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TARGET : NEET (UG) 2024

Course : SARANSH (Youtube Live CRASH COURSE)

PHYSICS
DPP
DAILY PRACTICE PROBLEMS
DPP NO. 1

PHYSICS: MODERN PHYSICS

DPP No. : 1

1. An electron of mass ' m ', when accelerated through a potential V has de–Broglie wavelength λ. The de–Broglie wavelength associated with a proton of mass M accelerated through the same potential difference will be:

(1) $\lambda\sqrt{\frac{M}{m}}$ (2) $\lambda\sqrt{\frac{m}{M}}$ (3) $\lambda\left(\frac{M}{m}\right)$ (4) $\lambda\left(\frac{m}{M}\right)$

2. Two hydrogen atoms are in excited state with electrons residing in n = 2. First one is moving towards left and emits a photon of energy E_1 towards right. Second one is moving towards left with same speed and emits a photon of energy E_2 towards left. Taking recoil of nucleus into account during emission process

(1) $E_1 > E_2$ (2) $E_1 < E_2$ (3) $E_1 = E_2$ (4) information insufficient

3. Consider atoms H, He^+, Li^{++} in their ground states. If L_1, L_2 and L_3 are magnitude of angular momentum of their electrons about the nucleus respectively then :

(1) $L_1 = L_2 = L_3$ (2) $L_1 > L_2 > L_3$ (3) $L_1 < L_2 < L_3$ (4) $L_1 = L_2 = L_3$

4. The voltage applied to an X-ray tube is 18 kV. The maximum mass of photon emitted by the X-ray tube will be:

(1) 2×10^{-13} kg (2) 3.2×10^{-36} kg (3) 3.2×10^{-32} kg (4) 9.1×10^{-31} kg

5. When a metallic surface is illuminated with monochromatic light of wavelength λ, the stopping potential is $5\,V_0$. When the same surface is illuminated with light of wavelength 3λ, the stopping potential is V_0. Then the work function of the metallic surface is :

(1) $\frac{hc}{6\lambda}$ (2) $\frac{hc}{5\lambda}$ (3) $\frac{hc}{4\lambda}$ (4) $\frac{2hc}{4\lambda}$

6. The energy difference between the first two levels of hydrogen atom is 10.2 eV. What is the corresponding energy difference for a singly ionized helium atom ?

(1) 10.2 eV (2) 20.4 eV (3) 40.8 eV (4) 81.6 eV

7. If the binding energy of the electron in a hydrogen atom is 13.6 eV, the energy required to remove the electron from the first excited state of Li^{2+} is :

(1) 30.6 eV (2) 13.6 eV (3) 13.6 eV (4) 122.4 eV

8. Consider a hypothetical annihilation of a stationary electron with a stationary positron. What is the wavelength of resulting radiation.

(1) $\frac{h}{2m_0c}$ (2) $\frac{h}{m_0c}$ (3) $\frac{2h}{m_0c}$ (4) $\frac{h}{m_0c^2}$

(h = Plank's constant, c = speed of light, m_0 = rest mass)

9. Photoelectric effect can be explained by assuming that light

(1) is a form of transverse waves (2) is a form of longitudinal waves

(3) can be polarised (4) consists of quanta

10. The ratio of deBroglie wavelengths of a proton and an alpha particle of same energy is .

(1) 1 (2) 2 (3) 4 (4) 0.25