

NAME \_\_\_\_\_ CLASS \_\_\_\_\_

DATE \_\_\_\_\_ SIGNATURE \_\_\_\_\_

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PHYSICS  
FORM FOUR  
1<sup>ST</sup> TERM 2016  
2 HRS.

Kenya Certificate of Secondary Education  
PHYSICS PP2  
FORM FOUR 1<sup>ST</sup> TERM EXAMINATION 2016

**INSTRUCTIONS**

- Write your name and your class in spaces provided
- This paper consists of two sections, section A and section B
- Answer all the questions in each section in the spaces provided.
- Mathematical tables and Electronic calculators may be used
- All working must be clearly shown where necessary

**For Examiner's Use Only**

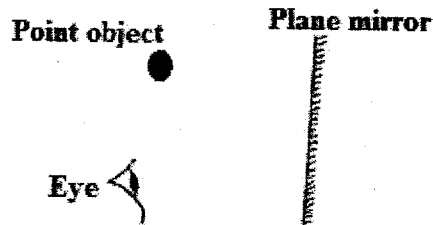
Section	Maximum score	Candidates score
A	25	
B	55	
<b>TOTAL</b>	<b>80</b>	

*This paper consists of 11 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

**SECTION A(25 MARKS)**

**ANSWER ALL QUESTIONS IN THIS SECTION IN THE SPACES PROVIDED**

1. **Figure 1** show a point object placed in front of a plane mirror.



**Figure 1**

On the same diagram, draw rays to locate the position of the image **I**, as seen from the eye, **E**. (2marks)

2. State one way in which the induced current in a transformer can be increased (1mark)

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3. Name the property of light that is depicted by the formation of shadows (1 mark)

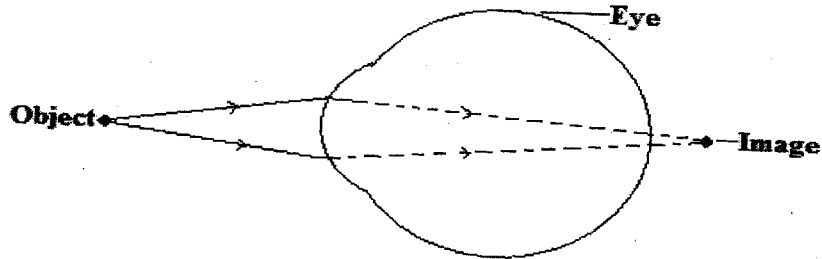
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4. The table below shows various types of radiation, methods of detection and their respective uses. Complete the table appropriately by filling in the blank spaces (3 marks)

Type of radiation	Detector	Uses
Radio waves		Communication
	Blackened bulb thermometer	Warmth sensation
Ultraviolet radiations	Fluorescence of material	

5. **Figure 2** shows a certain eye defect on the focus of a near object. Study it and answer the questions that follow



**Figure 2**

- a) Name the type of defect shown in the figure (1 mark)
- 
- b) Name the type of lens that is used to correct the defect (1 mark)
- 
- c) Draw on the same diagram an arrangement to show the correction of the defect (1 mark)
6. State the basic law of electrostatics (1 mark)
- 
7. An object lies at the bottom of a swimming pool at a depth of 2.4 m. given that the refractive index of water is 1.33, determine the position of the image of the object as viewed normally from the surface of the water (3 marks)
8. Give two reasons why lead-acid accumulators are preferred to for use as car batteries and not dry cells (2 marks)
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9. A consumer has the following appliances operating in his house for the times indicated in one day

Appliance day		Time per
1.	one 500 W fridge	24 hours
2.	one 3kW electric heater	5 hours

Determine the total electrical energy consumed in 30 days, assuming the power consumption per day is the same. (3marks)

10. Figure 3 shows a torch containing two cells, a switch and a lamp

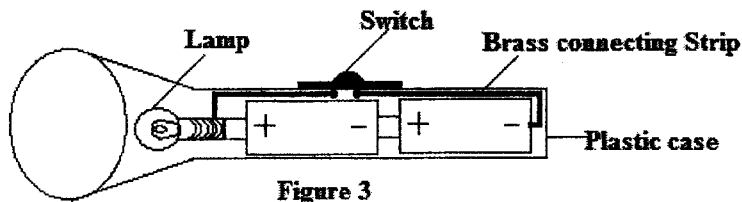


Figure 3

In the spaces provided, draw the correct circuit diagram for the torch (3marks)

11. Polarization is one of the defects of a simple primary cell. Explain how the defect reduces the emf in a simple cell. (1mark)

12. Figure 4 shows a bar magnet placed close to a soft iron material. Sketch the magnetic field patterns between the magnet and the soft iron material (2 marks)

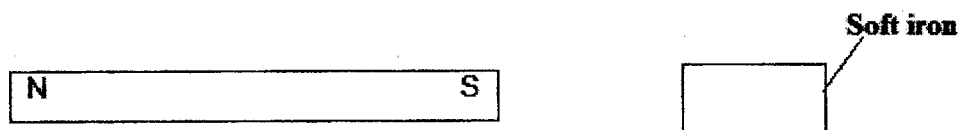
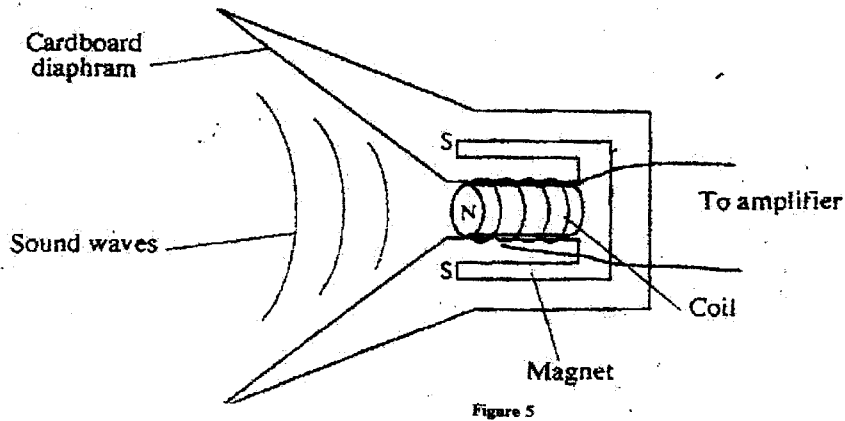


Figure 4

**SECTION B(55 MARKS)**

**ANSWER ALL QUESTIONS IN THIS SECTION IN THE SPACES PROVIDED**

- 13.a) **Figure 5** shows a simple microphone in which sound waves from the person talking cause the cardboard diaphragm to vibrate



Explain how a varying current is induced in the coil when the diaphragm vibrates  
(2 marks)

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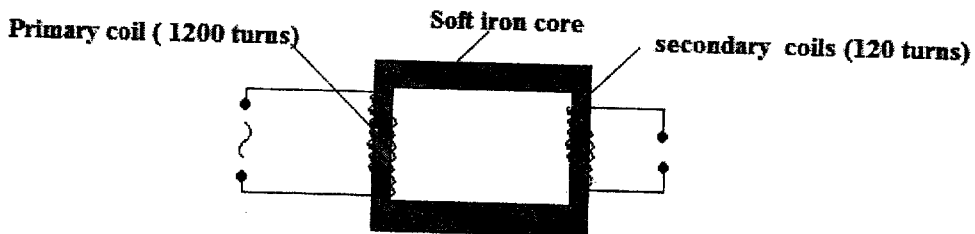


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- b) **Figure 6** shows transformer **X** with 1200 turns in the primary circuit and 240 turns in the secondary circuit has its primary circuit connected to an 800V a.c source. It is found that when a heater is connected to the secondary circuit, it produces heat at the rate of 600W.



- i) What type of transformer is transformer X? Give a reason for your answer (2 marks)

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ii) Assuming 100% efficiency, determine the:  
 I) Voltage in the secondary circuit (3 marks)

(ii) Current in the primary circuit (2 marks)

(iii) The current in the secondary circuit (2 marks)

c) Explain how each of the following reduce energy losses in practical transformers  
 i) soft- iron core (2 marks)

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ii) A laminated core (2 marks)

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14.a) **Figure 7** shows two metallic spheres A, B stand in contact as shown. A positively charged rod is held near sphere A. Show the charge on each sphere when the metallic balls are separated and the rod is removed. (2marks)

Negatively charged rod

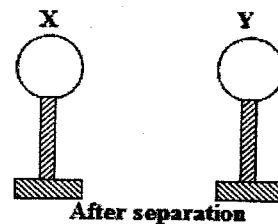
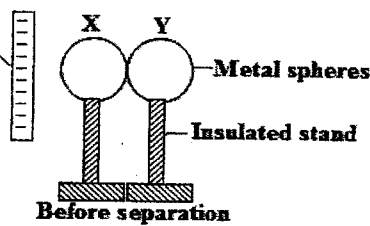


Figure 7

ii) Give a reason why the metal spheres are supported on insulated stands (1mark)

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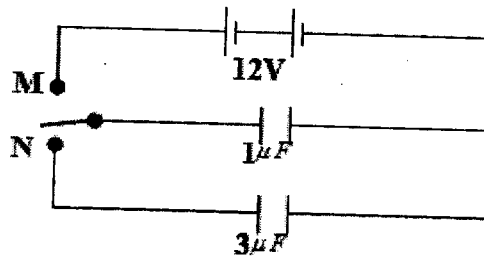
b) State how the adjustments on the following factors affect the capacitance of a parallel plate capacitor.  
Reducing the distance of separation (1 mark)

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Reducing the area of overlap of the plates (1 mark)

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c) **Figure 8** shows a circuit where a battery of e.m.f 12V, a voltmeter, switches *M* and *N*, two capacitors of capacitance  $1\ \mu\text{F}$  and  $3\ \mu\text{F}$  are connected

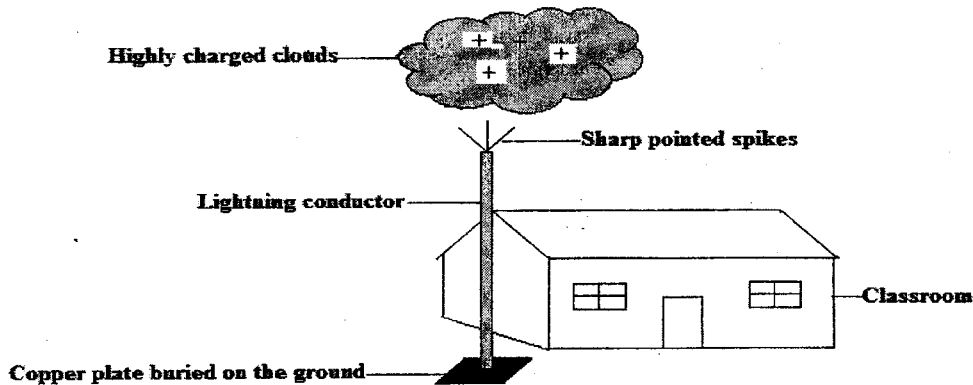


**Figure 8**

i) Determine the charge stored in the  $1\ \mu\text{F}$  capacitor when switch *M* is closed and switch *N* is open. (2marks)

ii) When the switch *N* is finally closed and switch *M* is open, determine the potential difference across each capacitor. (2marks)

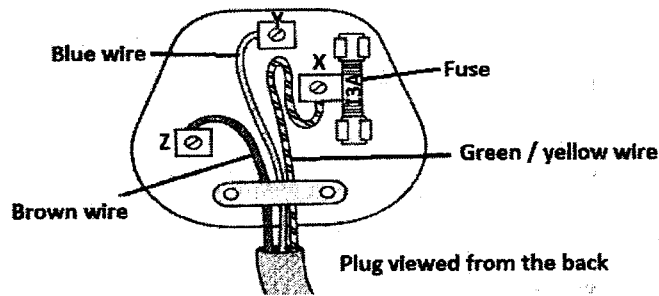
- d) **Figure 9** shows a lightning arrestor used to protect a classroom from damage by lightning. Study it and answer the questions that follow



**Figure 9**

- i) State the purpose of the following on the arrestor  
 Sharp pointed spikes at the end of the conductor (1 mark)
- 
- ii) Burying the copper plate on the ground (1 mark)
- 
- e) Explain how the arrestor protects the building from damage by lightning (2 marks)
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15.a) **Figure 10** below shows a connection to the pin plug.



**Figure 10**

- i) Name the parts X, Y and Z (3marks)
- X
- 
- Y
- 
- Z
-



ii) Give one reason why the earth pin is normally longer than the other two pins. (1 mark)

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iii) State the purpose of the fuse in the circuit (1 mark)

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iv) Give the reason why electric current is usually transmitted at very high voltage in the cables (1 mark)

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b) **Figure 11** the voltmeter reads 2.1 V when the switch is open. When the switch is closed, the voltmeter reads 1.8 V and the ammeter reads 0.1A.

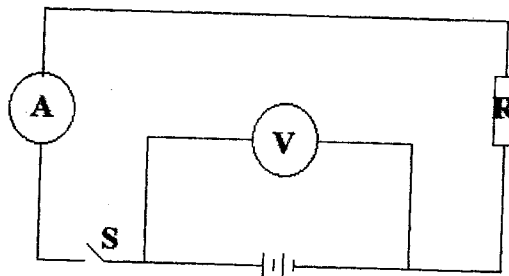


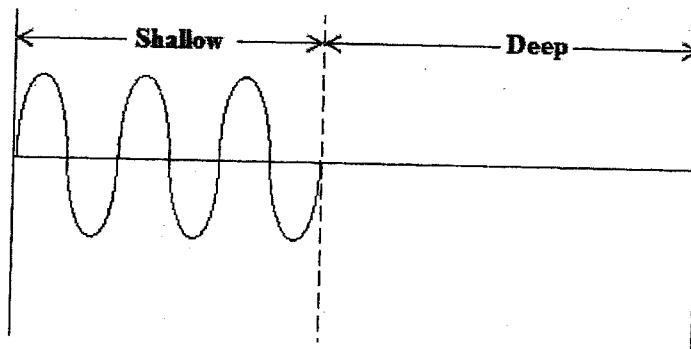
Figure 11

Determine:  
(i) The e.m.f of the cell (1 mark)

(ii) The internal resistance of the cell (3 marks)

(iii) The resistance of the lamp (2 marks)

16.a) **Figure 12** shows displacement of particles in a progressive wave incident on a boundary between shallow and deep regions in a pool of water.



**Figure 12**

- i) Considering that the waves don't lose energy, complete the diagram to show how the waves will emerge at the deep ends (2 marks)
- ii) Name the physical quantity on the wave that remains constant when the wave travel from a shallow to deep water (1mark)
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- b)i) Water waves are observed as they pass a fixed point at a rate of 15 crests per minute. A particular wave crest takes 4 seconds to travel between two fixed points 12 m apart. Determine  
The frequency of the wave (2 marks)
- ii) The wavelength of the wave (3 marks)
- c) A lens forms an image four times the size of the object on the screen. The distance between the object and the screen is 40cm when the image is sharply focused.  
i) State with a reason what type of lens was used. (2marks)
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(ii) Determine:  
I) The object distance.

(3 marks)

II) The image distance

(2 marks)