

**Sainik School Tilaiya**

**Class-XI**

**Subject-Chemistry**

**Chapter Name- Structure of Atom**

**Q1. Short answer type questions.**

- a. Name the sub-atomic particles of an atom.
- b. What is the  $e/m$  ratio of an electron?
- c. What is the charge( $e$ ) of an electron?
- d. What is the mass and charge of a proton?
- e. What is the mass and charge of a neutron?
- f. Name the scientist who first gave the atomic model?
- g. What is an isotope?
- h. What are isotones and isobars ? Give example.
- i. What is atomic number and mass number?
- j. Give the drawbacks of j-j Thomson's experiment.
- k. Why Rutherford's model could not the stability of an atom?
- l. Define photoelectric effect?
- m. How does intensity of light effect photoelectrons?
- n. What is threshold frequency?
- o. What did Einstein explain about photoelectric effect?
- p. State Hisenberg's Uncertainty principle.
- q. How would the velocity be effected if the position is unknown?
- r. Give the de-Broglie relation.
- s. Which orbital is non-directional?
- t. What is the meaning of quantization of energy?
- u. What is nodal surface or nodes?
- v. Why is the energy of 1S electron lower than 2S electron/
- w. How many spherical nodal surfaces are there in 4s-sub-shell?

**Q2. Long answer type questions.**

- a. How will you calculate the mass of a electron?
- b. Which experiment led to discovery of electron and how?
- c. Give the main features of Thomson's model of atom.

- d. What did Rutherford conclude from the observed alpha –ray scattering experiment?
- e. What is the relation between kinetic energy and frequency of the photoelectron?
- f. Spectral lines regarded as finger prints of the elements. Why?
- g. Why cannot the motion of an electron around the nucleus be determined accurately?
- h. calculate the uncertainty of momentum of an electron if it is confined to a linear region of length  $1 \times 10^{-10}$ ?
- i. Give the mathematical expression of uncertainty principle.
- j. Which quantum numbers determines
  - i. Energy of electron
  - ii. Orientation of orbitals
- k. Arrange the electrons represented by the following sets of quantum number in decreasing order of energy.
  - i.  $n=4, l=0, m=0, s=+1/2$
  - ii.  $n=3, l=1, m=1, s=-1/2$
  - iii.  $n=3, l=2, m=0, s=+1/2$
- l. write the electronic configuration of the following ions and mention the number of unpaired electrons in each case.
  - i.  $Mn^{4+}$
  - ii.  $Cr^{2+}$
  - iii.  $Fe^{3+}$
  - iv.  $Zn^{2+}$

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