QP CODE: 104018 **Reg. No: ……..**

First Year B.Sc (MRT) Degree Supplementary Examinations September 2023

Atomic and Nuclear Physics

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

- ***Answer all questions to the point neatly and legibly • Do not leave any blank pages between answers • Indicate the question number correctly for the answer in the margin space***
- ***Answer all parts of a single question together • Leave sufficient space between answers***
- ***Draw table/diagrams/flow charts wherever necessary***

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

1. Explain about Thomson's model.
2. State and explain the assumption of Bohr's theory, postulates and evaluate with respect to merits and demerits

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

3. Explain Larmour precession.
4. Derive an expression for a half-life of radioactive substance in terms of decay. Write the relation between mean life and decay constant. What is the SI unit of activity
5. Fusion and Fission.
6. Explain the process of electron capture in β decay.
7. Explain Ritz combination principle.
8. Pair production
9. Photo electric effect and state its laws, derive the Einstein photoelectric equation.
10. Explain the vector model in detail

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

11. Define mass defect and binding energy.
12. Transient equilibrium.
13. Compute mass of 1 curie of $C^{l}4$. The half-life of $C^{l}4$ is 5700 years.
14. What is $E=mc^2$
15. What are the drawback of the Rutherford atomic model
16. The half-life of radium is 1600yr. After how many years I kg of sample reduce to 50 gm. Calculate using formula.
17. Define specific binding energy. Sketch the graph between binding energy per nucleon and mass number.
18. Elementary particles.
19. Conversion of electrons.
20. Define curie and relation between curie and Becquerel.

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