NAME:.....

SCHOOL:.....

INDEX NO:.....

CANDIDATE'S SIGN:.....

DATE:.....

232/2
PHYSICS
PAPER 2
(THEORY)
JULY/AUGUST - 2014

TIME: 2 HOURS

MERU COUNTY JOINT EVALUATION EXAM - 2014

Kenya Certificate of Secondary Examination K.C.S.E

232/2
PHYSICS
PAPER 2
(THEORY)
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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 the working must be clearly show.
d) Non programmable silent electronic calculator and KNEC Mathematical tables may be used.

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1-12	25	
B	13	11	
	14	12	
	15	12	
	16	10	
	17	10	
TOTAL SCORE		80	

This paper consists of 12 printed pages.
Candidates must check to ascertain that all pages are printed as indicated and that no question(s) is/are missing.

SECTION A (25 Marks)

Answer ALL the questions in this section.

1. Figure 1 below shows two mirrors inclined at an angle of 70^0 to each other. A ray of light is incident on one of the mirrors as shown.

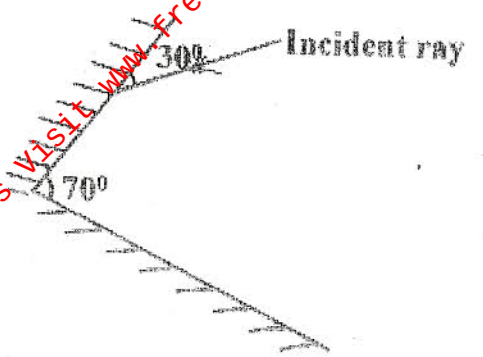

Fig. 1

(i) Sketch on the diagram the path of the ray until it leaves the 2nd mirror. (1mk)

(ii) Indicate the angle at each reflection. (2mks)

2. Figure below shows an uncharged pith ball under the attraction of a charged ball.

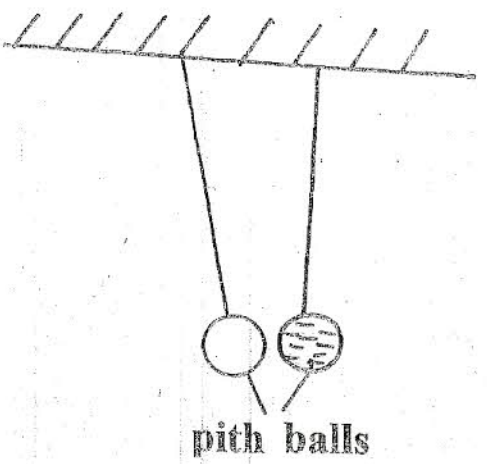

Figure 4

After the balls touch they are observed to repel. Explain. (1mk)

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3. An unmagnetised steel rod is clamped facing North-South direction and then hammered repeatedly for some time. When tested it is found to be magnetized. Explain this observation. (3mks)

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5. The circuit in figure 3 below has two switches P and Q. The brightness of the lamp is observed to be lower when P only is closed than when P and Q are both closed. Explain. (1mk)

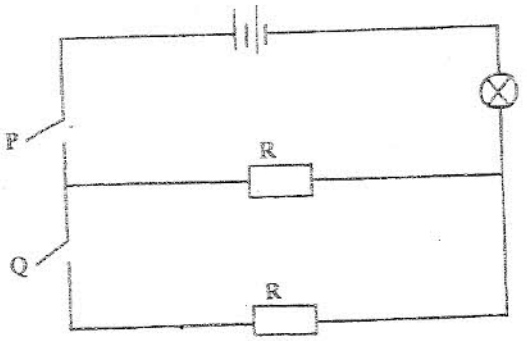

Fig. 3

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6. The speed of sound at the top of Mount Kenya is less than the speed of sound at Mombasa. Explain this observation assuming humidity of air at the two places is the same. (2mks)

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7. A heating coil is rated 100W, 240V. At what rate would it dissipate heat energy when connected to a 220V supply? (3mks)

8. Figure 4 below shows an image formed by convex mirror. On the same diagram draw the rays to locate the position of the object. (3mks)

Fig. 4

9. Mains electricity is transmitted as alternating current at very high voltage. Explain. (2mks)

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10. Figure 5 below shows three capacitors arranged as shown in the circuit below.

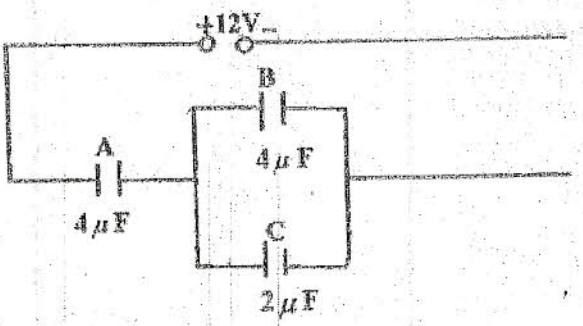

Fig. 5

Determine

(i) The combined capacitance of the three capacitors. (2mks)

(ii) The charge on capacitor A. (1mk)

11. (i) Figure 6 (a) below shows the trace seen on a CRO screen when both the time base and y-plate deflecting system are switched on. Sketch in the space alongside (Figure 6(b)) the trace seen on the CRO screen when the time base is switched off leaving the y-plate deflecting system on. (1mk)

Figure 6(a)

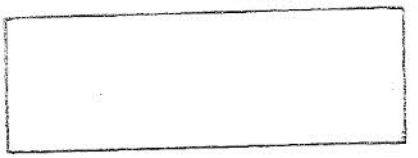

Figure 6(b)

(ii) Figure 7 below shows a beam of cathode rays passing through a magnetic field. Complete the diagram to show how the cathode ray beam is deflected. (1mk)

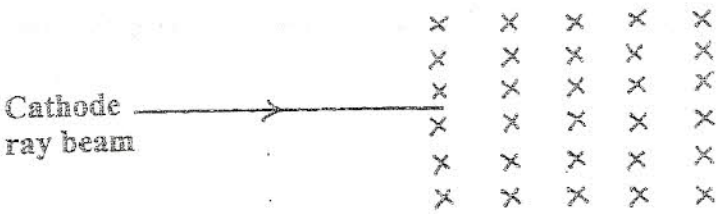

Fig. 7

12. An electromagnet is made by winding insulated copper wire on a straight soft iron core. State two changes that could be made to decrease the strength of the electromagnet. (2mks)

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13. (a) State Snell's law (1mk)

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(b) Figure 8 below shows an object O at the bottom of a beaker full of a liquid. An observer above the beaker sees its image at point I inside the liquid.

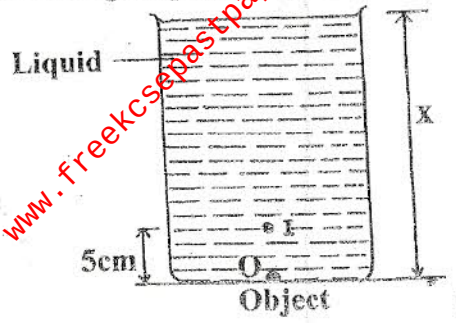

Fig. 8

Determine x if the refractive index of the liquid is 1.44 (3mks)

(c) Figure 9 below shows a narrow beam of light incident on glass prism.

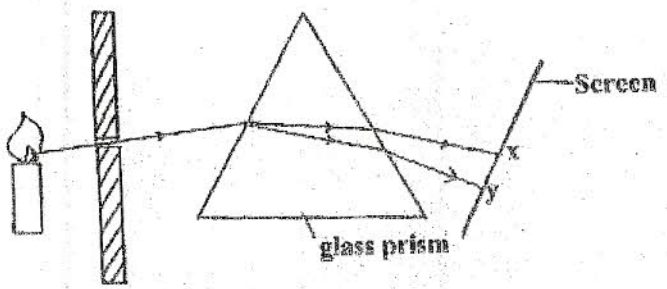

Fig. 9

(i) Name the colours at x and y. (2mks)

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(ii) Explain your answer in (i) above (2mks)

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(d) Figure 10 shows a human eye with a certain defect.

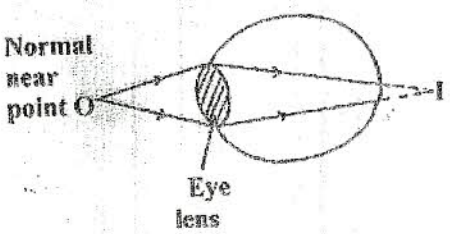

Fig. 10

(i) Name the defect. (1mk)

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(ii) On the same diagram draw rays to show how the defect may be corrected. (2mks)

14. (a) Define the term mutual induction. (1mk)

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(b) Figure 11 below shows two coils A and B placed close to each other. Coil A is connected to a d.c supply and a switch. B is connected to a sensitive galvanometer.

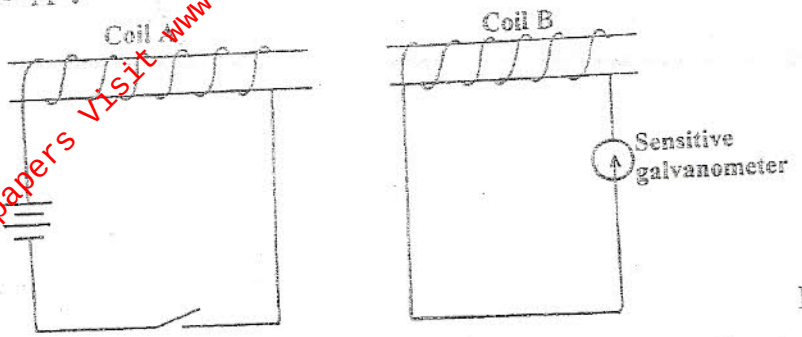

Fig. 11

(i) State and explain what is observed when the switch is closed. (2mks)

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(ii) State what is observed when the switch is opened. (1mk)

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(c) The primary coil of a transformer has 1000 turns and the secondary coil has 200 turns. The primary coil is connected to a 240V mains supply.

(i) Determine the secondary voltage (3mks)

(ii) Given that the current in the primary coil is 0.2A and in the secondary coil is 0.8A. Determine the efficiency of the transformer. (3mks)

(d) Figure 12 below shows part of the electromagnetic spectrum.

Radio waves	Q	Infrared	Visible light

Fig. 12

Name and state the use of the electromagnetic wave in the region labeled Q. (2mks)

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15 (a) A radioactive element has an initial count rate of 3200 counts per minute on a scaler. The count rate fails to 200 counts per minute in 4 hours.

(i) Calculate the half-life of the element. (3mks)

(ii) If the initial number of atoms in another sample of the same element is 4.0×10^{23}, how many atoms will have decayed in 20hrs? (2mks)

(b) Figure 13 below shows an expansion cloud chamber.

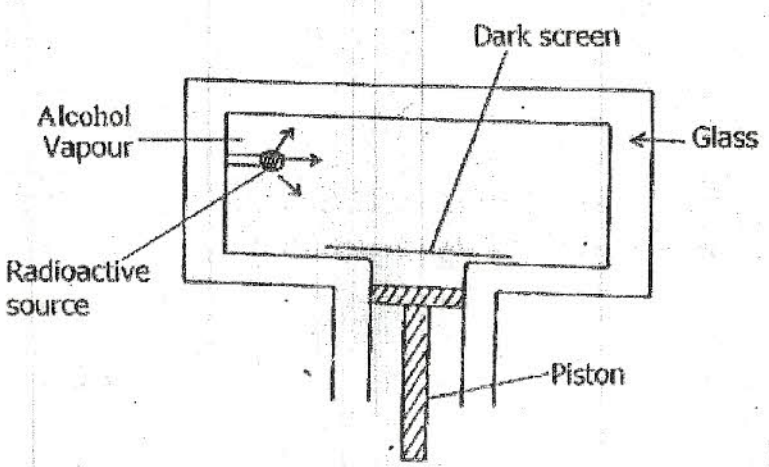

Fig. 13

(i) What is the purpose of the alcohol vapour? (1mk)

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(ii) Explain how the radiations emitted by the radioactive source in the chamber are detected. (3mks)

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(c) Figure 14 below shows a photoelectric cell circuit. The intensity of the light can be varied.

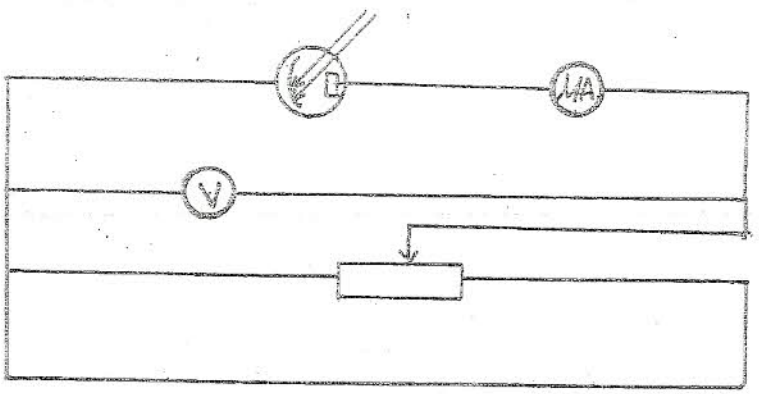

Fig. 14

Describe how the circuit may be used to show how the current I varies with the potential difference, V, across the cell. (3mks)

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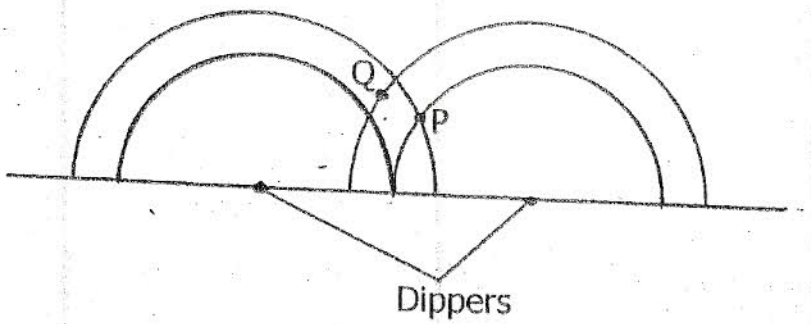
16. (a) Students set up a ripple tank with a vibrator and one spherical dipper at one end of the ripple tank. They observed that the vibrator made 20 oscillations in 36 seconds. The distance between the vibrator and the other end of the ripple tank was 80cm.

(i) Determine the periodic time of the vibrator. (1mk)

(ii) Calculate the frequency of the waves produced on the water surface. (2mks)

(iii) The students counted four ripples between the vibrator and the other end of the tank. Use this information to determine the speed of the waves. (3mks)

(b) The students introduced a second dipper and connected it to the vibrator. The figure below shows part of crests of the circular waves that spread from the two dippers.



Given that the amplitude of each wave is 4 cm, state with reason the amplitude of the waves at points:

(i) P (2mks)

(ii) Q (2mks)

17. (a) Define doping. (1mk)

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(b) Figure 15 below is a graph of current (mA) against p.d (Voltage) across the diode, to investigate a p-n junction diode characteristic.

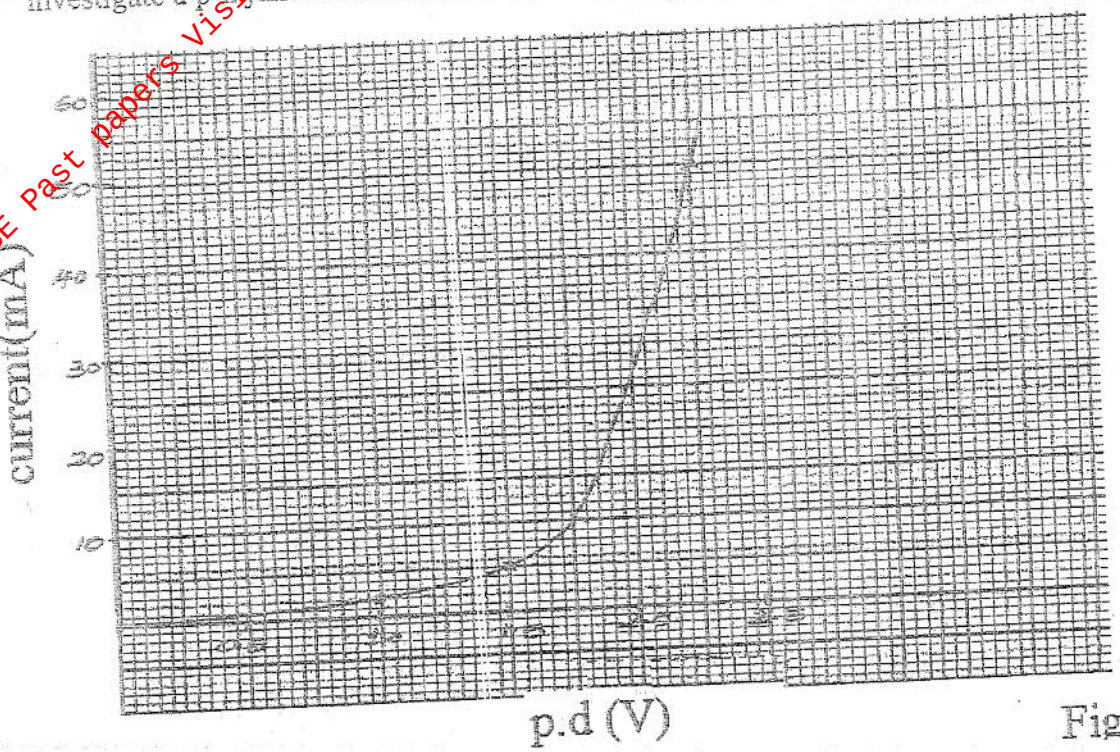

Figure 15

(i) Draw a circuit diagram that can be used to obtain the results in the graph above. (1mk)

(ii) Find the resistance when the voltage is 1.3V. (3mks)

(c) The circuit shown in figure 16 below consists of a source of a.c, a diode, and a load R. A C.R.O is connected across the load.

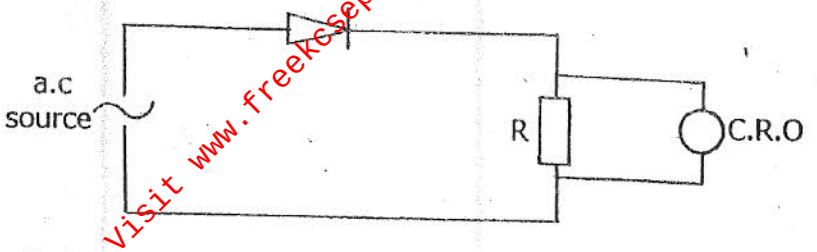

Fig. 16

(i) In the space below draw a sketch to show what is observed on the C.R.O screen. (1mk)

(ii) The connections to the diode are reversed. Draw a sketch in the space below to show what is now observed on the C.R.O screen. (1mk)

(d) Figure 17 below shows a cell of internal resistance 0.5 Ω connected in a circuit with 5.5Ω resistor. Determine the ammeter reading when the switch S is closed. (3mks)

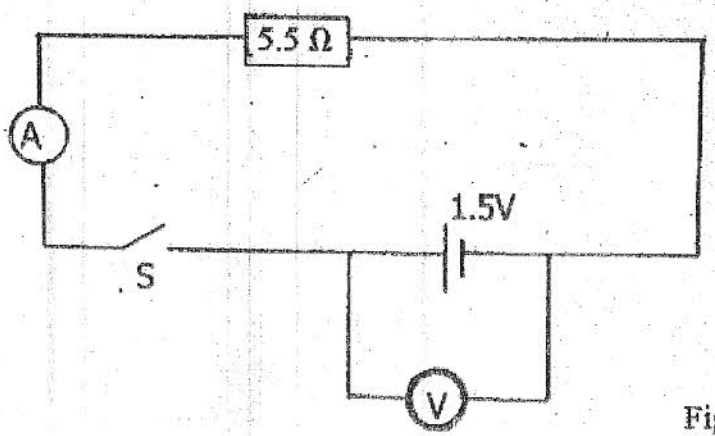

Figure 17