

232/2
PHYSICS
PAPER 2
JULY / AUGUST 2010
2 HOURS

FORM FOUR MID YEAR CONTINUOUS ASSESSMENT TEST 2010
Kenya Certificate of Secondary Education
PHYSICS
PAPER 2
2 HOURS

INSTRUCTIONS TO CANDIDATES

- (a) This paper consists of TWO sections A and B.
- (b) Answer ALL the questions in sections A and B in the spaces provided.
- (c) All working MUST be clearly shown
- (d) Mathematical tables and calculators may be used.

FOR EXAMINER’S USE ONLY

SECTION	QUESTION	MARKS	CANDIDATE'S SCORE
	TOTAL		

This paper consists of 12 printed pages

Turn Over

SECTION A (25 MARKS)

Answer all the questions in the spaces provided.

1. State two advantages and one disadvantage of alkaline cells over lead acid accumulator. (3 marks)

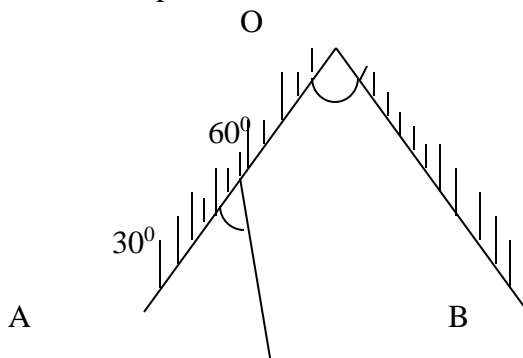
2. The figure 1 below shows a diagram of an insulated copper wire wound on an iron rod. The wire is connected to a battery. Name the polarity marked X. (1 mark)

Fig. 1 X

3. A boy scout wanted to light up his match stick using a curved mirror. State the type of mirror he should use and explain how? (3 marks)

4. The figure 2 below shows two plane mirrors inclined at 60° to one another

Fig 2



Draw the path of the ray after reflection on mirror OA and OB. (2 marks)

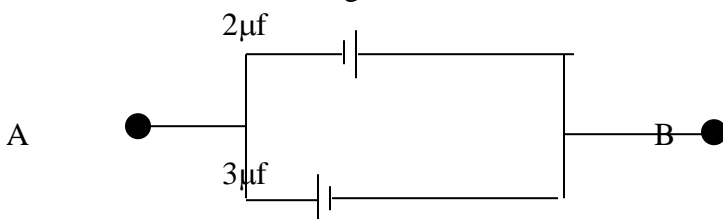
5. Describe how you would identify a material as a conductor or insulator using a charged electroscope. (2 marks)

6. A pinhole camera forms an image of size 10cm. The object is 5m tall and 20m away from the pinhole. Find the length of the pinhole camera. (3 marks)

7. A pulse of sound is sent from sea surface to the seabed and its echo received after 0.8 seconds. Calculate the depth of sea given that velocity of sound in sea water is 1500m/s. (3marks)

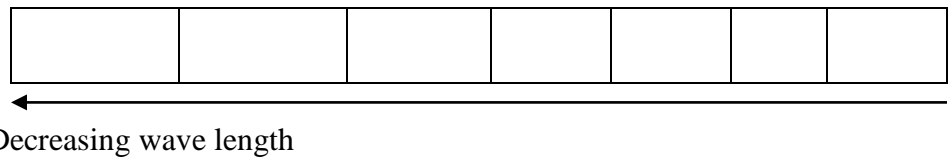
8. The figure 3 is a part of a circuit containing two capacitor of $2\mu\text{f}$ and $3\mu\text{f}$, determine the potential difference across AB given that the total charge in the capacitors is 1×10^{-4} coulombs. (3 marks)

Fig 3



9. The figure 4 shows regions of the electromagnetic spectrum. D is the region of visible light

10.



Indicate the region for the following . (2 marks)

(i) X - rays _____

(ii) Ultraviolet _____

10. The figure 5 shows a human eye with a certain defect.
Fig 5

(i) Name the defect _____ (1 mark)

(ii) On the same diagram sketch the appropriate lens to correct the defect and sketch rays to show the effect of the lens. (2 marks)

SECTION II (55 MARKS)

Answer all the questions

11. (a) State the difference between longitudinal and transverse waves. (2 marks)

(b) The figure 6 shows a transverse wave traveling along the horizontal axis

Fig 6 2 1 0 -1 -2 1 2 3 4 5 6 7 8 A Y(cm) X(cm)

Determine

(I) Wavelength of the wave in metres.

(2 marks)

(II) Amplitude of the wave.

(1 mark)

(III) If the time taken by the wave to move from O to A is 0.02 seconds

Determine

(i) Frequency of the wave.

(3 marks)

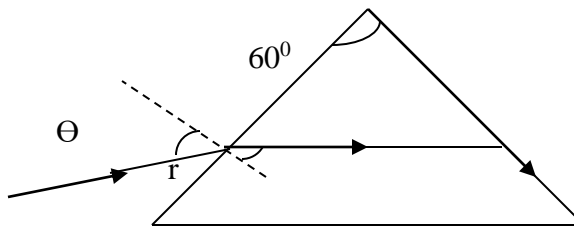
(ii) Speed of the wave.

(2 marks)

(c) If the frequency of a wave is doubled. State what happens to the energy of the wave if the amplitude remains constant.

(1 mark)

12. The figure 7 shows path of ray of yellow light through a glass prism. The speed of yellow light in the prism is $1.88 \times 10^8 \text{ m/s}$.



(a) Determine the refractive index of the prism material for the light
(speed of light in vacuum = $3.0 \times 10^8 \text{ m/s}$)

(3 marks)

(b) (i) Show on the diagram the critical angle .

(1 mark)

(ii) Determine the value of the critical angle.

(3 marks)

(c) Given that $r = 21.2^\circ$, determine angle θ .

(4 marks)

(d) On the same figure, sketch the path of the light after striking the prism if the prism was replaced by another of similar shape but lower refractive index
(Use dotted line for your answer)

(2 marks)

13. The table below shows how the activity of a sample of iodine – 128 varies with time.

minutes)									
ty (disintegration /sec									

(a) On the grid provided below, plot a graph of activity against time.

(5 marks)

(b) From the graph, determine the half life of iodine – 128

(2 marks)

(c) How long would the activity of a sample if iodine – 128 take to drop from 1200 to 75 disintegrations per second?

(2 marks)

(d) (i) Explain what is meant by background radiation.

(1 mark)

(ii) State three possible sources of background radiation.

(2 marks)

14. (a) What is photoelectric effect.

(1 mark)

(b) The threshold wavelength of a photoemissive surface is $5.55 \times 10^8 \text{m}$

$$\text{Take } c = 3.0 \times 10^8 \text{m/s}$$

$$h = 6.6 \times 10^{-31} \text{J/s}$$

$$m_e = 9.1 \times 10^{-31} \text{kg}$$

Calculate

(i) Its threshold frequency.

(3 marks)

(ii) The work function in electron volt.

(3 marks)

(iii)

The maximum speed with which a photo electron is emitted if the frequency of radiation is $6.2 \times 10^{14} \text{HZ}$.

(4 marks)

15. (a) Explain how you can obtain an n-type extrinsic semiconductor. (1 mark)

(b) What do you understand by term full wave rectification of A.C ? (1 mark)

(c) The figure 8 shows a bridge rectifier

F D₃ D₂

(i) Describe how the illustrated rectifier works . (4 marks)

(ii) State the modification that can be made on the arrangement to improve the quality of the output. (1 mark)

(iii) Sketch on the axes below how the improved output is displayed on a C.R.O screen. (1 mark)



