Name: ……..…… Index No: …….

Candidate's signature……

Date……

Muungano KCSE Trial Exam

232/2

PHYSICS

PAPER 2

July 2017

2 Hours

INSTRUCTIONS:

Write your name and index number in the spaces provided above.
This paper consists of ***TWO*** sections: ***A*** and ***B***.
Answer ***ALL*** the questions in sections ***A*** and ***B*** in the spaces provided.
All working ***MUST*** be clearly shown in the spaces provided in this booklet.
KNEC mathematical tables and non programmable silent calculators may be used.

Physical Constants

Speed of sound in air = 330m/s
Refractive index of water = $^{4}/_{3}$

For Examiner's Use Only

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

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

Turn Over

SECTION A (25Marks)

Answer all the questions in this section in the spaces provided below each question

1. **Figure 1** below shows a negatively charged electroscope.

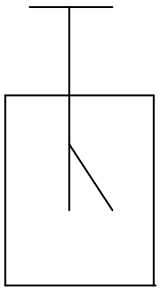

Figure 1

What will happen to the divergence when a negatively charged rod is brought near the cap of the electroscope? (1mk)

……

……

2. An image of an object in a convex mirror is 4cm from the mirror, if the mirror has a radius of curvature of 24cm, ***find the position*** of the object (3mks)

……

……

……

3. The diagram in **figure 2** shows a certain eye defect

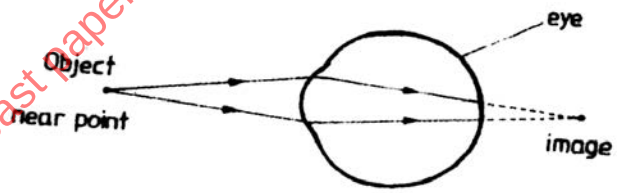

Figure 2

Which lens can be used to correct the defect (1mk)

……

4. **Figure 3** below shows an object ***O*** placed in front of a plane mirror. On the same diagram ***draw rays*** to show the position of the image I as seen by the eye ***E***. (2mks)

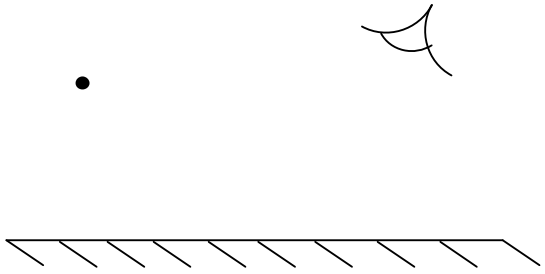

Figure 3

5. Table 1 shows radiations and their respective frequencies

Type of radiation	***Yellow light***	***Gamma rays***	***Radio waves***	***Micro waves***
Frequency (Hz)	1×10^{15}	1×10^{22}	1×10^{6}	1×10^{11}

Arrange the radiations in the order of increasing energy. (1mk)

……

6. A current of 13A flows through a heating element of resistance 8.5Ω for 1.5 minutes.
Calculate the quantity of heat supplied. (3mks)

……

……

……

7. **Figure 4** shows how displacement varies with time as a wave passes a fixed point.

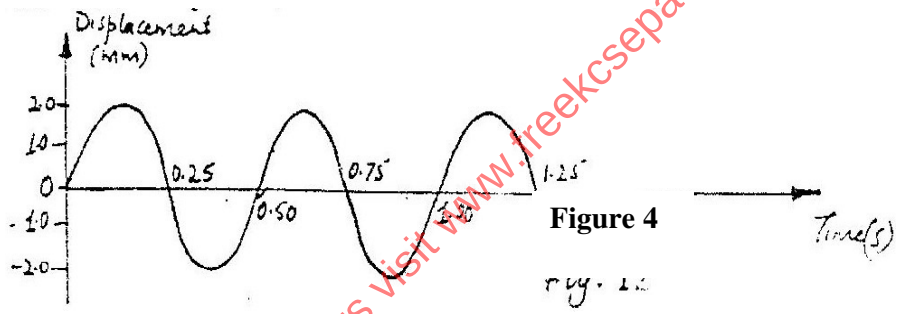

Figure 4

Determine the:

I. Amiplitude (1mk)

……

……

II. Velocity of the wave if its wave length is 0.25m. (3mks)

……

……

……

8. The **figure 5** below shows the displacement of a spot on a cathode ray oscilloscope screen.

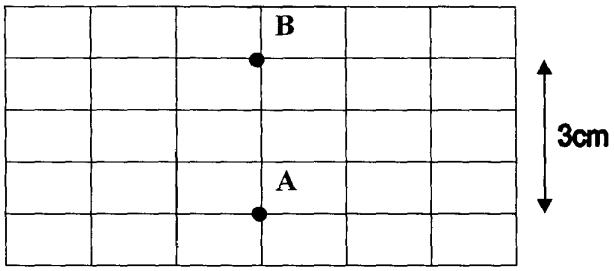

Figure 5

The spot appears on the CRO at position **A**. When DC voltage is applied to **Y**-plates the spot is displaced to position **B**. The **Y**-gain is set at 20 V/cm.

(i) ***State*** the type of voltage applied. (1mk)

……

(ii) ***Find*** the voltage applied. (2mks)

……

……

9. **Figure 6** shows an incident ray normal to the surface ***BC*** of a right-angled glass prism ***ABC***. The critical angle of the glass is 42^0

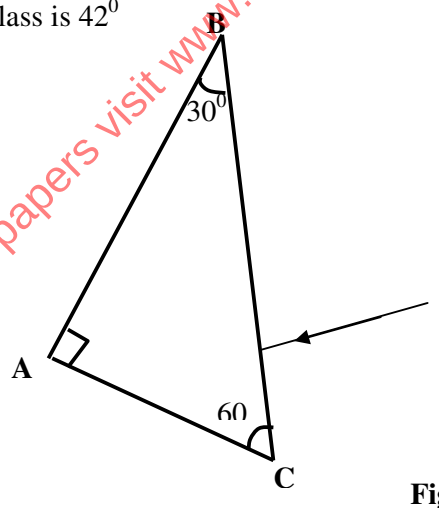

Figure 6

Complete the diagram to show the path of the ray. (2mks)

10. A pin at the bottom of a beaker containing glycerine appears to be 6.8cm below the surface of glycerine. Determine the height of the column of glycerine in the beaker. (*take the refractive index of glycerine as 1.47*) (3mks)

……

……

……

11. The Figure 7 below shows a conductor carrying current placed in the magnetic field of two magnets. ***Complete*** the diagram by showing the field pattern and the direction of force ***F*** that acts on the conductor. (2mks)

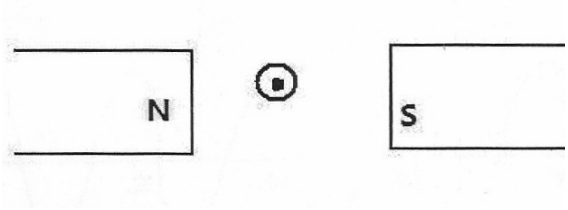

Figure 7

SECTION B (55Marks)

*Answer **all** questions in this section*

12. (a) (i) ***Define*** capacitance of a capacitor (1mk)

……

……

(ii) **Figure 8** below shows a pair of parallel plates of a capacitor connected to a battery. The upper plate is displaced slightly to the left.

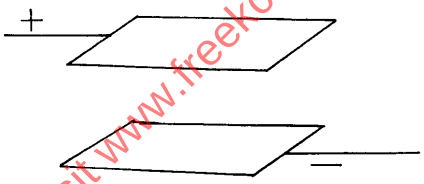

Figure 8

State with a reason the effect of this movement on the capacitance. (2mks)

……

……

iii) The circuit diagram in figure 9 below shows four capacitors connected between two points ***A*** and ***B***.

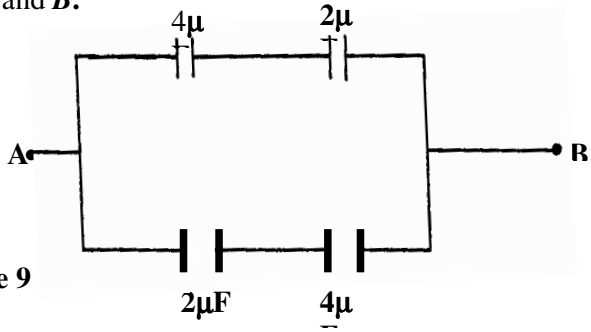

Figure 9

Determine the capacitance across **AB**. (3mks)

……

……

……

(b) **Figure10** below shows metal plates **X** and **Y**. Metal **Y** is illustrated by ultra-violet radiation.

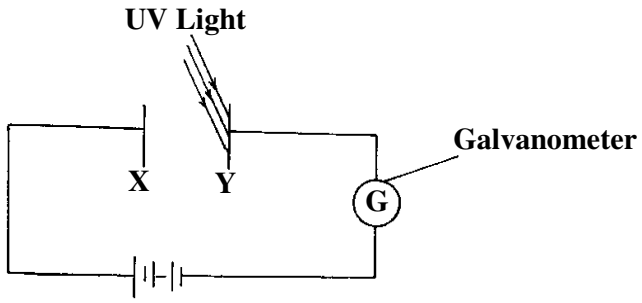

Figure 10

(i) ***State the observation*** made on the galvanometer (1mk)

……

(ii) ***Explain the observation*** *in (i)* above (2mks)

……

……

(iii) A material has a work function of 2.0eV. ***Determine*** the largest wavelength of incident radiation that can cause photo electrons to be emitted from its surface.
($C = 3 \times 10^{8}$ *m/s*, $h = 6.63 \times 10^{-34}$ *Js*, $1eV = 1.6 \times 10^{-19}$ *J*) (3mks)

……

……

……

13. a) A radioactive nuclide of atomic number *z* emits a beta particle and gamma rays. ***State*** the atomic number of the new nuclide. (1mk)

……

……

b) i)***Define*** half-life of a radioactive material. (1mk)

……

……

ii) **Figure 11** shows a graph of the variation of the number of atoms of a certain radioactive material with time.

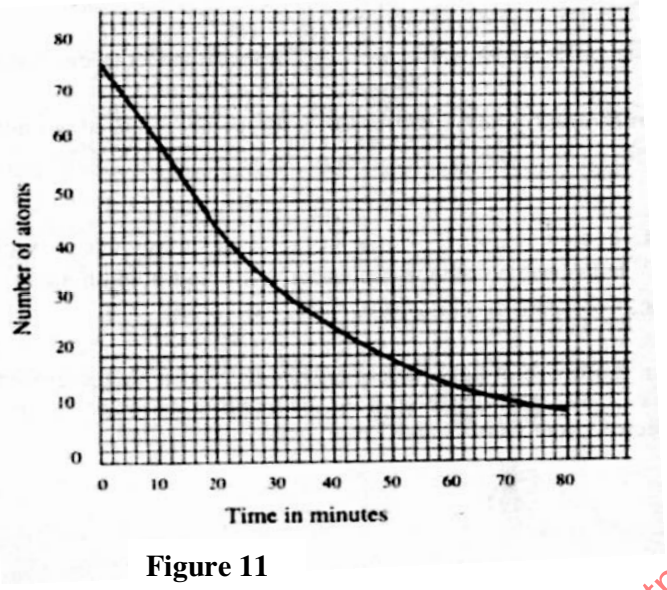

Figure 11

Determine the half-life of the material (2mks)

……

……

c) The **figure 12** below shows features of a diffusion cloud chamber used for detecting radiations from a radioactive source.

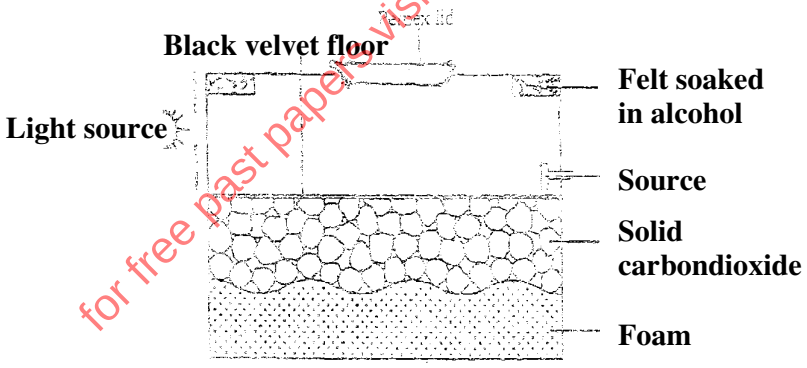

Figure 12

I. ***Explain how*** the chamber works when a radioactive particle is introduced at the source. (2mks)

……

……

II. ***What is*** the purpose of solid carbon (IV) oxide? (1mk)

……

……

III. When a radiation was released into a diffusion cloud chamber, short thick tracks were observed. ***State with a reason*** the type of radiation that was detected. (2mks)

……

……

d) Cobalt 60 is a radio isotope that has a half-life of 5.25 years. ***What fraction*** of the original atoms in a sample will remain after 21 years? (3mks)

……

……

……

14. a) **Figure 13** shows two coils ***A*** and ***B*** placed close to each other. ***A*** is connected to a steady D.C. supply and a switch, ***B*** is connected to a sensitive galvanometer.

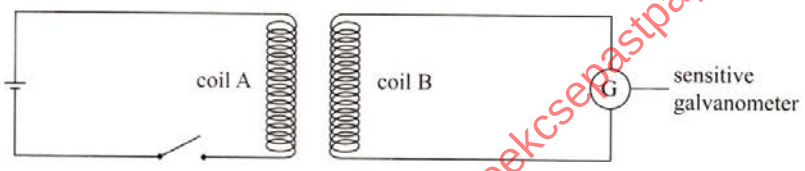

Figure 13

i) ***What happens*** to the galvanometer when the switch is closed? (1mk)

……

ii) If the D.C source was replaced with an A.C source, ***what will*** be the observation?

……

b) The primary coil of a transformer has 10000 turns and the secondary coil has 2000 turns. The primary coil is connected to a 240Va.c. Mains supply

i) ***Determine*** the secondary voltage (2mks)

……

……

……

ii) ***Calculate*** the efficiency of the transformer given that the current in the primary coil is 0.20A and in the secondary coil it is 0.8 A (3mks)

……

……

……

c) Study the **figure 14** shown below.

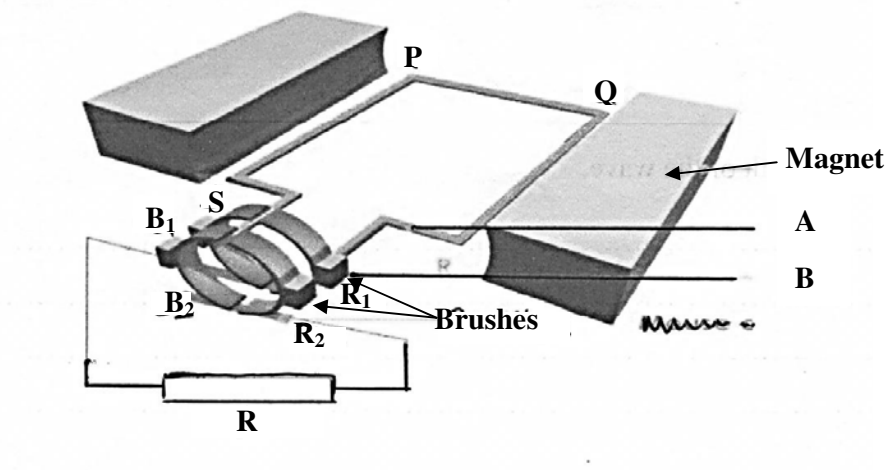

Figure 14

i) ***State the name*** of the machine shown in figure above. (1mk)

……

ii) ***What*** are the ***names*** of the parts labelled ***A*** and ***B***? (2mks)

A----------

B----------

iii) ***What*** would be the ***effect*** of doubling the number of turns of the coil if the speed of rotation remained unchanged? (1mk)

……

……

15. **Figure15** shows the parts of an x-ray tube.

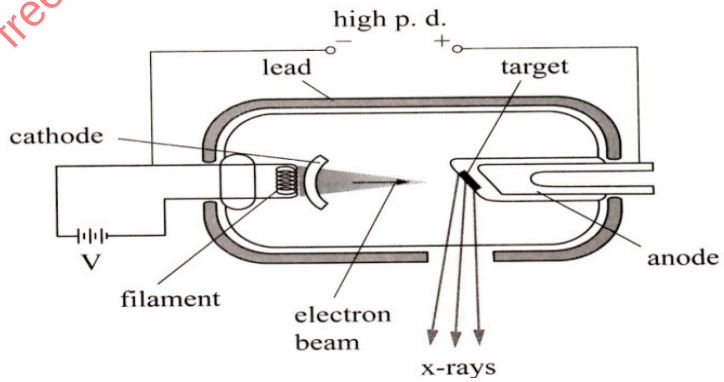

Figure 15

a) ***Explain*** why:

i) The cathode is concave shaped (1mk)

……

ii.) A high potential difference is applied between the cathode and the anode (1mk)

……

……

iii) Most of the tube is surrounded by lead. (1mk)

……

……

iv) The target of X-ray tube is made of metals of high melting point. (1mk)

……

……

b) ***State type*** of the x-rays produced as a result of increasing the potential difference between the anode and the cathode (1mk)

……

c) **Figure16** shows a cell of e.m.f. 2v connected in series with a resistor ***R*** and a switch ***S***. Voltmeters V_1 and V_2 are connected across the cell and the resistor respectively.

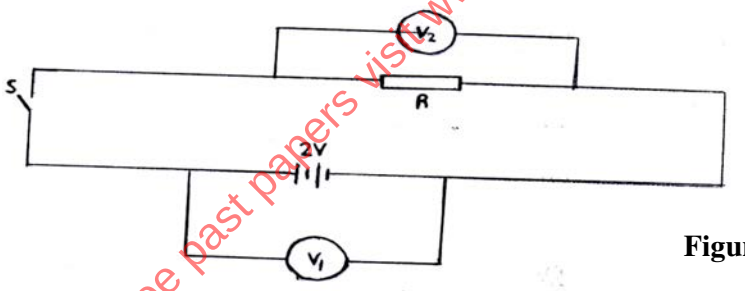

Figure 16

I. **State** the reading of V_1 with **S** open (1mk)

……

II. With **S** closed, V_1 reads 1.6 V. State the reading of V_2 (1mk)

……

III. If a current of 0.05 A flows when ***S*** is closed determine the value of ***R***. (2mks)

……

……

d) A 4Ω resistor is connected in series to a battery of e.m.f 6V and negligible Internal resistance. ***Determine*** the power dissipated by the resistor. (3mks)

……

……

……

16. a) ***Explain*** the propagation of sound with reference to compressions and rarefactions. (2mks)

……

……

b) In an experiment to measure the speed of sound in air, a starter is banged at a distance of 150m away from a wall. The banging was done in such a frequency that causes the echo to coincide with the banging. If 20 bangs were made within a time of 18.5 seconds.

i) ***Determine*** the time taken for the first echo to be heard. (2mks)

……

……

……

ii) ***Calculate*** the speed of sound in air. (2mks)

……

……

……

iii) ***What difference*** would you expect if the experiment was repeated during a very hot day? ***Explain*** (2mks)

……

……