Name:…………………………………………………………………………. ADM No:……………................

Candidate's Signature:…………………..……...

Date:……………………...……………………..

232/2
PHYSICS
Paper 2
MAY/JUNE 2014
Time: 2 Hours

CROSS COUNTRY EXAM 2014

Kenya Certificate of Secondary Education

232/2
PHYSICS
Paper 2
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Instructions To Candidates

This paper consists of two sections: Section A and Section B
Answer all questions in both sections in the spaces provided
All working must be clearly shown.
Electronic calculators may be used.

For examiners use only

Section	Question	Maximum Score	Candidate's Score
A	1-11	25	
B	12	13	
	13	10	
	14	10	
	15	11	
	16	11	
	Total Score	80	

This paper consists of 10 printed pages
Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing

SECTION A (25 Marks)

1. State any two maintenance practices for secondary cells (2mks)

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2. The diagram in figure 1 below shows the displacement against time for a wave whose wavelength is 4.0mm.

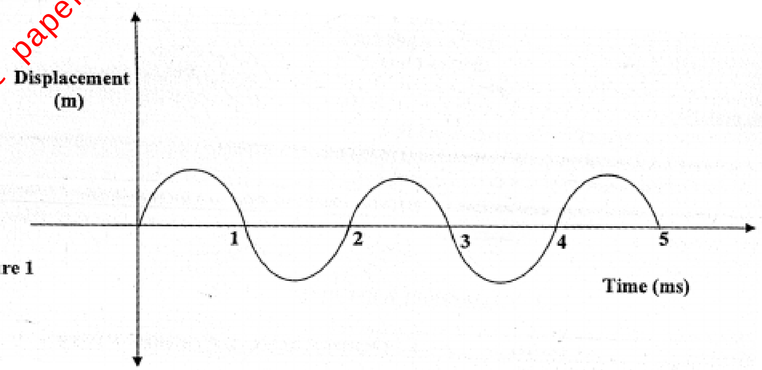


Figure 1

Determine the velocity of the wave. (2mks)

3. Complete the ray diagram in figure 2 below to show the location of the object and the image. (3mks)

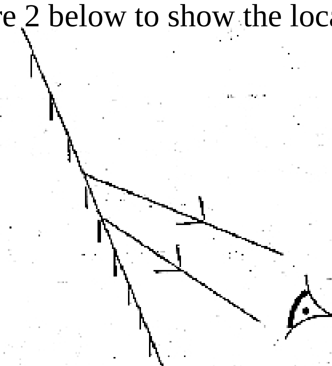


Figure 2

4. Two rays are incident to the base of a triangular prism as shown in figure 3. If the refractive index of the prism is 1.414. Sketch the rays until they emerge from the prisms. (4mks)

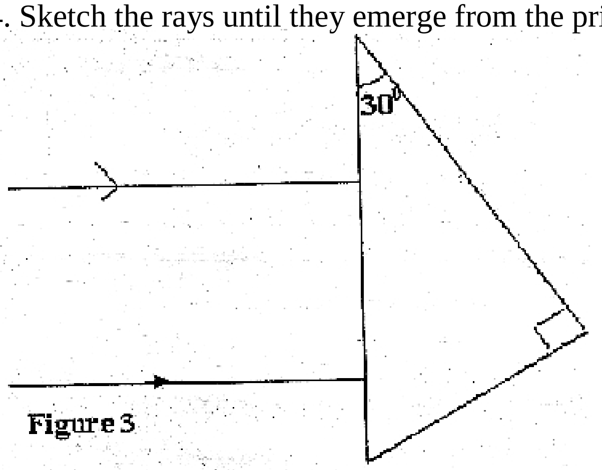
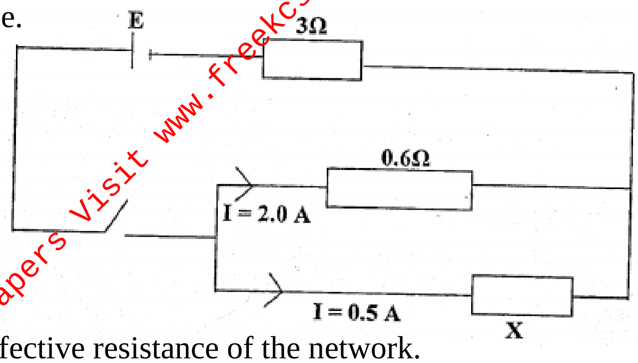


Figure 3

5. Figure 4 drawn below shows a combination of resistors connected to a cell of e.m.f E volts and negligible internal resistance.

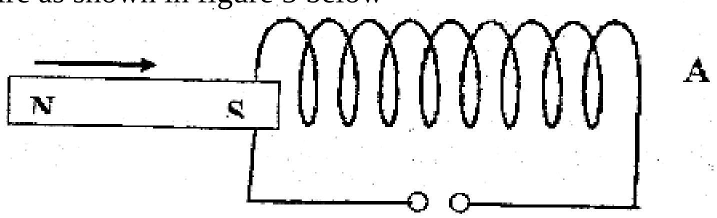
Figure 4



Determine the effective resistance of the network. (3mks)

6. A magnet moves into a coil of wire as shown in figure 5 below

Figure 5



(i) Show the direction of the induced current in the coil and the polarity of the end A of the coil.(2mks)

(ii) State the law applied in (i) above (1mk)

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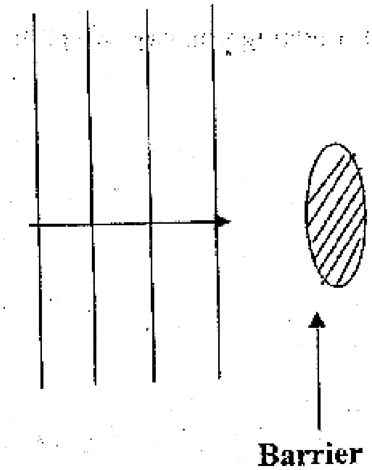
7. Plane parallel waves in a ripple tank strike a barrier as shown in figure 6 below.

Figure 6



Complete the diagram by showing the appearance of the waves after the barrier (1mk)

8. State two operational differences between the C.R.O and the T.V tube. (2mks)

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9. What property of cathode rays is demonstrated by the maltese cross? (1mk)

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10. (i) You are provided with one magnet whose poles are marked, one magnet whose poles are not marked, one magnetic material and a string. Explain how you would identify the magnet and the magnetic material. (2mks)

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(ii) Attraction is not the sure way for testing polarity. Explain (1mk)

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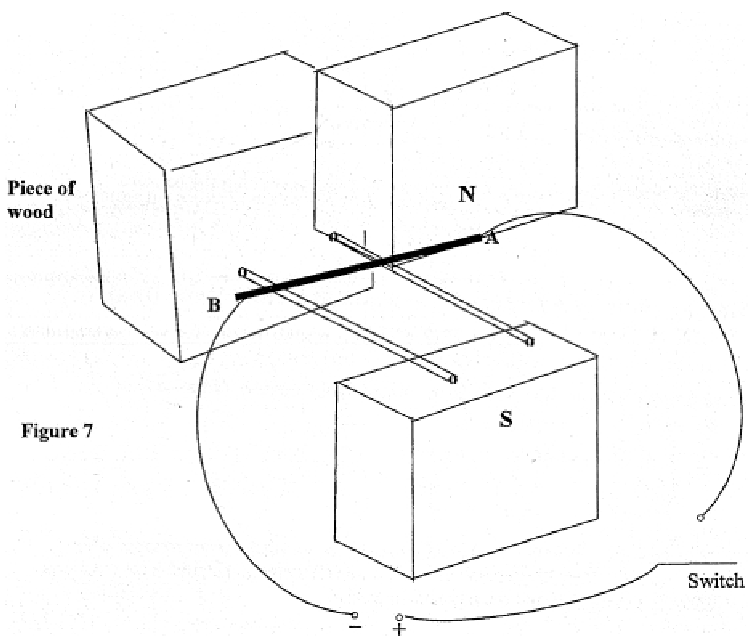

Figure 7

(i) State the direction the conductor AB moves when the switch S is closed. (1mk)

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(ii) Suggest one method by which the effect in (i) above can be increased. (1mk)

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SECTION B (55 Marks)

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

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(b) The values in the table below were obtained in an experiment using concave mirror.

Object distance (U) (cm)	80	26.7	22.4	20.6	19.6
Image distance V (cm)	20	40	56	76	88
Magnification (M)					

(i) Complete the table for values of M (1mk)

(ii) On the grid provided, plot a graph of magnification against image distance. (5mks)

(iii) Using your graph, determine the focal length of the mirror (give your answer to 2 d.p.) (3mks)

13. (a) What is the purpose of using a fuse in a circuit? (1mk)

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(b) In domestic wiring (consumers fuse box) use of circuit breakers are preferred to fuses. Give two advantages of using a circuit breaker over a fuse. (2mks)

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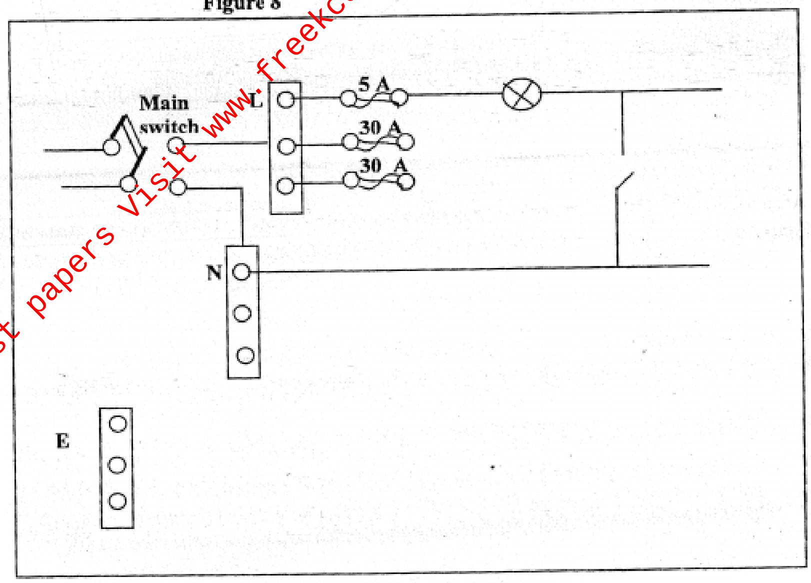
(c) The diagram below shows a typical house wiring system.

Figure 8



(i) The main switch is a double pole switch. What does this mean? (1mk)

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(ii) Identify one mistake in the wiring above. (1mk)

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(iii) On the diagram show how the cooker may be connected. (2mks)

(d) An electric cooker operating from a 240V main has a 4KW oven, 2KW grill and 2 rings each rated at 0.5KW. The cooker is connected to 30A fuse. Determine whether the fuse is suitable or not. (3mks)

14. (a) The SI unit of capacitance is the Farad. Define the Farad. (1mk)

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(b) Figure 9below shows two aluminium plates X and Y of equal dimensions 30cm x 30cm fixed on wooden support and fairly close to each other but separated by a distance d.

Figure 9

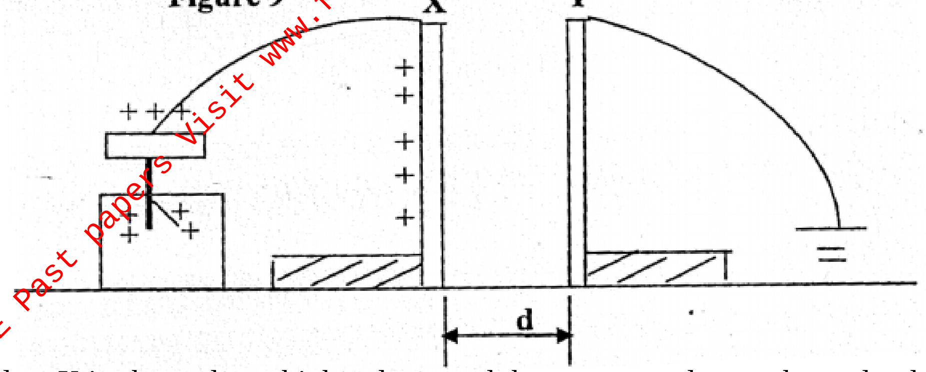

Plate X is charged to a high voltage and then connected to uncharged gold leaf electroscope. The area of overlap is maintained but the distance of separation d, is varied by moving plate Y.

(i) What happens to the divergence of the electroscope when plate Y is moved closer to plate X? Give a reason for your answer. (2mks)

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(ii) What happens to the leaf divergence when plate Y is moved away from plate X while area of overlap is maintained? (1mk)

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(iii) What effect does the movement of plate (Y) above have on the capacitance? (1mk)

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(iv) The area of overlap is decreased by moving plate Y parallel to plate X but keeping the distance of separation constant. What happens to the leaf divergence? (1mk)

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(v) The area of overlap and the distance of separation are kept constant; but an insulator introduced between the plates, what happens to the divergence of the leaf? (1mk)

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(c)

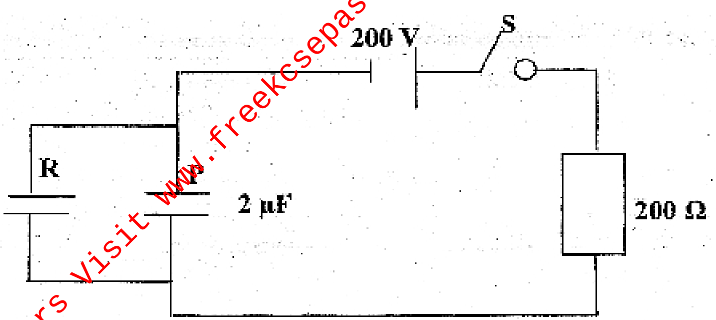


Figure 10

A 2μF capacitor P is charged to a potential of 200V, then the supply is disconnected as shown in figure 10 above. The charged capacitor is then connected to another uncharged capacitor (R). The p.d across the parallel arrangement is 80V.

Calculate:

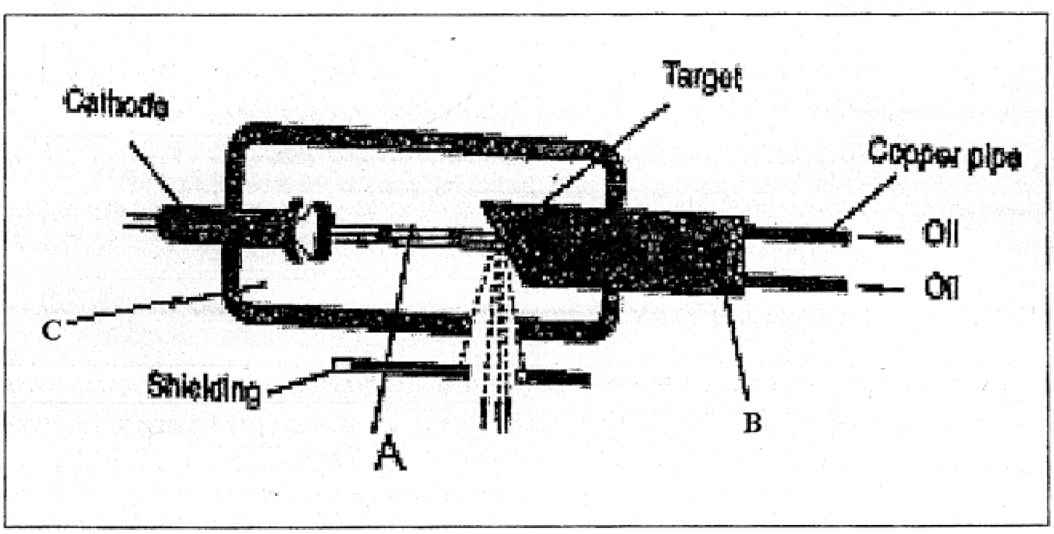
(i) The capacitance of the second capacitor. (2mks)

(ii) The final charge on each capacitor. (2mks)

(iii) What is the initial energy stored by capacitor P? (1mk)

15. (a) The figure below shows the features of an X-ray tube.

Figure 11



(i) Name the parts labeled A, B and C (1 ½ mks)

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(ii) Briefly describe how X-rays are produced. (2mks)

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(iii) Why is it necessary to maintain a vacuum inside an X-ray tube. (1mk)

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(iv) During the operation of the tube, the target becomes very hot. Explain how this heat is caused. (1mk)

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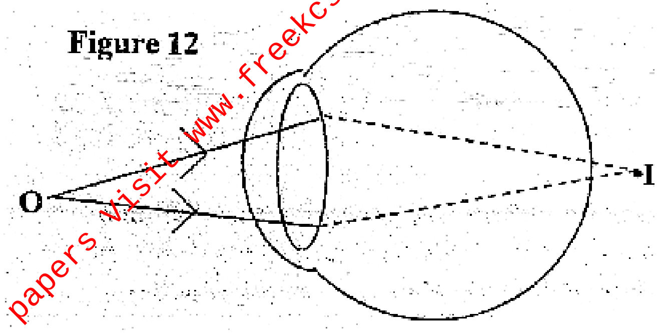
(b) An X-ray tube produces X-rays whose wavelengths vary from 6.0×10^{-13} to 4.5×10^{-9}m. ($v=3.0 \times 10^{8} ms^{-1}$ and $h=6.63 \times 10^{-34}$Js). Determine:

(i) The range of the frequency of X-rays. (2mks)

(ii) The highest energy of the X-rays. (2mks)

16. (a) The figure below shows an eyeball illustrating a defect in vision.



(i) Name the defect explaining its possible cause. (2mks)

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(ii) Illustrate on a separate sketch how the above defect could be corrected. (1mks)

(b) (i) State one way a camera differs from the human eye. (1mk)

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(ii) State one ways in which the two resemble. (1mk)

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(c) You are provided with two converging lenses of focal lengths F_1 and F_2. F_1 and F_2 are short but F_2 is slightly longer than F_1. Sketch a diagram to show the two lenses may be used to make a compound microscope. (2 ½ mks)