



MANGU HIGH SCHOOL

NAME: CLASS:

ADM NO. INDEX NO.

232/2
PHYSICS
PAPER 2
JULY 2015

Instructions to candidates

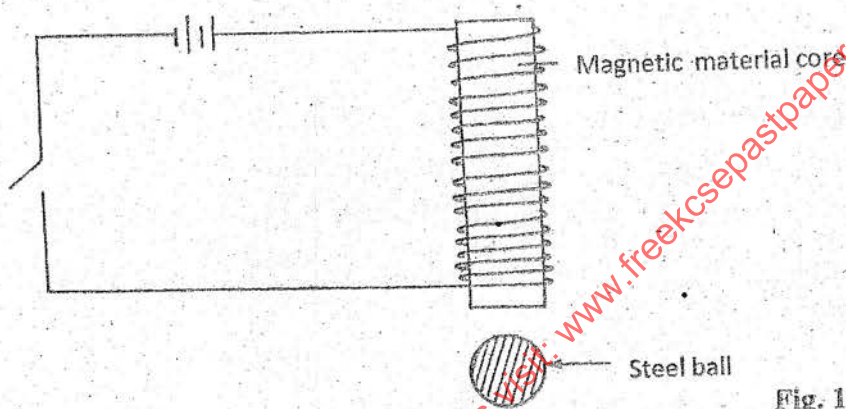
- This paper consists of two sections A and B.
- Answer **ALL** the questions in the two sections in the spaces provided after each question.
- All working **MUST** be clearly shown.
- Electronic calculators and mathematical tables may be used.
- This paper consists of **12** printed pages.

EXAMINER'S USE ONLY

SECTION	QUESTION	MAX MARKS	CANDIDATE'S SCORE
A	1 - 12	25	
B	13	10	
	14	7	
	15	9	
	16	13	
	17	16	
TOTAL		80	

SECTION A (25 MARKS)

1. A white paper is a good reflector of light but does not form an image like a mirror.
Explain this observation. (1 mk)
2. The set up in figure 1 below can be used in a laboratory for lifting and releasing a steel ball.



- (i) State the material which is suitable for use in the core. (1mk)
 - (ii) If a slightly larger ball is to be lifted, it is necessary to make an electromagnet stronger. State one other way of increasing the strength of the magnet. (1 mk)
3. The two conducting balls shown in figure 2 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. ($e = 1.6 \times 10^{-19} \text{ C}$) (3 mks)

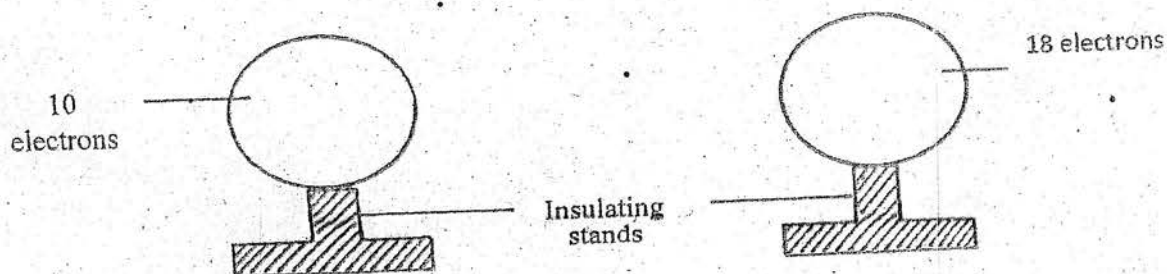


Fig. 2

4. The count rate of a radioactive isotope falls from 3200 counts per minute to 200 counts per minute in 220 minutes. Determine the half-life of the radioactive isotope (2 mks)

5. Figure 3 below shows the profile of a transverse wave

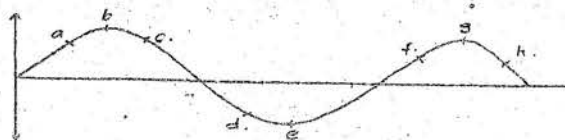


Fig 3

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

(1 mk)

6. The diagram below, figure 4 shows a coin placed at the bottom of a tank so that it is beyond the view of the eye

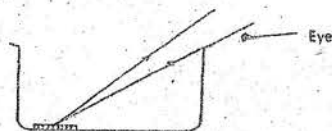


Fig 4

Sketch the rays to show how the coin can be brought into view when water is added into the tank to a suitable level

(2 mks)

7. Figure 5 below shows a ray of light being incident on a mirror. Find the angle of reflection (1 mk)

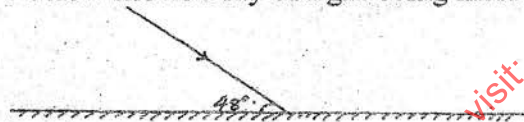


Fig 5

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

(3 mks)

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

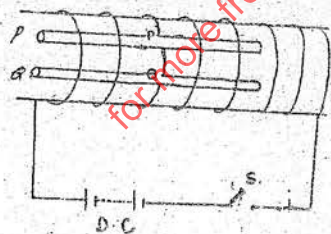


Fig 7

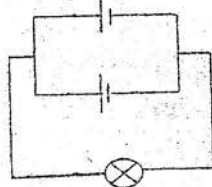
- b) State what would be observed when the switch S is closed

(1 mk)

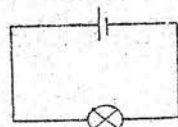
- c) Explain your observation in (a) above

(2 mks)

10. In the circuit diagram shown in figure 7, the lamps are identical and also the cells are identical



(a)



(b)

Fig 7

State with reason, in which circuit the lamp will be lit for a longer period

(2 mks)

11. In modern x-ray tube, state the reason why:

(1 mk)

b) there a high vacuum in the tube

(1 mk)

c) Cooling fins are provided

12. Figure 8 below shows an object placed some distance from a biconcave lens

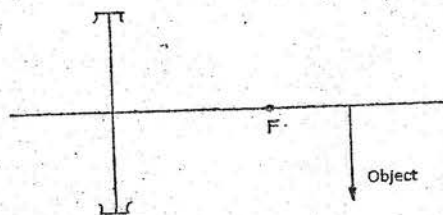


Fig 8

Construct the image on the diagram

(3 mks)

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 the help of a plane mirror fixed on the opposite side as shown in figure 9 below

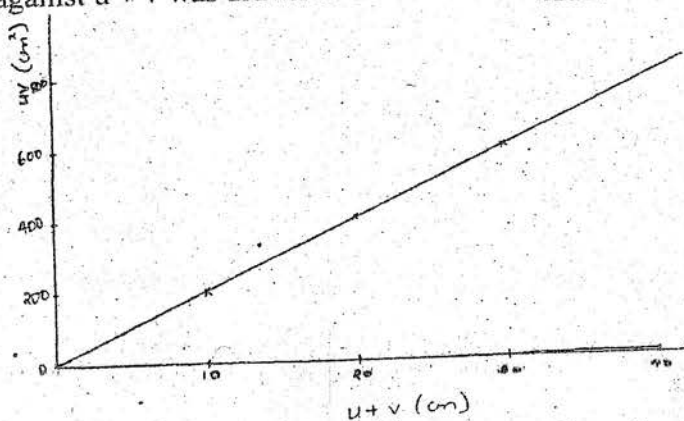


Fig 9

With the help of a ray diagram, find which sticks images cannot be seen while the girl is at R

(3 mks)

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



i) From the graph, obtain the value for this focal length

(3 mks)

ii) Determine the magnification when the image distance is 40cm

(2 mks)

c) i) State Snell's law

(1 mk)

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 mk)

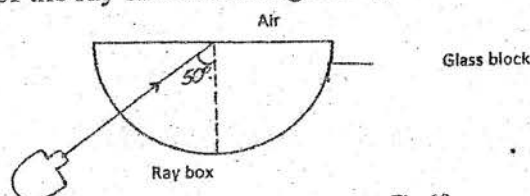


Fig. 10

14. a) 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 mk)

b) The figure 11 below is a sketch of ripples caused by a vibrator in a ripple tank whose frequency is 50Hz

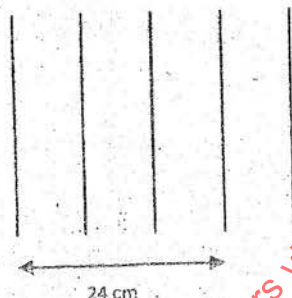


Fig 11

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

(3 mks)

c) 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 mks)

d) State one use of microwaves

(1 mk)

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

(1 mk)

b) The diagram below shows a simple generator

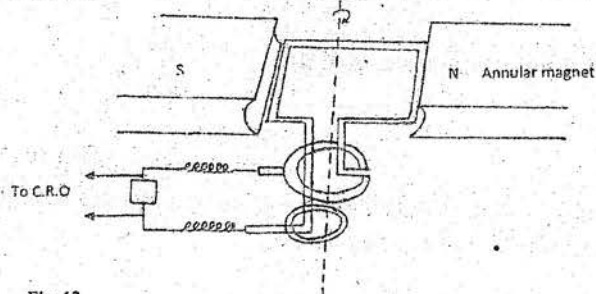
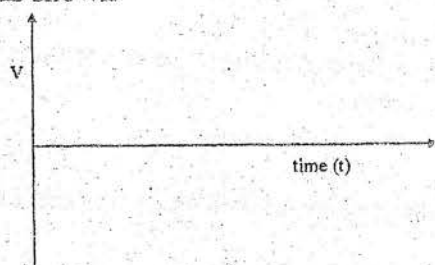


Fig. 12

- i) Name the type of generator (1 mk)
- ii) On the axes below, sketch the graph of the output voltage for two cycles if a C.R.O is connected as shown (1 mk)



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

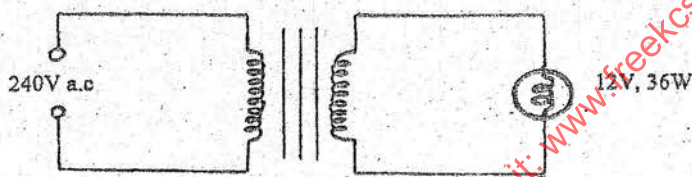


Fig 13

- i) Determine the number of turns in secondary coil if the number of turns in the primary coil is 4000 (2 mks)
- ii) Determine the current in the primary coil if the bulb is operating normally (3 mks)
- d) Explain why long distance power transmission is done at a very high voltage (1 mk)

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

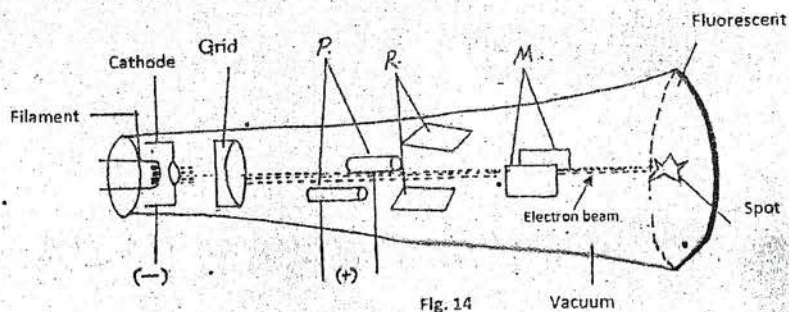


Fig. 14

i) Name the parts labelled

P

R

M

ii) Explain how the electrons are produced in the tube

(2 mks)

iii) State and explain the function of the grid

(2 mks)

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

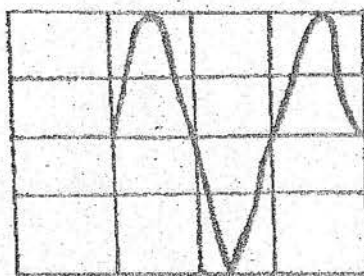


Fig 15

ii) The frequency of the a.c signal

(3 mks)

iii) The peak voltage of the input signal

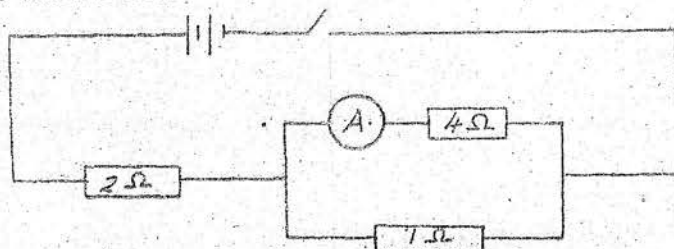
(3 mks)

17. a) i) State Ohm's law

(1 mk)

ii) The circuit diagram shows two cells each of e.m.f 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

(4 mks)

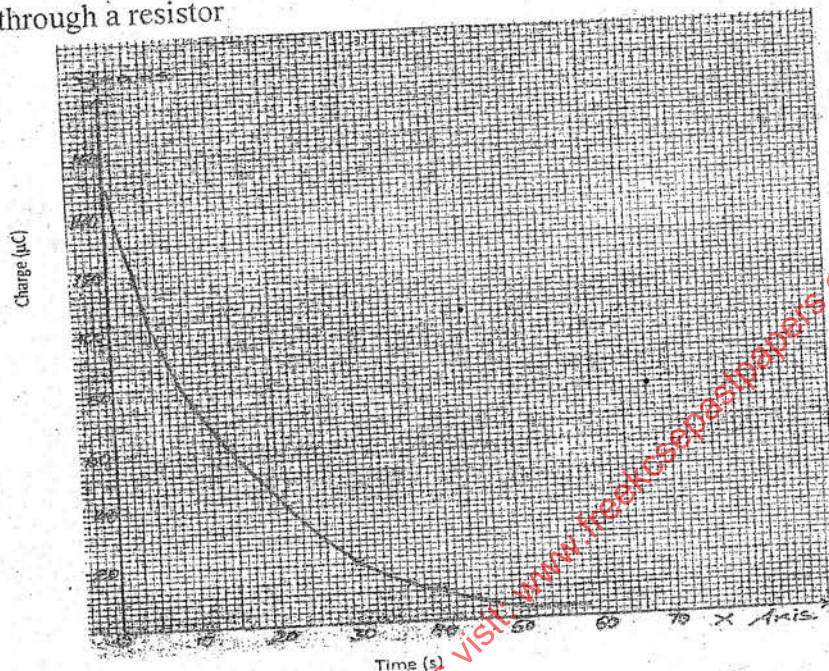


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- b) A piece of red-hot charcoal is brought close to the cap of a negatively charged electroscope, using tweezers. Explain what is observed (3 mks)

- c) The graph below shows the variation of charge and time when the capacitor is being discharged through a resistor



- d) From the graph, determine

- i) The quantity of charge at $t = 34$ seconds (1 mk)

- ii) The amount of current flowing when the time is 20 seconds (3 mks)

- iii) The initial charge (1 mk)

- 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

Ksh. 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 mks)