**FORM 3 PHYSICS PAPER 2**

**TERM 3 2023**

**MARKING SCHEME**

1. - One picture can be taken at a time ;
	* It has long exposure time / picture of moving objects cannot be taken
	* (ANY ONE ) ;

1. - A lead accumulator give large current over a long time compared to a dry cell;
	* A lead acid accumulator can be recharged while dry cell cannot be renewed / recharged
2. Any two
	* Virtual ;
	* Erect / upright;
	* Enlarged ;

1. Light travels in a straight line✓

.

 5. Polarisation✓.Hydrogen gas produced causes insulation at the cathode .It increases the internal resistance of the cell✓

.

 6. None✓

 Each of them retained their magnetism✓

1. Image formation takes place with regular✓1 reflection not with diffuse reflection

Plane mirror-regular reflection

Sheet of paper-irregular diffuse reflection ✓1

8. 1.375 Ampres; ✓

9. (i) White light is a spectrum✓; The velocities of the colours that form the spectrum is different in a given transparent material medium✓;

(ii) The white light will not be separated✓

Since the direction of travel of the colours will be the same ✓;

10.Soft iron became induced magnet and attracts back the razor✓

Wood is non-magnetic material hence does not attract the blade✓.

11. T = 2000 s ;

f = 1

 T

 = 1 ;

 2000

 = 5.0 x 10-4 Hz ;

12.

 

**SECTION B**

13a) i) For a metallic Conductor, the Current flowing through is directly proportional to the

p.d across its ends provided temperature ( and other physical condition) are kept constant

 ii) p.d across parallel network = IR

 = 0.2 x 4 = 0.8 v✓

 Current though 1Ω

 = 0.8 = 0.8A✓

 1

 ( or by ratios)

 Total Current

 = 0.8 + 0.2 = 1 A

 Total Resistance

 4/5 + 2 + 1

 0.8 + 3 = 3.8 Ω✓

 V = IR ( whole cut )

 2 E = 1 ( 3.8)

 E = 1.9 volts✓

 Or by using division of p.d

1. The leaf collapsed / Electroscope discharged ✓

The red hot charcoal ionizes the air around which neutralizes ✓

The negative charges on the electroscope✓

 c) Graph

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| i) (A-1)1/l | 1.25 | 1.43 | 2 | 2.7 | 4.17✓ |
| R (Ω) 1.6  | 2.1 | 2.5 | 3.6 | 5.0 | 8.0 |

14.a) i) Light must be traveling from a denser medium to a less dense /rarer medium✓

 ii) The angle of incidence must be greater than the critical angle✓

 b) i) Refractive index of perpex = Sin 90°✓

 Sin 42.5°

 = 1/sin 42.5°

 **= 1.48**✓

1. Sin C = 1η2✓

= 1ηa x aη2✓

= ½.4 x 1.48

= 0.6167

**C= 38.07°**✓



Labelling both axes correctly with units✓

 Appropriate scale✓

 Uniform and covers More than half page✓

Plotting 6 pts corrects✓✓ 4-5 pts✓ 0-3pts no mark

 Straight line, positive gradient and cutting y-axis at positive value✓ ;

Gradient = 1/Ε

 = 3.4 - 1.6

 6.5 - 2.8

 1/Ε = 1.8

 3.7

 1/Ε  = 0.4865✓

 E = 2.058 volts

 Accept 2 ± 0.05✓

15. (a)

 (i) -They leave the surface of a charge body at right angles✓;

-the electric field lines are directed away from positive charges and towards the negative

 charges; ✓

-The closer the field lines the stronger the field at that point✓,

 (ii) -The moving clouds get charged through friction; ✓

 When a charged cloud pass over a lightning arrestor it induces on opposite charge in it✓; Because of the structure of the arrestor at the top (sharp spikes) it releases charges into the air which discharges the charged cloud as shown in the diagram✓; (1mark)

The arrestor acts as an easy way of discharging the clouds because it is a good conductor; ✓

 (b)

 (i) Is the charge stored per unit voltage ✓.

Capacitance, C=Charge ✓

 Voltage;

 (ii) The type of dielectric materials between the plates✓

* 1. C =E.d; ✓

 A

Can be in words Where C – Capacitance

 E – Dielectric constant

 d – Separation distance

 A – Area of overlap

 (c) Charge store =CV

 = 2x10-6x200

 = 4.0x10-4✓

 Charge stored when both capacitor and connected is the same

 =4.0x10-4

 Total capacitance

 C1=2.0x10-6+C2✓

 Hence

 4.0x10-4= (2.0x 10-6+C2)80;; ✓

 4.0x10-4=160x10-4+ 80C2

C2 =4.0 x 10-4-160x 10-6

 =400x10-6-160x10-6

 =40x10-6

 =4.0x10-5F; ✓

16.a) i) Point on principal axis to which all rays originally close and parallel to the

principal axis converge to or from which they appear to diverge from after reflection

from the mirror✓.

 ii) Distance between the pole of the mirror and principal focus✓

 b)



c) i) Focus image of distant object on the screen.

 ii) Measure distance between screen and mirror

 iii) Repeat the procedure several times

 iv) Determine the average value of d

 v) Focal length of mirror f = d

***d)For convex mirror, its formula is***

 ******✓

 ***Multiply terms in ***✓

 ******✓

e)

 ✓✓✓

 F

I

 C

 C

o

I

 Ray parallel to principal focus diverged but seem to diverge from F ;

 Ray seeming to pass through C are undeviated ;

 Position of image

 Characteristics

 Virtual✓

 upright✓

 between F and O✓

 smaller ✓