FORM 4 END TERM 1 EXAMS PHYSICS

Class of KCSE March 2022.

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232/1 PHYSICS (Theory)

END TERM 1

PAPER ONE

TIME: 2HRS

Kenya Certificate of Secondary Education

Instruction to candidates

- This paper consist of two sections **A** and **B**
- Answer all questions in section **A** and **B** in the spaces provided
- All workings **must** be clearly shown, and Use the **CONSTANTS** given.

FOR EXAMINERS USE ONLY

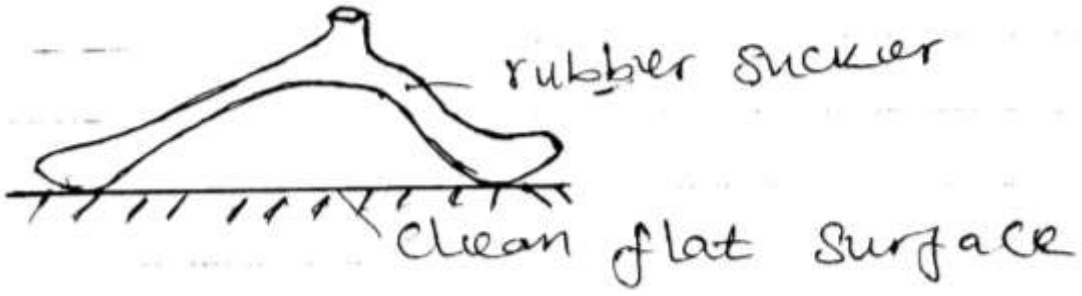
SECTION	QUESTION	MAXIMUM SCORE	CAND SCORE
A	**1 – 13**	**35**	
B	**14** **15** **16** **17** **18**	**08** **12** **08** **09** **09**	
TOTAL		**80**	

SECTION A (35 Marks)

(Answer all questions in this section)

1. A micrometer screw gauge has a zero error of -0.03mm. It is used to measure the diameter of a wire. If the actual diameter of the wire is 0.30mm, draw the micrometer screw gauge showing the measured diameter of the wire. (3 marks)

2. The figure (1) below shows a rubber sucker, explain why the sucker sticks on a clean flat Surface. (1 mark)



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3. You are provided with a test – tube, thread and a meter ruler. Outline the steps you would use to measure the circumference and hence the diameter of the test – tube. (4marks)

4. A car weighs 12 000N.

i. What is the force acting on one tyre if the weight is evenly distributed amongst thetyres? (1 mark)

ii. If the area of contact of tyre is $80cm^2$.Calculate the pressure of the air in the tyre.(3 marks)

5. Why are gases easily compressible while liquids and solids are almost incompressible?(1 mark)

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6. Name three properties of a clinical thermometer that make it suitable for measuring body temperature (3 marks)

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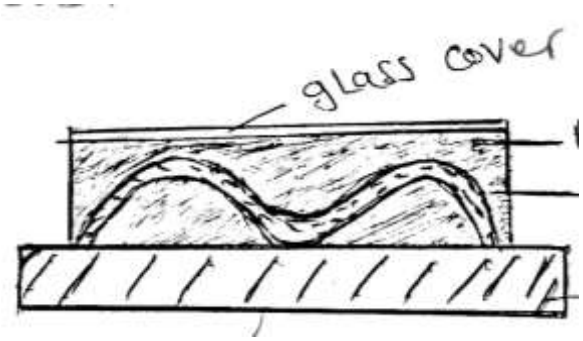
7. How does the volume of a given mass of water change as;

i) The water is cooled from 10^0 C to 0^0C? (1 mark)

ii) The water is frozen to ice at 0^0C? (1mark)

8. The figure (2) below shows a section of a solar heater



Explain;

i) Why the pipeline is fixed to a dark coloured collector plate (1 mark)

……

……

ii) Why is pipe coloured several times (1 mark)

……

……

iii) Why is pipe made of copper (1 mark)

……

……

iv) Why is the collector plate fixed to an insulator? (1 mark)

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……

v) Why the panel front covered with glass (1 mark)

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9. (a) Define moments of a force (1 mark)

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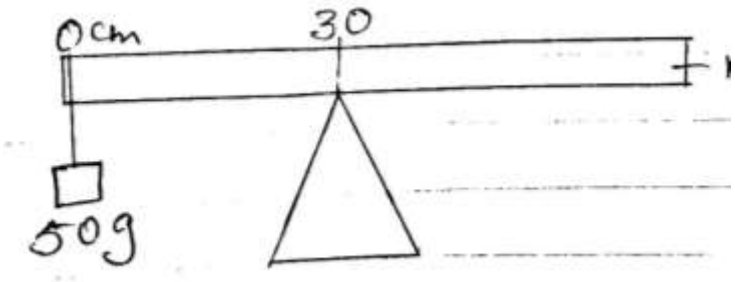
……

(b) The figure (3) below shows a uniform meter rule balanced at the 20 cm mark when a mass of 50g is hanging from its zero cm mark



Meter rule

Calculate the weight of the rule (3 marks)

10. State two practical applications of stability (2 marks)

……

……

11. Explain how loose clothing may affect safety in the laboratory (2 marks)

……

……

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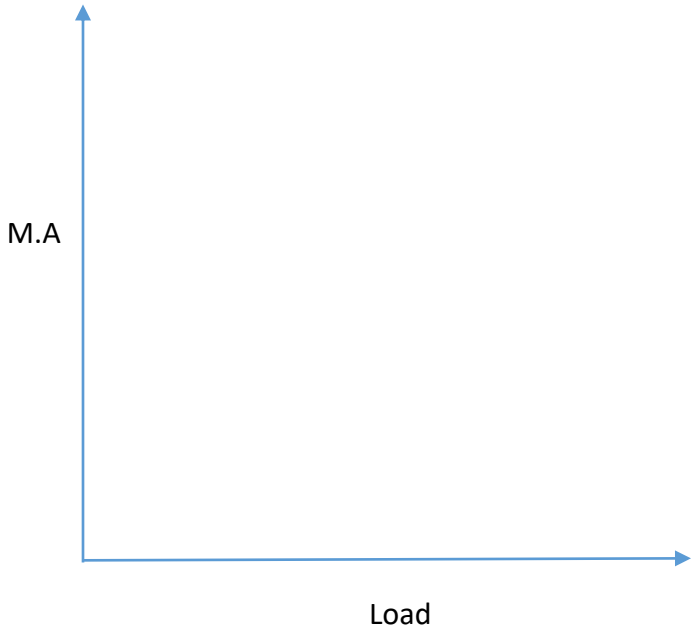
12. Water flows steadily along a horizontal pipe at a volume rate of $8.0\times10^{-3}m^3/s$.If the cross-section area of the pipe is $20cm^2$.Calculate the velocity of the fluid. (3 marks)

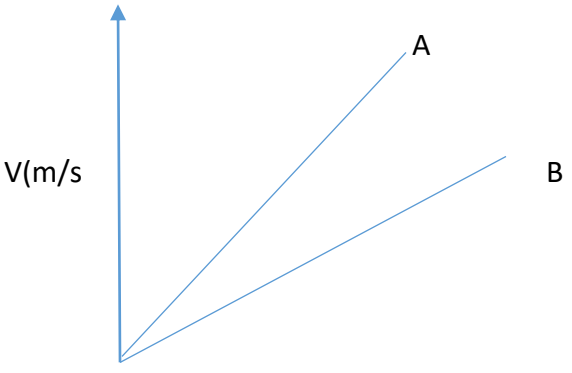
13. On the axis provided sketch a graph of mechanical advantage (MA) against load for a pulley system (1 mark)



SECTION B :(45 marks)

(Answer all the questions in this section)

14. The figure below shows velocity-time graphs of two objects A and B drawn on same axes



The two objects are of equal masses. The same size of force is applied against each object. State with a reason which of the two objects stops in a shorter distance. (2 marks)

……

……

(b) An object moving at 30 m/s starts to accelerate at 5m/s^2 so that its velocity becomes 50 m/s.

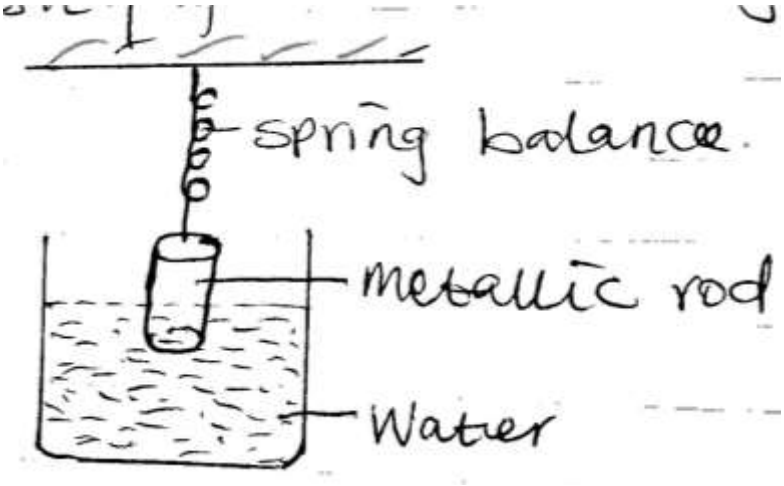
i) Find the distance moved during this acceleration (3 marks)

ii) The object is now braked so that it comes to rest in a time of 5 seconds. Find the braking force if its mass was 2700g. (3 marks)

15. State the law of floatation (1 mark)

……

(b)The figure (5) below shows a metallic rod of length 10cm and uniform cross-sectional area 4cm^2 suspended from spring balance with 7.5 cm of its length immersed in water. The density of the material is 1.5g/cm^3.The density of water is 1 g/cm^3.



Determine:

i) The mass of the rod (3marks)

ii) The upthrust acting on the rod (3marks)

iii) The reading 0f the spring balance (2marks)

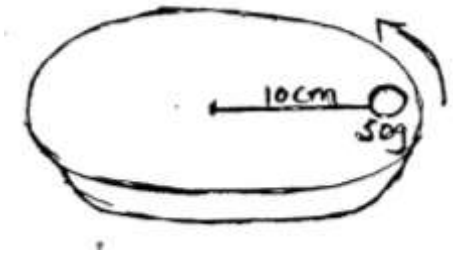
iv) The reading of the spring balance when the rod is wholly immersed in water (3marks)

16. (a)State what provides centripetal force for an electron moving round the nucleus (1mark)

……

……

(b)The figure (6) below shows a turntableon which a mass of 50g is placed 10cm from the centre



Frictional force between the 50g mass and the turntable is 0.4 N.When the turntable is made to rotate with angular velocity of W rad/sec, the mass starts to slide off.

i) Determine the:

I. Angular velocity W (3marks)

II. Time taken to make one complete revolution (3marks)

ii) On the figure, draw a path that would be taken by the 50g mass if the turntable suddenly came to stop (1 mark)

17. (a) An object of the mass 150kg moving at 20m/s collides with a stationary object of mass 90kg.They couple after collision .Determine the :

(i) Total momentum before collision (2 marks)

(ii) Total momentum after collision (1 mark)

(iii) Their common velocity after collision (2 marks)

(b)A piece of wire of length 12m is stretched through 2.5cm by a mass of 5 kg. assuming that the wire obeys the Hookes law, what force will stretch it through 4.0 cm.(2marks)

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18. (a)Explain why an air bubble increase in volume as it rises from the bottom of a lake to the surface (2 marks)

……

……

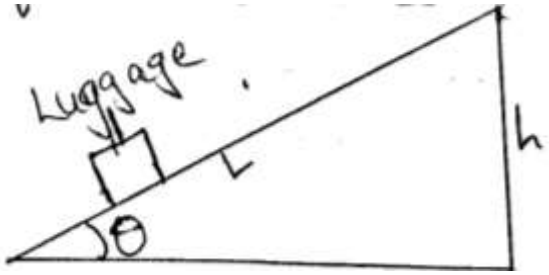
……

(b)An immersion heater rated 2.5Kw is immersed into a plastic jug containing 21kg of water and switched on for four minutes .Determine:

i) The quantity of heat gained by water (2 marks)

ii) The temperature change for water.(specific heat capacity of water=$4.2\times10^{3}Jkg^{-1}k^{-1}$ (3 marks)

(c) The figure (7) below shows an inclined plane used to load heavy luggage's onto a lorry. The length of the plane is L metres and the height is h metres



Show that the velocity ratio is given by $\frac{1}{\sin\theta}$

NAME: ……CLASS:…..…… ADM NO:……

SIGNATURE:…… DATE:……

232/2
PHYSICS
PAPER 2
END TERM 1

The Kenya Certificate of Secondary Education
Physics Paper 2

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.***

SECTION	QUESTION	MAX MARKS	CANDIDATE'S SCORE
A	1 – 12	25	
B	13	10	
	14	10	
	15	09	
	16	16	
TOTAL		80	

SECTION A (25 Marks)

*Answer **ALL** questions in this section.*

1) Figure 1 shows the V-I characteristic curve of a torch bulb.

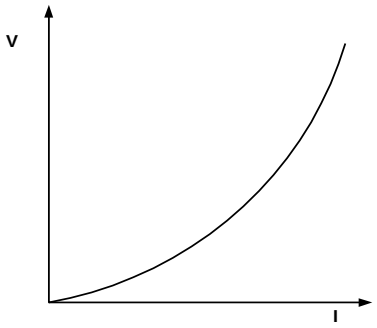


Fig.1

Explain the shape of the graph. (2 marks)

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2) The size of the pinhole camera is increased. State and explain what happens to the image.

……(1 mark)

3) Define the term sensitivity (1 mark)

……

4) Why is concave mirrors used as a saloon mirror? (1 mark)

……

5) Figure 2 shows a graph of magnetisation against magnetising current for two materials A and B.

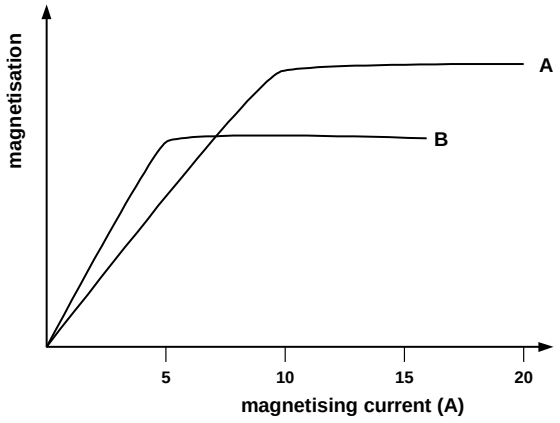

Fig. 2

a) State with a reason, the material which is more suitable for use in a transformer to concentrate the magnetic fields. (2 marks)

……

……..……..……..……..……

b) Determine the current required to obtain saturation for the material which is suitable for making a permanent magnet. (1 mark)

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6) A beaker of height 10 cm is filled with water. An optical pin which is at the bottom of the beaker is then viewed from the top of the beaker. How far does the pin appear from the surface, if the refractive index of water is $\frac{4}{3}$) (2 marks)

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……..……..……..……..……

7) An electric heater takes 4 minutes to heat some water to boiling point. How long would it take if the current flowing through it is doubled? (2 marks)

……

……..……..……..……..……

8) (a) **State** Ohm's law (1mark)

……

(b) The figure 3 below shows part of the scale of a voltmeter, which is being used in an experiment to measure potential difference across a resistor.

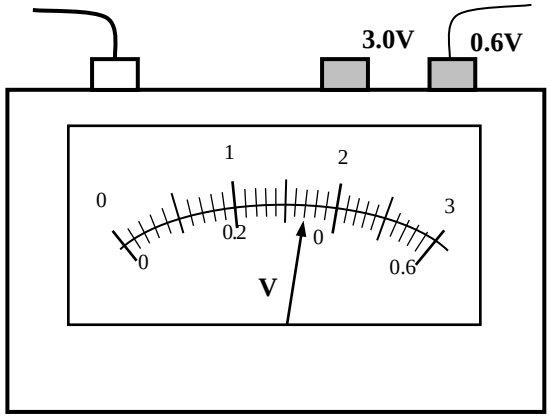

Fig.3

(i) State the accuracy of the upper and the lower scales of the voltmeter. (2 marks)

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(ii) Record the reading shown by the lower scale of the voltmeter. (1 mark)

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9) The figure 4 shows region of electromagnetic spectrum.

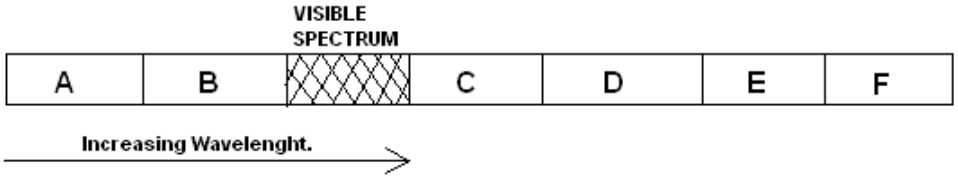


Fig.4

Name the region that representsand give one use of each. (4marks)

(a) Ultraviolet

(b) Infrared

(c) X- ray

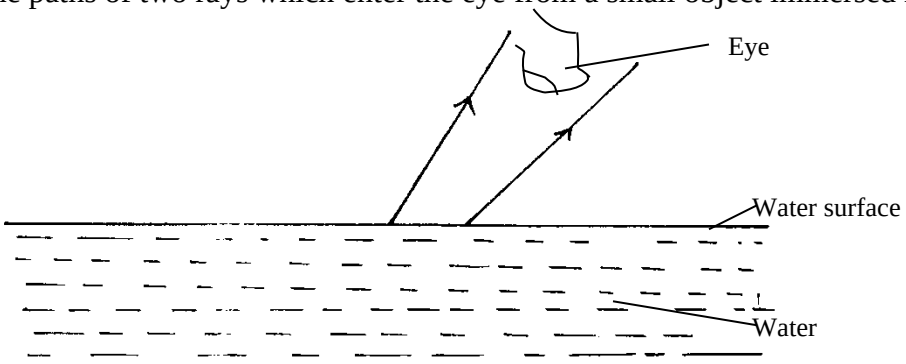
(d) Radio wave

10) State one advantage of optical fibre cable over conventional copper cables as used in telecommunication. (1 mark)

……

11) Fig 5. below shows the paths of two rays which enter the eye from a small object immersed in water.

Fig. 5



Draw rayson the diagram to show a possible position of the object and itsactual position.

(2marks)

12) State two conditions necessary for total internal reflection to occur. (2marks)

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SECTION B(55 Marks)

*Answer **ALL** questions in this section.*

13) (a) (i) Define capacitance. (1 mark)

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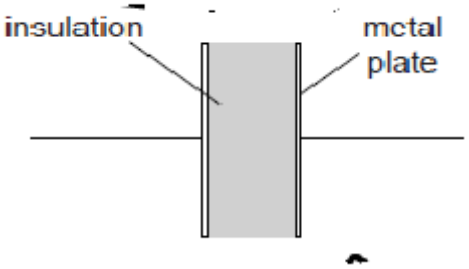
……

(ii) A capacitor is made of two metal plates, insulated from one another, as shown in the Fig 6.

Fig. 6



Explain why the capacitor is said to store energy but not charge. (2 marks)

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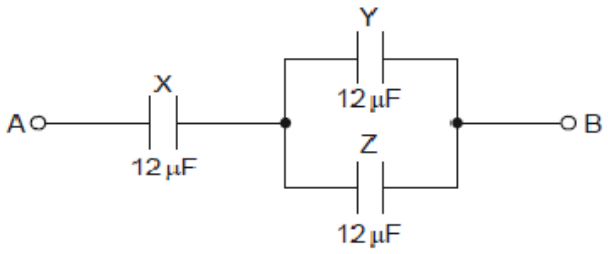
(b) Three uncharged capacitor X, Y and Z, each of the capacitance 12 microfarads, are connected as shown in Fig 7s below

Fig. 7



A potential difference of 9.0V is applied between points A and B. Calculate the combined capacitance of the capacitors X,Y and Z. (3 marks)

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……

(c)Explain why, when the potential difference of 9.0V is applied, the charge on one plate of capacitor X is 72 microcoulombs. (2 marks)

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……

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……

(d) Determine ;

I . the potential difference across capacitor X, (2 marks)

……

……

……

……

II. the charge on one plate of capacitor Y. (2 marks)

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……

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……

14) A wire was connected to a battery and it was found that the energy converted to heat was 30J when 20 coulombs of charge flowed through the wire in 5 seconds.

Calculate;

(i) the p.d between the ends of the wire. (2marks)

……

……

(ii) the current flowing through the wire. (2marks)

……

……

(iii) the resistance of the wire. (2marks)

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……

(iv) the average power development in the wire. (2marks)

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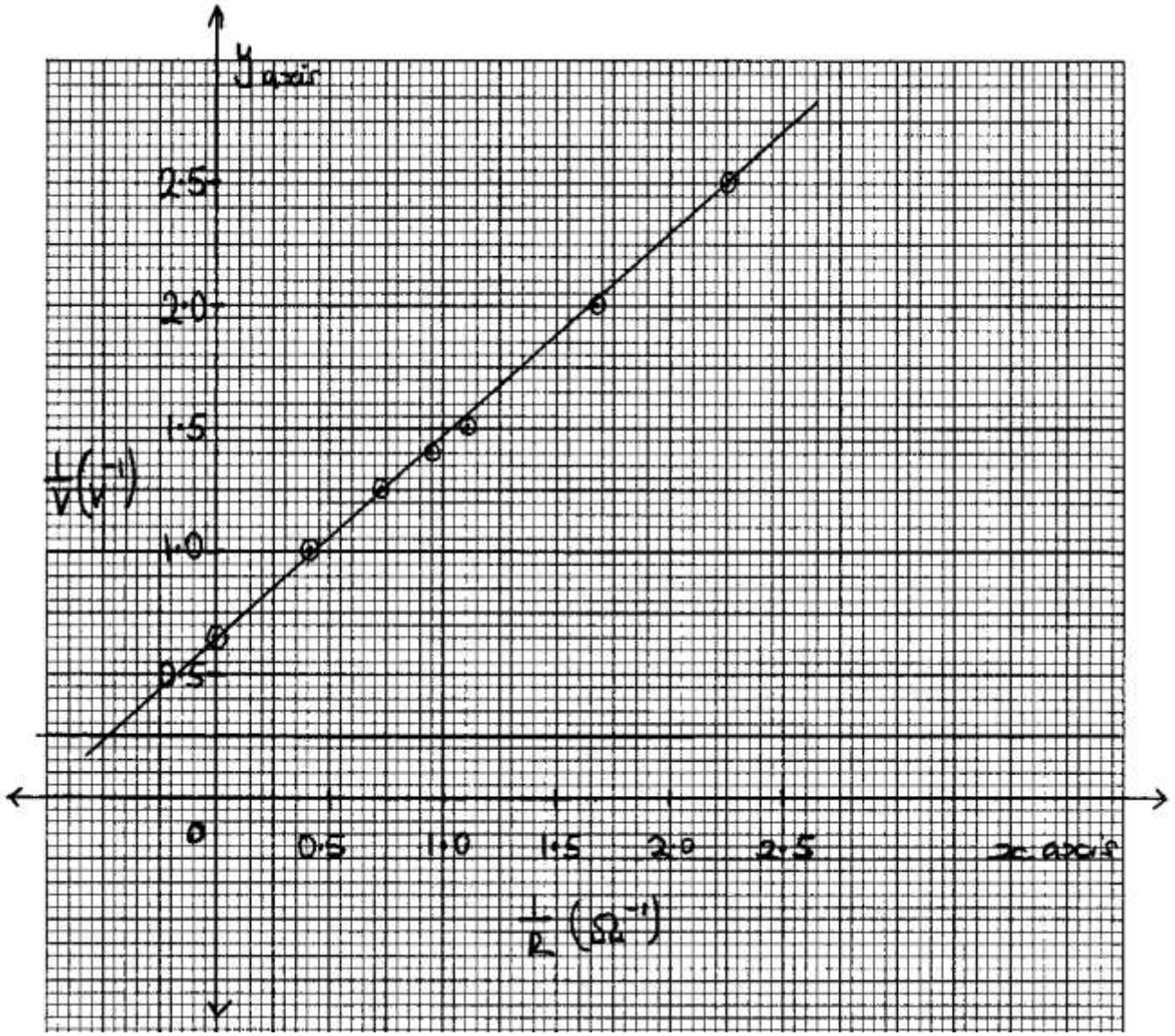
The graph below shows results obtained in an experiment to determine the e.m.f.(E) and the internal resistance, r, of a cell.



Given that the equation of the graph is $\frac{E}{V} = \frac{r}{R} + 1$

Use the graph to determine the values of:-

(i) E (2marks)

……

……

ii) r (3marks)

……

……

15) Thefigure8 belowshowstwographswhichrefertothesamewave.

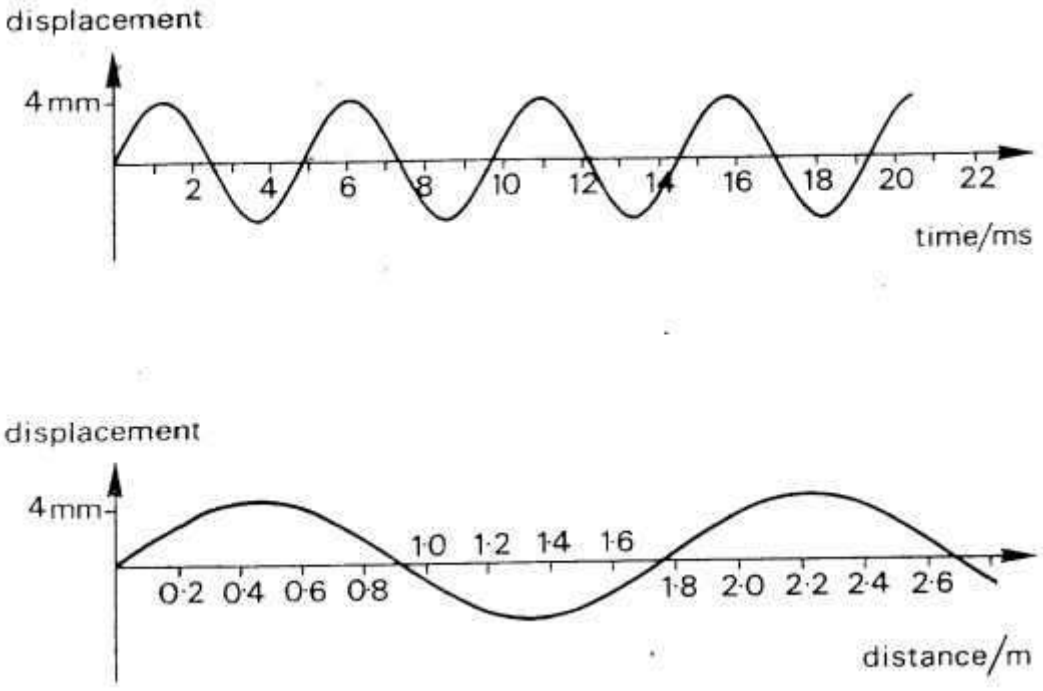


Fig. 8

i) Calculatethespeedofthewave. (4marks)

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……

ii) Distinguishbetweenprogressiveandstationarywaves. (2marks)

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……

ii) Figure9 belowshowsastationarywaveon astringstretchedbetweentwopointsAandFwhich areadistance*L* apart.

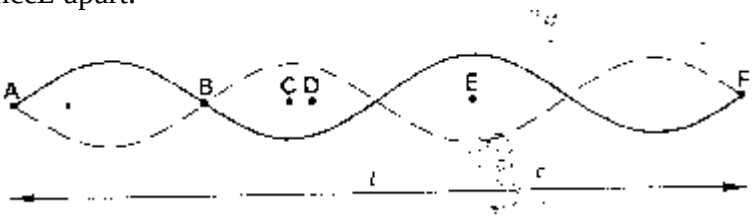

Fig. 9

DescribetheoscillationsofthepointsB,C,Dand E.Comparetheseoscillationsintermsof theirrelativephasesand amplitudes. (3marks)

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……

……

iii) Whatisthewavelengthintermsof*L*. (1mark)

……

16) **i)**Statethecharacteristicsofimagesformedbya pinholecamera. (2marks)

……

……

ii) Whatistheeffectsontheimage whenthecameraiselongated? (2mark)

……

……

The **figure 10** below shows how a white light behaves when it is incident on a equilateral glass prism.

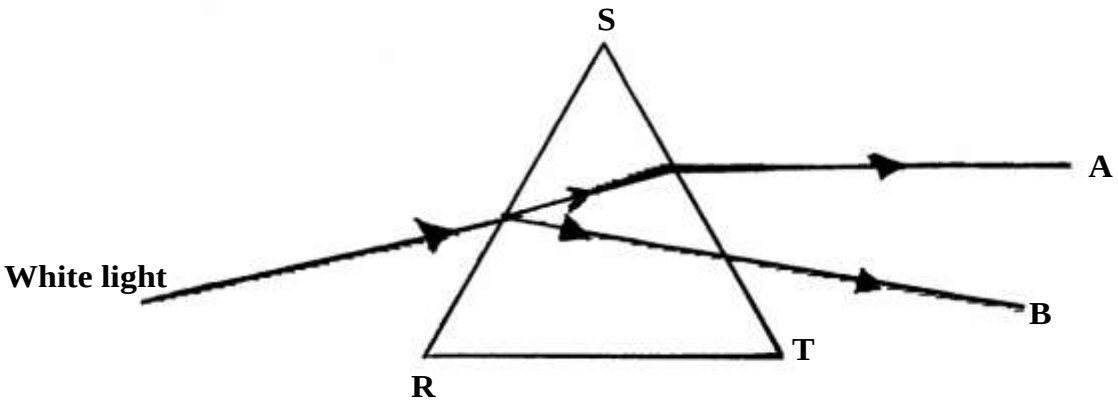


Fig. 10

iii) Explain why it split into different colours between A and B. (3 marks)

……

……

iv) Suppose the white light is incident on the face SR normally, **State** and **explain** the observation.

(3 marks)

……

……

17) (a) **Define** the term principal focus in relation to a thin convex lens (2marks)

……

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

……

(c) The Fig.11 below shows an arrangement of lenses, L_o and L_e used in a compound microscope F_o and F_e are principal foci of L_o and L_e respectively.

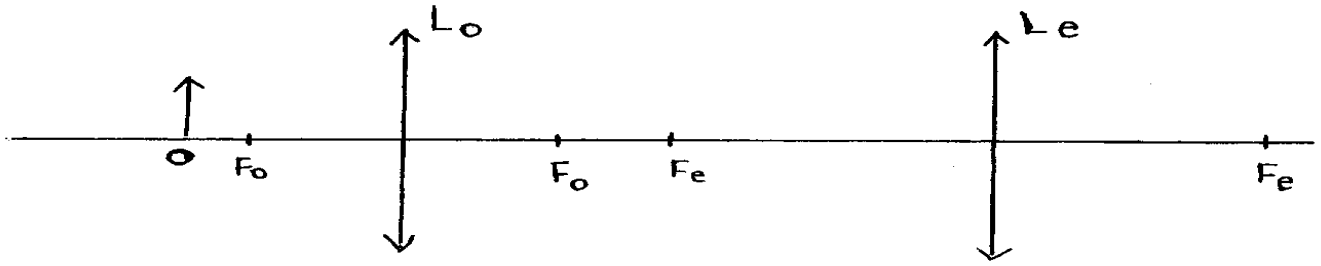


Figure 11

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

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

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

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

(ii) **Determine** the focallength of the lens. (2marks)

NAME:…… DATE:……..

CLASS:…… ADM NO……

PHYSICS 232/3

FORM FOUR

TIME: $2^1/_2$ HOURS

END TERM 1

CONFIDENTIAL

Question 1

1. Complete retort stand with two clamps
2. Some water in a beaker ($100m^2$)
3. 100ml measuring cylinder
4. Boiling tube
5. Cotton thread (100cm)
6. Meter rule
7. Beam balance (can be shared)
8. Vermier calipers (can be shared)

Question 2

1. Meter rule
2. Convex lens of focal length 10cm
3. A cande
4. Lens holder
5. Cross wire mounted on a cardboard
6. A white screen
7. One cell
8. Cell holder (one cell)
9. A switch
10. Six connecting wires, at least two with crocodile clips.
11. 10Ω carbon resistor (label it R)
12. Ammeter
13. Volt meter

232/3 PHYSICS (Practicals)

PAPER THREE

END TERM 1

TIME: 2½HRS

Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES

- This paper consist of two questions and Answer ALL questions in the spaces provided
- All workings MUST be clearly shown.

FOR EXAMINERS USE ONLY

PART	QUESTION	MAX SCORE	CAND SCORE
I	11	19	
II	A	16	
	B	5	
		40 MKS	

You are provided with the following

- Water in a beaker
- Complete retort stand
- Two clamps
- 100ml measuring cylinder
- Boiling tube
- Cotton thread

- Meter rule
- Beam balance(can be shared)
- Vernier calipers (can be shared
-

Proceed as follows

i) a) Using the vernier calipers, measure the internal diameter of the boiling tube

D=……. (1mk)

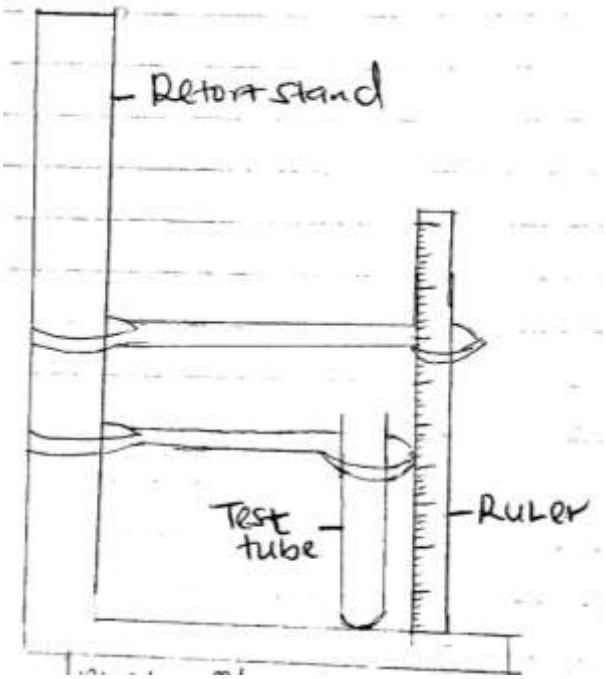
b) Measure the length H, of the boiling tube

H=…….cm (1mk)

ii) Measure the mass of the boiling tube using the beam balance

M=…….g (1mk)

iii) Clamp the boiling tube vertically with its base resting on a flat surface as shown, Use the second clamp to clamp the meter rule beside the boiling tube.



iv) Measure 10ml of water and pour into the boiling tube. Measure the height h, of the water. Keep adding water in small amounts in the boiling tube and complete the table below

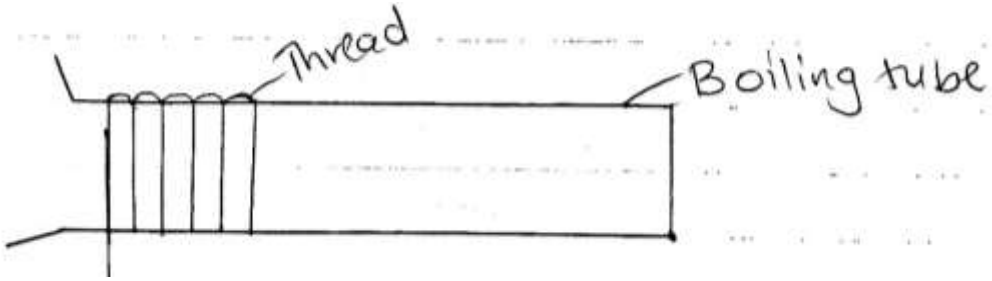
VOLUME IN CM^3/ML	**HEIGHT H(CM)**
10	
20	
35	
45	
50	
65	

(3MKS)

v) On the grid provided, plot a graph of volume V(cm^3) of water (y-axis) against height h(cm) (5mks)

vi) From the graph determine the slope, (3mks)

vii) Wind the cotton thread ten times round the boiling tube, pushing the windings very close together, the turns should not overlap on each other.



Unwind the thread and measure the length L of the thread.

L…….(cm) (1mk)

viii) Calculate the volume V,of the glass material which the boiling tube is made of, given that

$V=h\left[\frac{2L^2}{2500}-5\right]$

V= ……. (2mks)

ix) Calculate the density d, of the glass material of the boiling tube

d=…….. (2mks)

QUESTION 2

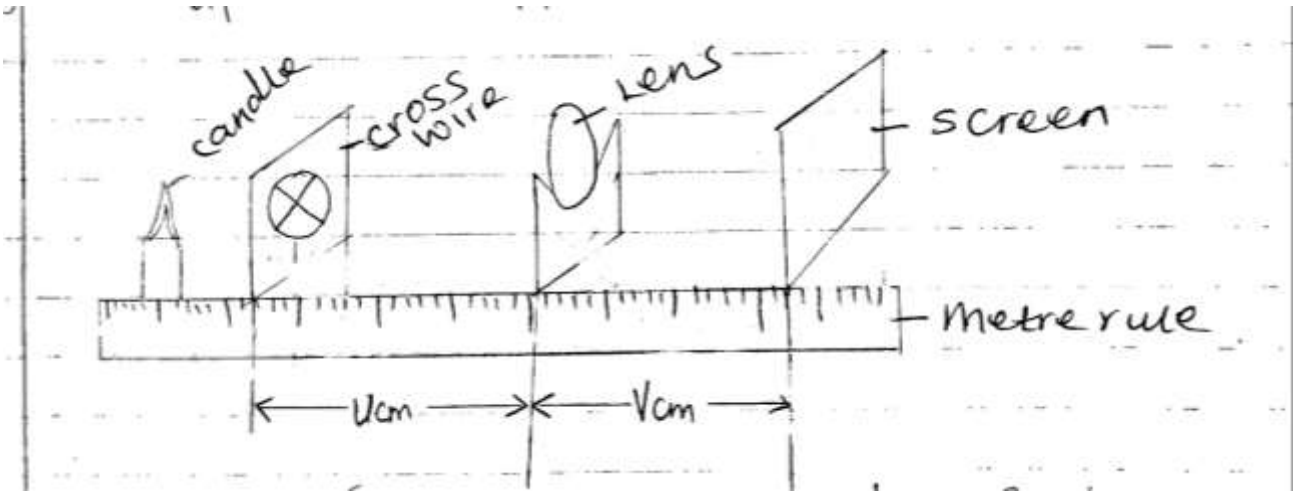
PART A

You are provided with the following

- A meter rule
- Convex lens
- A candle
- Len's holder
- Cross wither mounted on a cardboard
- A white screen

Proceed as follows:-

i) Set up the apparatus as shown



ii) Starting with U=30cm vary the position of the screen S until a sharp image of the cross wire is observed on the screen. Measure and record the value of the image distance V.

iii) Repeat the experiment above for other values of U, and complete the table below (6mks)

U(cm)	30	35	40	45	50	55
V(cm)						
M= $\frac{V}{U}$						

iv) Plot a graph of M against V (5mks)

v) Determine the slope of the graph (3mk)

vi) The equation of the graph is given by M= $\frac{v}{f} - 1$. Use your graph to obtain the value of f (2mks)

PART B

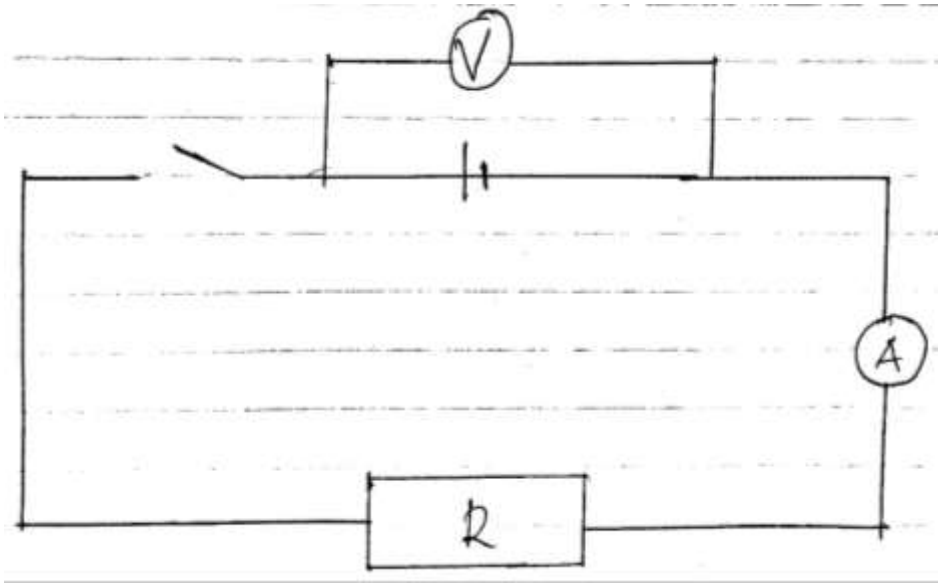
You are provided with the following apparatus:

- One cell and a cell holder

- Six connecting wires, two with crocodile clips
- A switch
- A 10 carbon resistor labledded R
- An Ammeter
- A voltmeter

Proceed as follows

i) Set up the apparatus as shown below.



Record the reading E of the voltmeter E…….. volts (1mk)

ii) Close the switch and record the reading, V, of the voltmeter and I the reading of the ammeter

V= ……..volts (1mk

I= ……amperes (1mk)

iii) Given that E = v + V + 1r, determine the value of r

r…….. volts (2mks)