

# Chapter-15 Structure of Atoms and Nuclei

Assignment-15

PHYSICS-54

Name of Chapter	Marks	Marks with option
Structure of Atom and Nuclei	04	06

## Very Short Answer (VSA) (1 MARK Each)

1. State the formula to calculate size of nucleus.
2. Define nuclear binding energy of nucleus.

## Short Answer I (SA1) ( 2 MARKS Each )

3. Derive an expression for the radius of  $n^{\text{th}}$  Bohr orbit of the electron in hydrogen atom.
4. Derive an expression for the Energy of  $n^{\text{th}}$  Bohr orbit of the electron in hydrogen atom.
5. Draw neat labeled energy level diagram for first five series of hydrogen atom
6. Find shortest wavelength of Lyman series in hydrogen atom.
7. Derive an expression for half-life of radioactive material.

## Short Answer II (SA2) (3 MARKS Each)

8. State any two limitations of Bohr's atomic model.
9. Determine the shortest wavelength of Balmer and Paschen series. Given the limit for Lyman series is  $912 \text{ \AA}$ .
10. What are alpha, beta and gamma decay?
11. The half-life of radioactive species is 3.2 days. Calculate decay constant (per day).

## Long Answer (LA) (4 mark each)

12. State Bohr postulates for hydrogen atom.
13. Derive an expression for energy of electron in  $n^{\text{th}}$  Bohr orbit.
14. Using expression for energy of electron, obtain the Bohr's formula for hydrogen spectral line.
15. State the Law of radioactive decay. Hence derive the relation  $N = N_0 e^{-\lambda t}$ . Represent it graphically.
16. Write short notes on
  - a. Nuclear Fission
  - b. Nuclear Fusion