

QP CODE: 104018

Reg. No:

**First Year B.Sc (MRT) Degree Supplementary Examinations
September 2022**

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 Thomson's experiment to determine the value of specific charge (e/m) of the electron
2. What is radio activity. Discuss the fundamental laws of radioactivity. Obtain an expression for the half-life of a radioactive substance

Short notes: (8x5=40)

3. Discuss in brief, the drawbacks of the Rutherford nuclear atom model
4. Explain different coupling schemes for combining the vectors of the electrons in the atom
5. State and explain laws of photoelectric emission
6. Discuss nuclear forces
7. Neutrino hypothesis
8. Distinguish between α , β , and γ rays
9. Discuss the theory of α - decay and obtain an expression for the kinetic energy of the particle
10. Elementary particles

Answer briefly: (10x2=20)

11. What are positive rays
12. Critical potential of an atom
13. Bohr magneton
14. Explain Zeeman Effect
15. What are matter waves
16. Explain pair production
17. What are the reasons for the instability of nuclei
18. What is 'Mean life' of a radioactive sample
19. Explain electron capture
20. Binding energy of nucleus
