First Year B.Sc (MRT) Degree Examinations August 2018

Atomic and Nuclear Physics

Time: 3 Hours   **Total Marks: 100**

- Answer all Questions.
- Draw Diagrams wherever necessary.

Essays: **(2x20=40)**

1. Describe the experimental set for normal Zeeman effect and based on the classical theory, derive an expression for the Zeeman shift.

2. Describe Paul's exclusion principle and classification of elements based on this theory. What is artificial radioactivity and mention the application of radio isotopes. Add a note on the discovery of isotopes.

Short notes: **(8x5=40)**

3. The properties of cosmic rays.

4. Discuss the Millikan's experiment.

5. Discuss the properties of atomic nucleus.

6. Explain Stern Gerlach experiment.

7. Pair production.

8. Discuss the radioactive equilibrium.

9. Explain Rutherford Atom model.

10. Discuss nuclear reactions (α.p), (α,n).

Answer briefly: **(10x2=20)**

11. Conversion of electron

12. Electron capture.

13. Explain the properties of artificial radioactive isotopes.

14. Explain Beta and Gama decay with examples.

15. The relationship between half-life and mean life.

16. What do electromagnetic waves consist of.

17. Define curie and relation between curie and becquerel.

18. The properties of short lived and long lived radioisotopes

19. The ground state energy of hydrogen atom is -13.6 eV. What are the kinetic and potential energies of electron in this state.

20. Explain critical potential and excitational potential.

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