DPP
DAILY PRACTICE PROBLEMS

CLASS : XIITH **SUBJECT : PHYSICS**
DATE : **DPP NO. : 8**

Topic :-Atoms

1. The colour of the second line of Balmer series is
   a) Blue b) Yellow c) red d) violet

2. An α - particle of energy 5MeV is scattered through 180° by a fixed uranium nucleus. The distance of closest approach is of the order of
   a) 1 A°b) 10^{-10} cmc) 10^{-12}cmd) 10^{-15}cm

3. The wavelength of radiation emitted is λ_0 when an electron jumps from the third to the second orbit of hydrogen atom. For the electron jump from the fourth to the second orbit of hydrogen atom,the wavelength of radiation emitted will be
   a) $\frac{16}{25}\lambda_0$ b) $\frac{20}{27}\lambda_0$ c) $\frac{27}{20}\lambda_0$ d) $\frac{25}{16}\lambda_0$

4. For light of wavelength 5000 Å, photon energy is nearly 2.5 eV. For X-rays of wavelength 1 Å, the photon energy will be close to
   a) [2.5 ÷ 5000]eVb) $[2.5 \div (5000)^2]$eVc) [2.5 × 5000]eVd) $[2.5 \times (5000)^2]$eV

5. The ionisation energy of 10 time ionised sodium atom is
   a) $\frac{13.6}{11}$eV b) $\frac{13.6}{112}$eV c) 13.6 × $(11)^2$eV d) 13.6 eV

6. What is the maximum wavelength of light emitted in Lyman series by hydrogen atom?
   a) 691 nm b) 550 nm c) 380 nm d) 122 nm

7. The Rydberg constant R for hydrogen is
   a) $R = -\left(\frac{1}{4\pi\varepsilon_o}\right)\frac{2\pi^2me^2}{ch^2}$ b) $R = \left(\frac{1}{4\pi\varepsilon_o}\right)\frac{2\pi^2me^2}{ch^2}$
   c) $R = \left(\frac{1}{4\pi\varepsilon_o}\right)^2\frac{2\pi^2me^2}{c^2h^2}$ d) $R = \left(\frac{1}{4\pi\varepsilon_o}\right)^2\frac{2\pi^2me^4}{ch^3}$

8. A photon collides with a stationary hydrogen atom in ground state inelastically. Energy of the colliding photon is 10.2 eV. After a time interval of the order of micro second another photon collides with same hydrogen atom inelastically with an energy of 15n eV. What will be observed by the detector?
   a) 2 photon of energy 10.2 eV.
   b) 2 photon of energy of 1.4 eV.
   c) One photon of energy 10.2 eV and an electron of energy 1.4 eV
   d) One photon of energy 10.2 eV and another photon of energy 1.4 eV

9. The ratio of kinetic energy and the total energy of the electron in the nth quantum state of Bohr's atomic model of hydrogen atom is
   a) - 2 b) - 1 c) +2 d) +1

10. When an electron jumps from the orbit $n = 2$ to $n = 4$,then wavelength of the radiations absorbed will be (R is Rydberg's constant)
   a) $\frac{3R}{16}$ b) $\frac{5R}{16}$ c) $\frac{16}{5R}$ d) $\frac{16}{3R}$

11. Assuming the mass of earth as 6.64×10^{24} kg and the average mass of the atoms that makes up earth as 40 u (atomic mass unit), the number of atoms in the earth is approximately
   a) 10^{30} b) 10^{40} c) 10^{50} d) 10^{60}

12. The shortest wavelength which can be obtained in hydrogen spectrum is ($R = 10^7\ m^{-1}$)
   a) 1000 Å b) 800 Å c) 1300 Å d) 2100 Å

13. The K_α line of singly ionised calcium has a wavelength of 393.3nm as measured on earth. In the spectrum of one of the observed galaxies, the spectral line is located at 401.8 nm. The speed with which this galaxy is moving away from us, will be
   a) 7400 ms^{-1} b)32.4 $\times$ 10^2 ms^{-1} c)6480kms^{-1} d) None of these

14. The binding energy of the electron in the lowest orbit of the hydrogen atom is 13.6 eV. The energies required in eV to remove an electron from the three lowest orbits of the hydrogen atom are
   a) 13.6, 6.8, 8.4 b) 13.6, 10.2, 3.4 c) 13.6, 27.2, 40.8 d) 13.6, 3.4, 1.5

15. What is the radius of Iodine atom? (Atomic no.53, mass no.126)
   a) 2.5×10^{-11}m b) 2.5×10^{-9}m c)7×10^{-9}m d) 7×10^{-11}m

16. Hydrogen atom from excited state comes to the ground state by emitting a photon of avelength λ. If R is the Rydberg constant, the principal quantum number n of the excited state is

a) $\sqrt{\frac{\lambda R}{\lambda R - 1}}$ b) $\sqrt{\frac{\lambda}{\lambda R - 1}}$ c) $\sqrt{\frac{\lambda R^2}{\lambda R - 1}}$ d) $\sqrt{\frac{\lambda R}{\lambda - 1}}$

17. The spectrum of an oil flame is an example for

a) Line emission spectrum
b) Continuous emission spectrum
c) Line absorption spectrum
d) Band emissionspectrum

This section contain(s) 0 questions numbered 1 to 0. Each question contains STATEMENT 1(Assertion) and STATEMENT 2(Reason). Each question has the 4 choices (a), (b), (c) and (d) out of which **ONLY ONE** is correct.

a) Statement 1 is True, Statement 2 is True; Statement 2 **is** correct explanation for Statement 1

b) Statement 1 is True, Statement 2 is True; Statement 2 **is not** correct explanation for Statement 1

c) Statement 1 is True, Statement 2 is False

d) Statement 1 is False, Statement 2 is True

18. **Statement 1:** It is difficult to excite nucleus to higher energy states by usual methods which we use to excite atoms like by heating or by irradiation of light.

Statement 2: Terms like ground state or excited state for nucleus are meaningless.

19. **Statement 1:** An alpha particle is a doubly ionized helium atom.

Statement 2: An alpha particle carries 2 units of positive charge.

20. **Statement 1:** In He-Ne laser, population inversion takes place between energy levels of neon atoms.

Statement 2: Helium atoms have a meta-stable energy level.