**PHYC PP2 MUMIAS WEST JOINT EVALUATION TEST**

**JUNE SERIES 2022**

***SECTION A***



 √- Correct direction of reflected ray

 √- Final angle of reflection = 60o

2.



property--- variation of wavelengths when wave fronts move from shallow to deep region

3. in a radio tuning circuit

4. The metre rule will tip in anticlockwise direction√. This is because when the switch S is closed the iron core becomes magnetized with the top of the core becoming a south pole√ hence attracts the north pole of the magnet.

5. I = $\frac{1800}{240}$ = 7.5 A√ safest fuse = 10 A√ which is slightly above the operating current√.

6. a) A- Micro wave

 b) Photographic film, photocell, fluorescent materials

7. Metals get charged by induction, the charges are transferred from the electroscope this causes earthing, / charges on the electroscope induce opposite charges on the conductor.

8. Total capacitance = 2(8) + (2.4) = 4.0µf√

 (2+8)

 Q = CV

 = 4(3) √

 = 12µC √

9. Hydrogen gas insulates copper plate√ thus increasing the internal resistance√ of the cell

10. f = no. of holes × rev. per sec.

= 200 × 30/60 = 100Hz √1

λ = V/f = 340/100

 = 3.4m√1

11. Real images are formed on the screen while virtual images appear behind the screen.

12.

I

F

F

O

 √ a mark for each ray

 √ for correct position of image

13. Area of each plate

 Number of plates

***SECTION B (55MKS)***

14.

1. Cooling fins /copper fins .
2. Increase the cathode heater current .
3. Increasing the anode potential
4. To prevent **energy loss** by electrons this results from **collisions** with the air particles
5. $Q=It=15 x10^{-3}x1= 15 x10^{-3}C$

$$N= \frac{Q}{e}=\frac{15 x10^{-3}}{1.6 x 10^{-19}}=9.4 x 10^{16}electrons$$

$$V= \sqrt{\frac{2eV}{m\_{e}}} =\sqrt{\frac{2x 1.6 x10^{-19}x10,000}{9.1 x 10^{-31}}}$$

$$=5.93 x 10^{7}m/s$$

15. .(a) E.m.f is the p.d. across the battery in the ü1 open circuit while terminal voltage is the p.d. across the cell is a closed circuit.

(b) By Connecting the bulbs in parallel, √ this lowers the total resistance in the circuit thus the brightness increases.

(C) (i) E = V+Ir

 (ii) E = IR + Ir

 V = E - Ir

 V = -Ir + E

 Slope

(iii) E.m.f = 1.625V

(d)

V

I

The resistance of the metallic conductor increases with increase in its temperature.

16. a) (i) Radioactive decay is the spontaneous random disintegration of an unstable

nuclide to form a stable nuclide. ✓ 1mk

ii) - Counts registered in the absence of a radioactive source; ✓1mk any one

- Radiations present on the surface of the earth and in the atmosphere 1mk

b) - Cosmic radiation from the sun

- Radio isotopes in the earth’s rocks

- Nuclear waste from nuclear power stations Any 2 4’

- Screen of TV

- Some paints are radioactive.

c) i) - ionizes the gas ✓ 1mk

ii) - Ions are attracted towards electrodes 1mk

- Collision with other molecules cause avalanche of ions which on attraction to electrodes cause discharge. ✓1mk

d) i) Negative

ii) K—Alpha Radiation L- Beta Radiation

iii) K is more massive than L

 (e) No = 82 - 10 = 72

 N = 19 - 10 = 9

 72 36 18 9

 3 - half line = 210

 1 half life = 210/3 = 70 seconds.

17. a) Total internal reflection.

 .Rays of light undergo total internal reflection repeatedly on the boundary of high and low refractive index the entire length of the fibre.

 b) Light must be traveling from optically denser to a less dense medium

 The angle of incidence in the denser medium must be greater than the critical angle

c (i) sin 60o = 1.5

 sin x

 sin x = sin 60o = 0.5774

 1.5

X = Sin-1(0.5774)

 = 35.260

ii) gnw = gna×. anw

 = 2/3 x 4/3

 = 0.8889

iii) sin 35.26o = 8/9

 sin y

 y = sin -1(0.6494)

 Y = 40.5o

18. a) An induction coil uses direct current while a transformer uses alternating current.

 b) i) As the diaphragm vibrate to and fro due to sound wave impact, it causes the coil to move forth and back cutting through the magnetic field lines. This causes a varying electromotive force to be induced in the coil which causes a varying current to flow.

 ii) Increase impulsive force of sound waves to diaphragm

 Increase sound frequency

 Increase no. of turns

 Increase strength of magnet / use magnet with closer poles

 ***any two***

 c) I) i) Occurs when some of the magnetic flux produced by the primary coil does not link up with the secondary coil.

 ii) Secondary coil wound on top of the primary coil✓

II) i) Primary coil

 ii) It carries more current than the secondary coil in a step up transformer and should have very little resistance.