

SRI KRISHNA MATRIC HR. SEC. SCHOOL, ODDANCHATRAM
III – 25 % EXAMINATION – 2023-2024

CLASS: XII
SUBJECT : PHYSICS

MAX MARKS : 70
TIME: 3.00 Hrs.

I. Choose the correct answer:

15X1=15

1. An object is placed between two plane mirrors inclined at 30° to each other. How many images will be formed?
a) 9 b) 10 c) 11 d) 12
2. Which of the following factors does the intensity of light depend on?
a) Frequency b) Wavelength c) Amplitude d) Velocity
3. The polarising angle for water is $53^\circ 4'$. If the light is incident at this angle on the surface of water, the angle of refraction in water
a) $53^\circ 4'$ b) $26^\circ 30'$ c) $30^\circ 4'$ d) $36^\circ 56'$
4. The distance upto which ray optics is a good approximation for light of wavelength 500 nm falls on an aperture of width 0.5 mm.
a) 25 cm b) 20 cm c) 15 cm d) 10 cm.
5. The power of the combination of the lenses of focal lengths 2 cm and 4 cm are in contact is
a) $3/4D$ b) $4/3D$ c) 75D d) 0.013 D
6. The optical path of the light travels from air into a glass slab of thickness 50 cm and refractive index 1.5.
a) 75 cm b) 0.01 cm c) 0.03 cm d) 51.5 cm
7. Which of the following phenomenon is used in optical fibre?
a) Refraction b) Diffraction
c) Scattering d) Total Internal Reflection
8. Which of the following factors affects the amount of scattering of light?
a) Wavelength of the light b) Intensity of the light
c) Temperature of the medium d) All of the above
9. In Young's double slit experiment, a minimum is obtained when the phase difference of superimposing waves is
a) Zero b) $(2n-1)\pi$ c) $n\pi$ d) $(n+1)\pi$

10. In the propagation of light waves, the angle between the plane of vibration and plane of polarisation is

- a) 0° (b) 90° (c) 45° (d) 80°

11. Linear magnification of a simple microscope is 5. Find its focal length.

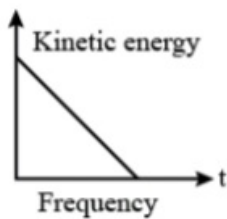
- a) 4.75 cm (b) 5.75 cm (c) 6.25 cm (d) 5.25 cm

12. A proton and an alpha particle are accelerated in a field of the same potential difference.

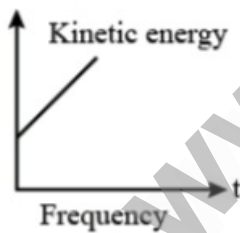
Then, the ratio of the Broglie wavelengths associated with the moving material particles is.

- a) $2\sqrt{2} : 1$ (b) 1:2 (c) 4:1 (d) 2:1

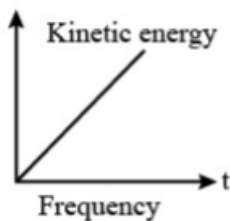
13. According to Einstein's photoelectric equation, the graph between the kinetic energy of photoelectrons ejected and the frequency of incident radiation is:



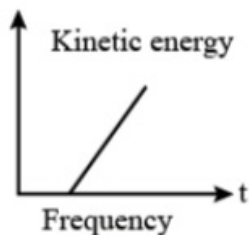
b)



c)



d)



14. When the minimum wavelength of X-rays is 2\AA then the applied potential difference between cathode and anticathode will be

- a) 6.2 kV b) 2.48 kV c) 24.8 kV d) 62 kV

15. When light falls on a photosensitive surface, electrons are emitted from the surface. The

kinetic energy of these electrons does not depend on the:

- a) Wavelength of light b) thickness of the surface layer
c) type of material used for the layer d) Intensity of light.

II. Answer any six of the following questions. Qn.No.24 is compulsory. 6x2 =12

16. Why does sky appear blue?

17. What are primary focus and secondary focus of a lens?

18. Pure water has refractive index 1.33. What is the speed of light through it?

19. State Huygens' principle.

20. List the uses of polaroids.

21. Calculate the power of the lens of the spectacles needed to rectify the defect of nearsightedness for a person who could see clearly up to a distance of 1.8 m.

22. Define stopping potential.

23. Define work function of a metal. Give its unit.

24. Calculate the cut-off wavelength of x-rays from an x-ray tube of accelerating potential 20,000 V.

III. Answer any six of the following questions. Qn.No.33 is compulsory. 6x3 =18

25. Obtain the equation for apparent depth.
26. What are mirage and looming?
27. Find the dispersive power of a prism if the refractive indices of flint glass for red, green and violet colours are 1.613, 1.620 and 1.632 respectively.
28. Differentiate between Fresnel and Fraunhofer diffraction.
29. State Brewster's law and derive the relationship between polarising angle and refractive index.
30. List out the laws of photoelectric effect.
31. How many photons per second emanate from a 50 mW laser of 640 nm?
32. Give the applications photocell.
33. Two light sources with amplitudes 5 units and 3 units respectively interfere with each other. Calculate the ratio of maximum and minimum intensities.

IV. Answer the following questions in detail.

5x5 =25

34. Briefly explain the principle and working of electron microscope.

(OR)

Obtain the equation for radius of illumination (or) Snell's window.

35. Derive the equation for angle of deviation produced by a prism and thus obtain the equation for refractive index of material of the prism.

(OR)

Explain about compound microscope and obtain the equation for the magnification.

36. Using Young's double slit experiment derive path difference and bandwidth.

(OR)

Explain the effect of potential difference on photoelectric current.

37. Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.

(OR)

Derive the equation for refraction at single spherical surface.

38. Describe the Fizeau's method to determine the speed of light.

(OR)

Prove law of reflection using Huygens' principle.

👍 *All the best* 👍

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