Name ..... Index No. .....

School .....Candidate's signature .....

Date .....

232/2

PHYSICS
Paper 2

July/August 2016
Time 2 hours

WESTLANDS JOINT EXAMINATION

Kenya Certificate of Secondary Education

PHYSICS

Paper - 232/2

July/August 2016

Time: 2 hours

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Sign and write the date of the examination in the spaces provided above.
- This paper consist of two section A and B.
- Answer **ALL** questions in section A and B in the spaces provided.
- All working must be clearly shown in the spaces provided in this booklet.
- Non-programmable, silent electronic calculators and **KNEC** mathematical tables may be used.

FOR EXAMINER'S USE ONLY

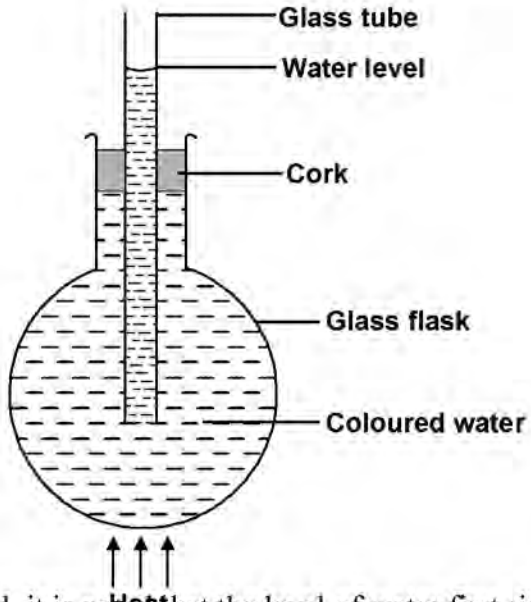
SECTION	Questions	Maximum score	Candidate score
A	1 to 13	25	
B	14		
	15		
	16		
	17		
	18		
	19		
TOTAL SCORE		80	

This paper consists of 10 printed pages

Candidates should check the question paper to ensure that all the printed pages are printed as indicated and no questions are missing.

SECTION A (25 marks)
Answer ALL questions in this paper

1. The figure below shows a flask filled with coloured water. The rubber cork is pushed in until the water rises a short distance in the glass tube.



When the flask is cooled, it is noted that the level of water first rises before it starts to drop. Explain this observation. (1 mark)

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2. The receiving part of a TV aerial should have a length equal to half the wavelength of the incoming waves. What is the ideal aerial length for reception of TV transmission of frequency 400MHz. (Speed of radio waves = 3×10^8 m/s) (3 marks)

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3. An uncharged metal rod brought close but not touching the cap of a charged electroscope causes a decrease in the divergence of the leaf. Explain. (1 mark)

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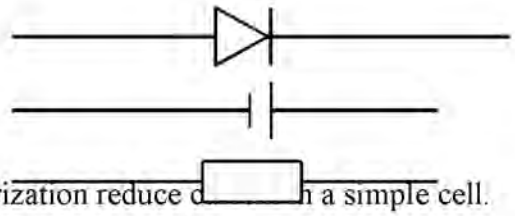
4. Using the components symbols shown in the figure 1, sketch a series circuit diagram for a forward biased diode.



5. Explain how polarization reduce d[illegible]n a simple cell. (1 mark)

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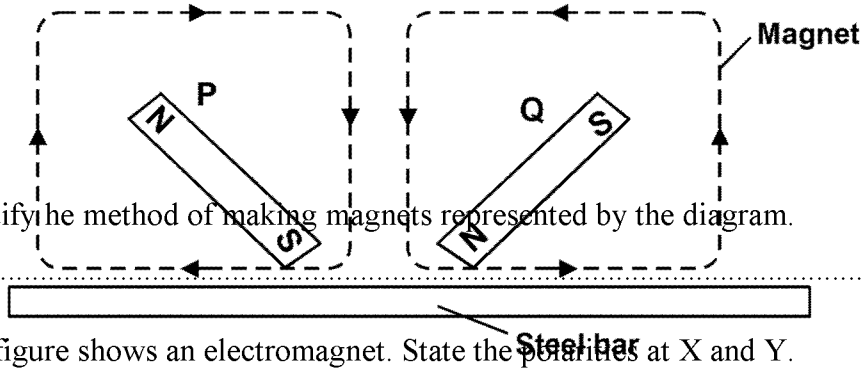
6. The figure below shows two magnets being used to strike a steel bar.



Identify the method of making magnets represented by the diagram. (1 mark)

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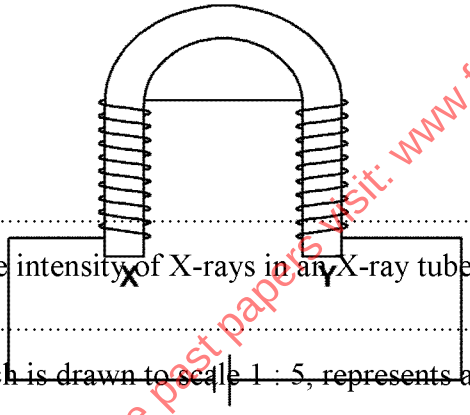
7. The figure shows an electromagnet. State the polarities at X and Y. (2 marks)



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8. Explain how the intensity of X-rays in an X-ray tube can be controlled. (1 mark)

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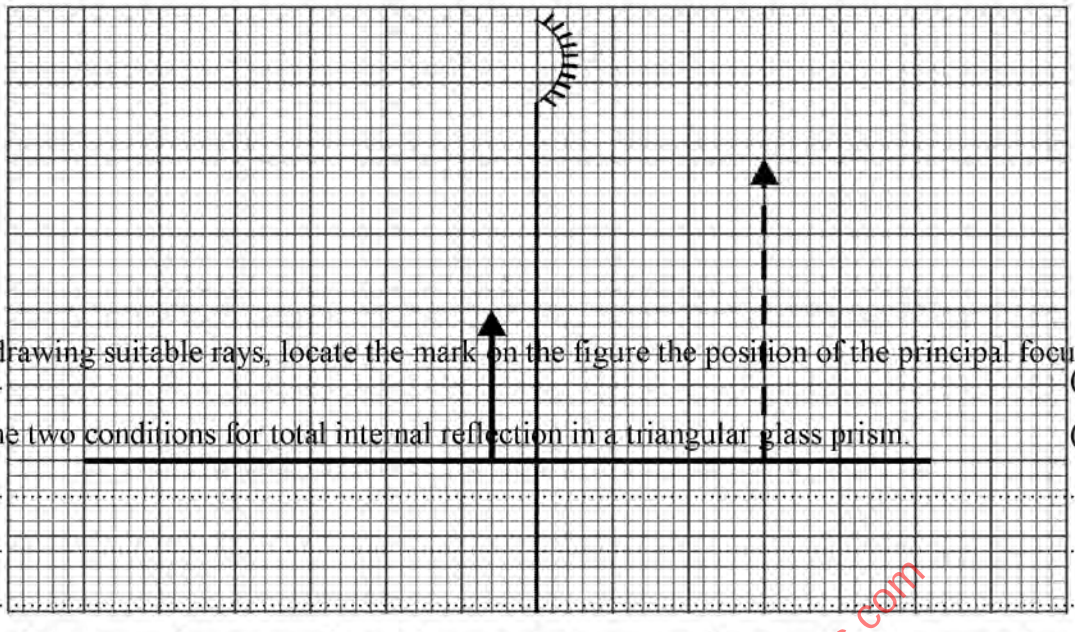
9. The figure which is drawn to scale 1 : 5, represents an object O and its image I formed by a concave mirror.



i) By drawing suitable rays, locate the mark on the figure the position of the principal focus F of the mirror. (3 marks)

10. State the two conditions for total internal reflection in a triangular glass prism. (2 marks)

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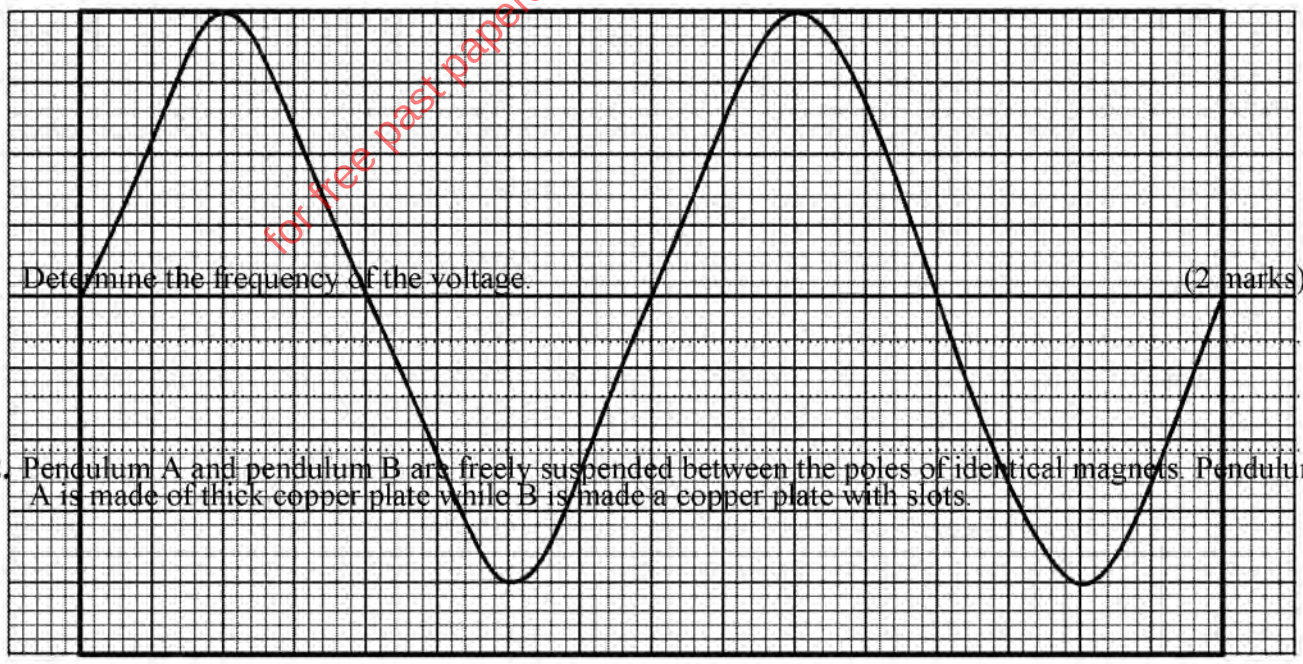
11. The graph in figure shown was obtained on a cathode ray oscilloscope (CRO) screen when the output of an a.c. generator was connected to the input of the CRO. The time-base calibration of the CRO was set at 20 milliseconds per centimetre and the y-gain at 5 volts centimetre.



Determine the frequency of the voltage. (2 marks)

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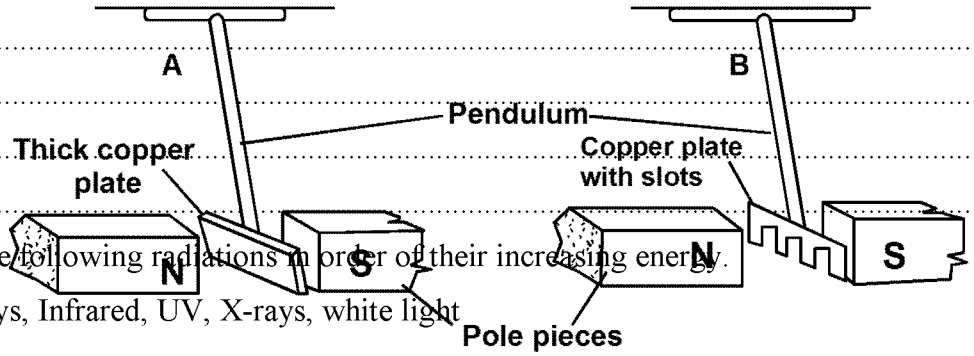
12. Pendulum A and pendulum B are freely suspended between the poles of identical magnets. Pendulum A is made of thick copper plate while B is made a copper plate with slots.

When the two are set to swing, it is observed that A slows down faster than B. Explain this observation.



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13. Arrange the following radiations in order of their increasing energy.

Gamma rays, Infrared, UV, X-rays, white light

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14. Water waves are produced in a ripple tank. The following is an example of the wave from that was observed.

a) i) From the graph determine the frequency of the wave. (2 marks)

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ii) Derive an equation relating velocity of a wave, frequency and wavelength. (2 marks)

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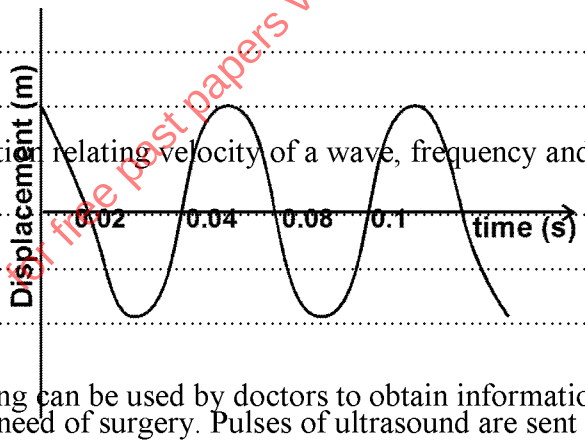

b) Ultrasound scanning can be used by doctors to obtain information about internal structure of human body without the need of surgery. Pulses of ultrasound are sent into the body from the transmitter placed on the skin.

i) The ultrasound used has a frequency of 4.5MHz. State why waves of this frequency are called ultrasound. (1 mark)

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ii) A pulse of ultrasound enters the body and its reflection returns to the transmitter after a total time

of 1.6×10^{-4}S. Calculate how far the reflecting surface is given that the average speed of ultrasound in a body = $1500ms^{-1}$ (3 marks)

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iii) State why the ultrasound sources are transmitted in pulses. (1 mark)

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15. a) An object O placed in front of a converging lens L_O forms an image I on the other side of the lens. Another converting lens L_e is placed such that the two lenses form a compound microscope.

i) Draw a reason of the set up and sketch the rays to show how the final image is formed. (5 marks)

ii) What is meant by virtual image? (1 mark)

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iii) A lens forms a clear image on a screen when the distance between the screen and the object is 80cm. If the image is 3 times the height of the object, determine. The distance of the image from the lens. (2 marks)

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16.a) The figure shows the charged plates of a parallel plate air capacitor when the distance of separation is d.

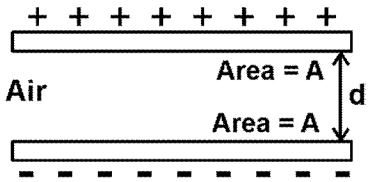
Complete the diagram to show the electric field pattern in the space between the plates. (1 mark)

b) Without changing the area of overlap, suggest two methods by which you would increase the capacitance of a capacitor. (2 marks)

i) .....

ii) .....

c) Three capacitors A, B and C are connected as shown in the figure.



Calculate

i) the charges on each capacitor. (3 marks)

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ii) The potential difference across each capacitor (3 marks)

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17.a)i) State the Lenz's law.

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ii) State Faraday's law. (2 marks)

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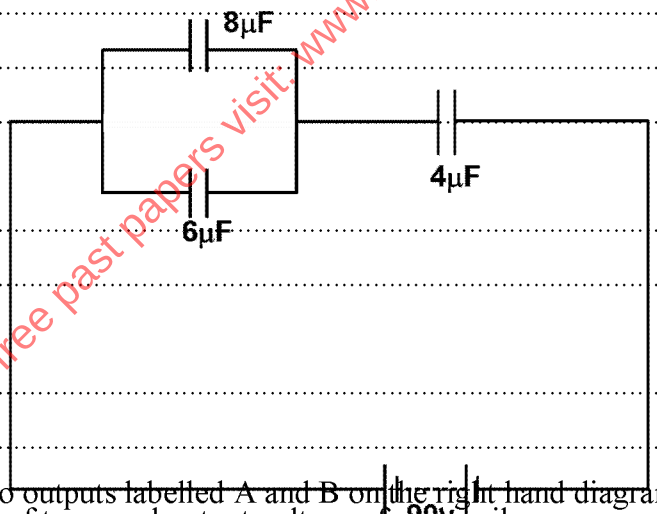
b) The transformer has two outputs labelled A and B on the right hand diagram. Complete the table below to show number of turns and output voltage of each coil.



c) In a laundry four electric irons each rated 750W, 240V are connected to the 240V mains supply using a 13A fuse.

i) Can the 13A fuse be suitable for the circuit when all the electric ions are being used (support your answer) (2 marks)

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ii) Calculate the cost of using all the electric ions everyday for 3 hours. If the cost of electricity is shs 15.00 pre kilowatt hour. (2 marks)

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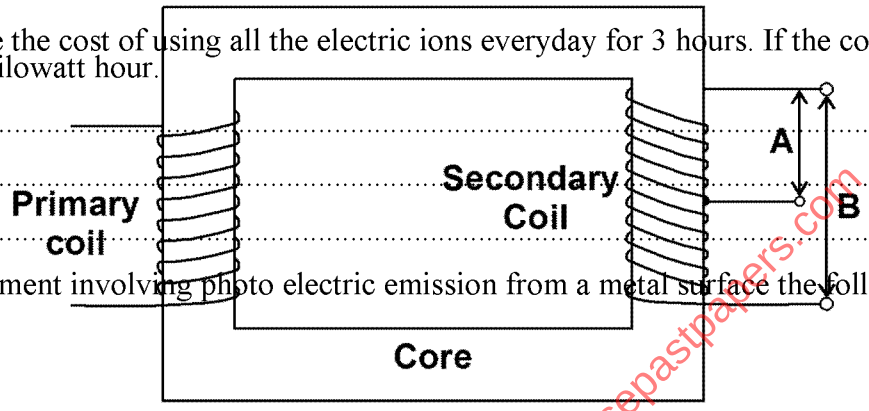

18. In an experiment involving photo electric emission from a metal surface the following readings were obtained.

Input voltage	Primary turns	Secondary turns	A or B	Output voltage
230v	5000	2500		
230v	5000	5000		

a) Explain how you would change the frequency of the incident radiation, without changing the source of radiation. (1 mark)

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b) Plot a graph of slopping voltages, V_S, (y-axis) against frequency, f, (5 marks)

Stopping voltage Vs / v	0.2	0.6	1.0	1.8	2.2
Frequency f/10^{14}Hz	8.0	9.0	10.0	12.0	13.0

c) Use Einsteins equation of photoelectric effect, namely hf = hfo + ev, and your graph in part (b) to determine a value for

i) planck's constant. (3 marks)

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ii) Work function of the metal. (2 marks)

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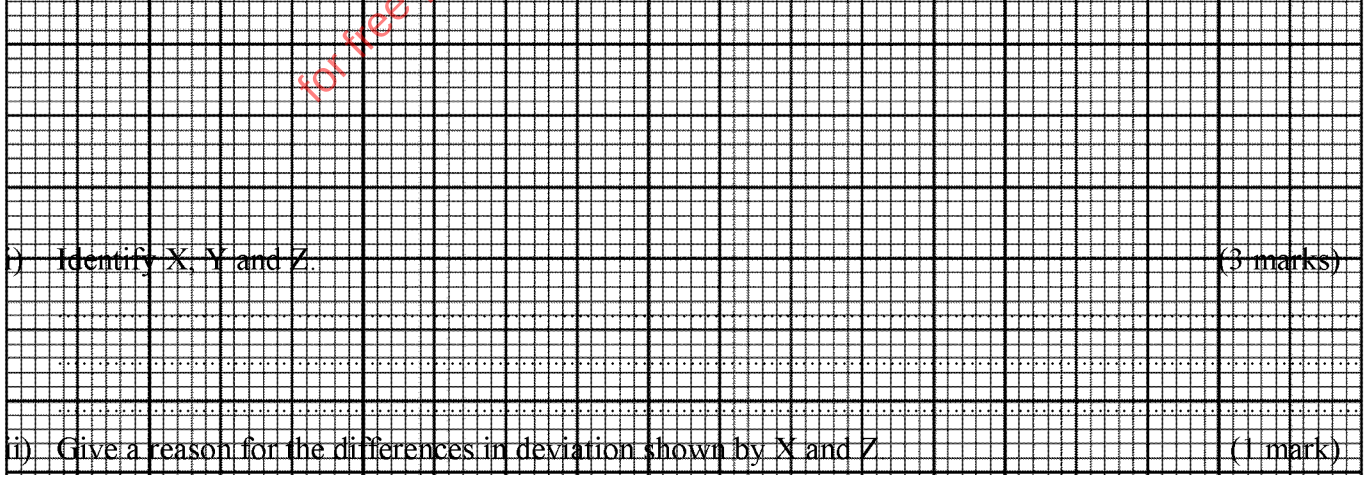
19. a) The diagram below shows the path taken by three radiations X, Y and Z from a radioactive source, through an electric field.



i) Identify X, Y and Z. (3 marks)

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ii) Give a reason for the differences in deviation shown by X and Z (1 mark)

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b) A radioactive source infront of a Geiger-muller tube shows a high count rate. The count rates are then taken from the source after placing a thin paper, then a thin aluminium foil and finally a thick lead slab, one at a time between the source and the G - M tube. It was observed that the paper had no effect on the count rate, aluminium had a small effect while the count rate was reduced greatly with lead.

i) Give reasons for the three observations. (2 marks)

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ii) Deduce the possible radiations from the source. (2 marks)

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iii) State any two applications for the radiations entitled. (2 marks)

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