

Signature _____ Date _____

232/2
PHYSICS
PAPER 2
(Theory)
JULY/AUGUST 2009
2 HOURS

THE BARINGO - KOIBATEX DISTRICT
EDUCATIONAL IMPROVEMENT EXAMINATIONS

Kenya Certificate of secondary Education
232/2
Physics
Paper 2
(Theory)
July/August – 2009
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SECTION A (25 MARKS)

1. Pinhole camera forms an image of size 5 cm. The object is 2.5m tall and 5m away from the camera.
Calculate the length of the pinhole camera. (3 marks)

2. The figure below shows a progressive water wave crossing from a shallow to a deep end

Show how the waves proceed in the deep region (2 marks)

3. What are the main charge carriers in
- (i) A n – type semi- conductor (2 marks)

 - (ii) A – P – type semi conductor
4. A radioactive atom $^{226}_{88}\text{X}$ undergoes alpha decay, associated with further gamma – radiation down the nuclear reaction describing this process in the daughter atom is Y (3 marks)
5. (a) What is the use of the grid in the electron gun of a cathode ray tube (2 marks)
- (b) Define capacitance of a capacitor (1 mark)
6. The frequency of the heart beat of a person is measured with a CRO, when the time base is 500 m. Calculate the heartbeat per minute. If the minute wavelength measured from the screen is 1.7 cm (3 marks)
7. Polarization and local action are two common defects in a simple cell. How are these defects minimized in the cell? (2 marks)

8. In the diagram below a U-shaped iron core is to be magnetized electrically using a low d.c power supply.

Show the windings on the core so as to make both X and Y S- poles
(2 marks)

9. The diagram below shows the path taken by three radiations X, Y, and Z from a radioactive sources, through an electric field

10. The figure below shows a point object in front of a plain mirror. Explain with an aid of a ray diagram, how that image of a point object O is seen by the eye
(2 marks)

SECTION B: (55 MARKS)

11. (a) Ultraviolet, gamma rays, radio waves, infrared are parts of the electromagnetic spectrum

(i) Which one is emitted by the nucleus of an atom (1 mark)

(ii) Arrange them in the order of increasing frequency (2 marks)

(b) An aircraft A is flying at a constant speed of 270m/s at a constant height of 8100m above the surface of the earth. The aircraft directs a radar beam of wave length 12 cm to a target T on the earth's surface. After 90 μ S an echo from the target is detected on the air craft. If the frequency of the radar was $\times 10^{10}$ HZ,

Find;

(i). The speed of radar waves (1 mark)

(ii) The distance AT between the air craft and target (2 marks)

(iii) The time which elapses before A is vertically above T.
(μ S= 1.0×10^{-6} S) (3 marks)

(c) Your radio is turned into a radio station 144km away

(i) How long does it take the signal to reach the receiver (2 marks)

- (ii) If the signal has a frequency of 980KHz, how many wavelengths is the station away from your receiver (2 marks)

12. (a) Three capacitors of capacitance $3\ \mu\text{F}$, $4\ \mu\text{F}$ and $6\ \mu\text{F}$ are connected to a potential difference of 24V as shown below

Find;

- (i) The total capacitance (2 marks)

- (ii) The total charge (2 marks)

- (iii) The charge on each capacitor (1 mark)

- (iv) The voltage across the $4\ \mu\text{F}$ capacitor (2 marks)

- (b) (i) Calculate the time for an electric immersion heater rated 240V, 3KW to raise the temperature of 50 litres of water in a copper tank of mass 20 kg from 20°C to 75°C.
[Specific heat capacities of water 4200J (kgk)⁻¹, copper is 390J (kgK)⁻¹]
(3 marks)

- (ii) The heater is used once a day for one week. If it costs shs 1.50 per Kwh. Calculate the cost of running it for this one week
(2 marks)

13. (a) In the circuit shown in the figure below a cell of e.m.f 6v drives a current of 2.0 through a resistor R, when switch S is open

Calculate

- (i) The current through the 2 Ω resistor (2 marks)

- (ii) The internal resistance of the cell (3 marks)

- (iii) The current through each resistor, when the switch S is closed (3 marks)
- (b) A ray of light is incident on the face AB of a glass prism ABC of refractive index 1.50 as shown in the diagram below
- (i) What is the angle of incidence at the surface BC of the prism? (2 marks)
- (ii) Complete the diagram to show the path of light at the surface BC (3 marks)
14. In an experiment to determine the kinetic energy of the emitted electrons by photoelectric effect, the following graph was obtained

Use the graph to determine;

(a) The threshold frequency (1 marks)

(b) The Planck's constant (3 marks)

(c) The work function of the metal in electron- volt (ev) (2 marks)

15 (a) The diagram below shows the magnetization of two bars A and B. A is a steel bar and B is a soft iron bar

(i) Name the method of magnetization (1 mark)

(ii) On the axes below sketch the variation of magnetic strength against force for bars A and B

(b) The figure below shows the essential components of an X – ray tube

(i) Why is a step – up transformer used (1 mark)

(ii) Name the most suitable material for the anode giving a reason for your choice
(2 marks)

(iii) Why is the cathode concave shaped (1 mark

(iv) What changes occur on the X – rays produces when;

(i) R_2 is increased (2 marks)

(ii) R_2 is reduced (2 marks)