

Name Index No.

School Candidate's signature

Date

232/2

PHYSICS
Paper 2

July/August 2016
Time 2 hours

NYANDARUA SOUTH FORM FOUR JOINT EVALUATION

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

							TOTAL SCORE
SECTION A	1 to 12						
SECTION B	13	14	15	16	17	18	
GRAND TOTAL							

This paper consists of 10 printed pages

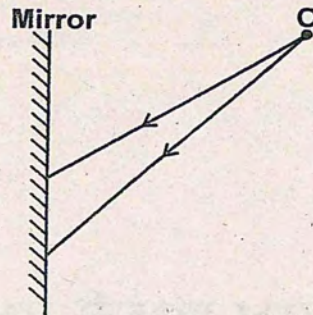
Candidates should check the question paper to ensure that all the printed pages are printed as indicated and no questions are missing.

SECTION A (25 marks)

Answer ALL questions in this paper

- 1.a) Figure 1 shows two rays from a point object, O, incident on the surface of a plane mirror.

Fig 1

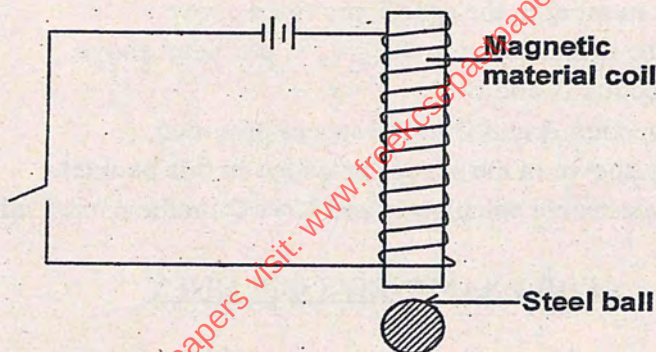


Complete the diagram show the path of the rays and the position of the image, I. (2 marks)

- b) A white paper is a good reflector of light but does not form an image like a mirror. Explain this observation. (1 mark)

2. The set in figure 2 below can be used in a laboratory for lifting and releasing a steel ball.

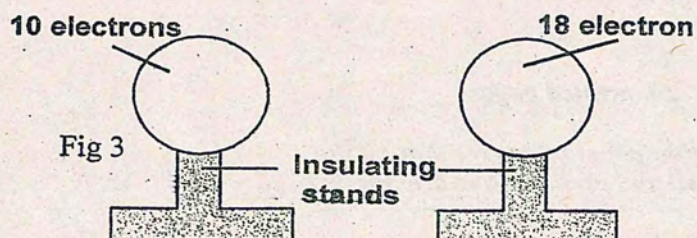
Fig 2



- i) State the material which is suitable for use in the core. (1 mark)

- ii) If slightly a larger ball is to be lifted, it is necessary to make an electromagnet stronger. State one way of increasing the strength of the electromagnet formed. (1 mark)

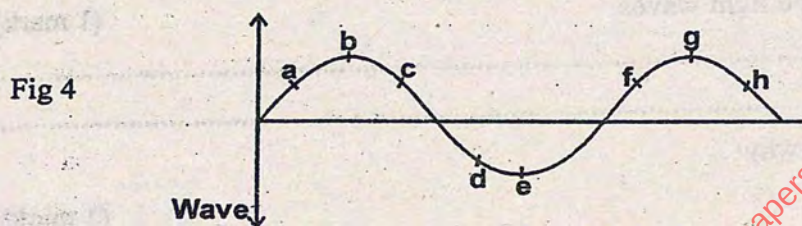
3. The two conducting balls shown in figure 3 below are identical and contain the number of excess electrons indicated. The two balls are made to touch. Calculate the charge in coulombs, each will have (given $e = 1.6 \times 10^{-19} \text{ C}$) (2 marks)



4. A swimmer sees a fish to be a depth of 4m below the surface of a pond. Determine how far below the surface of the pond the fish actual is. The refractive index of water is 1.33. (2 marks)

5. The count rate of a radioactive indium falls from 3200 counts per minute to 200 counts per minutes in 220 minutes. Determine the half-life of the radioactive isotope. (3 marks)

6. Figure 4 below shows the profile of a transverse.



Identify two sets of points other than b and g that are a wavelength apart.

(1 mark)

7. The following diagnostic observation was made in Murang'a level 4 hospital, on a patient eye: the eye ball was too small. State the eye defect in this case and its remedy. (2 marks)

8. The work function of a certain metal is 2.8 eV. Determine its threshold wavelength. ($h = 6.63 \times 10^{-34} \text{ Js}$ and $e = 1.6 \times 10^{-19} \text{ C}$) (3 marks)

9. Figure 5 shows an aluminium ring placed between the poles of magnet.

Fig 5



Sketch the magnetic field pattern.

(1 mark)

10. The figure 6 below shows metal rods P and Q placed inside a solenoid connected to a D.C. supply.

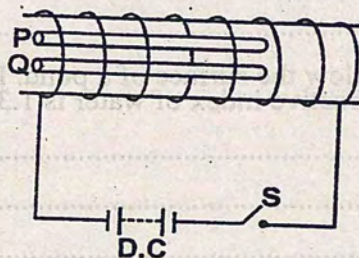


Fig 6

- State what would be observed when the switch S is closed. (1 mark)
 - Explain your observation in (a) above. (1 mark)
11. State one difference between sound and light waves. (1 mark)
12. In modern x-ray tube, state the reason why:
- there is high vacuum in the tube. (1 mark)
 - Cooling fins are provided. (1 mark)

SECTION B (55 MARKS)

- 13.a) A girl positioned at R attempts to see the sticks A to C on the other side of a wall with help of a plane mirror fixed on the opposite side as shown in figure 7 below.

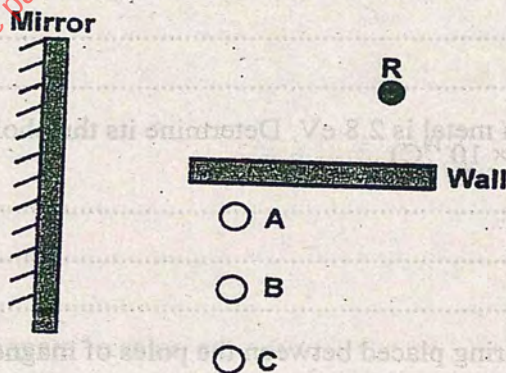


Fig 7

- With the help of a ray diagram, find which stick images cannot be seen while the girl is at R. (2 marks)

- b) A student performed an experiment to measure the focal length of a converging lens. In the experiment, a series of object and image distance (u and v) were obtained and then a graph of uv against $u + v$ was drawn as shown.

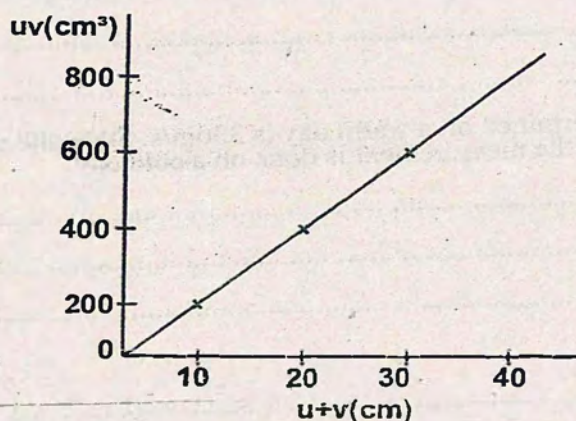


Fig 8

- i) from the graph, obtain the value for this focal length. (3 marks)

- ii) determine the magnification when the image distance is 40cm. (2 marks)

- 14.a) i) State Snell's law. (1 mark)

- ii) The critical angle for crown glass is 42° . Using this information complete the figure below to show the passage of the ray shown through the glass block. (1 mark)



Fig 9

- b) A person standing behind a wall hears a bell ringing although he cannot see the bell. State the property of sound that enables him to hear the sound. (1 mark)
- c) The figure 10 below is a sketch of ripples caused by a vibrator in a ripple tank whose frequency is 50Hz.

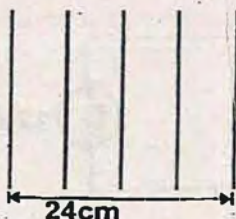


Fig 10

Using the above information, determine the speed of the wave motion.

(2 marks)

.....

.....

.....

- d) The speed of sound in air determined on a warm day is 330m/s. State and explain any difference you would expect in the results if the measurement is done on a cold day. (2 marks)

.....

.....

.....

- e) State one use of microwaves.

(1 mark)

.....

- 15.a) State Faraday's law of electromagnetic induction.

(1 mark)

.....

- b) The diagram below shows a simple generator.

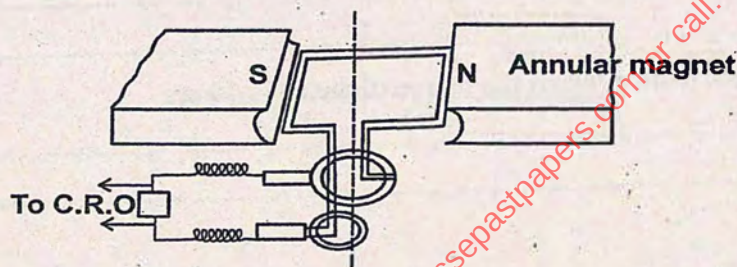


Fig 11

- i) Name the type of generator.

(1 mark)

- ii) On the axes below, sketch the graph of the output voltage for two cycles if a CRO is connected as shown. (1 mark)

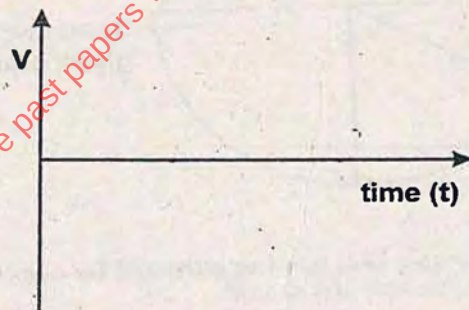


Fig 12

-) The figure 13 below shows a transformer which is 90% efficient

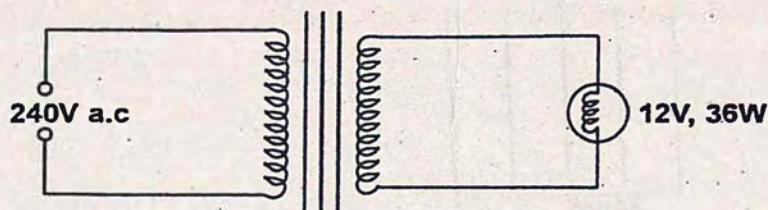


Fig 13

- i) Determine the number of turns in secondary coil if the number of turns in the primary coil is 4000. (2 marks)

- ii) Determine the current in the primary coil if the bulb is operating normally. (2 marks)

- d) Explain why long distance power transmission is done at a very high voltage. (1 mark)

- e) The power company supplies electrical energy and charges the consumption to ordinary domestic consumers as follows.

A monthly fixed charge of Ksh 75;

Kshs. 1.55 per unit for the first 50 units consumed.

Kshs 6.55 per unit for the next 51 - 30 units.

1 unit = 1 kilowatt -hour (Kwh)

A consumer uses 1.98×10^5 kJ of electrical energy in a given month. Determine the total month's bill. (3 marks)

16. a) The figure 14 below shows the main components of a cathode ray tube. Use it to answer the questions that follow.

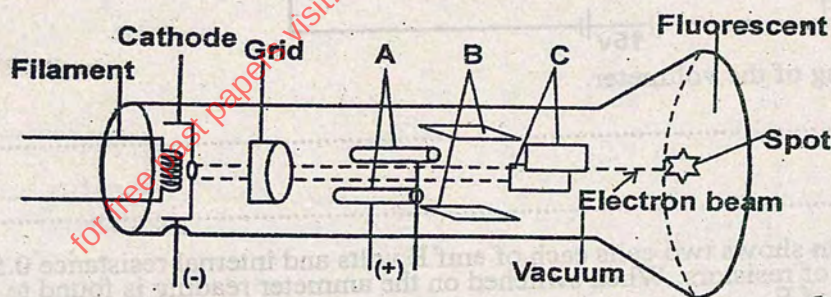


Fig 14

- i) Name the parts labelled. (3 marks)

A

B

C

- ii) Explain how the electrons are produced in the tube. (2 marks)

iii) State and explain the function of the grid.

(2 marks)

- b) The figure 15 below shows the trace on the screen of an a.c. signal connected to the y-plates of a CRO with time base on. Given that the time base control is 100ms/div and the y-gain is at 120V/div , determine.

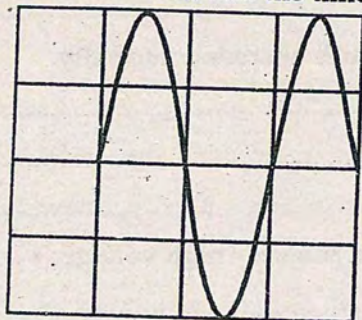


Fig 15

- i) The frequency of the a.c. signal.

(2 marks)

- ii) The peak voltage of the input signal.

(2 marks)

- 17.a) i) Figure 16 shows four identical light bulbs connected to a 15V battery whose internal resistance is negligible.

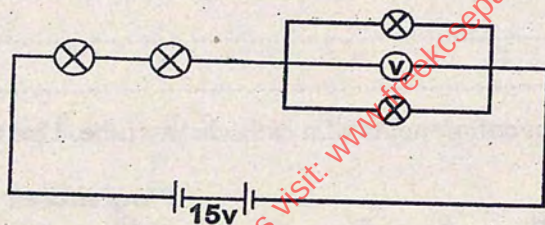


Fig 16

Determine the reading of the voltmeter.

(2 marks)

- ii) The circuit diagram shows two cells each of emf E volts and internal resistance 0.5Ω supplying a current to a network of resistors. When switched on the ammeter reading is found to be 0.2A . Determine the value of E .

(2 marks)

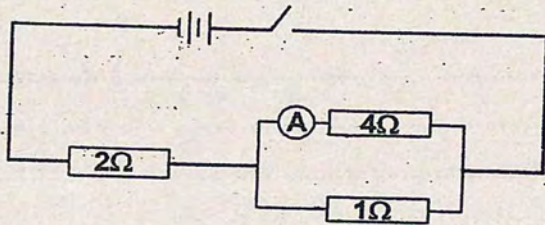


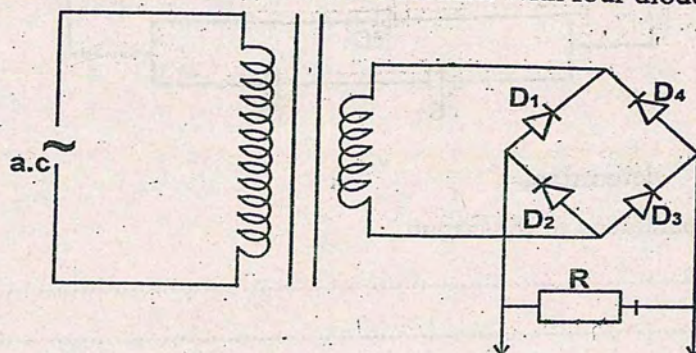
Fig 17

- i) Define the term 'donor atom' as applied in semi-conductors.

(1 mark)

- ii) The figure below shows a circuit for a full wave rectifier with four diodes, D_1 , D_2 , D_3 and D_4

Fig 18



Explain how the circuit work to produce a rectified alternating current. (a.c) (2 marks)

.....

.....

.....

- 18.a) A piece of red-hot charcoal is brought close to the cap of negatively charged electroscope, using tweezers. Explain what is observed. (2 marks)

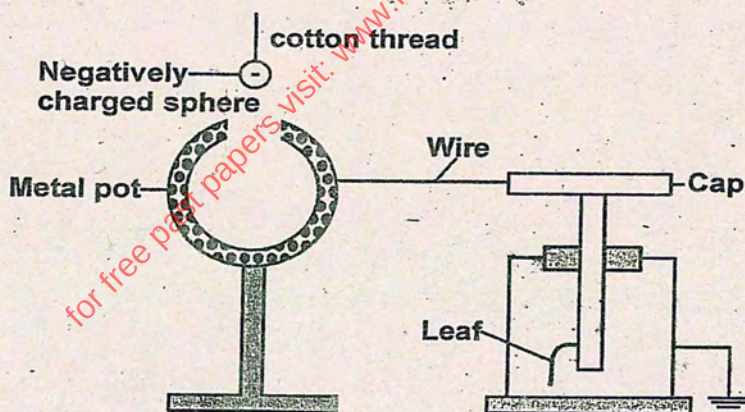
.....

.....

.....

- b) Figure 19 shows a small negatively charged sphere hanging above a hollow uncharged metal pot supported by an insulating stand and connected by a wire to uncharged lead electroscope.

Fig 19



- i) The sphere is lowered into the pot so that it is suspended inside without touching the pot. State and explain what happens to the leaf. (2 marks)

.....

.....

.....

- ii) The earth is connected to the pot while the sphere is inside the pot. Now what happens to the leaf? Explain your answer. (1 mark)

.....

.....