Name:..... Index.no...../.....

Adn No. ..... Class... Candidate's signature.....

ALLIANCE HIGH SCHOOL K.C.S.E TRIALS

232/2 PHYSICS PAPER 2 JULY 2014

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

a) *Write your name and Admission number in the spaces provided.*
b) *Sign and write the date of the examination in the spaces provided.*
c) *This paper consists of **Two** sections 1 and 2*
d) *Answer **ALL** questions in sections 1 and 2 in the spaces provided.*
e) *All working **MUST** be clearly be shown.*
f) *Non-programmable silent scientific calculators and mathematical tables may be used.*
g) *This paper consist of 12 printed pages*
h) *Candidates should check the question paper and ascertain that all the pages are printed and that no questions are missing.*

For Examiners' Use Only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 – 11	25	
B	12	11	
	13	11	
	14	11	
	15	12	
	16	10	
TOTAL		80	

This paper consists of 12 Printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION 1 (25 MARKS)

1. Figure 1 show a gold leaf electroscope charged positively. **C** is the cap and **L** is the gold leaf. State and explain what happens to **L** when a positively charged rod is brought near **C** without touching it. (2marks)

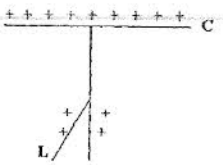


Figure1

2. A student designed an a.c generator, which produces a current of 1.2 A at a voltage of 5V. State TWO ways of increasing the voltage output. (2marks)

3. Figure 2 shows an object O placed in front of a biconvex lens. Using rays show the image of O after refraction. (2 marks)

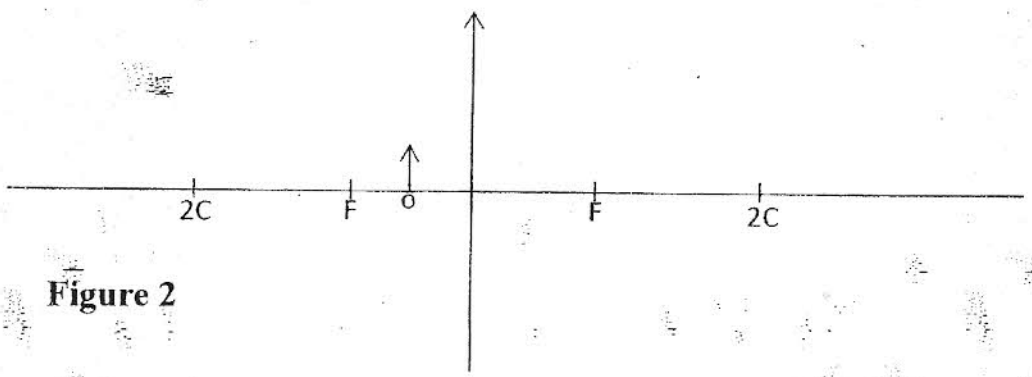


Figure 2

4. The frequency of visible spectrum ranges from 4.0×10^{4} to 7.0×10^{14}Hz. Calculate the minimum and maximum wavelengths for the visible spectrum. (Speed of light in a vacuum = 3.0×10^{8}m/s) (3 marks)

A radioactive isotope of copper decays to form an isotope of zinc, a radioactive particle, and energy as shown in the radioactive equation below.

$$^{69}_{29}Cu \rightarrow {}^{69}_{30}Zn + Radiation$$

5. State the radioactive particle and radiation emitted. (2 marks)

Use the information given **below** to answer questions 6(a) and 6(b). The kinetic energy K.E of an electron ejected from a metal surface illuminated by radiation of frequency, f is given by $K.E = hf - \theta$ where h is the Planck's constant and θ is the work function of the surface.

6 (a) Define the term work function (1 mark)

6(b) Explain why their no photoemission when the frequency of the illuminating radiation is just equal to the threshold frequency of the surface. (1 mark)

7. Figure 3 shows part of a waveform travelling at 20 ms^{-1}. The numbers on the horizontal axis show a scale in metres. Determine the frequency of the wave. (3marks)

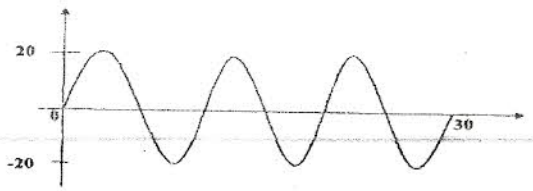


Figure 3

Figure 4 shows a wire XY of right angles to a magnetic field between two magnetic poles, north and south. XY is part of a circuit containing a galvanometer. A current flows in the direction shown when wire XY is suddenly moved upwards.

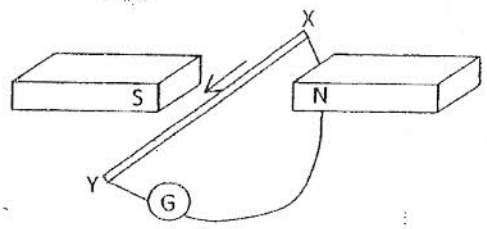


Figure 4

8. State **TWO** factors that can increase the magnitude of the e.m.f generated. (2 marks)

Figure 5 shows plane waves incident on a straight metal barrier at an angle of 45^0

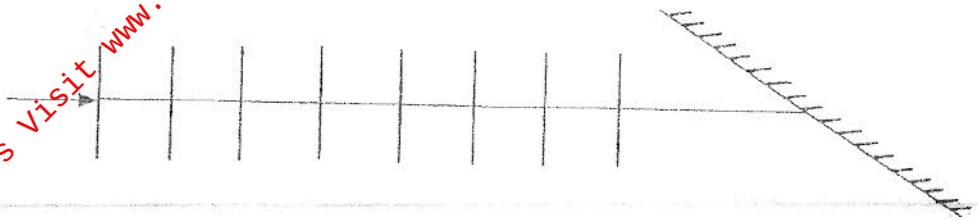


Figure 5

9. Sketch the reflected waves. (2marks)

10. A 12.0V a.c voltage is applied to the Y-plates leading to formation of 2 cycles of waves that occupy exactly 20cm across the screen of a CRO, when the time base is set to 10ms/cm. Determine the frequency of the alternating current. (2 marks)

_____

_____

11. Complete figure 6 to show the path of the incident ray after refraction and emergence from glass. (3 marks)

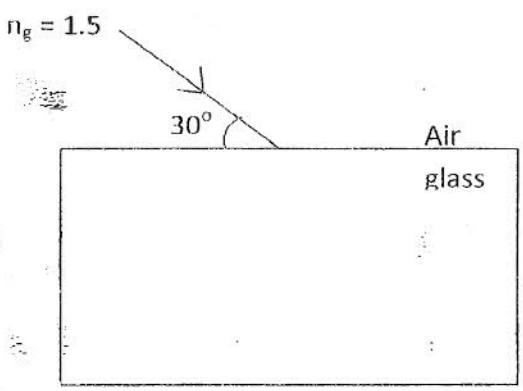


Figure 6

Section 2 (55 MARKS)

12(a) State **ONE** source of the mains electricity. (1 mark)

(b)Explain why the fuse is always fitted to the live wire in any electrical appliance.

(1 mark)

(c)In a power generating station, the voltage output is 20kV at a current of 50A. An ideal step-up transformer of turns ratio 1:20 is used to transmit power to a distant town 100 km as shown in figure 7, using transmission wires of resistance 8Ω per kilometre.

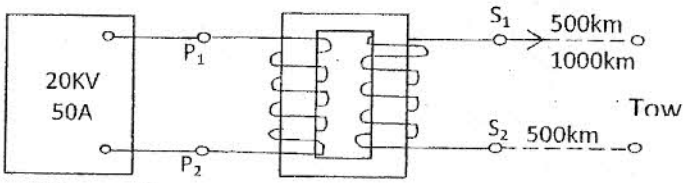


Figure 7

Calculate:

(i) The voltage drawn at the secondary coil of the transformer. (2 marks)

(ii) The current drawn from the secondary coil. (2 marks)

(iii) The power output at the town. (2 marks)

(iv) The efficiency of the transmission system. (2 marks)

13.a) State **ONE** condition that is necessary for interference of waves to occur.

(1 mark)

(b)In Young's double-slit experiment using a yellow light, state the effect of the following procedures on the pattern of the fringes formed.

(i) Covering the slits (1 mark)

(ii)Moving the screen closer to the slits (1 mark)

(iii)Decrease the separation of the slit. (1 mark)

c) A form three student placed a metre rule in a ripple tank, and noted that the distance between 24 successive dark lines was 60cm. The frequency of the vibrator was 40Hz.

i)Calculate the time required for a complete wave. (2 marks)

(ii) The wavelength of the wave (2 marks)

(iii) The velocity of the wave (3 marks)

7a) Explain briefly how X-rays are produced (2marks)

b) Figure 8 shows an X–ray tube. Study the figure and answer the questions that follow.

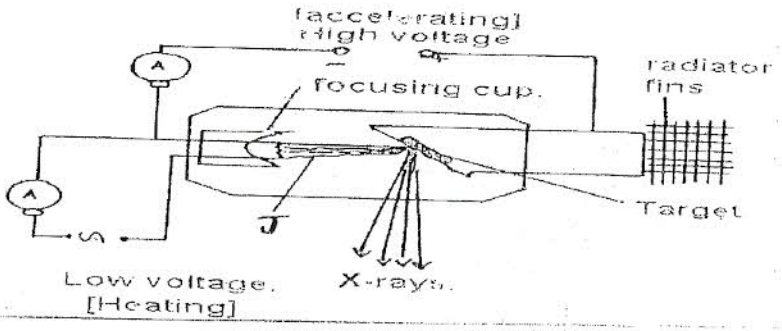


Figure 8

(i) Name J (1mark)

(ii) Suggest a material, which can be used to make the target. Give reason for your suggestion. (2 mark)

Figure 8 shows a sketch of cathode ray oscilloscope

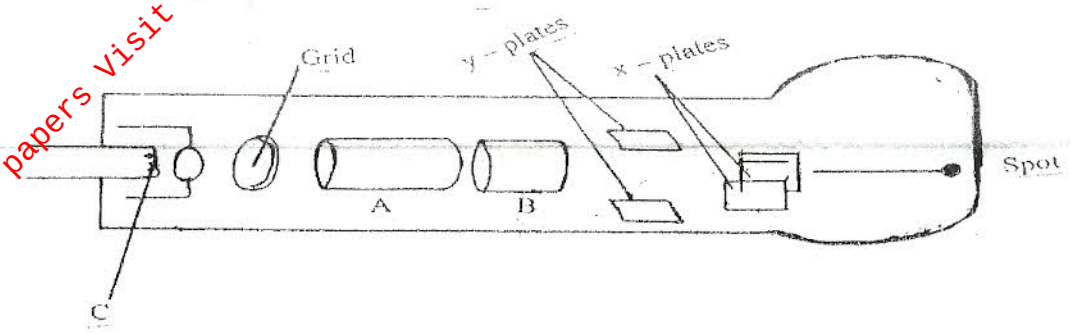


Figure 8

c) Name the parts indicated with letters stating their functions. (3marks)

A _____

B _____

C _____

(d) Explain how the spot forms on the screen. (2marks)

_____

_____

(e) Describe what is observed on the screen when the following settings are made

(i) Time base off and a.c signal applied to the Y – plates. (1mark)

_____

(ii) No signal connected to either X and Y – plates and voltage to the grid made less negative relative to the cathode. (1mark)

_____

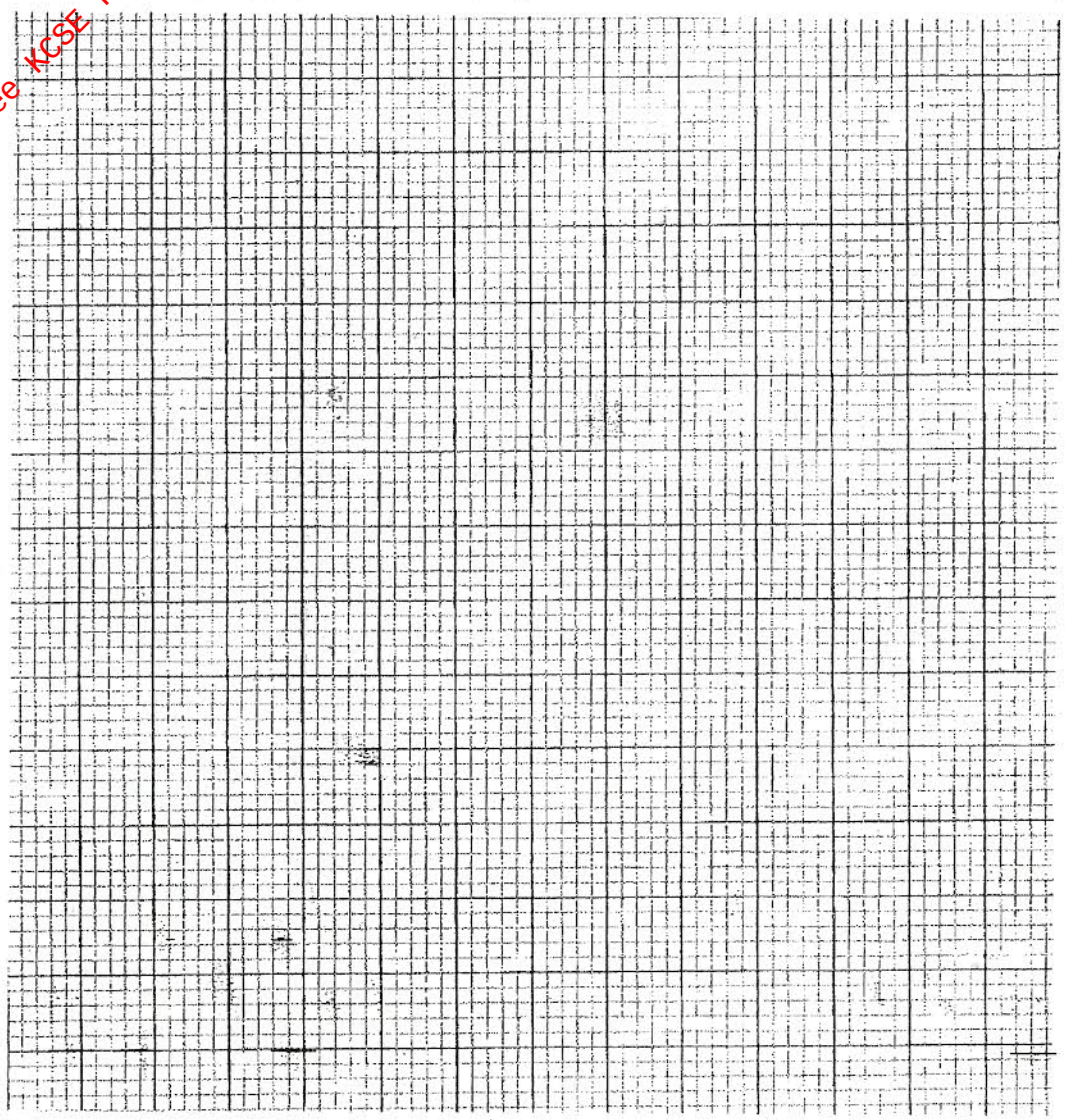
15.a) Define the term radioactivity. (1 mark)

_____

b)The table below shows how the activity of a radioactive nuclide varies with time.

Time in minutes	0	1	2	3	5	6	8	11
Count rate per minute	420	341	285	230	162	131	85	50
Activity per minutes								

Given that the background radiation count is 10 counts per minute complete the table and plot a graph of activity against time. (7 marks)



i) From the graph determine the half life of the sample. (1 mark)

c)A radioactive element X of half life of 28 days decay to element Y. A sample of X of mass 16g is kept in a container. Assuming Y is stable, determine the mass of Y that will be found in the container after 112 days. (3 marks)

16) Figure 9 shows a narrow beam of white light incident on a glass prism.

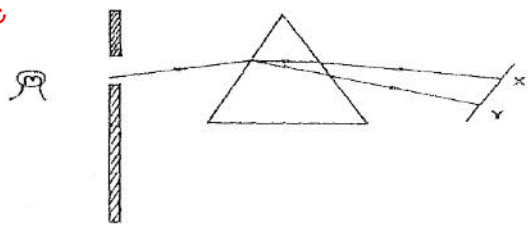


Figure 9

a) Name the phenomena of light represented in figure 9. (1mark)

b) Figure 10 shows the path of ray of yellow light through a glass prism. The speed of yellow light in the prism is 1.8×10^8 m/s.

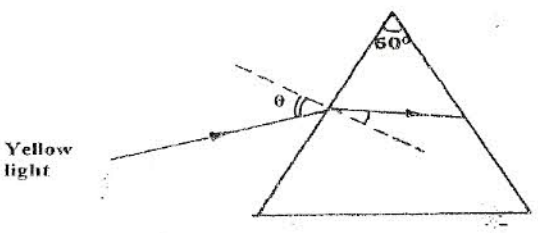


Figure 10

i)Determine the refractive index of the prism material (3marks)

(Speed of light in vacuum, $c = 3.0 \times 10^8$ m/s)

(ii)Show on the same diagram, the critical angle c and hence determine its value.

(3marks)

(iii) Given that $r = 31.2^0$, determine the angle θ (3marks)

LAST PAGE