Class: XI

Unit 2

Subject - Chemistry

Structure of atom

1. A certain particle carries -2.5×10^{-16} C of static electric charge. Calculate the number of electrons present in it.
2. In Millikan's experiment, static charge on the oil drops has been obtained by shining X-rays. If the static charge on the oil drop is -1.282×10^{-18} C calculate the number of electrons present in it.
3. Define the following terms:
   (I) Atomic number (II) Mass number (III) Isotopes (IV) Isotones (V) Isobar (VI) Nucleus (VII) Orbit (VIII) orbital (IX) Nodal point (X) Nodal plane
4. State the following laws / Rules / Principles:
   (I) Heisenberg's Uncertainty Principle (II) Pauli Exclusion principle (III) Aufbau Rule (IV) Hund's Rule of maximum multiplicity (V) $(n+l)$ Rule
5. Write Schrodinger wave equation. What are significances of ψ and ψ^2.
6. Write the electronic configuration of following:
   (I) Cu (II) Cr (III) Fe^{2+} (IV) Mn^{2+} (V) Co^{2+} (VI) N^{3-}
7. What are limitations of Rutherford's nuclear model of atom.
8. What are main points of Bohr Atomic model. What are the limitation of this?
9. Write the main points of Plank's Quantum Theory.
10. Write a short notes on Photoelectric effect.
11. Derive de-Broglie equation.
12. A 150 Watt bulb emits a monochromatic light of wavelength 4500 Å. Calculate the number of photons emitted by the bulb in 1 min.
13. Light of wavelength 400 nm strikes a certain metal which has a photoelectric work function of 2.13 eV. Find out the maximum kinetic energy of photoelectrons.
14. Calculate the longest wavelength of light that will be needed to remove an electron from the 3rd orbit of He^+ ion.

15. An electron beam can undergo diffraction by crystals. Through what potential should a beam of electrons be accelerated so that its wavelength becomes equal to 1.54 Å.

16. Calculate the wavelength of the first line and the last line in the Lyman series of hydrogen atom.

17. Calculate the uncertainty in position of electron if the uncertainty in its velocity is 5.7×10^5 m s^{-1}.

18. If the electron is to be located within 5×10^{-5} Å, what will be the uncertainty in its velocity?

19. How many sub-shells are associated with $n = 4$?

20. How many electrons will be present in the subshells having m_s value of $-\frac{1}{2}$ for $n = 4$.