

QP CODE: 104018

Reg. No:

**First Year B.Sc (MRT) Degree Supplementary Examinations
September 2021
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. Describe the construction and working of nuclear reactor and its merits and demerits.
2. Define radioactivity. Mention the types of decay in detail and explain radioactive decay law by deriving the formula.

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

3. Define nuclear fission and nuclear fusion also, discuss the energy released in fission and fusion processes by giving suitable reactions. with example.
4. Define and explain binding energy. How does Binding energy per nucleon vary with mass number. What is the significance.
5. Photo electric effect, and state its laws, derive the Einstein photoelectric equation.
6. Discuss Neutrino theory of Negative Beta decay,
7. Different types of mesons.
8. Atomic excitation.
9. State and explain Paul's exclusion principle.
10. Explain the process of electron capture in β decay.

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

11. State De-Broglie's theory
12. Define binding energy Sketch the graph between binding energy per nucleon and mass number.
13. What are the properties nuclear forces.
14. Discuss the properties of electromagnetic radiation.
15. Role of a moderator in a nuclear reactor.
16. Why does electron revolving around the nucleus write its energy.
17. Mention the production of auger electrons.
18. Define radioisotope with an example
19. What are the drawbacks of the Rutherford atomic model.
20. Properties of cosmic rays.
