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TARGET : NEET (UG) 2024

Course : SARANSH (Youtube Live CRASH COURSE)

PHYSICS
DPP
DAILY PRACTICE PROBLEMS
DPP NO. 2

PHYSICS: MODERN PHYSICS

DPP No. : 2

1. The ratio of de Broglie wavelengths of a proton and a neutron moving with the same velocity is nearly

(1) 1 (2) $\sqrt{2}$ (3) $1/\sqrt{2}$ (4) none of the above

2. Two particles have identical charges. If they are accelerated through identical potential differences, then the ratio of their deBroglie wavelength would be

(1) $\lambda_1 : \lambda_2 = 1 : 1$
(2) $\lambda_1 : \lambda_2 = m_2 : m_1$
(3) $\lambda_1 : \lambda_2 = \sqrt{m_2} : \sqrt{m_1}$
(4) $\lambda_1 : \lambda_2 = \sqrt{m_1} : \sqrt{m_2}$

3. If a_0 is the Bohr radius, the radius of the n = 2 electronic orbit in triply ionized beryllium is -

(1) $4a_0$ (2) a_0 (3) $a_0/4$ (4) $a_0/16$

4. In Bohr's model of hydrogen atom, the centripetal force is provided by the Coulomb attraction between the proton and the electron. If a_0 is the radius of the ground state orbit, m is the mass and e the charge of an electron and ε_0 is the vacuum permittivity, the speed of the electron is :

(1) zero (2) $\frac{e}{\sqrt{\varepsilon_0 a_0 m}}$ (3) $\frac{e}{\sqrt{4\pi\varepsilon_0 a_0 m}}$ (4) $\frac{\sqrt{4\pi\varepsilon_0 a_0 m}}{e}$

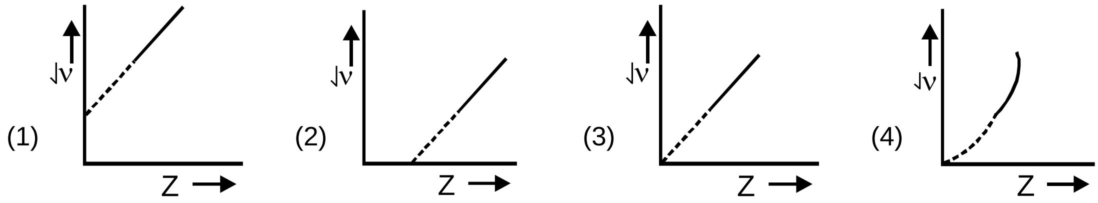
5. If an orbital electron of the hydrogen atom jumps from the ground state to a higher energy state, its orbital speed reduces to half its initial value. If the radius of the electron orbit in the ground state is r, then the radius of the new orbit would be :

(1) 2r (2) 4r (3) 8r (4) 16r

6. Three photons coming from excited atomic-hydrogen sample are picked up. Their energies are 12.1eV, 10.2eV and 1.9eV. These photons must come from

(1) a single atom
(2) two atoms
(3) three atom
(4) either two atoms or three atoms

7. The graph between the square root of the frequency of a specific line of characteristic spectrum of X-rays and the atomic number of the target will be



8. The de Broglie wavelength of an electron moving with a velocity 1.5×10^8 ms^{-1} is equal to that of a photon. The ratio of the kinetic energy of the electron to that of the energy of photon is :

(1) 2 (2) 4 (3) $\frac{1}{2}$ (4) $\frac{1}{4}$

9. Let p and E denote the linear momentum and the energy of a photon. For another photon of smaller wavelength (in same medium)

(1) both p and E increase
(2) p increases and E decreases
(3) p decreases and E increases
(4) both p and E decreases

10. Two separate monochromatic light beams A and B of the same intensity (energy per unit area per unit time) are falling normally on a unit area of a metallic surface. Their wavelength are λ_A and λ_B respectively. Assuming that all the incident light is used in ejecting the photoelectrons, the ratio of the number of photoelectrons from beam A to that from B is

(1) $\left(\frac{\lambda_A}{\lambda_B}\right)$ (2) $\left(\frac{\lambda_B}{\lambda_A}\right)$ (3) $\left(\frac{\lambda_A}{\lambda_B}\right)^2$ (4) $\left(\frac{\lambda_B}{\lambda_A}\right)^2$