

CLASS-XII	VGR COACHING CENTER PHYSICS [CHAPTER 7,8,9]	MARK-75
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PART-A

CHOOSE THE CORRECT ANSWER

1. First diffraction minimum due to a single slit of width 1.0×10^{-5} cm is at 30° . Then wavelength of light used is,
(a) 400 \AA (b) 500 \AA (c) 600 \AA (d) 700 \AA
2. Two coherent monochromatic light beams of intensities I and $4I$ are superposed. The maximum and minimum possible intensities in the resulting beam are
(a) $5I$ and I (b) $5I$ and $3I$ (c) $9I$ and I (d) $9I$ and $3I$
3. Light transmitted by Nicol prism is,
(a) partially polarised (b) unpolarised (c) plane polarised (d) elliptically polarised
4. When a metallic surface is illuminated with radiation of wavelength λ , the stopping potential is V . If the same surface is illuminated with radiation of wavelength 2λ , the stopping potential is $V/4$. The threshold wavelength for the metallic surface is
a) 4λ b) 5λ c) $5/2\lambda$ d) 3λ
5. Two radiations with photon energies 0.9 eV and 3.3 eV respectively are falling on a metallic surface successively. If the work function of the metal is 0.6 eV , then the ratio of maximum speeds of emitted electrons in the two cases will be
a) $1:4$ b) $1:3$ c) $1:1$ d) $1:9$
6. If the mean wavelength of light from sun is taken as 550 nm and its mean power as $3.8 \times 10^{26} \text{ W}$, then the number of photons emitted per second from the sun is of the order of
a) 10^{45} b) 10^{42} c) 10^{52} d) 10^{51}
7. The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is
a) 4125 \AA b) 3750 \AA c) 6000 \AA d) 2062.5 \AA
8. The work functions for metals A, B and C are 1.92 eV , 2.0 eV and 5.0 eV respectively. The metal/metals which will emit photoelectrons for a radiation of wavelength 4100 \AA is/are
a) A only b) both A and B c) all these metals d) none
9. Emission of electrons by the absorption of heat energy is called.....emission.
a) photoelectric b) field c) thermionic d) secondary

10. 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.
11. The ratio of the wavelengths for the transition from $n = 2$ to $n = 1$ in and H is
- (a) 1:2:3 (b) 1:4:9 (c) 3:2:1 (d) 4:9:36
12. If the nuclear radius of ^{27}Al is 3.6 fermi, the approximate nuclear radius of ^{64}Cu is
- (a) 2.4 (b) 1.2 (c) 4.8 (d) 3.6
13. Atomic number of H-like atom with ionization potential 122.4 V for $n = 1$ is
- a) 1 b) 2 c) 3 d) 4
14. The ratio between the first three orbits of hydrogen atom is
- a) 1:2:3 b) 2:4:6 c) 1:4:9 d) 1:3:5
15. The charge of cathode rays is
- a) positive b) negative c) neutral d) not defined

PART-B WRITE ANY 7

Q.NO 20 IS COMPULSORY

- 16. State Huygens' principle
- 17. What are polariser and analyser?
- 18. Define work function of a metal. Give its unit
- 19. Define stopping potential.
- 20. Calculate the cut-off wavelength and cut-off frequency of x-rays from an x-ray tube of accelerating potential 20,000 V.
- 21. State and obtain Malus' law.
- 22. What is hypermetropia? What is its remedy?
- 23. Define impact parameter
- 24. What is meant by activity or decay rate? Give its unit.
- 25. Define curie.

PART-C WRITE ANY 7

Q.NO 35 IS COMPULSORY

- 26. Differentiate between Fresnel and Fraunhofer diffraction.
- 27. Discuss about Nicol prism.

28. Explain double refraction?
29. List out the laws of photoelectric effect
30. Derive an expression for de Broglie wavelength of electrons
31. Explain the idea of carbon dating.
32. Write down the postulates of Bohr atom model.
33. Give the construction and working of photo emissive cell.
34. a. Distance of closet approach
b. Property of neutrons
35. Characol pieces of tree is found from an archeological site. The carbon-14 content of this characol is only 17.5% that of equivalent sample of carbon from a living tree. What is the age of tree?

PART-D

ANSWER ALL QUESTIONS

36. Explain the Young's double slit experimental setup and obtain the equation for path difference
OR
Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.
37. Discuss the diffraction at single slit and obtain the condition for nth minimum.
OR
Prove law of reflection using Huygens' principle
38. Explain how frequency of incident light varies with stopping potential.
OR
Obtain Einstein's photoelectric equation with necessary explanation.
39. Explain the J.J. Thomson experiment to determine the specific charge of electron.
OR
Discuss the Millikan's oil drop experiment to determine the charge of an electron.
40. Discuss the spectral series of hydrogen atom.
OR
Obtain the law of radioactivity.

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