**232/2**

**PHYSICS PAPER 2**

**(THEORY)**

**FORM FOUR**

**MARKING SCHEME**

1. - When the object distance from the pinhole is equal✓ to the image distance.
* When the screen is as large as the object✓1(any 1) Give 1 mk
1. i) Diffraction✓1

ii) Interference.✓1

 The two opening acts as two source✓1 hence the two waves interfere producing soft and loud sound along the way✓1

1. a) Transformer uses a.c only while induction coil uses d.c✓

b) Transformer produces a humming sound while induction coil is quiet✓1

1. i) Region C ✓1

ii) Microwaves – for cooking in microwave ovens.✓ (any 1x1 = 1 mk)

iii) For communication – satellite communication

1. i) The electrons emitted from the zinc plate✓1 are attracted by the positive charge on the electroscope, hence the leaf does not fall.✓1

ii) Electrons emitted from the zinc plate are repelled by the ✓1 negative charge on the electroscope hence the leaf falls.

1. a) Enlarged ✓

Any 2 (2x1= 2 mks)

b) Virtual ✓

c) Erect/ upright✓

1. E = IR + Ir

3.0 = I 3.5 I 0.5✓1

 I = 0.75A;✓

1. E = p t

3 ✓1

= 9kWh✓1

1. V =

1500 = ✓1

d = 150 2 = 300m✓1

1. i) Soft iron✓1 since it is easily magnetized and demagnetized.

ii) - Increasing the amount of current ✓1

* Increasing the number of turns on the coil✓1
1. Refractive index of perplex = ✓1

= ✓1 = 1.48✓1

1. Period = = 0.01✓1

f = = ✓1

f = 100Hz✓

1. a) - Risk of electric shock in case pole collapses✓
* Can cause fires to vegetation and structures✓
* Harmful effects from e-m radiations due to effects of electric field.

 b) i)

* Fuse is connected to the neutral wire✓ instead of live wire.
* Bulbs are connected to the neutral wire which is at zero potential instead of the live✓1 wire

ii)

* So as to receive the full voltage ✓1 from the source.✓1

 c) i) An a.c generator (dynamo)✓1

 ii) A – armature✓1

 B – slip rings✓1

 iii) The voltage of the induced e.m.f ✓1 doubles✓1

 d) i) f = = ✓1

 = 10Hz✓1

 ii) The slip rings have been replaced by split ✓1 rings (commuters)

1. a) A – Cathode rays/ electrons/ electron beam✓

 B – Anode / copper Anode✓ (both correct 2 x ½ = 1 mk)

b) Change in p.d across PQ cause change in filament ✓1 current **OR** temperature of cathode increases. This changes the number of electrons released by the cathode✓1 hence intensity of X- rays.

c) High density✓1

d) Q = 1t

 = 20 10-31

 Total change of electrons = ne

 20 10-3 = n 1.6 10-19✓1

 n = 1.25 1017 electrons✓1

e) i) photo emmisive✓1

 ii)

 

 iii) E = hf

 hf = hfo + K.E max

 6.63 x 10-34 x f = 6.63 x 10-34 x 5x1014 + 9.95x 10-20

 = 3.315 x 10-19 + 9.95 x 10-20✓1

 6.63x10-34f = 13.265 x 10-19✓1

 f = 2.001 x 1015 Hz✓1

1. a) i) In , the neutron to proton ratio is one✓1 thus stable, while N/P1 thus unstable.

 ii) Actual rate = 82–10= 72c/s,19-10 = 9c/s✓1

4

3

1

 72 →36 →18 →9

 →3 half lies

 t½ = = 70 sec ✓1

b) The radiations ionize argon gas✓1 along their path. The alcohol vapour condense✓ on the ions formed creating tracks.

c) i) Lower the temperature✓ in the chamber thus making it possible for the alcohol vapour to condense.

 ii) The nature of radiation✓1 can be identified

d) i) Doping in the introduction of an impurity✓1 into a pure semiconductor to improve its conductivity.

 ii) Formed by adding a pentavalent atom (phosphorous) to a group 4 semi conductor (silicon) and an extra electron is left unpaired and is available for conduction. ✓1 It’s called n-type because the majority carriers are electrons.

e) Diode is forward- biased; current flows✓1

 Diode- reverse- biased; no current flows✓1

1. a) i) A – Grid….. Controls the brightness of the spot ✓

 B – Y- plates….. deflects the electron beam vertically.✓

 iii) When the cathode is heated, electrons are emitted from it through thermionic emission which are then accelerated and focused by✓1 the anode to the fluorescent screen.

 iv) Low work function✓1

b) i) T =4 X 100

 = 400MS✓1

 f = = = 2.5Hz✓1

 ii) = n Y-gain

 = 2 120✓1

 = 240V✓1

1. a)



Reflected wavefront

b) Sound waves have longer wavelengths✓1 thus they cannot be diffracted by narrow slip. (2mks)

c) There is hot air high above the ground✓1 sound travels faster in hot air than in cold air ✓1 hence change in wavelength (2 mks)

d) i) Adjust the position of the lens until a sharp image of the flame is observed✓1

 - Record the object distance (u) and the image distance (V)

 - Repeat with different object positions✓1

 - Use the relation f = to determine f ✓1

 ii) Diverging lens produces a virtual image which cannot ✓1 be formed on a screen

e) At intercept, = 2.5 10-2 cm-1✓1

 = 2.5 10-2

 f = 10-2 ✓1 1