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

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

Date: …………………………...

232/2
PHYSICS
PAPER 2 (Theory)
MARCH/APRIL 2015
TIME: 2 HOURS

CROSS COUNTRY EXAMS 2015

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

PHYSICS
PAPER 2
TIME: 2 HOURS

INSTRUCTIONS TO THE CANDIDATES:

- *Write your **name** and **index number** 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 in the spaces provided.*
- *KNEC mathematical tables and silent non-programmable electronic calculators may be used.*

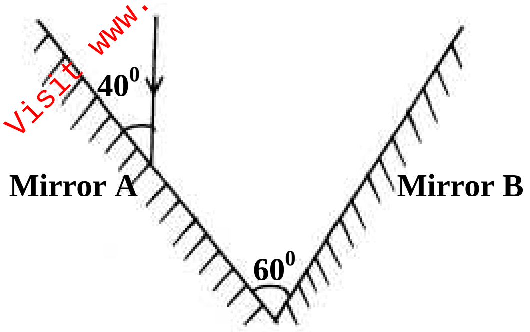
For Examiners' Use Only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1-12	25	
B	13	10	
	14	09	
	15	12	
	16	07	
	17	08	
	18	09	
	TOTAL	**80**	

This paper consists of 11 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION A (25 MARKS)

1. A ray is incident on two mirrors inclined at 60^0 as shown in the diagram below. (2mks)



Determine the angle of reflection on mirror **B**, hence trace the path of the ray as it leaves mirror **B.**

2. State and explain the observation made when an acetate rod rubbed with fur is brought close to the cap of a negatively charged electroscope. (2mks)

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3. State how polarization is reduced in a dry cell. (1mk)

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4. Distinguish between a P-type and a N-type extrinsic semiconductors. (2mks)

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5. State one similarity and one difference between the gamma rays and x-rays based on the mode of generation of the radiations.

i) Similarity (1mk)

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ii) Difference (1mk)

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6. **X**-rays are produced by a tube operating at 10^4 Volts. Calculate the wavelength of the radiation.
(Take $h=6.63x10^{-34}$Js, $e=1.6x10^{-19}$C, $c=3x10^8$m/s) (3mks)

7. State how a vertical trace can be obtained on the screen of a cathode ray oscilloscope. (1mk)

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8. A boat sends a sound signal in the middle of Lake Victoria and an echo is heard after 6 seconds. Determine;

i) The depth of the lake. (2mks)

ii) The frequency of the signal stated in (i) above. (1mk)

(Take speed of sound in water = 1440ms^{-1}, wavelength = 0.4m)

9. A concave mirror produces an erect image of magnification **2**. If the focal length of the concave mirror is 30cm, find the distance of the object from the mirror. (3mks)

(Hint: the image is virtual)

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

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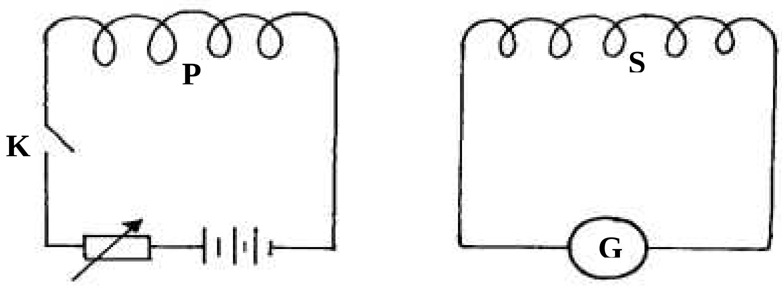
11. The coils **P** and **S** are connected as shown below. **P** is connected to a battery, rheostat and a switch **K**. **S** is connected to a galvanometer **G**.



State the behaviour of the pointer on **G** in the following cases;

i) When **K** is switched on (closed) (1mk)

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ii) When **K** is opened. (1mk)

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12. A current of **5mA** passes through a wire of length 1.0m, radius 1.0×10^{-4}mm and resistivity $1.1 \times 10^{-6}\Omega$m. Calculate the rate at which heat is given off by the wire. (Assume temperature is constant.) (3mks)

SECTION B (55 MARKS)

13. a) Define the term photoelectric effect. (1mk)

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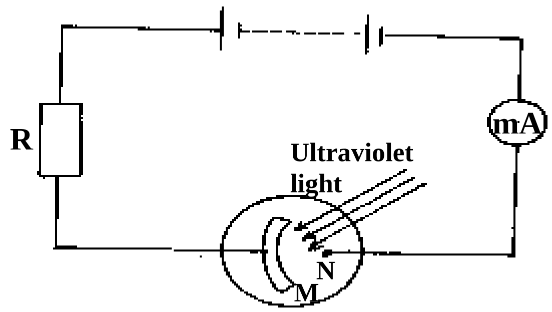
b) The diagram below shows a circuit to investigate the photoelectric effect using a photocell.



i) Explain why the milliameter shows a reading when ultraviolet light is shone as in the diagram. (3mks)

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ii) State with a reason how the milliameter reading is affected when the intensity of light is increased. (2mks)

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iii) State one practical application of a photocell. (1mk)

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c) A laser beam of intensity $2x10^{-1}Nm^{-2}$ and wavelength $\lambda=5x10^{-7}m$ hits a wall 5m away. How many photons per second are emitted? (3mks)

(Take $h=6.6x10^{-34}Js$, $c=3x10^{8}ms^{-1}$)

14. a) Differentiate between a nuclear fussion and nuclear fission. (2mks)

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b) The equation below represents a nuclear reaction.

$$^{218}_{84}P_o \longrightarrow ^{218}_{85}A + ^{q}_{p}Y$$

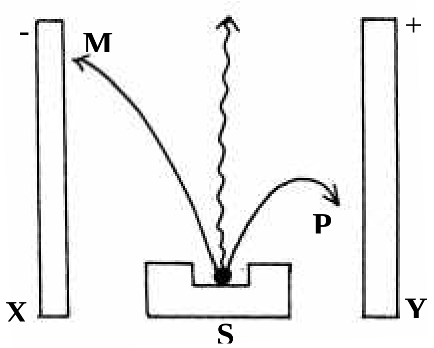
i) Determine the values of **p** and **q.** (1mk)

p………………………………..…………………………..

q………………………………...……………………….

ii)Identify **Y**………………………………………………………………...……. (1mk)

c) The figure below represents deflection of various radiations from a radioactive source S placed in electric field between two plates **X** and **Y.**



Identify the radiations marked with letters **M** and **P.** (1mk)

M.……………………………………………………………………………………

P.……………………………………………………………………………………

d) What do you understand by the term 'Random decay' (1mk)

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e) A sample of radioactive substance initially has 8×10^{25} particles. The half life of the sample is 98 seconds. Determine the number of particles that will have decayed after 294 seconds. (3mks)

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

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b) Find the angle of incidence of a ray of light on one phase of a 60^0 prism if the ray is just totally internally reflected on meeting the next face. (3mks)

(Take refractive index of glass = 1.5)

c) Explain why glass prisms are preferred for use in periscopes to plane mirrors. (1mk)

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d) i) State **two** ways in which a photographic camera is different from the human eye. (2mks)

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ii) Determine graphically in the space below the position, size and nature of the image of an object 2cm high placed 30cm away from a diverging lens of focal length 20cm. (5mks)

(Use the scales vertically: 1cm rep 1cm, horizontally: 1cm rep 10cm)

16. a) Differentiate between a transverse wave and a longitudinal wave. (2mks)

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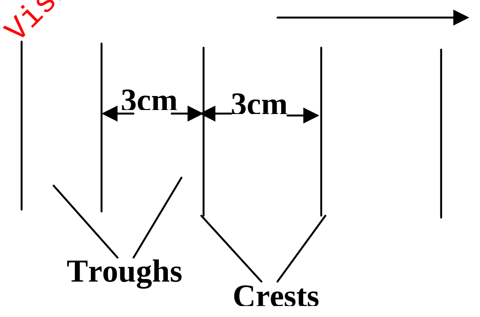
b) Water ripples are caused to travel across the surface of a shallow tank by means of a suitable straight vibrator.

The distance between successive crests is 3.0cm and the waves travel 25.2cm in 1.2s.



Calculate:

i) The velocity of the waves. (2mks)

ii) The frequency of the vibrator. (3mks)

17. a) State any two disadvantages of direct transmission of electricity from power generating stations at a large current through the transmission cables. (2mks)

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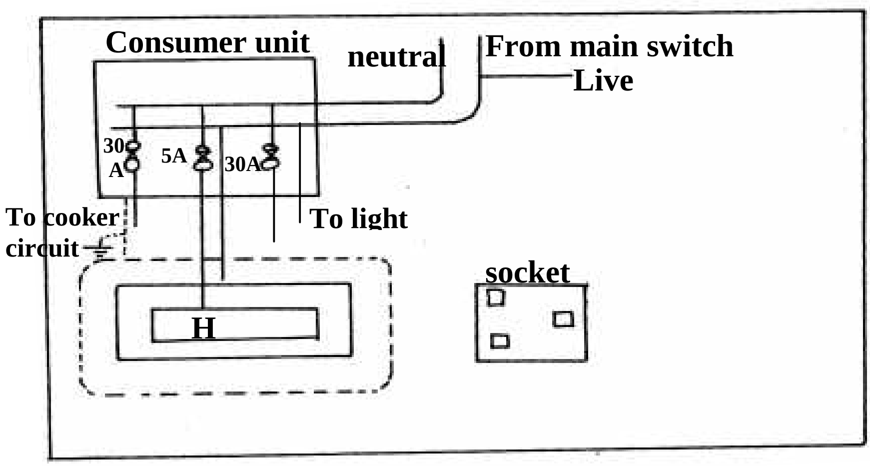
b) The diagram below represents part of a domestic wiring system.



i) Identify any two mistakes in the wiring above and explain how they should be corrected. (4mks)

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ii) Identify the circuit **H** represented above. (1mk)

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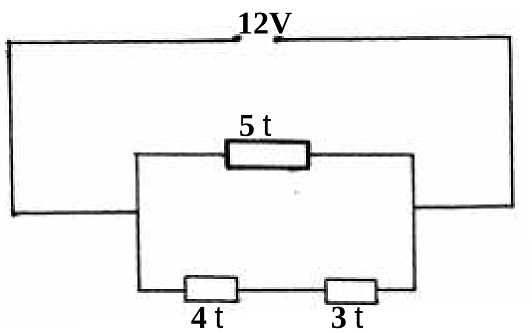
c) Complete the wiring to the socket in the wiring system **H** above. (1mk)

18. a) The figure below represents a circuit diagram of three resistors connected to a 12V battery.



Determine;

i) The effective resistance for the arrangement above. (2mks)

ii) The potential difference across the 3Ω resistor. (3mks)

b) The figure below shows part of the circuit containing two capacitors $\mathbf{C_1}$ and $\mathbf{C_2}$.

If $\mathbf{C_1}$**=2«F** and the **Pd** across **PQ** is **150V** while the total charge in the capacitors is $1.8\text{x}10^{-4}$ coulombs. Determine the capacitance of $\mathbf{C_2}$. (4mks)