**FORM 4 TERM 2**

**PHYSICS PAPER 2**

**Marking scheme**

SECTION A 1. n = 360/𝜃 - 1 √1S = 360
𝜃 -1
θ = 360
6
= 600√12. i. Polarization√1ii. Add a depolarizer/ an oxidizing agent√13. (i) Reciprocal of the focal length power of the lens

 (ii) 1/f = gradient => f = 1/gradient

 f= 13cm

iii v =u= 27cm

1. 4. Hammering makes the dipoles to vibrate√1Earth magnetic field aligns the dipoles√15. B- North pole√1A- South pole – Allow correct pole at one end
6. A1 will shows a reading while A2 will not show any reading. This is the fact that P will be forward biased hence conducting while Q is reverse biased hence it wil not conduct.

**7.** r =beta particle ✓, c=206 ✓ d= 82 ✓8. It forms a coating at the surface to prevent rusting and as an insulator
It is less dense hence easy to carry
It is easily available/cheaper (Any TWO √1 each)9. Distance between a particle in the wave medium and the next one that is in phase with it or Distance between two successive crest/trough √1
10. V=2nd/t

= 400\*2/2.5

=320m/s

11. n=(2.2x108)/(2.0x108)

 =1.1

* 1. = sin i/sin 30

Sin I = 1.1 x sin30

 =0.55

I = sin-1 0.55

 12. (i)



(ii)

Right hand grip rule

Maxwell – cork screw rule

13. i) Wide view

 ii) Gives upright image

14. ultra violet light

**15.** a) i) A – Grid✓1

 B – Electron gun✓1

 ii) C – Vertical deflection of beam of electrons✓1

 D – Horizontal deflection of beam of electrons✓1

 iii) By thermionic emission or heating the filament✓1

 iv) To prevent ionization of electrons as they move to the anode✓1

b) i) E = ev✓1

E = 1.6 x 10-19 x 80000✓1

 = 1.28 x 10-14 J✓1

ii) ½ mv2 = 1.28 x 10-14✓1

v2 = $\frac{2 ×1.28 × 10^{-14}}{9.11 ×10-31}$

v = $\frac{\sqrt{2 ×1.28 ×10-14}}{9.11 ×10-31}$✓1

v = 2.23 x 108 ms✓1

1. (a) 

 

 

 = 1.13

(b) (i) 

 

 r = 21.3º

1. Angle of incidence = 38.7º (show working)



 = 38.7º

(iii)

(iv) - The critical angle must be exceeded. ✓¹

 - Light must be travelling from a dense medium to a less dense medium. ✓¹

1. a) Capacitors are used in

 - rectification smoothing circuits

 - tuning circuits

 - camera flash

 - reduction of sparking in induction coil contact

 any one 1

  b) i) 2 x 8 = 16 = 1.6μF

 2 + 8 10

 1.6 + 3.2 = 4.8μF ✔

 CT = 5 x 4.8 ✔ = 24 = 2.45 x 10-6F ✔

 5 + 4.8 9.8

 ii) Q = CV

 = 2.45 x 10-6 x 12 = 2.94 x 10-5C ✔

 charge on 3.2μF = 2/3 x 2.94 x 10-5

 = 1.96 x 10-5C ✔

  iii) p.d on 5mF = Q = 2.94 x 10-5 = 5.88volts ✔

 C 5 x 10-6

 iv) energy = $\frac{1}{2}$CV2 ✔

 = ½ x 2 x 10-6 x 6.122

 = 3.75 x 10-5J ✔

(c) (i) Capacitance will also increase

 (ii) capacitance will decrease.

**Parallel circuit 1/30 + 1/20 = 5/60 or 60/50**

**R = 12 Ω**

**Total resistance = 10 + 12 = 22Ω (2 marks)**

 (ii) l = V/R = 2.1/22 = 0.095A **(1 mark)**

 (iii) Reading of the voltmeter

 **V = lR = 10 x 2.1**

 **22**  **= 0.95 (2 marks)**

1. a) Lenz’s Law states that the direction of induced current is such that it opposes the charge producing it.✔

 b) i) When switch S is closed, the magnetic field strength increases (magnetic flux) from zero to maximum ✔1/2 This changing magnetic flux (field) induces an e.m.f

in the secondary coil ✔1When the switch is opened, the magnetic field strength decreases (magnetic flux) from maximum to zero ✔1/2 This produces an induced current in the secondary coil

 ii) Having more turns on the coil connected to the cell ✔

 c) i) - Hysterisis

 - Eddy currents

 - Resistance of wire

 - Loss of magnetic flux linkage

 ii) Power Primary x = VsIs ✔1

 240 x IP x = 80 x 9

 IP = ✔1 = 3.33A ✔1

*18. (a) A – cathode B – Anode C – Cooling fins*

 *(b) (i) increase the p.d at the anode (B)*

 *(ii) : increase the cathode heater current*

 *(c) Tungsten:- It has a high melting point so the heat produced will not melt it easily*

 *(d) Copper – it is used to cool/conduct heat away from the anode*

 *(e) So that the electrons do not collide with gas molecules which could result in loss of energy.*

f) E = QV = hf ✔$\frac{1}{2}$

1.6 x 1019 x 1,200 = 6.63 x 1034 x f ✔$\frac{1}{2}$

f = 2.9 x 1018 Hz ✔

 *(g) (i)Detecting fracture in bones*

 *(ii) Detecting flaws in metals*

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