Name.. Index. No.............................

Stream... Admission No.........................

232/2

PHYSICS

THEORY

July 2013

2 hours

FORM FOUR

MARANDA HIGH SCHOOL

MOCK EXAMINATIONS

Instructions:

1. Write your name, admission number and stream in the spaces provided.
2. Answer ALL the questions in both section A and B in the spaces provided after each question.
3. All working MUST be clearly shown where necessary.
4. This paper consists of 9 printed pages.

For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A	1-12	25	
B	13	11	
	14	09	
	15	07	
	16	08	
	17	10	
	18	10	
	TOTAL SCORE	80	

SECTION A (25 MARKS)

1. The figure below shows a thin wire connected to a charge generator and placed close to a candle flame.
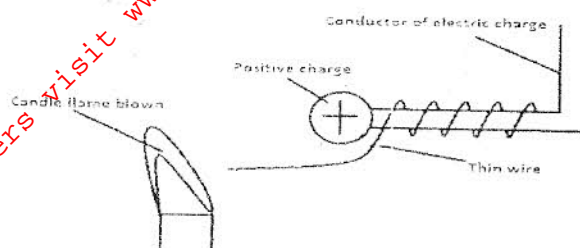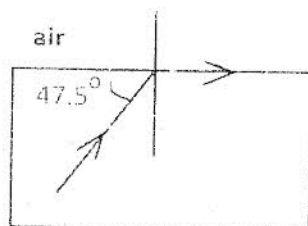

Explain why the candle flame is deflected as shown. (3 marks)

....

....

....

2. State the meaning of the term "threshold frequency" as used in photoelectric emission. (1 mark)

....

....

....

3. The figure below shows the path of light passing through a rectangular block of perpex, placed in air.

Calculate the refractive index of the Perspex. (2 marks)

....

....

....

4. A radio signal of 30MHz is received by an aerial whose length is $1/8^{th}$ of its wavelength. If the speed of light is 3.0×10^{8} m/s determine the length of the aerial. (3 marks)

....

....

....

....

5. The figure below shows an electric circuit with three diodes, three bulbs and a cell. State and explain what would be observed when the switch is closed. (2 marks)

....

....

....
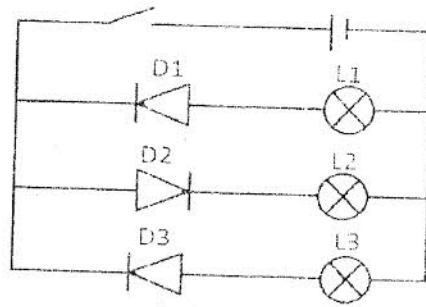
6. What property of cathode rays shows that they are particles and not waves? (1 marks)

....

....

7. Two similar razor blades are placed one on a wooden block and the other on a soft iron block as shown in the figure below
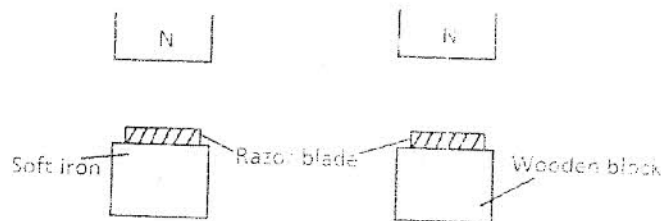
It was observed that the razor blade on the wooden block was attracted to the magnet while the other on the soft iron block was not. Explain. (2 marks)

....

....

....

8. The figure below shows a wire carrying current placed over a magnetic compass. On the wire, indicate the direction of electric current. The shaded side is the North Pole. (1 mark)
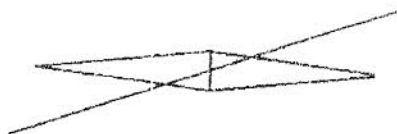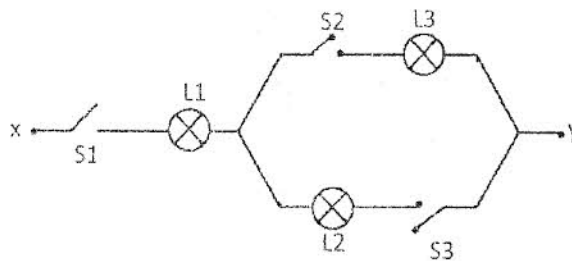
9. Differentiate between a capacitor and capacitance. (1 mark)

....

....

....

10. A 10µF capacitor is charged by a 100 V supply and then connected a cross an uncharged 20µF capacitor. Calculate the final p.d on each capacitor. (3 marks)

....

....

....

11. Fig.7 shows an electric circuit including three switches, S_1, S_2, S_3 and three lamps L_1, L_2, L_3. A constant potential difference is applied across X and Y.

i). Other than L_1, state the lamp that will light when S1 and S_2 are closed.

(1 mark)

....

....

ii). How does the brightness in L1 in i) above compare with its brightness when all the switches are close.

(1 mark)

....

....

iii). Explain the observation in ii) above. (1 mark)

....

....

12. During total eclipse of the sun, both light and heat are observed to disappear simultaneously. Explain the observation. (2 marks)

....

....

....

ii). Use the graph to obtain the half life of the source. (1 mark)

....

iii). Using the half life determine how long it would take for the count rate to fall from 320 to 40 counts per

second. (2 marks)

....

....

....

....

15.

a) Define the term electromagnetic spectrum. (1 mark)

....

....

b) Your radio is tuned into a radio station 144km away.

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

....

....

....

ii). If the signal has a frequency of 600 KHz, how many wavelengths is the station from your receiver.
(Take C=3.0x10^8 m/s) (3 marks)

....

....

....

c) State the function of magnetron in a microwave cooker. (1 mark)

....

....

16.
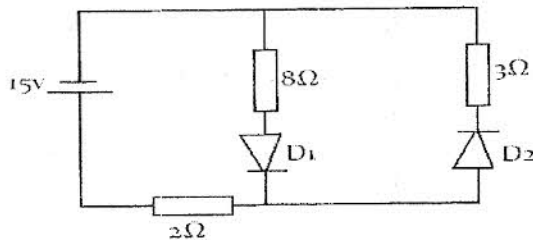
a) Sketch the circuit symbol of a semiconductor diode and name its parts. (2 marks)

b) What is rectification (1 mark)

....

....

....

....

c) Study the diagram below and answer the following questions

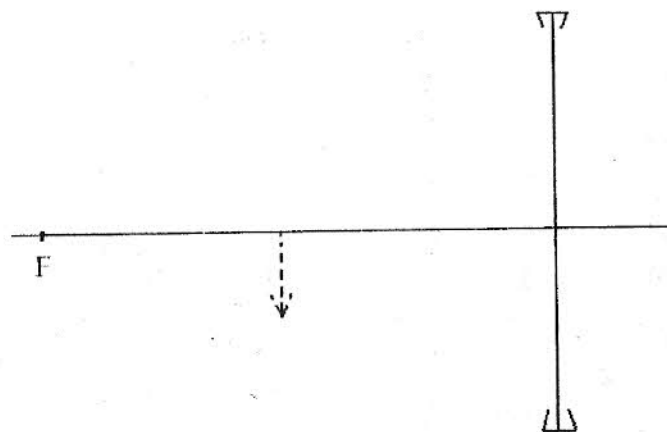
i). Calculate the current flowing through the 2Ω resistor. (2 marks)

....

....

....

ii). Calculate the voltage drop across the 3Ω resistor. (3 marks)

....

....

....

17.

a) Complete the diagram below indicating the rays that will lead to the formation of the image shown below (3marks)

b) A compound microscope with an objective lens L_o of focal length 1.2cm and an eye piece lens L_e of focal length 2.8cm. An object is placed 1.8cm from the objective lens. The system of lenses produces a final image a distance of 12.0cm from L_e. Determine the distance of separation of lens L_o and L_e.   (4 MARKS)

....

....

....

....

c) An object is placed 12cm from a convex lens and it forms a virtual image 36cm from the lens. Calculate the focal length of the lens.   (3 MARKS)

....

....

....

a) The diagram below show a battery of e.m.f 12V and an internal resistance of 0.17Ω connected to a combination of resistors.
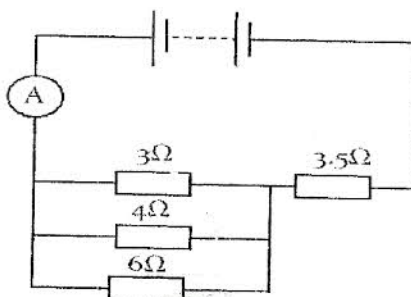
Calculate

i). The current through the 3.0Ω resistor   (3 marks)

....

....

ii). The potential difference across the parallel connection.   (2 marks)

....

....

....

iii). The current through the 4Ω resistor. (1 mark)

....

....

....
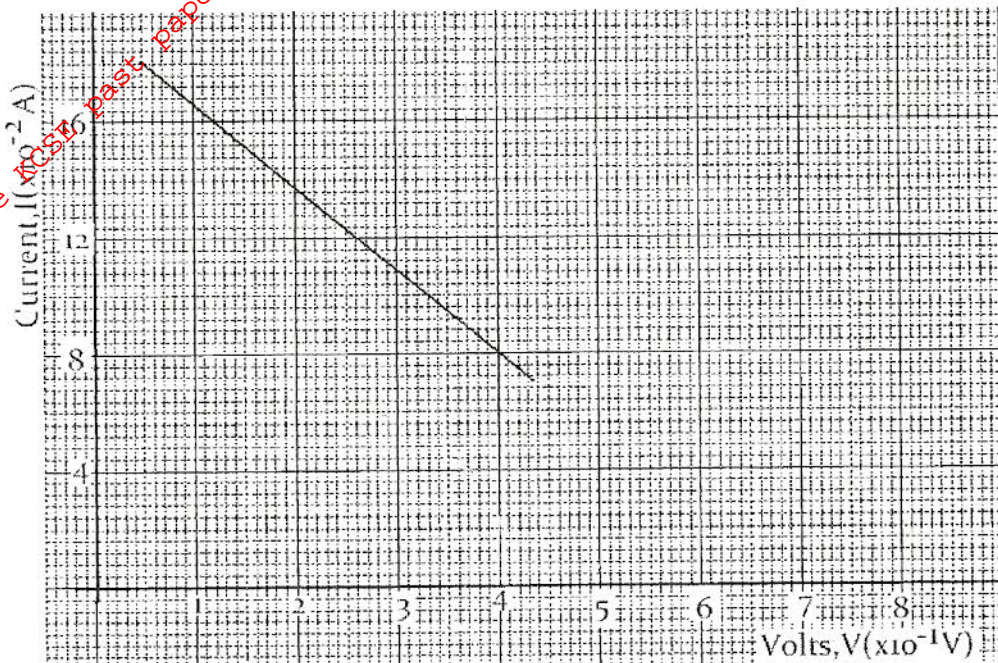
b) The graph below shows the variation of potential difference V with current I for a certain cell.

From the graph determine

i).   The internal resistance of the cell (3 marks)

....

....

....

ii). The e.m.f of the cell (1 mark)

....

....

....