DPP
DAILY PRACTICE PROBLEMS

CLASS : XIITH **SUBJECT : PHYSICS**
DATE : **DPP NO. : 2**

Topic :-Atoms

1. The ground state energy of hydrogen atom is -13.6 eV. When its electron is in the first excited
   state, its excitation energy i

   a) 3.4 eV b) 6.8 eV c) 10.2 eV d) Zero

2. Two energy lavels of an electron in an atom are separated by 2.3 eV. The frequency of radiation emitted when the electrons go from higher to lower level is
   a) 6.95×10^{14} Hz b) 3.68×10^{15} Hz
   b) 5.6×10^{14} Hz d) 9.11×10^{15} Hz

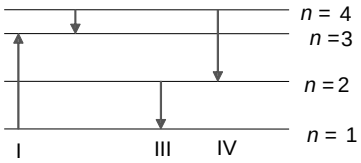
3. A neon sign does not produce
   a) A line spectrum b) An emission spectrum
   c) An absorption spectrum d) Photons

4. The ratio of the frequencies of the long wavelength limits of the Lyman and Balmer series of hydrogen is
   a) 27: 5 b) 5: 27 c) 4: 1 d) 1: 4

5. The required energy to detach one electron from Balmer series of hydrogen spectrum is
   a) 13.6 eV b) 10.2 eV c) 3.4 eV d) -1.5 eV

6. The radius of hydrogen atom in its ground state is 5.3×10^{-11} m. After collision with an electron it is found to have a radius of 212×10^{-11} m. What is the principal quantum number
   n of the final state of atom?
   a) $n = 4$ b) $n = 2$ c) $n = 16$ d) $n = 3$

7. The diagram shows the energy levels for an electron in a certain atom. Which transition shown represents the emission of a photon with the most energy?



a) III b) IV c) I d) II

8. When hydrogen atom is in its first excited level, its radius is how many times its ground state radius?

a) Half b) Same c) Twice d) Four times

9. An electron jumps from the 4th orbit to 2nd orbit of hydrogen atom. Given the Rydberg's constant $= 10^5$ cm $^{-1}$, the frequency in hertz of the emitted radiation will be

a) $\frac{3}{16} \times 10^5$ b) $\frac{3}{16} \times 10^{15}$ c) $\frac{9}{16} \times 10^{15}$ d) $\frac{3}{4} \times 10^{15}$

10. An electron is moving in an orbit of a hydrogen atom from which there can be a maximum of six transition. An electron is moving in an orbit of another hydrogen atom from which there can be a maximum of three transition. The ratio of the velocities of the electron in these two orbits is

a) $\frac{1}{2}$ b) $\frac{2}{1}$ c) $\frac{5}{4}$ d) $\frac{3}{4}$

11. The ionization energy of Li^{2+} is equal to

a) $9hcR$ b) $6\ hcR$ c) $2\ hcR$ d) hcR

12. An α-particle of energy 5 MeV is scattered through 180°by a fixed uranium nucleus. The distance of the closest approach is of the order of

a) 1Å b) 10^{-10} cm c) 10^{-12} cm d) 10^{-15} cm

13. In the Bohr model of the hydrogen atom, let R, V and E represent the radius of the orbit, the speed of electron and the total energy of the electron respectively. Which of the following quantities is proportional to quantum number n?

a) $\frac{R}{E}$ b) $\frac{E}{V}$ c) RE d) VR

14. The energy of a hydrogen atom in its ground state is -13.6eV. The energy of the level corresponding to the quantum number $n = 5$ is

a) -0.54 eV b) -5.40 eV c) 20.58 eV d) -2.72 eV

15. Three photons coming from excited atomic hydrogen sample are observed, their energies are 12.1 eV, 10.2 eV and 1.9 eV. These photons must come from

a) Single atom b) Two atoms
c) Three atoms d) Either two or three atom

16. First Bohr radius of an atom with $Z = 82$ is R. Radius of its third orbit is
a) $9\,R$ b) $6\,R$ c) $3\,R$ d) R

17. Radius of $_2He^4$ nucleus is 3fermi. The radius of $_{82}Pb^{206}$ nucleus will be
a) 5 fermi b) 6 fermi c) 11.16 fermi d) 8 fermi

18. In an inelastic collision an electron excites a hydrogen atom from its ground state to a M-shell state. A second electron collides instantaneously with the excited hydrogen atom in the M-state and ionizes it.At least how much energy the second electron transfers to the atom in the M-state?
a) +3.4 eV b) + 1.51 eV c) - 3.4 eV d) -1.51eV

19. If an electron is revolving around the hydrogen nucleus at a distance of 0.1 nm, what woul its speed?
a) $2.188 \times 106\ ms^{-1}$ b) $1.094 \times 106\ ms^{-1}$ c) $4.376 \times 106\ ms^{-1}$ d) $1.59 \times 106\ ms - 1$

20. Ionisation potential of hydrogen atom is 13.6 eV. The least energy of photon of Balmer series is
a) 3.4 eVb) 1.89 eVc) 10.2 evd) 8.5 eV