

SECOND MID TERM TEST - 2023

STD - XII

PHYSICS

TIME : 1.30 Hrs

YouTube/ Akwa Academy

MARKS : 35

I. Choose the correct Answer.

10 x 1 = 10

1. A ray of light strikes a glass plate of an angle of 60° . If the reflected and refracted rays are perpendicular each other, the refractive index of glass is

- a) $\sqrt{3}$ b) $\frac{3}{2}$ c) $\sqrt{\frac{3}{2}}$ d) 2

2. The transverse nature of light is shown in

- a) interference b) diffraction c) scattering d) polarisation

3. If the velocity and wavelength of light in air is V_a and λ_a and that in water is V_w and λ_w . Then the refractive index of water is

- a) $\frac{\lambda_w}{\lambda_a}$ b) $\frac{V_w}{V_a}$ c) $\frac{V_a \lambda_a}{V_w \lambda_w}$ d) $\frac{V_a}{V_w}$

4. In photoelectric emission, a radiation whose frequency is 4 times threshold frequency of a certain metal is incident on the metal. Then the maximum possible velocity of the emitted electron will be

- a) $\sqrt{\frac{hV_0}{m}}$ b) $\sqrt{\frac{6hV_0}{m}}$ c) $2\sqrt{\frac{hV_0}{m}}$ d) $\sqrt{\frac{hV_0}{2m}}$

5. The wave associated with a moving particle of mass $3 \times 10^{-6} \text{g}$ has the same wavelength as an electron moving with a velocity $6 \times 10^6 \text{ms}^{-1}$. The velocity of the particle is

- a) $1.82 \times 10^{-18} \text{ms}^{-1}$ b) $9 \times 10^{-12} \text{ms}^{-1}$ c) $3 \times 10^{-31} \text{ms}^{-1}$ d) $1.82 \times 10^{-15} \text{ms}^{-1}$

6. Which one of the following particle having maximum de broglie wavelength?

- a) electron b) proton c) neutron d) α - particle

7. The nucleus is approximately spherical in shape. Then the surface area of nucleus having mass number A varies as

- a) $A^{2/3}$ b) $A^{4/3}$ c) $A^{1/3}$ d) $A^{5/3}$

8. The half-life period of a radioactive element A is same as the mean life time of another radioactive element B. Initially both have the same number of atoms. Then ...

a) A and B have the same decay rate initially

b) A and B decay at the same rate always.

c) B will decay at faster rate than A

d) A will decay at faster rate than B

9. The ratio between the area of first three orbits of hydrogen atom is

- a) 1 : 2 : 3 b) 1 : 16 : 81 c) 1 : 4 : 9 d) 1 : 3 : 5

10. For light incident from air on a slab of refractive index 2, the maximum possible angle of refraction is

- a) 60° b) 30° c) 90° d) 45°

II. Answer any three Questions. Q.No.16 is compulsory**3 x 2 = 6**

11. State Huygen's principle.
12. Define work function of a metal. Mention its units: *half life*
13. What is Rayleigh's criterion?
14. Why we do not see the wave properties of a baseball?
15. What is isotope? Give an example.
16. The radius of the 5th orbit of hydrogen atom is $13.25A^{\circ}$. Calculate the de broglie wavelength of the electron orbiting in the 5th orbit.

YouTube/ Akwa Academy**III. Answer any three Questions. Q.No. 19 is compulsory****3 x 3 = 9**

17. Mention the differences between interference and diffraction.
18. Give the uses of polaroids.
19. A radiation of wavelength 300nm is incident on a silver surface. Will photoelectrons be observed? [work function of silver = 4.7 eV]
20. List out the laws of photo electric effect.
21. Discuss the alpha decay with example. *photo cell*
22. Explain the idea of Carbon dating.

IV. Answer all the Questions.**2 x 5 = 10**

23. Obtain the equation for bandwidth in young's double slit experiment.

(OR)

Briefly explain the principle and working of electron microscope.

24. Derive an expression for radius of n^{th} orbit by using Bohr atom model. *hydro*

(OR)

Obtain Einstein's photoelectric equation with necessary explanation.