GATUNDU SOUTH COUNTY EVALUATION EXAMINATION MARKING SCHEME
JULY/AUGUST 2018
PHYSICS PAPER 2 (232/2)

SECTION A (25 MARKS)

1).

$$P = \frac{V^2}{R} \checkmark 1$$

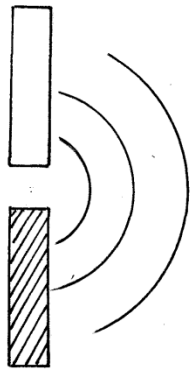
$P_A R_A = P_B R_B$

$1000R_A = 2500R_B$ ✓1

$= 240^2$

$$\frac{R_A}{R_B} = \frac{2500}{1000} = 2.5 \checkmark 1$$

2).



Correct shape✓1

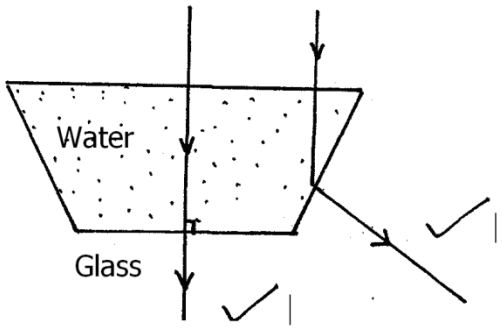
Same wavelength as incident rays✓1

3).

The distance between the plates ✓1

Presence of dielectric material between the plates✓

4).

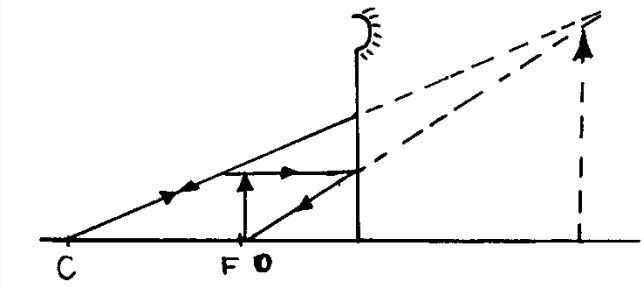


5).

To reduce energy (power) losses during transmission ✓1

6).

The image should appear as shown:

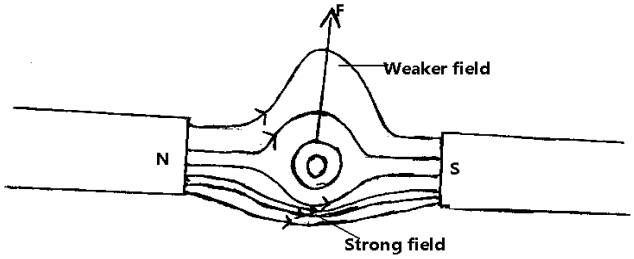


Virtual image; ✓
Rays virtual; ✓
Rays Real; ✓

7) Microwaves

Infrared
X – rays

8). The diagram should appear as follows:



Correct field ✓1
Direction of force ✓1

9). a) Zinc

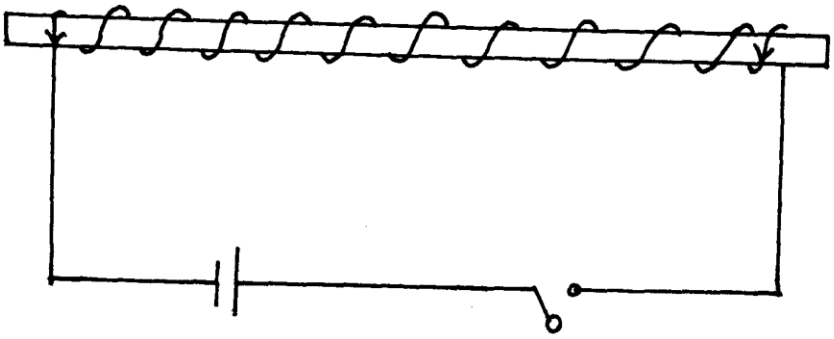
b) The bulb goes off due to polarization effect.
c) Polarization is minimized by using a depolarizer e.g. manganese IV oxide.

10). a) The work function of the surface

b). Energy/frequency of radiation

11). High concentration of positive charges at the sharp point causes ionization to provide electrons and positive ions, ✓1 electrons are attracted to the wire while positive ions drift towards the flame forming an electric wind ✓1 which deflects the flame

12).



Correct circuit connection by closing the switch current flow as shown and AB becomes magnetised

SECTION B (55 MARKS)

13). a) i) A: Tungsten or molybdenum target

B: Lead shield

ii) X – rays tube requires very high accelerating voltage. ✓1 The C steps up voltage to the required potential.

iii) Current is allowed to flow through the filament in the cathode heating it and boiling off electrons (through thermionic emission) ✓1 the high potential difference between the cathode and the target (anode) accelerates the electrons to hit the target✓1 the X – rays are produced when the electrons hit the target. ✓1

(b) (i) To avoid/ prevent ionization ✓1
To reduce energy losses (Any one)
(ii) Increasing the cathode currents✓1

c)

$K.e = \frac{hc}{\lambda};$ ✓1

$1.989\times10^{-14} = 6.6\times10^{-34}\times\frac{3.0\times10^{-8}}{\lambda};$ ✓1

$\lambda = 9.955\times10^{-12}m$ ✓1

14). a) i) To be easily ionized by the radiations.

ii) The radiation is transparent to the window; They collide with argon gas causing ionization; more electrons are produced (Avalanche/electrons). A pulse of current; is produced which is passed through the counter as clicks

iii) Quenching agent /absorbing kinetic energy of the positive ions

b) Amount of A – remaining $= \left(\frac{1}{2}\right)^4 \times 32$ ✓1

$= 2$ g; ✓1

Amount of B (mass of y) $= 32 - 2$

$= 30$ g ✓1

c) a = 226; b = 288

15). a) i) The e.m.f of 12 v is split into three equal parts across each resister. Or $\frac{12}{3} = 4$

Therefore, voltmeter reads 4v.

Reasoning✓1

Answer✓1

ii) $\frac{1}{R_p} = \frac{1}{R} + \frac{1}{R} = \frac{2}{R}$

$= Rp = \frac{R}{2}$ ✓ ½

$R_s = R + R + \frac{R}{2} = \frac{5}{2}R$✓ ½

$I = \frac{v}{R} = \frac{12}{\left(\frac{5}{2}\right)R}$ ✓ ½

P.d across Qs = I R✓ ½

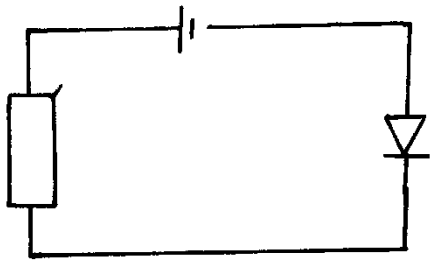
Hence $\frac{12}{\left(\frac{5}{2}\right)R}$ x $\frac{12 \times 2}{5}$ = 4.8 V✓1

b) i). In semi-conductor conduction is by holes and electrons while in conductors it is by electrons only✓1

ii) Semi-conductors – silicone/ Germanium
Conductors - copper, tin e.t.c

iii) Is an impurity which when introduced into a semi-conductor (during doping) provides extra electrons for conduction.

iv)



v) There is conduction because the diode is forward biased✓1

16). (a) Mechanical waves are waves which require a material for their transmission while ✓1 electromagnetic waves do not require a material medium

(b) The sound source exerts varying pressure on the air creating compressions and rarefactions in the air which move along the air column.✓1

(c) (i) Sound becomes less audible until it finally disappears✓1

(ii) The steam condenses creating a vacuum in the region above the water ✓1
A vacuum cannot transmit sound✓1

(d) $v = \frac{2x}{t}$ ✓1

Distance to first wall x_1

$x_1 = \frac{vt}{2} = \frac{330 \times 0.7}{2} = 115.5m$ ✓1

Distance to the second wall x 2

$X_2 = \frac{V_t}{2} = \frac{330 \times 0.9}{2} = 148.5m$ ✓ 1

$S = X_1 + X_2 = 148.5 + 115.5 = 264m$

17). a) i) P – Carbon Brush *Not brushes

Q – Slip ring

ii) – Increasing the speed of the rotating coil

- Inserting a soft Iron core

b)

i) output voltage (2marks)

$\frac{N_S}{N_P} = \frac{V_S}{V_P}$ ✓½

$\frac{60}{1200} = \frac{V_S}{240}$ ✓½

$V_S = \frac{240 \times 60}{120} = 12V$ ✓1

ii) output current when the primary coil has a current of 0.5A.Assume there are no energy losses. (2marks)

$V_S I_S = I_P V_P$ ✓½

$12 \times I_S = 0.5 \times 240$ ✓1

$I_S = 10A$ ✓½

c). So as to create a North pole which opposes the approaching North Pole according to Lenz's Law.

d).
- Hysteresis
- Eddy currents
- Resistance of wire
- Loss of magnetic flux linkage *Any two (2mks)*