

NAME DATE

INDEX NO. SIGNATURE

232/2
PHYSICS
PAPER 2
JULY/AUGUST, 2014
TIME: 2 HOURS.

MBOONI EAST DISTRICT FORM FOUR JOINT EXAMINATION 2014

Kenya Certificate of Secondary Education.

232/2
PHYSICS
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INSTRUCTIONS TO CANDIDATES

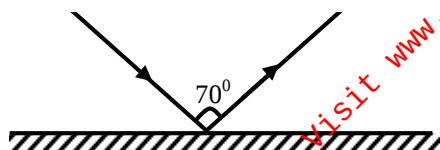
- o Write your name and your index number in the spaces provided above.
- o This paper consists of **two** sections **A** and **B**
- o Answer **all** questions in section **A** and **B** in the space provided
- o All working **must** be shown in the spaces provided in this booklet.
- o Mathematical tables and silent electronic calculators may be used
- o This paper consists of 10 printed pages. Candidates should check to ensure that all pages are printed as indicated and no questions are missing

FOR OFFICIAL USE

Section	Question	Max. score	Candidate's score
A	1-12	25	
B	13	11	
	14	15	
	15	12	
	16	07	
	17	10	
TOTAL SCORE		80	

SECTION A – 25 MARKS

1. Figure 1 shows a ray of light incident on a plane mirror.

Figure 1

The plane mirror is then rotated clockwise through an angle of 20° keeping the incident ray fixed. Determine the new angle of reflection. (2 Marks)

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2. A dry cell is not recharged once used up. However when used well, it can serve one for some time. State the precautions necessary when using it other than storing it in dry condition. (2 Marks)

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3. A charged rod A is used to charge another rod B by contact. When rod B is brought close to a charged acetate rod, repulsion occurs. State the type of charge on rod A. (1 Mk)

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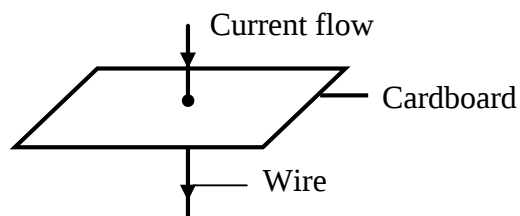
4. A nail is electrically magnetised, it attracts an increasing number of pins as the magnetising current increase. After some time it can no longer attract any more pins. Explain this observation domain theory. (2 Marks)

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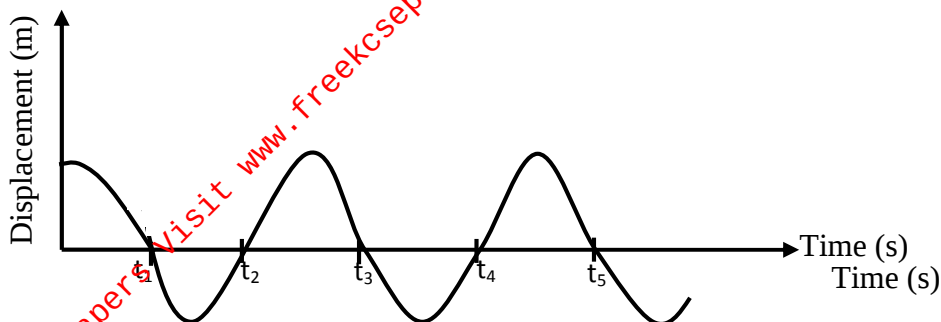
5. Figure below shows a current carrying vertically right wire at right angle to a cardboard. Iron fillings are sprinkled on the card and card slightly tapped.



Draw and indicate the direction of the magnetic field pattern displayed on the card. (2 Marks)

6. Figure 3 below shows a wave profile for a wave whose frequency is 2.5HZ

Figure 3



Determine the value of t_3

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7. An electric kettle has an element of resistance 28.8Ω . It is operating from a 240V main supply. Determine its power rating. (3 Marks)

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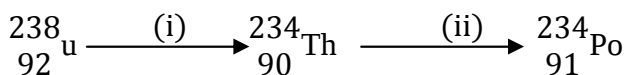
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8. Distinguish between intrinsic and extrinsic semi-conductor. (1 Mark)

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9. The following is part of a radioactive series.



Identify the radioactive particles emitted in stages (i) and (ii)

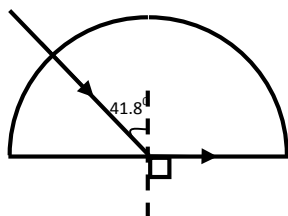
(2 Marks)

(i)

(ii)

10. Figure 4 shows light passing through a transparent block.

Figure 4



Determine the refractive index of the block.

(3 Marks)

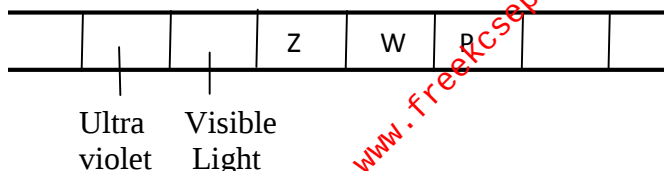
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11. Figure 5 shows part of the electromagnetic spectrum.



Identify radiation W and state one of its uses.

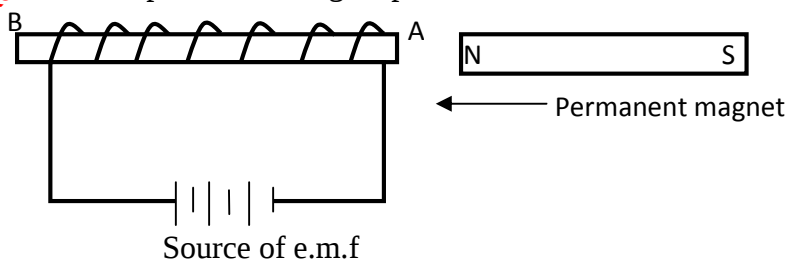
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12. Figure 6 shows a permanent magnet placed near a solenoid connected to a source of e.m.f.



(a) State and explain what is observed when the North – pole of the permanent magnet is brought to end A.

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(b) State the law applied

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SECTION B – 55 MARKS

Answer ALL questions in the spaces provided after each section of the question

13. (a) A strong positive charged rod is brought close to the cap of a charged electroscope from a high position. It is observed

(i) State the charge on the electroscope (1 Mark)

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(ii) Explain this observation (2 Marks)

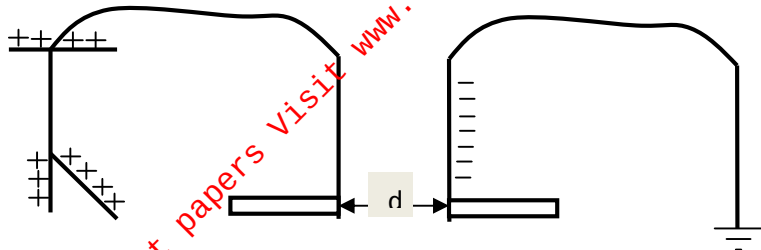
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- (b) A parallel – plate capacitor is connected to an electroscope as shown in Fig. 7 below.
Figure 7



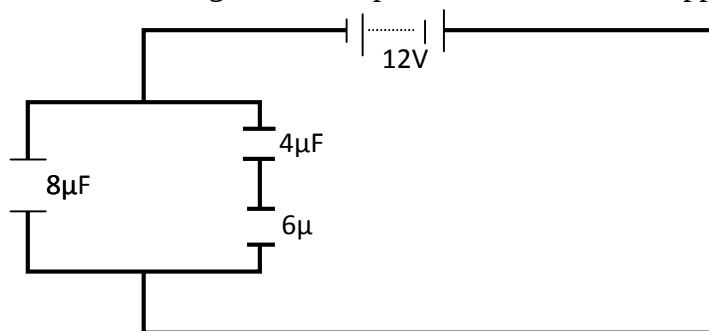
State and explain the behaviour of the leaf when the distance (d) between the plates is increased (2 Marks)

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- (c) Figure 8 shows an arrangement of capacitors to a 12V d.c. supply.



Determine

- (i) Effective capacitance (3 Marks)

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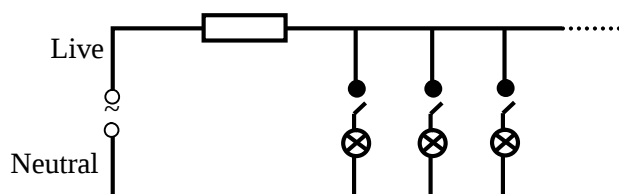
- (iii) Charge across the $8\mu\text{F}$ capacitor. (3 Marks)

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14. (a) The figure below shows part of the lighting circuit of a house.



- (i) Explain why a fuse is included in the circuit. (1 Mark)

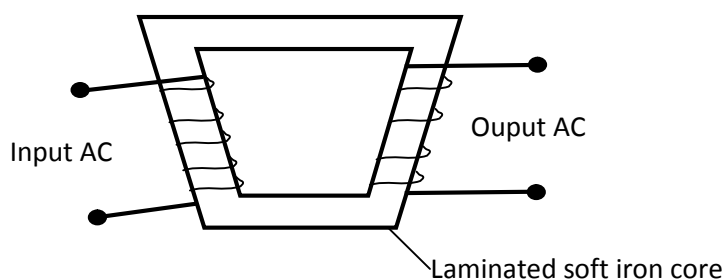
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(ii) Explain why the fuse is placed in the live wire rather than in the neutral wire. (1 Mark)

(iii) Each lamp has a power of 60W. Calculate the current through one lamp when it is switched on. (2 Marks)

(iv) The fuse has a rating of 4A. Calculate the maximum number of lamps that can be connected and switched on without the fuse blowing each bulb is switch on without blowing. Each bulb os parallel with the power supply. (2 Marks)

(b) (i) The figure below shows a step-up transformer commonly used at a power station.



(i) What is meant by a step-up transformer? (1 Mark)

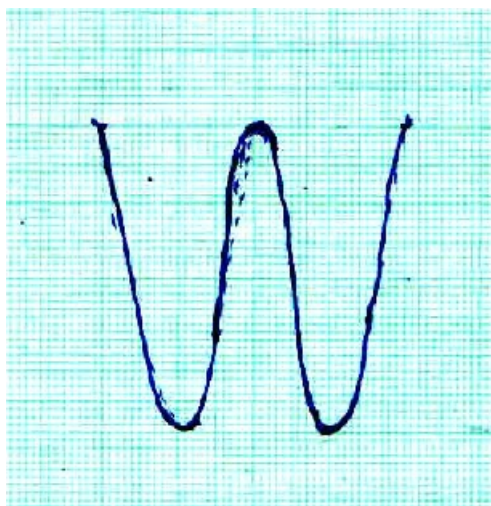
(ii) Why does a transformer work with AC only? (1 Mark)

(iii) What is the purpose of the soft iron core? (1 Mark)

(iv) State four ways in which power is lost in a transformer (1 Mark)

- (v) Why is the e.m.f. produced at a power station stepped up to high voltage for long distance transmission (2 Marks)

15. (a) Figure 9 shows the trace on the screen of a.c. signal connected to the Y-plates of a C.R.O with the time – base on.
Figure 9



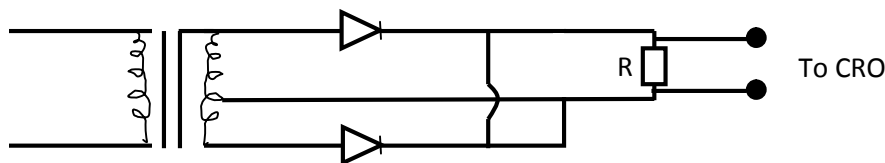
Given that the time base control is 10ms/cm and the Y-gain is at 120V/cm determine

- (i) The frequency of the a.c. signal (3 Marks)

- (ii) The peak voltage of the input signal (3 Marks)

- (iii) State what would be observed on the screen if the time base is switched off (1 Mark)

- (b) Figure 10 shows a circuit whose output voltage with time as displayed on the CRO screen. (2 Marks)



- (i) Sketch a graph to show the variation of output voltage with time as displayed on the CRO screen. (2 Marks)

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- (ii) Show on the diagram (Figure 10) how a capacitor should be connected to smooth the output voltage (1 Mark)

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- (iii) Sketch a curve of smoothed output voltage against time. (2 Marks)

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16. (a) In a photoelectric experiment, the following data was obtained using a clean metal surface.

Stopping potential	0.2	0.4	0.6	0.98
Frequency x 10^{14} HZ	5.0	5.5	6.0	7.0

- (i) Use the data to plot a graph of stopping potential against frequency (5 Marks)



(ii) Use the graph to determine:

(I) The threshold frequency of the metal

(1 Mark)

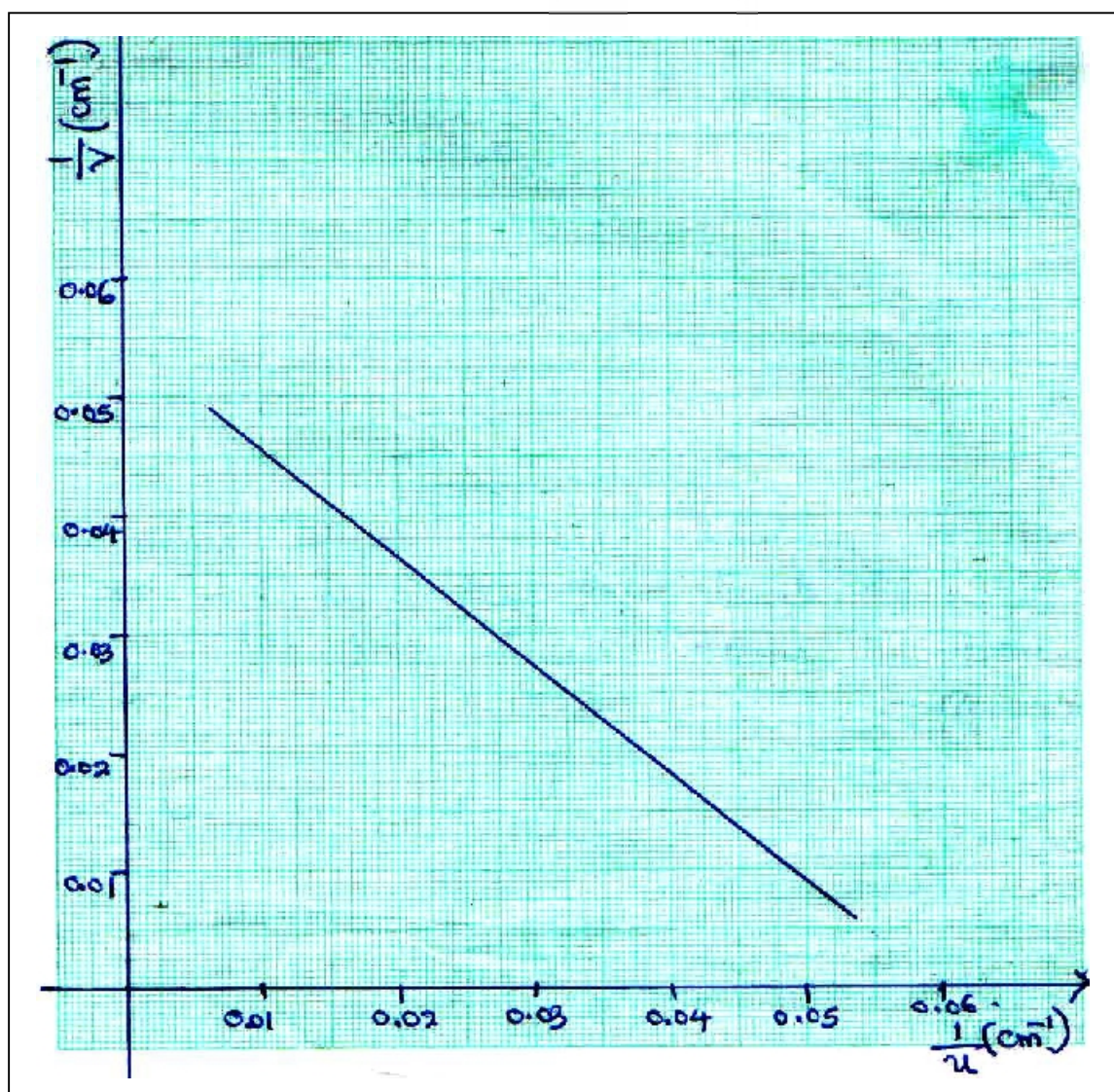
(II) The planks constant ($e = 1.6 \times 10^{-19}$)

(1 Mark)

17. (a) With the aid of a labelled diagram, explain how the focal length of a convex lens may be estimated by focusing a distant object.

(b) The graph below shows values obtained in an experiment to determine the focal length of a convex lens. Use the graph to determine the focal-length of the lens.

GRAPH OF $\frac{1}{v}$ AGAINST $\frac{1}{u}$



(c) An object is placed 30cm in front of a converging lens of focal length 20cm.

(i) By calculation determine the position of the image.

(2 Marks)

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(ii) State the nature of the image

(1 Mark)

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