*Ms p2*

**SECTIONtiotion A (25 MARKS)**

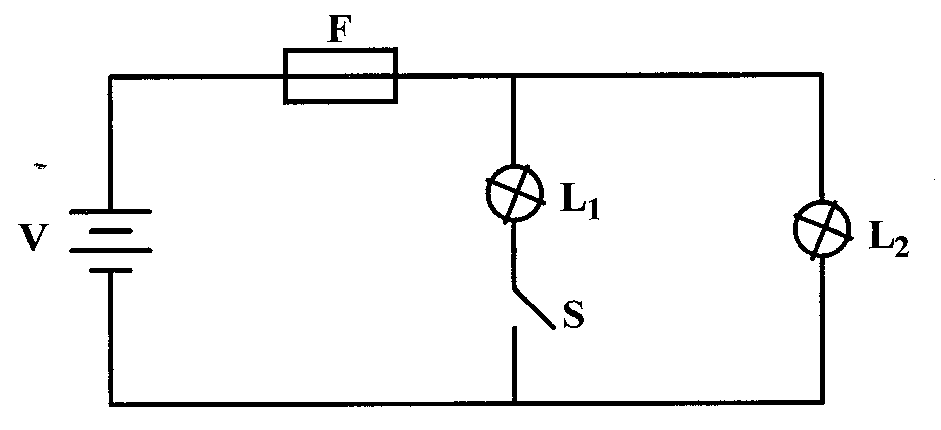
***Answer all the questions in the spaces provided***

1. Differentiate between a vector and a scalar quantity (1mark)

----------------vector---------------------------------scalar--------------------------------------

***Has b both mag and dir Has only magnitude***

2. The figure below shows a circuit consisting of a battery of 2 of cells ,a 1.5Afuse F, a switch S and two identical lamps L1 and L2. A current of 1.5A flows through lamp L2 when the switch is open.



Explain why the fuse may blow when the switch,L1 is closed..

***- reduced effective resistance ;***

***- INCREASED CURRENT ;***

3. When a highly negatively charged rod is brought near the cap of a positively charged leaf electroscope, the leaf first falls and then rises .. Explain this observation. (2marks)

***- neutralization takes place ;***

***- then , induction of + charge;***

4. The figure below shows two plane mirrors inclined at an angle of 400 to one another. A ray of

light strikes the bottom mirror at an angle of 500 to the horizontal as shown on the diagram.

**400**

**500**

L1

A1

(2 marks)

1. A charge of 90 coulombs flows through a circuit for one minute. Determine the amount of current

that flows through the circuit. (3marks)

***I = Q/t***

***= 90/60***

***= 1.5 A***

1. State two methods of charging an electroscope. (2marks)

* ***INDUCTION***
* ***CONTACT***

1. The figure below shows two bar magnets placed close to each other.

**N**

**S**

**N**

**S**

Sketch the magnetic field pattern around the two magnets. (2 marks)

1. An electric heater is rated 5000W, 250V. Determine its resistance. (3marks)

***R= V2/P ;***

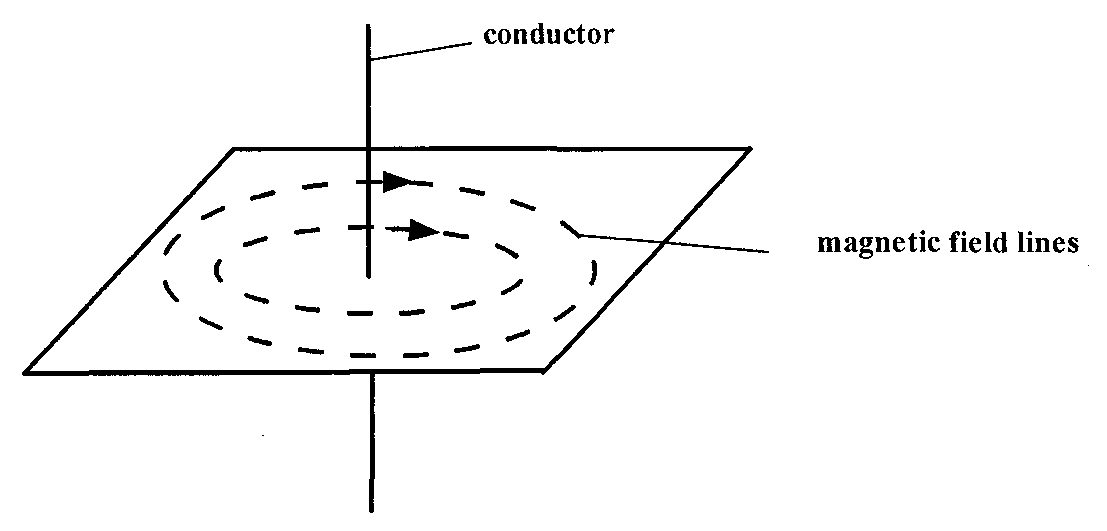
***= 2502/5000 ;***

***= 12.5 Ω ;***

1. The figure below shows the magnetic field pattern round a current-carrying conductor. Indicate

on the conductor the direction of the current . (1mark)

**Direction ;**



1. Explain how polarization of a cell increases the cell’s internal resistance. (2mks)

- ***Bubbles insulate the electrode ;***

***- Insulation increases internal ;***

1. **Figure below** shows a ray of light incident on an air bubble which is inside water,

Complete the ray to show the path it follows through the air bubble. (1mk)

1. A battery is rated 40Ah. Determine the time in hours it would work steadily supplying a current

of 2A.

**P = It ;**

**40 = 2(t) ;**

**t = 20 hours ;**

1. The figurebelow is that of a dry cell. Name parts labeled **A** and **B**

A

B ***A= CARBON ROD/GRAPHITE ;***

***B = AMMONIUM CHLORIDE PASTE*** ;

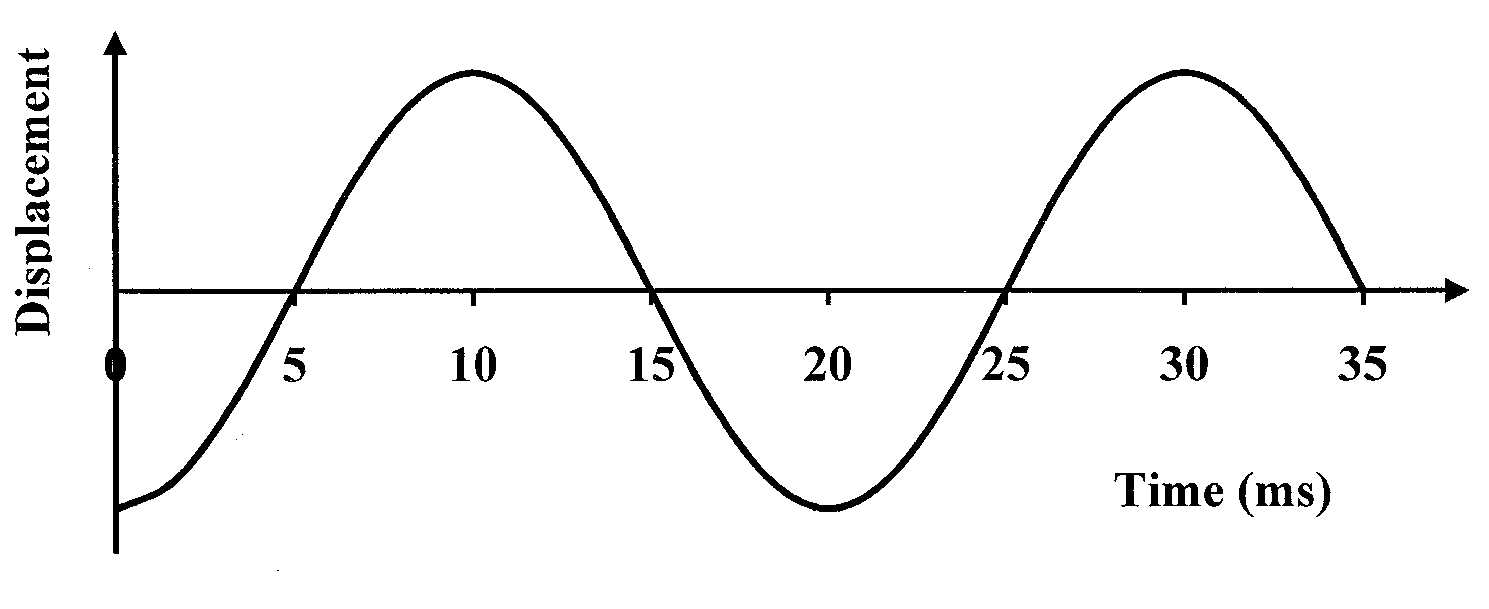
**SECTIION B (55MARKS)**

***Answer all the questions in the spaces provided***

1. a) Define frequency . (1mark)

***Number of oscillations made per given time ;***

b) The figure below represents a displacement time graph wave.

 ***At least one oscillation*** ***, one mark.***

1. On the graph draw a line marking the amplitude of the wave . (1mark)
2. Determine the period of the wave. ( 1mark)

***T = 20 S ;***

1. Calculate the frequency of the wave. (3marks)

F = 1/T ;

= 1/20x10-3 ;

= 50 Hz ;

(iii) Given that the wavelength of the wave is 0.2m, find the speed of the wave. (3marks)

**V = F٨**

**= 50X0.2 ; ;**

**= 10m/s ;**

c) On the same axes in (b) above, sketch another wave with double the frequency and half the

amplitude. (2marks)

1. a) State Ohm's law. (1 mark)

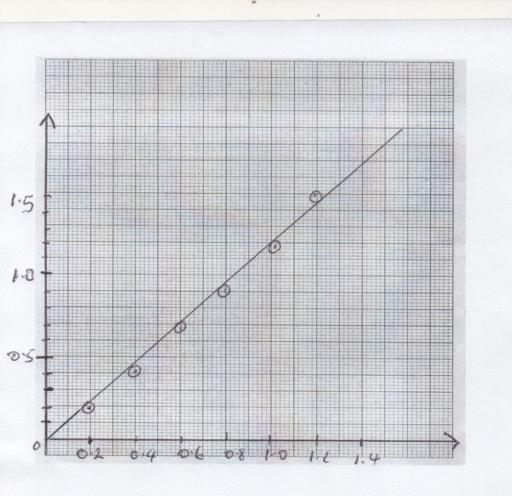
The current through a conductor is directly proportional to the pd across the conductor

provided the temperature and other conditions remain constant.

b) Differentiate between Pd and EMF . (2marks)

|  |  |
| --- | --- |
| Pd | EMF |
| ***Voltage across cell when supplying current ;*** | ***Voltage across cell when not supplying current ;*** |

The figure shows a graph drawn from data obtained in an experiment to verify Ohm's law.



Voltage(v)

Current(A)

c) Draw an electric circuit diagram that can be used to verify Ohm's law . (1mark)

A

V

d) Use the graph to determine the resistance of the conductor used in the circuit . (3 marks)

**R = ;**

**= 1.3/1.1;**

**= 1.18 Ω ; (± 0.15 )**

e) The figure belowshows resistors connected in a circuit diagram.

Ω







10V

* + 1. Calculate the effective resistance in the circuit . (2 marks)

RP = 2Ω ;

RT = 2+7+1 ;

RT = 10Ω ;

* + 1. Determine the current through the 6Ω resistor. ( 3marks)

**IT = 1A ;**

**V = IR ;**

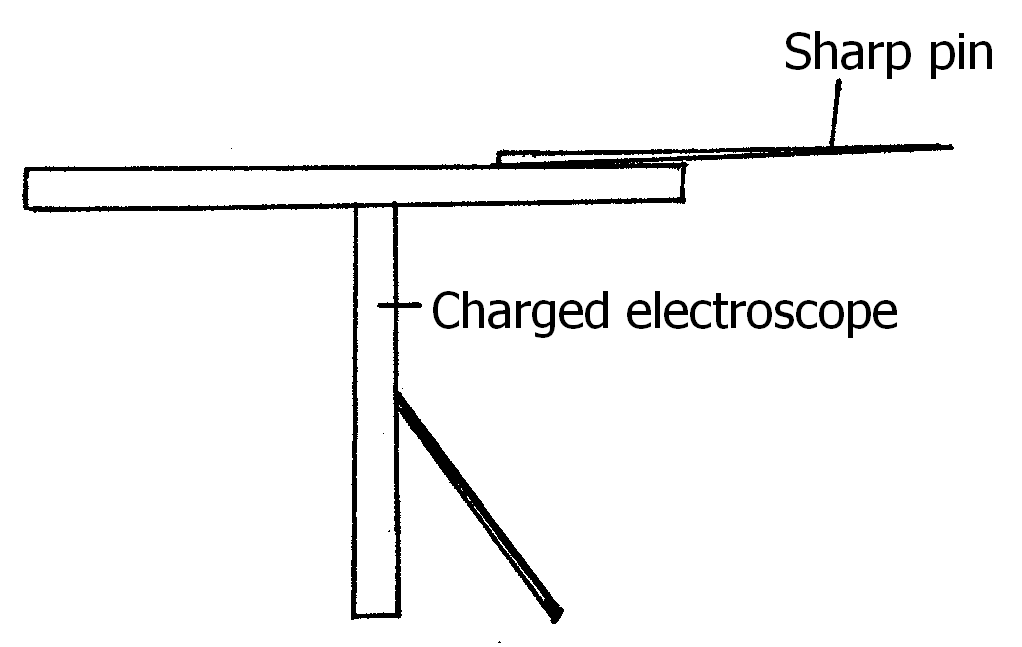
**V =2V ;**

1. a) Define capacitance of a capacitor (1mk)

**Charge per unit volt ;**

b)In fig below, a sharp pin is fixed on a cap of a leaf of the electroscope. The electroscope is

highly charged and then left for sometime.

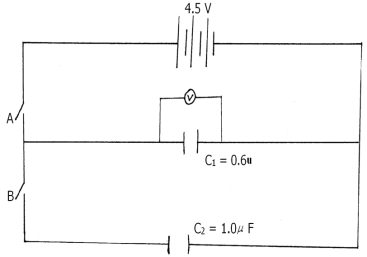


State and explain the observation made after sometime. (3marks)

* ***leaf falls ;***
* ***sharp pin ionizes air ;***
* ***discharging takes PLACE ;***

c)Figure below shows a circuit where a battery of e.m.f. 4.5 V, switches A and B, two

capacitors C1 = 0.6F and C2 = 1.0 F and a voltmeter are connected.



1. Determine the charge on C1 when switch A is closed and switch B is open.(2marks)  ***Q = CV ;***

***Q = 0.6x10-6 x 4.5 ;***

***Q = 2.7x10-6C ;***

ii) State and explain what is observed on the voltmeter when switch A is closed and switch B is

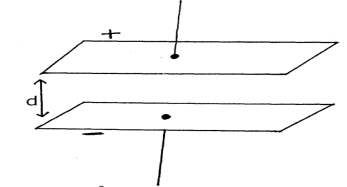
open. (2marks)

***- Voltage rises gradually and then stops ;***

***- capacitor charges until it is fully charged at 4.5 V ;***

d) The Figure bellow shows a pair of parallel plates of capacitors connected to a battery. The upper plate

is displaced slightly to the left.



Suggest two adjustments that can be made to so as to reduce the effective capacitance.(2marks)

* ***Move upper plate further to the left ;***
* ***Increase distance d ;***

1. (a) State two differences between light and sound waves (2mark)

|  |  |
| --- | --- |
| Light | sound |
| ***Are transverse*** | ***Are longitudinal ;*** |
| ***Travel through vacuum*** | ***Don’t travel through vacuum ;*** |

(b) A boy standing in front of a cliff blows a whistle and hears the echo after 0.5s. He then moves

7 meters away from the cliff and blows the whistle again. He now hears the echo after 0.6s.

Determine the speed of the sound in air. (3 marks)

***V = S/t ;***

***V = 34/0.1 ;***

***V = 340m/s ;***

( c) Thunder is heard long after lightning has been seen. Explain. (2marks)

**Light travels faster than sound ;;**

(d) State 2 factors that affect the speed of sound in a material. (2marks)

***- Temperature ;***

***- density ;***

1. a) State Snell’s law (1mark)

***The ratio of sine i to sine r is constant ;***

(b)A coin is placed beneath a transparent block of thickness 10cm and refractive index

1.56 .Calculate the vertical displacement of the coin. (3marks)

***n = real depth/apparent depth***

***1.56 = 10/A.D***

***A.D = 6.41 cm***

(c)The speed of green light in a prism is 1.94×108m/s

(i)Determine the refractive index of the Prism material (speed of light in air = 3 x 108 m/s). (3marks)

***n = C/V ;***

***n = 3x108/1.94x108 ;***

***n = 1.55 ;***

(ii) Determine the critical angle of the prism material (3marks)

***Sin C = 1/Sin n***

***Sin C = 0.6452***

***C = 40.20***

(e) The refractive indices of glass and water are 3/2 and 4/3 respectively. Find the value of angle Ф in

the figure below. (3marks)

42

Ф

***n1sinФ1 = n2SinФ2 ;***

***8/9sin42 = sin Ф2 ;***

***Ф2 = 36.50 ;***