Name: ………………………………………………………… Index No. …………………………

School: ……………………………………………………. Candidate's Sign. …………............

Date: …………………………….......................................

232/2
PHYSICS
THEORY
PAPER 2
JULY/AUGUST 2011
TIME: 2 HOURS

MUMIAS DISTRICT JOINT EVALUATION EXAM

Kenya Certificate of Secondary Education (K.C.S.E.)

Physics
Paper 2

INSTRUCTIONS TO CANDIDATES:

- *Write your **name** and **index number** in the spaces provided above*

- *Sign and write the date of the examination in the spaces provided above.*

- *This paper consists of **two** sections **A** and **B**.*

- *Answer **all** questions in section **A** and **B** in the spaces provided.*

- *All working **must** be clearly shown.*

- *Non-programmable silent electronic calculators and KNEC Mathematical tables may be used.*

For Examiners' Use Only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1-14	25	
B	15	13	
	16	14	
	17	15	
	18	13	
	TOTAL	**80**	

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This paper consists of 8 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing

SECTION A 25MARKS
Answer all the questions in this section
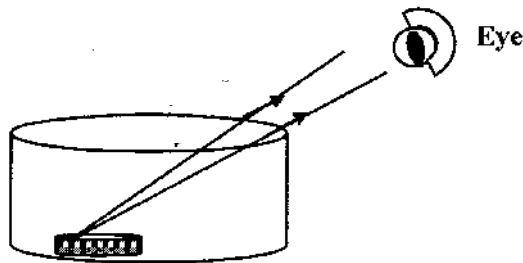
1. State **one** property of a magnet. (1 mk)

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2. Differentiate between hard and soft X — ray. (lmk)

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3. What is meant by the term 'work function' of a surface? (lmk)

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


   Sketch the rays to show how the coin can be brought into view when water is added into the tank to a suitable level. (2mks)

5. Define the term accommodation as used in the human eye. (1mk)

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6. A gold leaf electroscope is positively changed as shown in the figure below where **C** is the cap and **L** is the gold leaf. State and explain what happens to **L** when a negatively charged rod is brought near **C** without touching it. (2mks)

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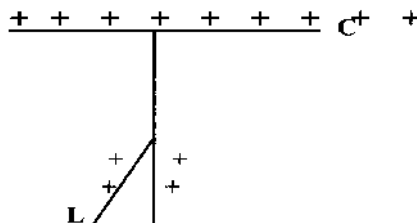
7. The chart below shows an arrangement of different parts of the electromagnetic spectrum.

Radio	A	Visible	B	X — Rays	Gamma Rays

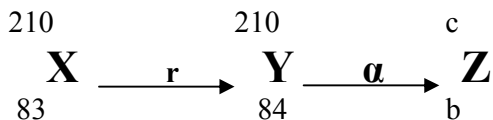Name the radiation represented by **B**. (1 mk)

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8. State Lenz's law of electromagnetic induction. (1 mk)

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9. The following reaction is part of a radioactive series.

$$\underset{83}{\overset{210}{X}} \xrightarrow{\ r\ } \underset{84}{\overset{210}{Y}} \xrightarrow{\ \alpha\ } \underset{b}{\overset{c}{Z}}$$

Identify the radiation r and determine the values of **b** and **c**. (3mks)

r……………………………………………………..

b……………………………………………………..

c…………………………………………………….

10. The circuit diagram below was used to light 3V 0.5A bulb from 12.0V d.c supply.
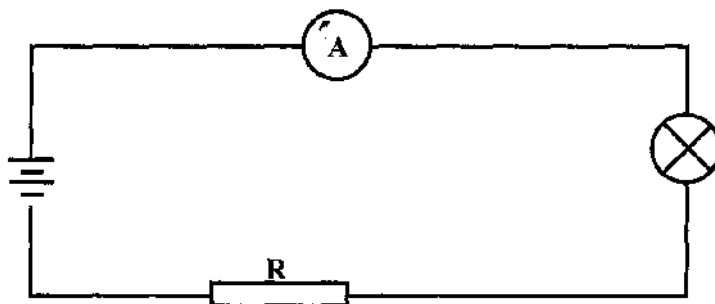
Determine the rate at which electrical energy is converted into heat energy in appliance **R**. (3mks)
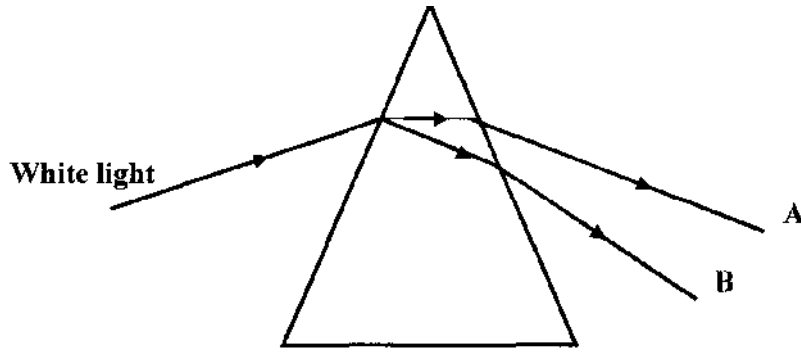
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11. The figure below shows how white light behaves when it is incident on a glass prism.

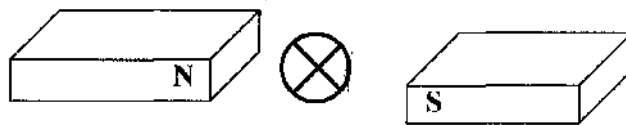Explain why it splits to different colours between **A** and **B**. (2mks)

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12. Sketch the magnetic field pattern between the two poles of the magnet shown below, the wire carrying current is in between the poles. (2mks)

13. A household uses a 1.5KW water heater for 2 hours a day for 30 days. If the cost of electricity is sh.6.70 per unit, calculate the cost of this consumption. (3mks)
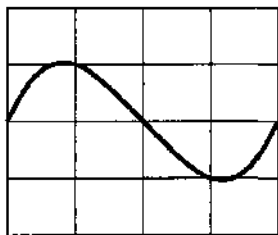
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14. The figure below shows the trace on the screen of an a.c signal connected to the y-plates of a C.R.O with time base on. Given that the time base control is l00ms/div and the y-gain is at 120v/d.v determine the frequency of the a.c signal   (2mks)

SECTION B (55 MARKS)

Answer _all_ the questions in this section in the spaces provided

15. a) What do you understand by the term internal resistance of a cell?   (1 mk)
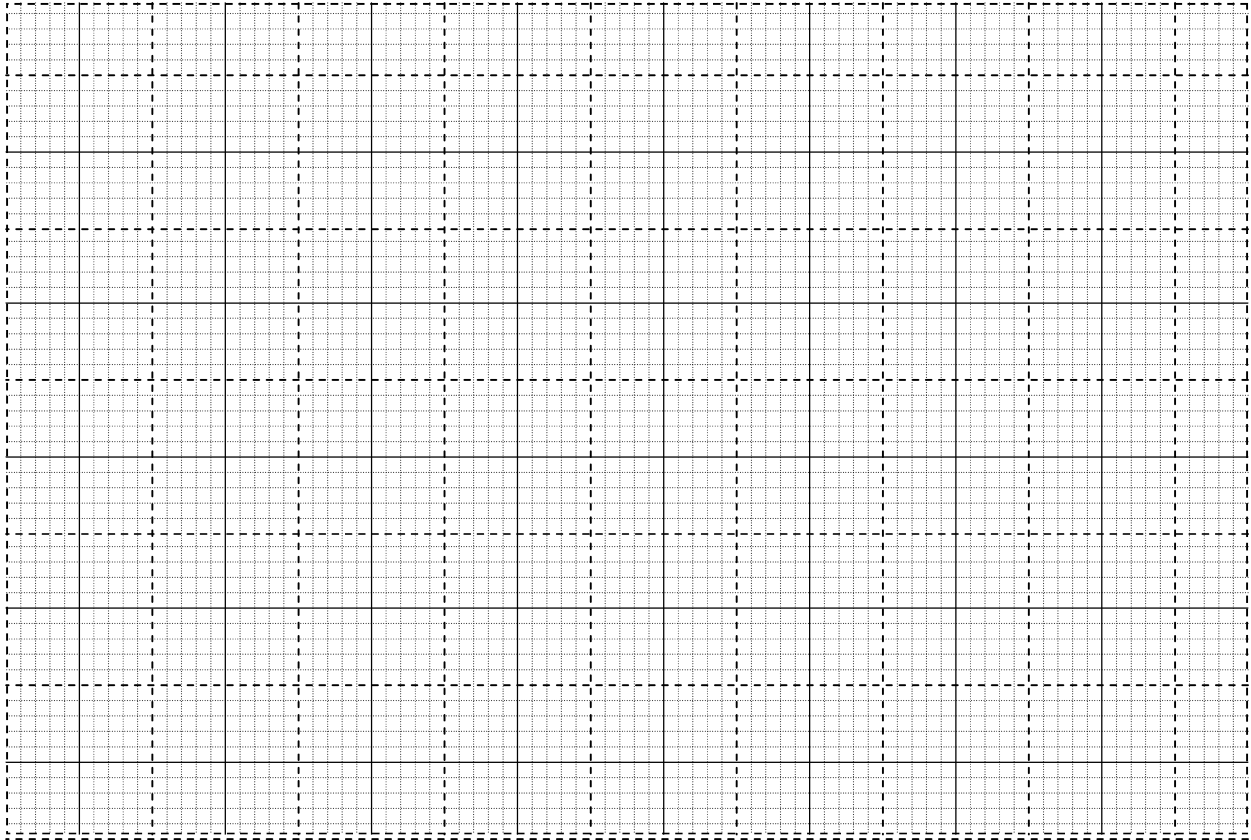
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b) In an experiment to determine the e.m.f E internal resistance r of a certain cell, current was passed though various known resistors and the results tabulated as shown below.

R(Ohms)	16	21	25	36	50	80
Current I(mA)	100	80	70	50	37	24
$^1/_I(A)^{-1}$						

i. Complete the table for the values of $^1/_I$ (A)$^{-1}$ (3mks)

ii. Plot a graph of $^1/_I$ versus R   (5mks)

iii. Use your graph to determine the e.m.f **E** and the internal resistance **r** of the cell.   (4mks)

16. a) Define the principal focus of a concave mirror. (l mk)

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b) You are provided with the following apparatus:

• Meter rule

• A concave mirror and holder

• A candle

• White screen

(i) Sketch a diagram to show how these apparatus may be used to obtain various object distances

(u) and their corresponding image distances **(v).** (2mks)

(ii) Briefly describe how this arrangement may be used to determine the focal length of the

concave mirror using the formula $(1/u + 1/v = 1/f)$ (5mks)

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c) Draw a ray diagram to scale showing how a thin converging lens of focal length 10 cm forms

a real image twice as large as the object. (3mks)

d) The diagram below shows a certain eye defect.

Rays from a distant object

Retina
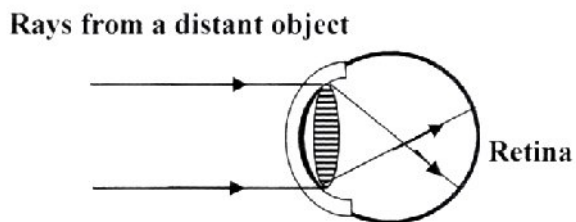
(i)Name the eye defect. (lmk)

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On the same diagram, draw an arrangement to show how the defect can be corrected. (2mks)

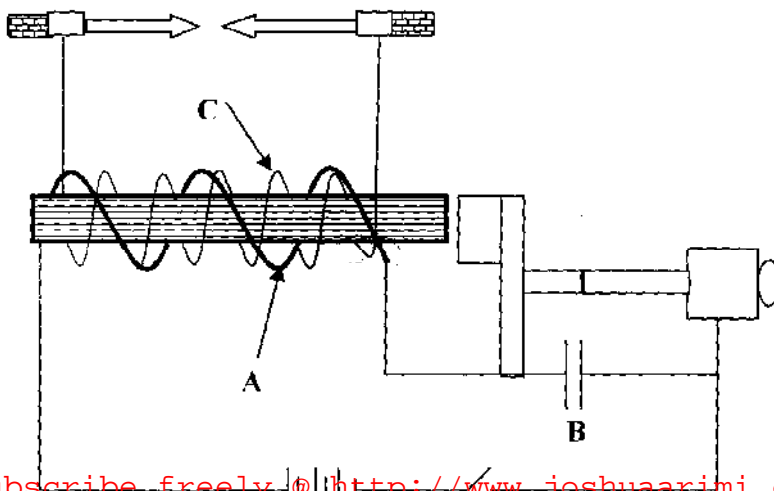17.   a) What do you understand by the term mutual induction? (1 mk)

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b) State **two** factors that determine magnitude of e.m.f induced in a coil. (2mks)

(i)…………………………………………………………………………………………

(ii)…………………………………………………………………………………………

c) The diagram below shows an induction coil used to produce sparks.

C

A

B

(i) Name parts labeled **A, B** and **C**   (3mks)

  A………………………………………………………………………

   B………………………………………………………………………

   C………………………………………………………………………

(ii) Briefly explain how the induction coil works.   (4mks)

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d) A transformer is used on a 240V a.c supply to deliver 12A at 120V to a heating coil.

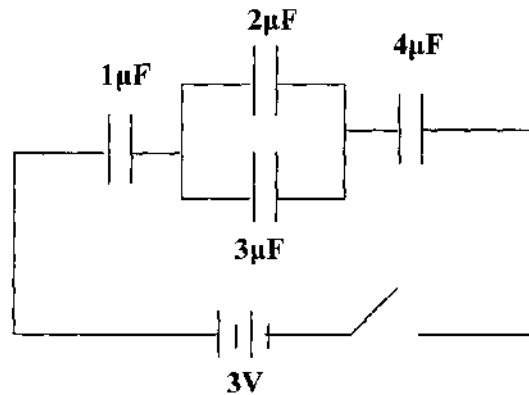 If 20% of energy taken from the supply is dissipated in the transformer.

i. Calculate the current in the primary coil.   (3mks)

ii. Account for **two** causes of the 20% energy dissipation in the transformer above.   (2mks)

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18.   a) The figure below shows an arrangement of four capacitors connected to a 3.0 V power supply.

Calculate:

i. The effective capacitance   (3mks)

ii. The charge stored by the 3μF capacitor   (3mks)

b) A mine worker in a valley between two cliffs sits 150 metres from the nearest cliff and strikes

a stone. He hears two echoes one after 0.9 seconds while the second comes 0.2 seconds later.

Use this information to calculate the distance between the two cliffs.   (4mks)

c) The diagram below shows a water wave traveling from a shallow to a deep end.

Shallow end
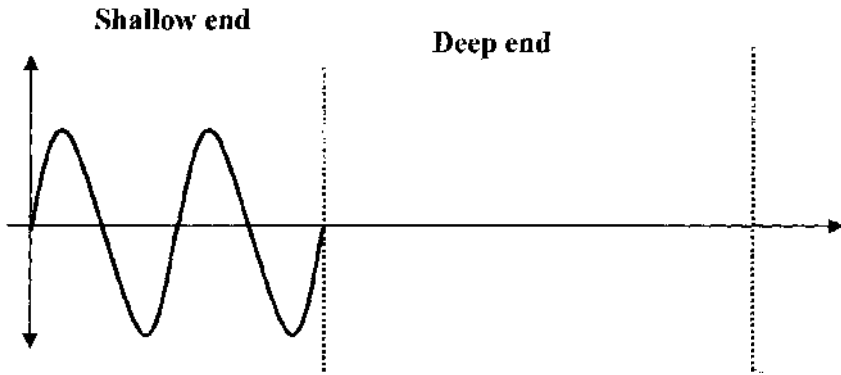
Deep end

Given that the velocity in the deep end is higher than that in the shallow end:

i. Complete the diagram to show the appearance of the wave in the deep end.   (1 mk)

ii. Explain your observation.   (2mks)

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