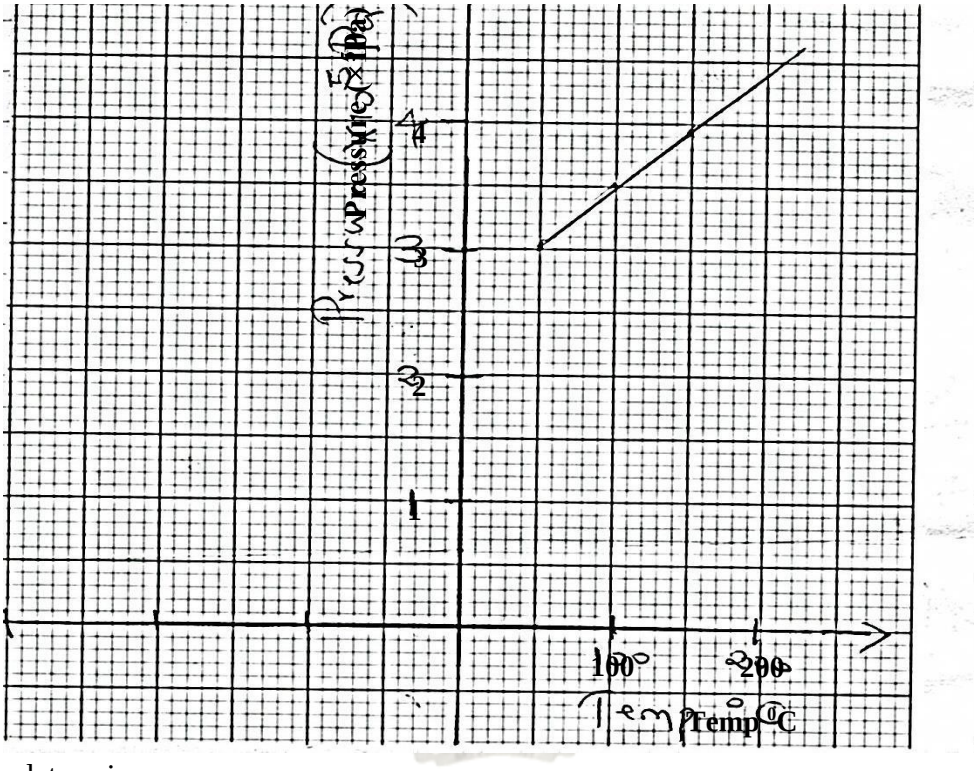
(i).State why the particles of different masses will acquire different radii as the system is rotated. (1 mark)

(ii). If $M_3 > M_2 > M_1$, arrange the particle in increasing radii when the centrifuge is rotated for some time. (1 mark)

17.a) State one condition necessary for pressure law to hold. (1 mark)

b) A bubble at the bottom of a pond expands as it rises to the top of the liquid. Explain. (1 mark)

c) The graph below represents a graph of pressure against temperature, ^{o}C.



From the graph, determine;

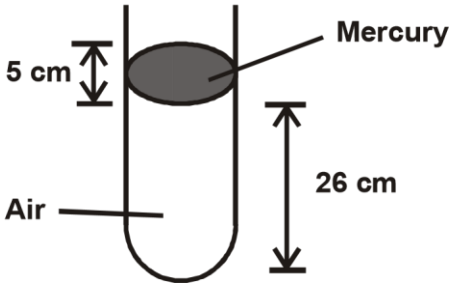
i)The absolute zero temperature.

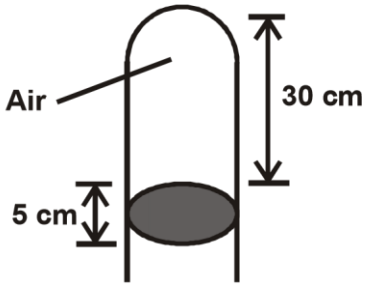
(1 mark

Ii)The pressure at 373K (1 mark)

Explain why temperature in (i) above cannot be achieved (2 marks)

d) A column of air 26cm long is trapped by mercury thread 5cm long. When the tube is inverted, the air column becomes 30cm long.What is the value of atmospheric pressure? (3 marks)





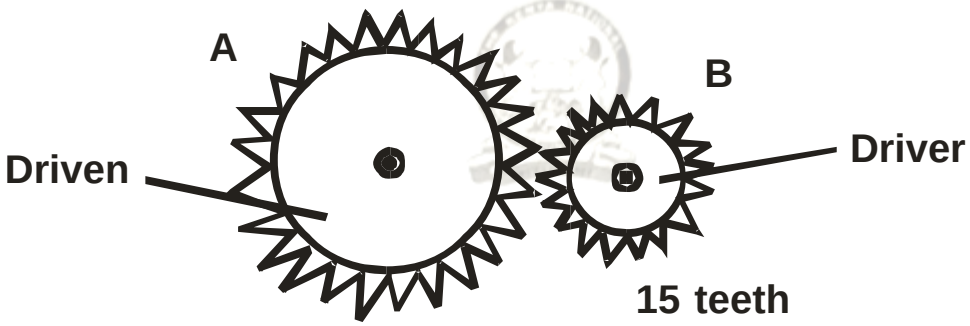
Explain using kinetic theory of gases why pressure of gases increases as temperature of the gas is increased. (3 marks)

18.a) Differentiate between work and energy. (2 marks)

.

b) Describe the energy transformation that takes place when a car battery is used to light a bulb. (1 mark)

c) The figure shows a machine.



Gear wheel A with 30 teeth is driven by gear wheel B with 15 teeth.

i) Determine the velocity ratio of the machine. (2 marks)

ii) If the machine has a mechanical advantage of 0.375, determine the efficiency of the machine. (2 marks)

d) A cart of mass 30kg is pushed along horizontal path by a horizontal force of 8N and moves with a constant velocity. The force is then increased to 14N.

Determine:;

i) The resistance to the motion of the cart. (1 mark)

ii) The acceleration of the cart. (2 marks)

THE KENYA CERTIFICATE OF SECONDARY EDUCATION

KCSE 2023 EXAMINER FINAL PREDICTION

232/2 PHYSICS

PAPER 2 (THEORY)

Name: …… **Index No**: ……..

Class: …… **Candidate's Sign**: ……

Date: …….

TIME: 2HRS

INSTRUCTIONS TO CANDIDATES

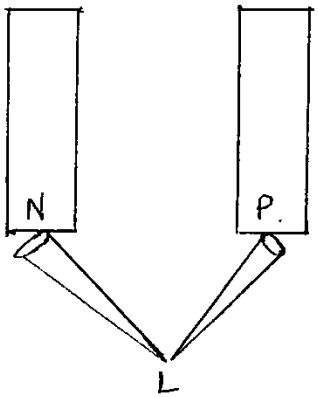
(i.) This paper consists of two sections A and B
(ii.) Answer all questions in section A and B in the spaces provided.
(iii.) All workings must be clearly shown
(iv.) Mathematical tables and non-programmable calculators may be used.

FOR EXAMINER USE ONLY

SECTION A	QUESTIONS	MAXIMUM SCORE	STUDENT SCORE
A	1 – 12	25	
B	13	10	
	14	12	
	15	11	
	16	11	
	17	11	
TOTAL SCORE		80	

SECTION A

1. The diagram below shows two steel pins held at the poles of two magnets.

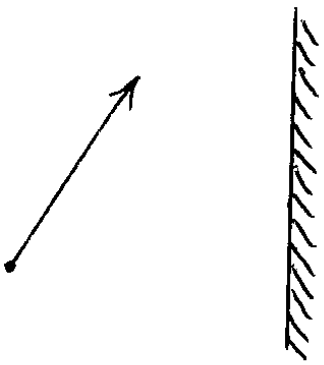


(i.) State the polarity at P _____. (1mk)

(ii.) (i) By what process are the pins magnetised? (1mk)

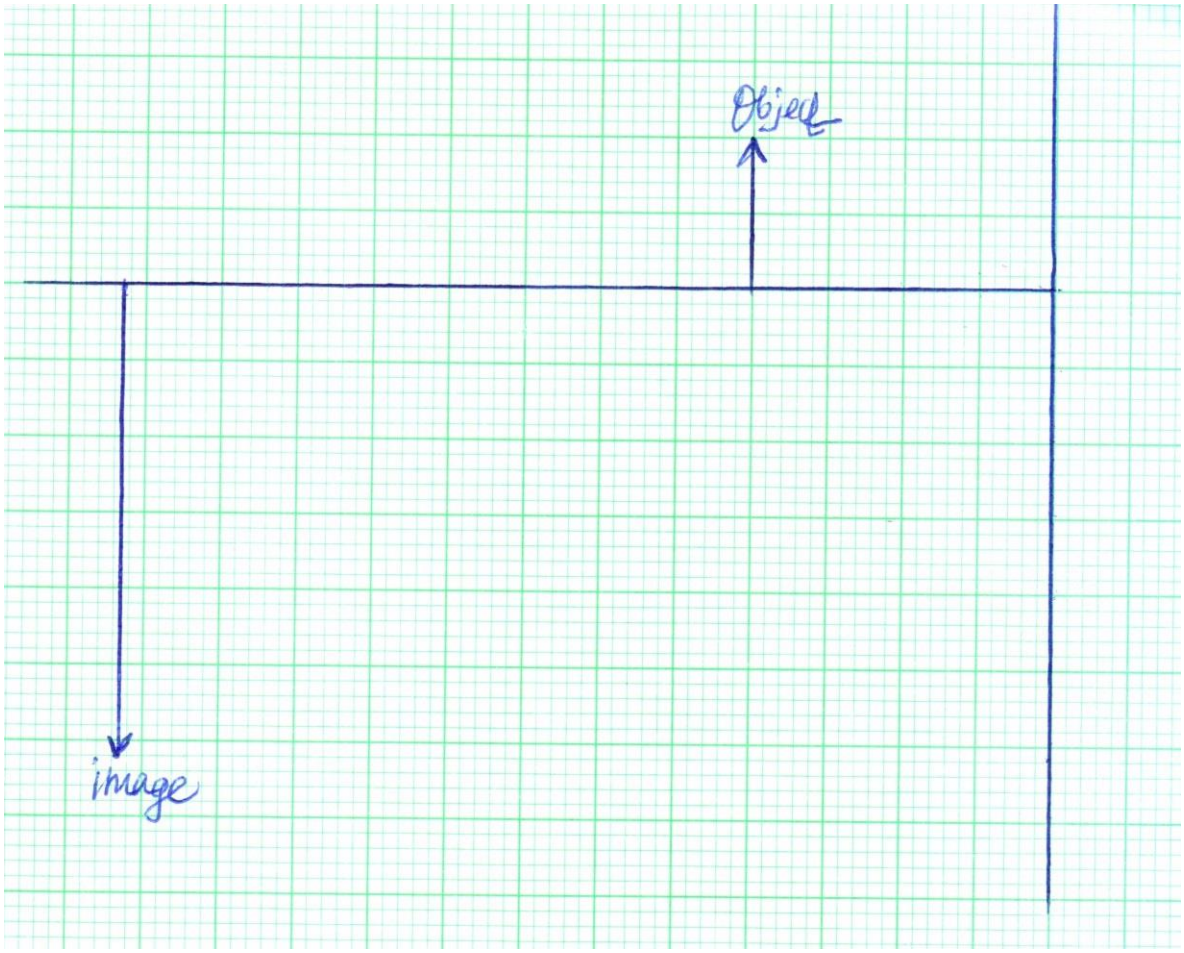
(ii) State the law illustrated by the two pins (1mk)

2. The figure below shows an object in front of a plane mirror.



Sketch the image of the object using the mirror shown (2mks)

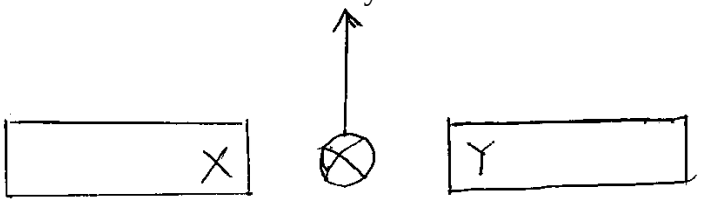
3. The figure below shows an object in front of a concave mirror and its image.



Locate the position of its principal focus (2mks)

4. State the use of Manganese (Iv) Oxide in dry cell (1mk)

5. The figure below shows conductor carrying current in a magnetic field and the conductor moves in the direction shown by the arrow.



(i.) Identify polarities X and Y (1mk)
(ii.) State the law used to determine the direction of movement of the conductor (1mk)

6. A man standing between two parallel walls fires a gun. He hears the first echo after 1.5 seconds and the second echo after 2.5 seconds and the third echo after 4 seconds since firing the gun respectively. Determine the separation of the walls. (take velocity of sound to be 340m/s (3mks)

7. A positively charged rod is brought near the cap of a leaf electroscope. The cap is then earthed momentarily by touching with the finger. Finally the rod is withdrawn. The electroscope is found to be negatively charged. Explain how this charge is acquired (2mks)

8. A wire is stretched between two fixed points such that when it is plucked, it produces sound. Explain why the pitch of the sound produced may become lower when the temperature of the surrounding rises. (2mks).

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

RADIO	INFRARED	VISIBLE LIGHT	A	X-RAYS	GAMMA RAYS

Name the radiation represented by A. (1mk)

10. State two differences between X - rays and gamma rays in the way in which they are produced (2mks)

11. (a) A nuclear reaction is represented by the following reaction.

$$^{a}_{86}X \longrightarrow {}^{220}_{b}Y + \text{Beta particles}$$

(i.) Determine the values a and b (2mks)

A is _____

B is _____

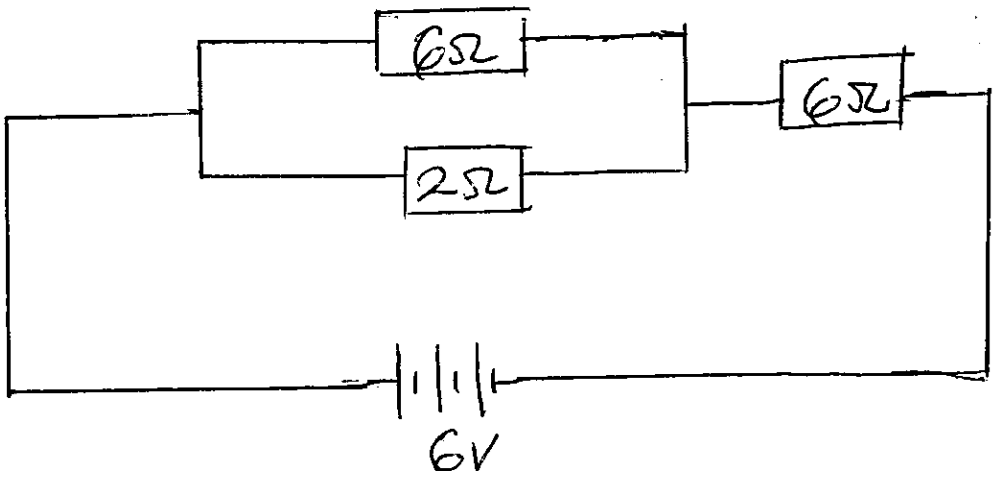
(ii.) What is meant by the term work function as used in photo electricity (1mk)

12. An electrostatic generator sets up a current of 20mA in a circuit. Calculate the charge flowing through the circuit in 15 seconds (2mk

SECTION B

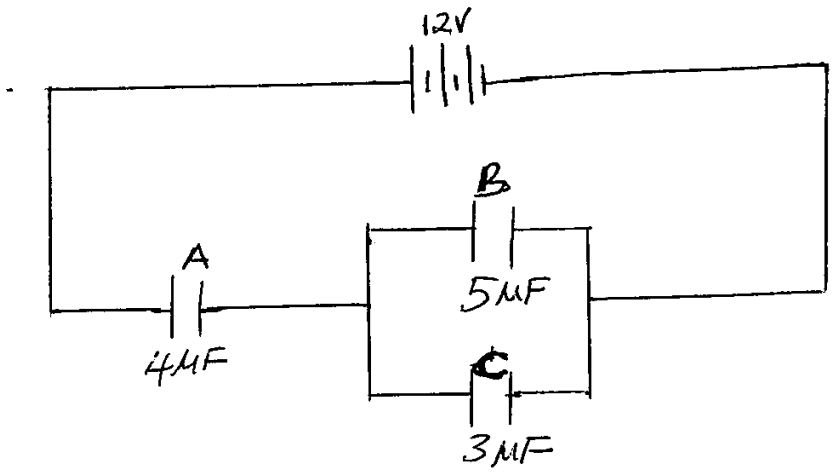
13. (a) State Ohm's law (1mk)

(b) The figure below shows a 6v battery connected to an arrangement of resistor.



Determine the current flowing through the 2Ωresistor. (3mks)

(c) The figure below shows an electronic circuit with three capacitors A, B and C of Capacitance 4μF, 5μF and 3μF respectively connected to a 12v battery.



Determine

(i.) The combined capacitance of the three capacitors. (2mks)

(ii.) The charge of the capacitor A (2mks)

(iii.) The potential difference across capacitor B (2mks)

14. (a) A vertical object is placed 20cm in front of a convex lens of focal length 5cm.
Determine

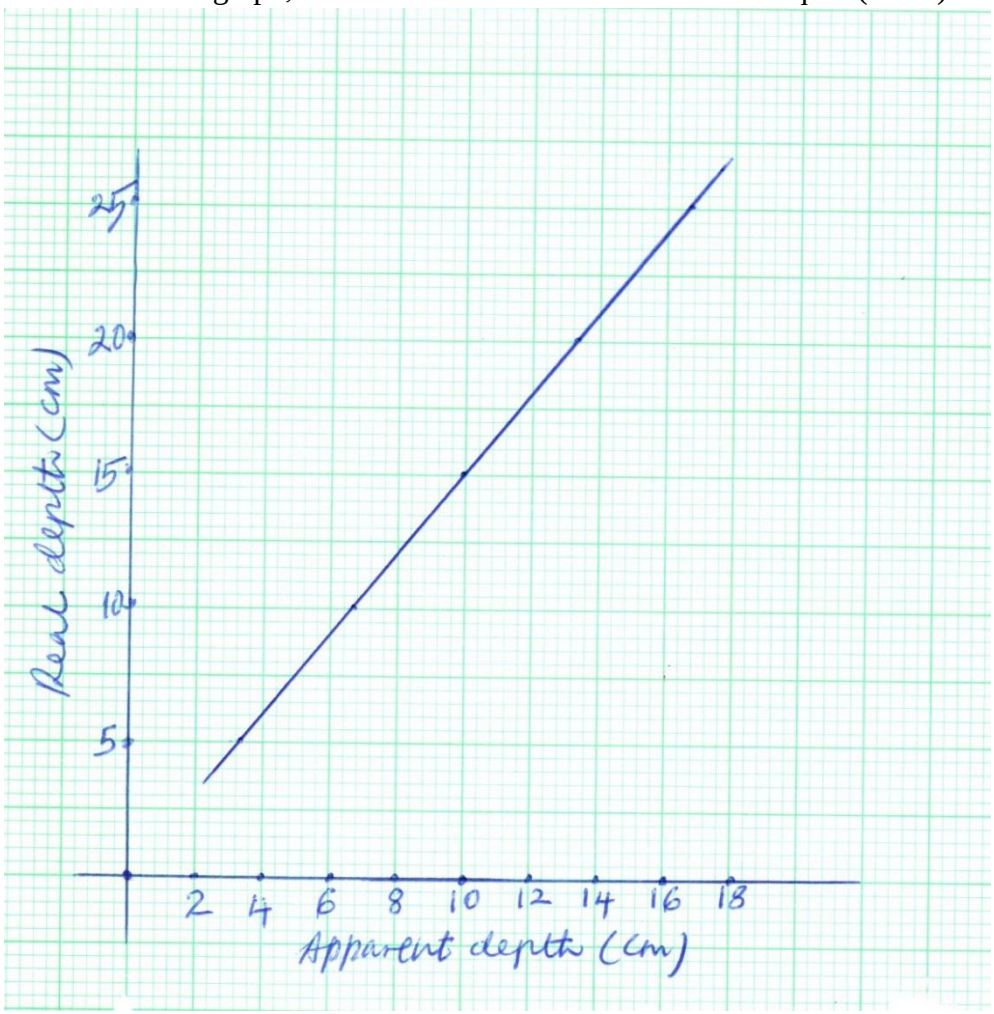
(i.) The image distance (2mks)

(ii.) The magnification (2mks)

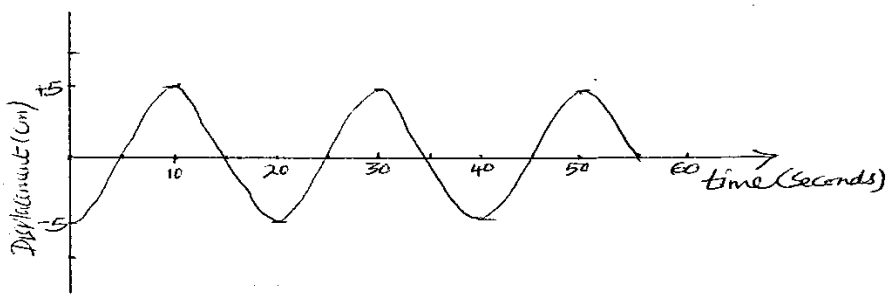
(b) In an experiment to determine the refractive index of a liquid, the liquid was poured into a measuring cylinder. A pin was placed at the bottom of the cylinder and another pin was used to locate the apparent position of the first pin. The real depth and apparent depth were

measured and recorded. The experiment was repeated with other values of real depth. For the tabulated measurement of real and apparent depths the following graph was drawn.

From the above graph, determine the reflective index of the liquid (3mks)



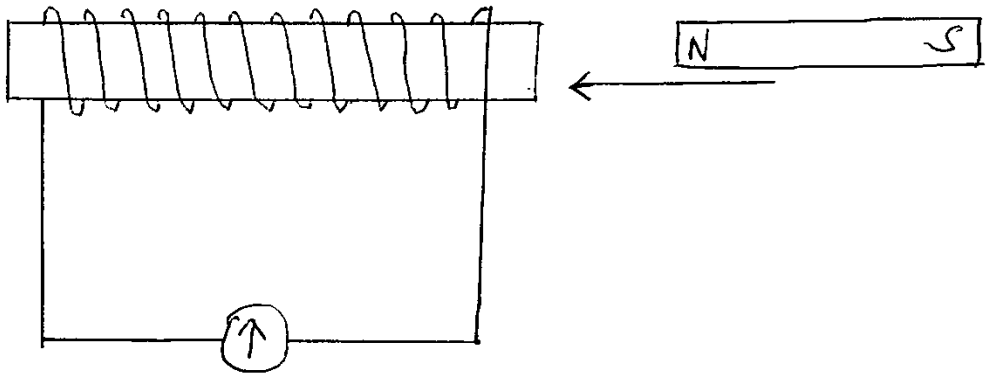
(c) The figure below shows a displacement – time graph for a progressive wave



(i.) Determine the frequency of the wave (3mks)

(ii.) Given that the velocity of the wave is 20m/s determine its wavelength. (2mks)

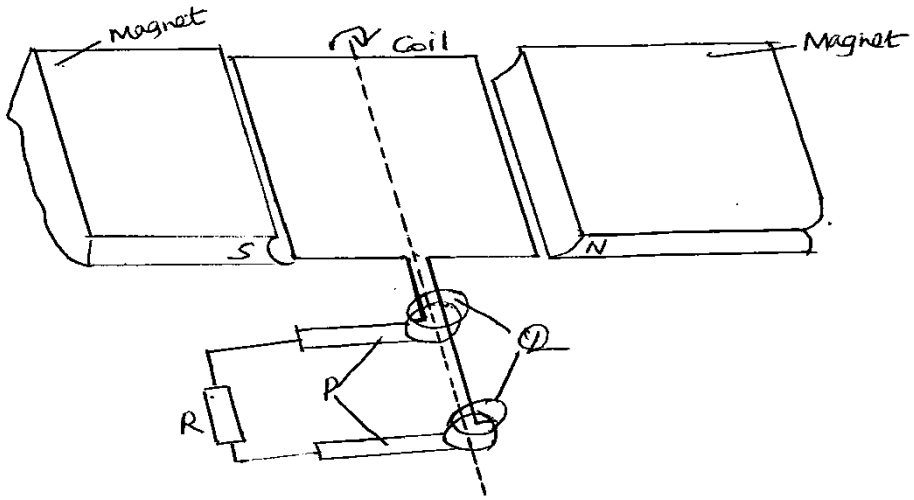
15. (a) The figure below shows a magnet being moved towards a stationery solenoid. It is Observed that the pointers of the galvanometer deflects.



(i.) Give a reason for the deflection of the pointers of the galvanometer (1mk)

(ii.) State two ways that can be used to increase the magnitude of the deflection of the pointer of the galvanometer (2mks)

(b) The figure below shows a simple electric generator.

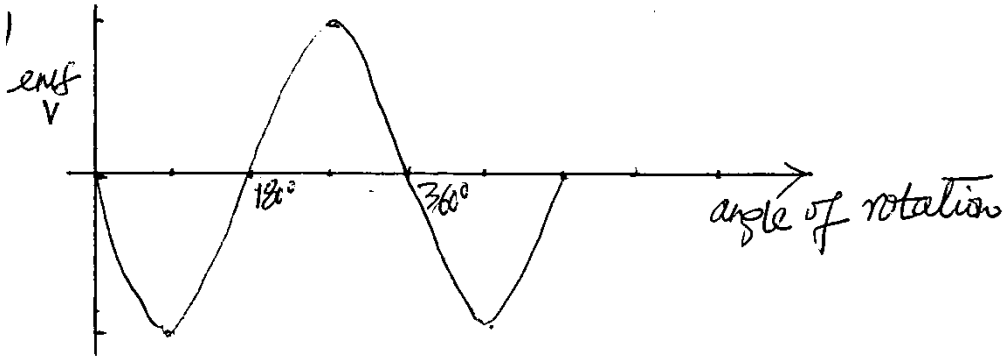


(i.) Name the parts labelled P and Q (2mks)

P is_____

R is_____

(ii.) The emf generated as the coil rotates is represented in the graph below.



Give a reason for the changes in the emf as the coil rotates from 0 to 90 and 90 to 180. (2mk)

(c) The primary coil of the transformer has 1200 turns and the secondary coil has 60 turns. The transformer is connected to a 240v a.c source

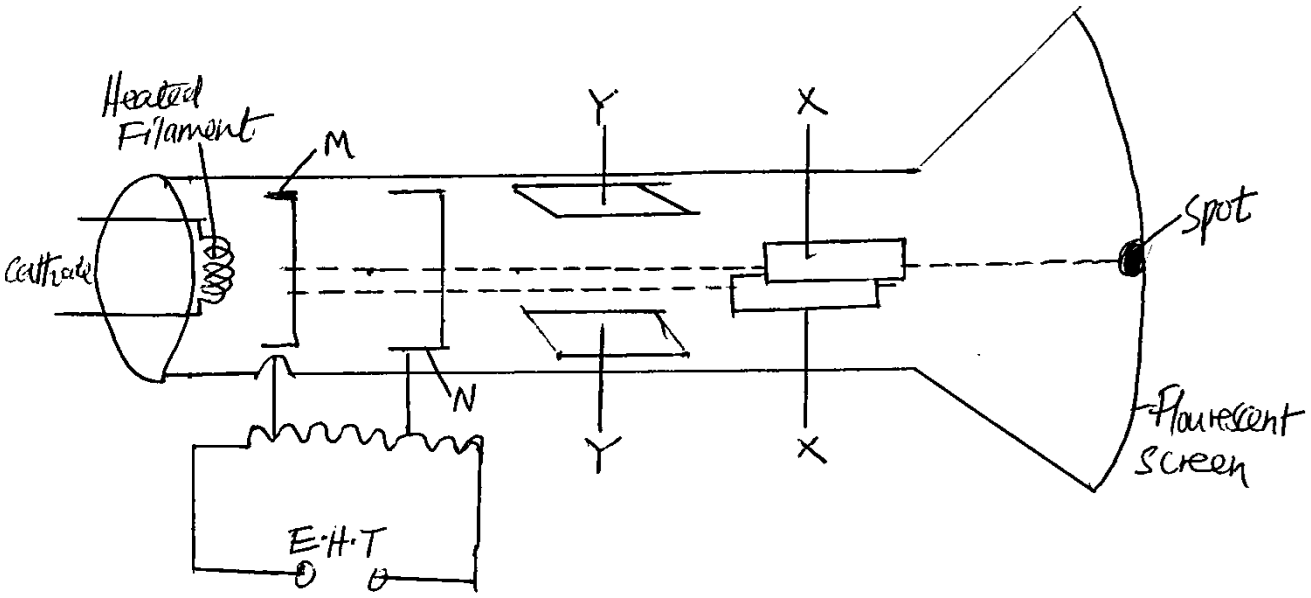
Determine

(i.) The output voltage (2mks)

(ii.) The output current when the primary coil has a current of 0.5 a. (assume there are no energy losses) (2mks)

16. (a) State the differences between cathode rays and electromagnetic radiations (2mks)

(b) The figure below shows the main features of a cathode ray oscilloscope (CRO)



(i.) Name the parts labelled M and N (2mks)

M_____

N_____

(ii.) State how electrons are produced in the tube (1mk)

(iii.) When using CRO to display wave fronts of voltages. State where the following should be connected

I. Voltage to be displayed on the screen. (1mk)

II. Time base voltage (1mk)

III. State why the tube is highly evacuated (1mk)

(c) An x ray tube operating at 12kv delivers a current of 8 mA per seconds. Calculate the number of electrons hitting the target per second (Take = 1.6 x 10-19 c) 3mks.

17. (a) State two ways of minimizing power losses during the transmission of electric Power (2mks)

(b) An electronic cooker is rated 2.5kw, 250v. state the meaning of these values (1mk)

(c) A consumer has the following appliances in the house
Electronic iron rated 1500v
A water heater rated 500w
An electric cooker rated 2500w
Three bulbs each rated 60w
The house is filled with 12A fuse.
Determine the resistance of the heating element used in the electric cooker (3mks)

(d) State how heating is achieved in a resistance wire (1mk)

(e) The lighting in a house has 20 lamps each rated 60w, 240 v. determine the rating of the fuse that maybe used in the circuit. (4mks)

THE KENYA CERTIFICATE OF SECONDARY EDUCATION

KCSE 2023 EXAMINER FINAL PREDICTION

232/3 PHYSICS

PAPER 3 CONFIDENTIAL

Confidential

- **Q**1
- Glass block
- Four optical pins
- Protractor
- Two new dry cells
- Cell holder
- 10 ohms resistor labeled Q
- 6 connecting wires, atleast 3 with crocodile clips
- A voltmeter (0 – 5v)
- An ammeter (0 – 1A) of (0 – 2.5A)
- A switch
- cellotape

Q2.

- A metre rule
- One stop watch
- A complete stand
- One spring (spring constant 0,1N/cm^{-1}
- 2 pieces of wood
- Beam balance to be shared
- One 100g mass labelled M.

THE KENYA CERTIFICATE OF SECONDARY EDUCATION

KCSE 2023 EXAMINER FINAL PREDICTION

232/3 PHYSICS

PAPER 3 (PRACTICAL)

Name: …… **Index No**: ……..

Class: …… **Candidate's Sign**: ……

Date: ……

232/3

PHYSICS

PAPER 3

TIME: 2 HOURS

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) Answer all questions in the spaces provided.
(d) You are supposed to spend the first 15 minutes of the 2½ hours allowed for this paper reading the whole paper carefully before commencing your work.
(e) Marks will be given for clear records of observations actually made, their suitability, accuracy and the use made of them.
(f) Candidates are advised to record their observations as soon as they are made.
(g) All working must be clearly shown where necessary.
(h) Mathematical tables and silent electronic calculators may be used in calculations.

FOR EXAMINER'S USE ONLY

Question	Maximum score	Candidate's score
1	20	
2	20	
TOTAL	**40**	

QUESTION 1.

PART A

You are provided with the following:

– Two new dry cells

– A resistor labeled Q

– 6 connecting wires with crocodile clips on one end of at least three

– A voltmeter

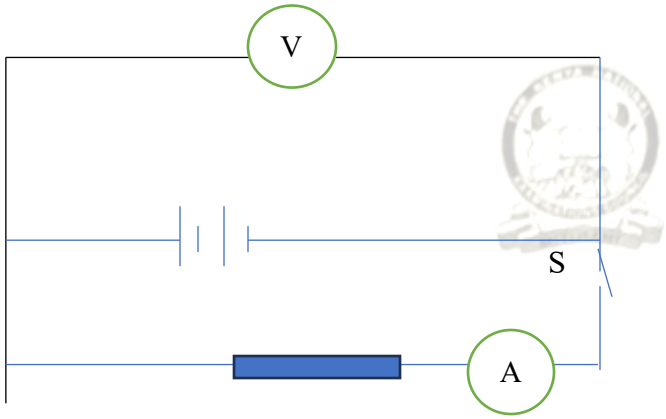
– An ammeter

– A switch

- cello tape

Proceed as Follows:

(a) Connect the apparatus provided as shown in the figure below.



Q

(i) Take the voltmeter reading when the switch S is open.

V_1 = …… volts (1 mark)

(ii) Close the switch S, and take the voltmeter reading V_2

and the ammeter reading I

V_2 = …… volts (1 mark)

I = ……... Amperes (1 mark)

(iii) Calculate the quantity $P = \frac{V_1 - V_2}{I}$ (3 marks)

PARTB

You are provided with the following:

a rectangular glass block

four optical pins

a piece of soft board

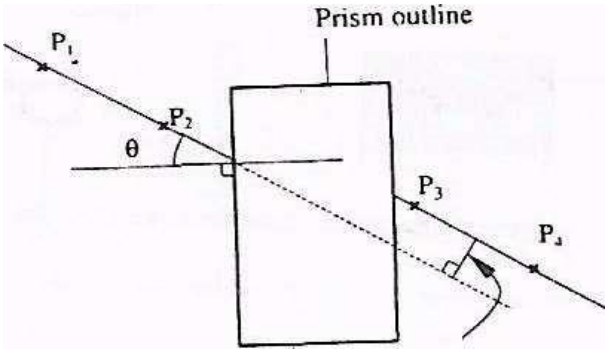
a plain sheet of paper

cello tape

You are also required to have your complete mathematical set.

Proceed as follows:

(a) Place the plain sheet of paper on the soft board and fix it using the Sellotape provided. Place the glass block at the center of the sheet, and draw its outline. Remove the glass block. (See figure 2).



b) Draw a normal line at a point 2 cm from the end of one of the longer side of the block outline. This normal line will be used for the rest of this experiment.

Draw line at an angle $\theta = 25°$ from the normal. Stick two pins P_1 and P_2 vertically on this line.

c) By viewing through the glass from the opposite side stick two other pins Pj and P_4 vertically such that they are in line with the images of the first two pins. Draw a line through the marks made by P_3 and P_4 to touch the outline.

Extend the line P_1P_2 through the outline (dotted line).

d) Measure and record in the table , the perpendicular distance d between the extended line and the line P_3P_4.

Record this value in table

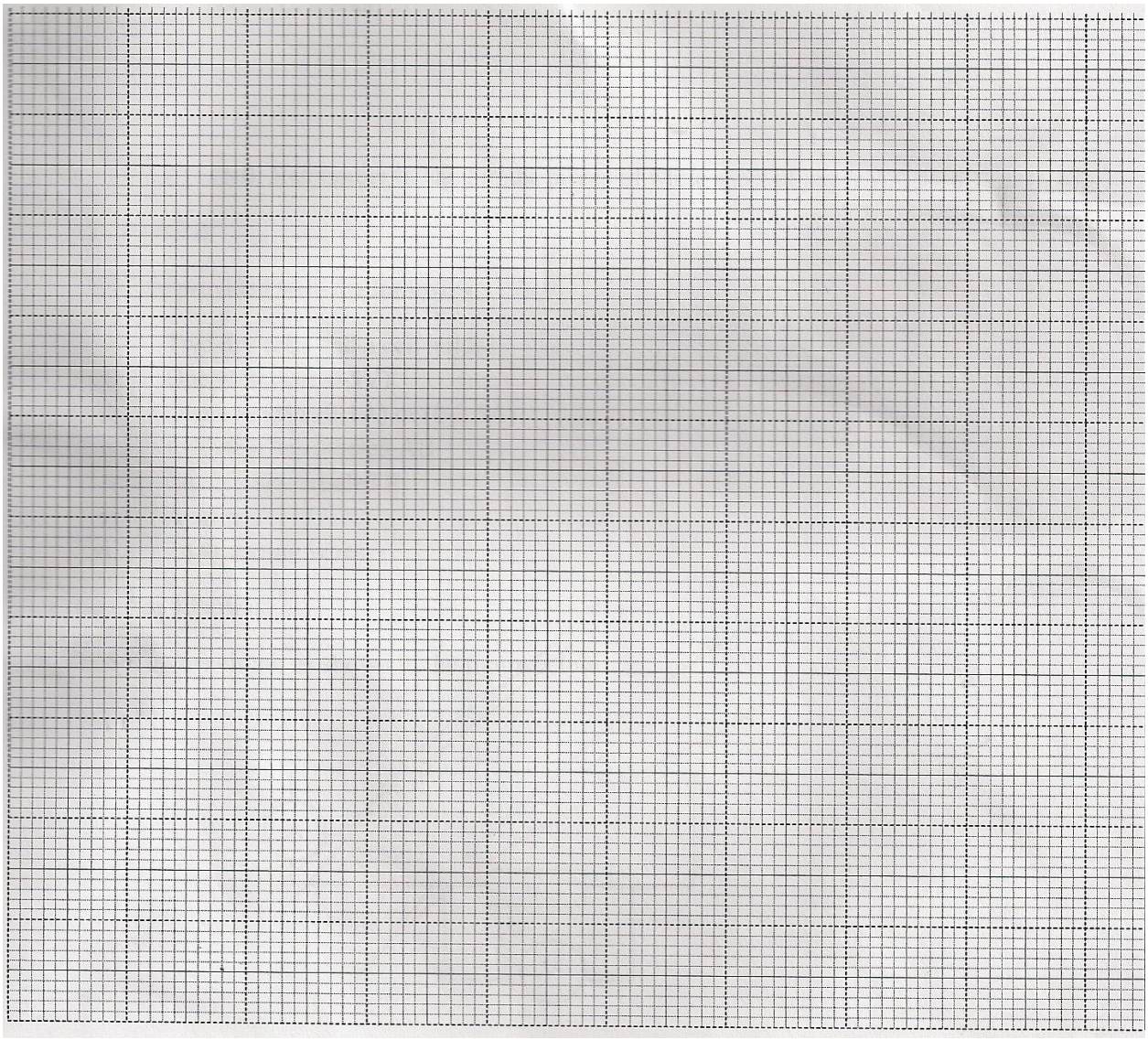
Repeat the procedure in (c) and (d) for other values shown in table

NB. The sheet of paper with the drawing must be handed in together with this question paper. Ensure you write your name and index number on the sheet of paper.

Θ °	25	35	40	45	55	60	65
d (cm)							

(7 marks)

f) On the grid provided, plot a graph of d (y-axis) against θ (5marks



Using the graph, estimate the value of d when 0=0°.
(2 mks)

QUESTION TWO

You are provided with the following apparatus:-

- A metre rule.
- One stop watch. one stand, clamp and boss.
- One spring.
- Two pieces of wood.
- A beam balance or electronic balance (to be shared)
- One mass labeled M.

Proceed as follows:

(a) Hang the spring vertically by clamping one end as shown in figure 1. (The small pieces of wood to clamp the spring).

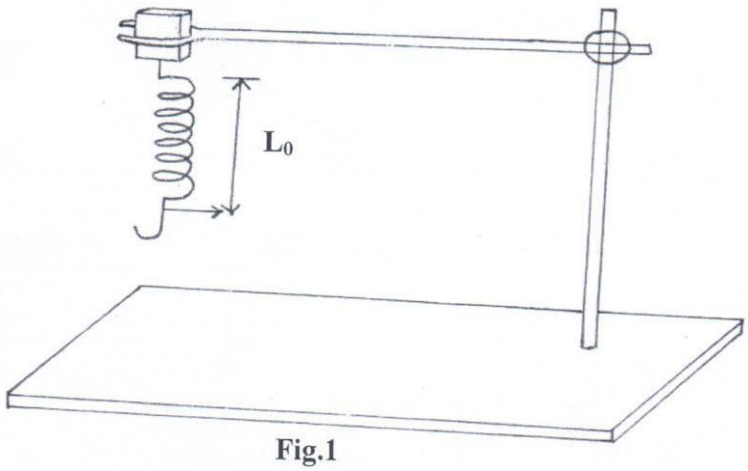


Fig.1

(b) Measure the length, Lo, of the unloaded spring, and record below.

Lo _____mm (½ mk)

(c) Hang the mass M given from the lower end of the spring. Measure the length, L_1 of the loaded spring.

L_1 = _____ mm (½ mk)

(d) Find the value of L_1 – Lo in centimeters

L = L_1 – Lo _____ cm (1mk)

(e) Using the balance given, find the mass of the object M.

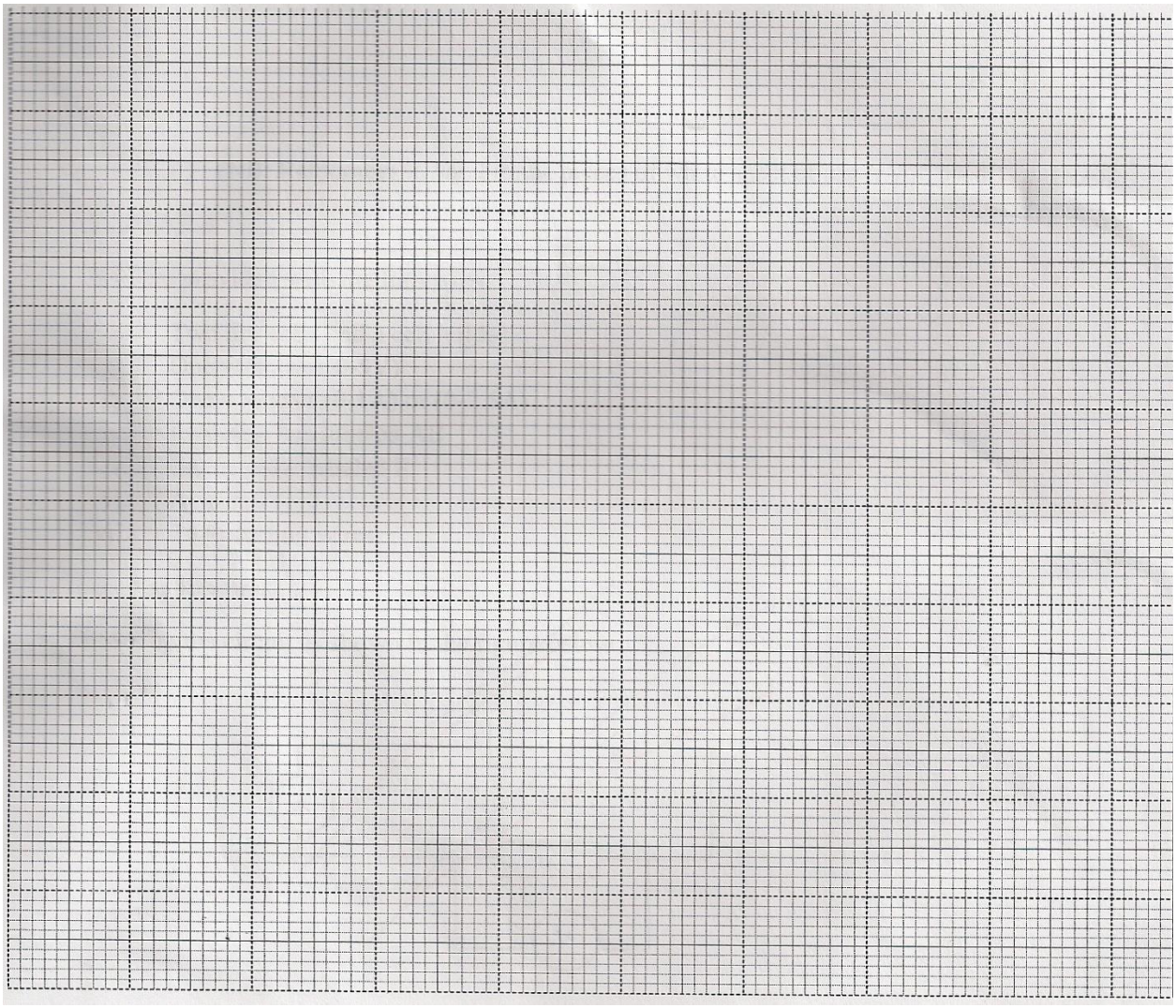
Mass of M = _____ g (1mk)

(f) Hang the mass M from the lower end of the spring. Displace it by a small vertical distance and release so that the spring makes vertical oscillations.

Measure and record, time for the number of oscillations given in the table below.

Oscillations, N	5	7	10	13	15	18	20
Time in seconds, t (s)							
$\frac{(N + 10t)}{10}$ (s)							
$\frac{(N + 10t)^2}{10}$ (s^2)							

Complete the table above. (7mks)



(g) (i) Determine the slope S, of the graph at N = 16. (3mks)

(ii) Find the constant k, given that:

$K = \frac{MS}{13L}$ (2mks)