

NAME: INDEX NO:

SIGNATURE: DATE :

SCHOOL:.....

232 / 2
PHYSICS
PAPER 2
THEORY
JULY / AUGUST 2013
TIME: 2 HOURS

NANDI CENTRAL DISTRICT JOINT MOCK 2013

Kenya Certificate of Secondary Education (KCSE)
PHYSICS
PAPER 2
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

- (a) Write your Name and Index Number in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided above.
- (c) This paper consists two sections A and B.
- (d) Answer all questions in Section A and B in the spaces provided below all questions.
- (e) All working **MUST** be clearly shown.
- (f) Non-programmable silent electronic calculators and KNEC Mathematical tables may be used.

Take $g = 10\text{Nkg}^{-1}$

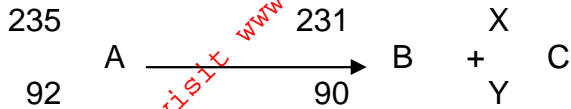
FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAX. SCORE	CANDIDATE SCORE
A	1 - 12	25	
B	13	09	
	14	13	
	15	10	
	16	12	
	17	11	
TOTAL SCORE		80	

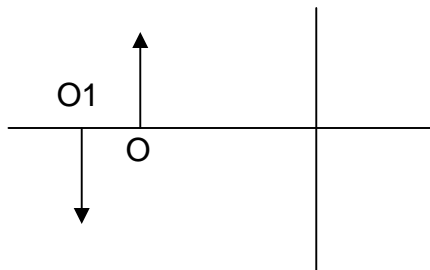
SECTION A (25 MARKS)

Answer ALL questions in this section in the spaces provided

1. The experiment below is an equation for a radioactive element A. Elements B and C are the daughter nuclides. A, B and C are not the actual symbols of any of the elements.

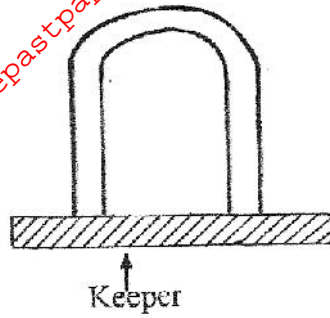


- (a) Identify the element C. (1mk)
- (b) State **two** of its characteristics. (2mk)
2. (i) State the characteristics of images formed by a pinhole camera. (2mks)
- (ii) What is the effects on the image when the camera is elongated? (1mk)
3. The figure below shows the object O and its image O1 formed by a concave mirror. Locate the position of the principle focus. (2mks)



4. An electromagnet is made by winding insulated copper wire on an iron core. State **three** changes that could be made to increase the strength of the electromagnet. (3mks)

5. Figure below shows a U-shaped magnet stored with a keeper.



Explain how this method helps to retain magnetism longer.

(2mks)

6. State the energy transformation when fast moving electrons are suddenly stopped by a target in an x-ray tube. (1mk)

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

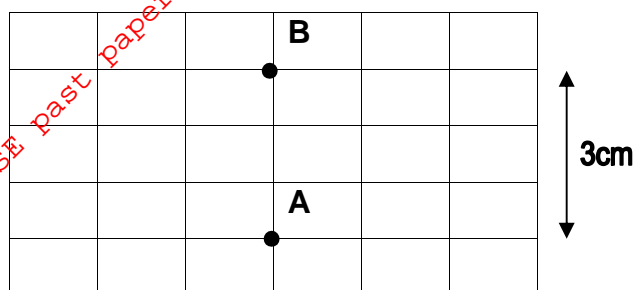
8. Give a reason why it is not advisable to smoke a cigarette near a charging battery. (1mk)

9. State the dynamo rule. (1mk)

10. Radio X is broadcast on wavelength 150m at a frequency of 200KHz. Calculate the velocity of the radio waves. (2mks)

11. Draw a diagram to illustrate the correction of myopia. (1mk)

12. The figure below shows the displacement of a spot on a cathode ray oscilloscope screen.



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 20V/cm.

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

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

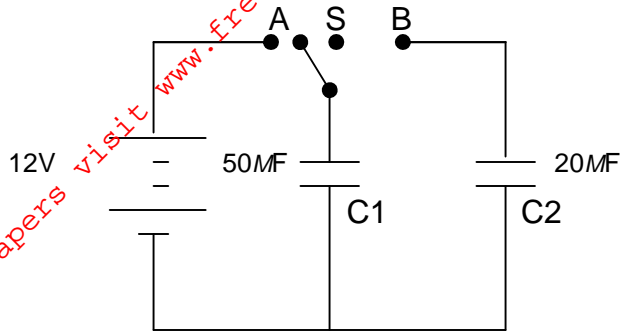
SECTION B (55 MARKS)

Answer ALL questions in this section in the spaces provided

13. (a) (i) State the basic law of electrostatics. (1mk)

(ii) In testing for the sign of charge on a body, explain the behaviour of a positively charged electroscope when charged bodies are brought closer to the electroscope. (2mks)

- (b) The figure below shows an arrangement which may be used to charge a capacitor of capacitance 50MF and then to connect it to a capacitor of capacitance 20MF .

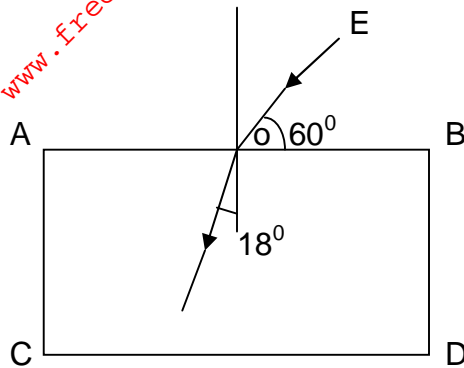


- (i) The switch S is first placed at position A, so that the capacitor C, is connected to the 12V dc supply. Calculate the charge stored in the capacitor. (3mks)

- (ii) The switch S is now changed to position B. Calculate the final potential difference across the capacitors. (3mks)

14.(a) State the conditions to be satisfied for total internal reflection to occur. (2mks)

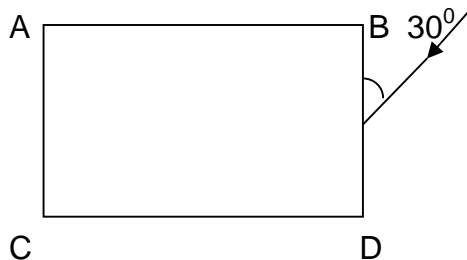
- (b) A ray of light traveling in the direction EO in air enters a rectangular block at an angle of incidence 30° . The resulting angle of refraction is 18° .



Find:-

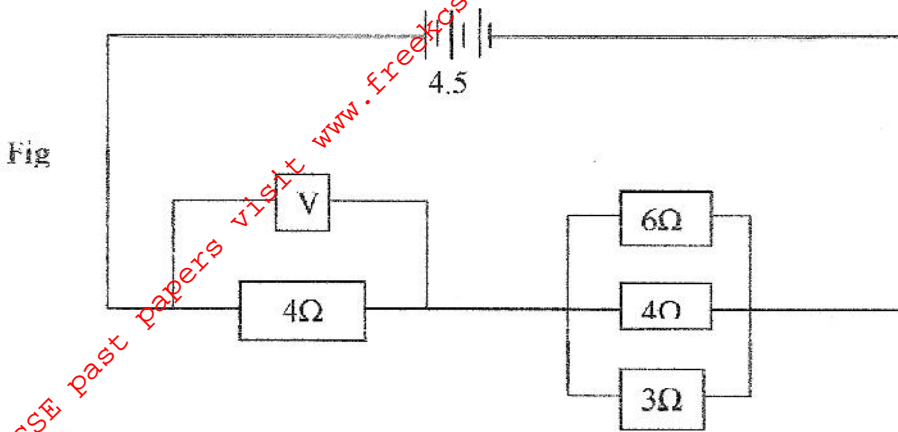
- (i) The refractive index of the block. (2mks)
- (ii) The critical angle C of the block. (3mks)

- (c) If the ray is incident on surface BD, as shown in the figure.



- (i) Complete the diagram to show the path of light through and out of the block. (2mks)
- (ii) At what angle will the ray leave the block? (4mks)

15. (a) Study the circuit diagram below and answer the questions that follow.



(i) Calculate the effective resistance of the circuit.

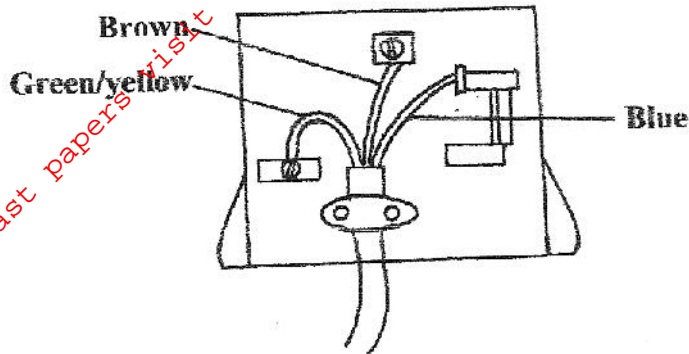
(3mks)

(ii) Find the voltmeter reading.

(3mks)

(b) A cell drives a current of 3.2A through a 2.8 Ω resistor. When it is connected to 1.6 Ω resistor, the current that flows is 5A. Find the E.m.f. (E) and internal resistance of the cell. (4mks)

16.(a) The figure below shows a connection to the three pin plug.



(i) Identify the mistakes in this wiring. (3mks)

(ii) What would happen if this plug was connected to the mains of the socket? (1mk)

(iii) State **two** reasons why the earth pin is normally longer than the other two pins. (2mks)

(b) A house has five rooms with 240V, 60W bulbs. If the bulbs are switched on from 7.00p.m. to 10.30p.m.

(i) Calculate the power consumed per day in Kilowatt-hours. (3mks)

(ii) Find the cost per week for lighting these rooms at Kshs. 6.70 per unit. (3mks)

17. (a) The diagram below shows part of the electromagnetic spectrum.



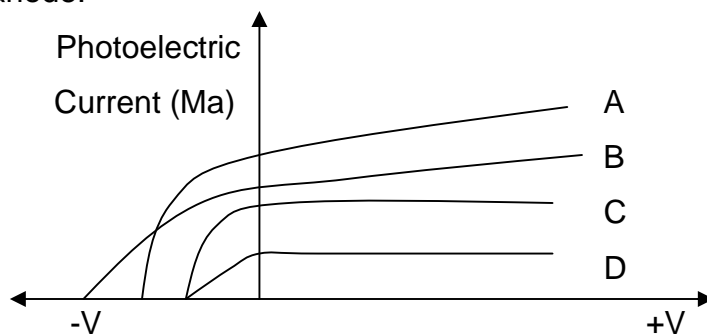
Increasing wave length

Radiation of frequency corresponding to each of the above regions is allowed to strike a metal plate and in some case electrons were ejected from the metal.

(i) From which of the above regions is Radiation most likely to eject electrons from a metal plate? (1mk)

(ii) Give a reason for your answer in (i) above. (1mk)

(b) A photoelectron cell consists of a conducting plate (cathode) coated with photo emissive material and an anode were used in an experiment to study photoelectric current and the potential difference V between the cathode and anode.



(i) In what ways do curves ACD differ from B? (1mk)

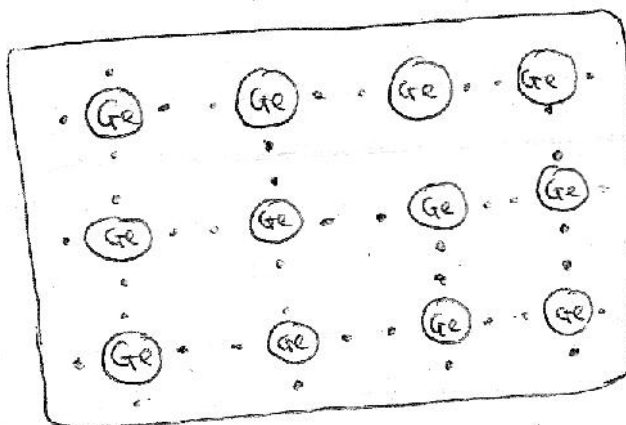
(ii) Explain the cause of difference in (i) above. (1mk)

(c) Light of frequency $8.05 \times 10^{14} \text{ Hz}$, can eject electrons with a kinetic energy of $4.5 \times 10^{-18} \text{ J}$ from the metal surface. Determine the energy required just to release electrons from the metal (give your answer in eV) (3mks)

(Planck's constant = $6.63 \times 10^{-34} \text{ Js}$)

($1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$)

(d) The structure of germanium crystal may be represented by the diagram in the figure shown below.



(i) How many valence electrons has each germanium atom? (1mk)

(ii) State and explain the conditions under which pure germanium behaves as an insulator. (2mks)

(iii) How can the conductivity of germanium be increased? (1mk)