

QP CODE: 104018

Reg. No:

**First Year B.Sc (MRT) Degree Supplementary Examinations
March 2026
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 the Vector Atom Model in detail. How does it impact upon the Bohr model of the atom
2. Describe the role of photoelectric effect, Compton scattering, and pair production in gamma-ray attenuation through matter

Short notes:

(8x5=40)

3. Explain Nuclear fission and Nuclear fusion with example.
4. Define and explain Binding energy. How does Binding energy per nucleon vary with mass Number. What is the significance.
5. Discuss Neutrino hypothesis.
6. Explain the difference between internal conversion and gamma emission following nuclear de-excitation.
7. Explain Excitation and ionization in relation to its potential.
8. Discuss the relation between phase and group velocities matters waves.
9. Explain the Transient equilibrium.
10. Discuss isomeric transition.

Answer briefly:

(10x2=20)

11. Write the relation between phase velocity and group velocity
12. What are Auger electrons and how are they generated following inner-shell vacancies
13. What are the properties nuclear forces.
14. Differentiate between short-lived and long-lived isotopes with examples.
15. What is role of a moderator in a nuclear reactor
16. Why does electron revolving around the nucleus write its energy.
17. What are cosmic rays.
18. Write on Larmour precession.
19. What are the draw back of the Rutherford atomic model
20. Write the different unit of activity and its relation.

CORRECTION / NO-CORRECTION FILE
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QPCODE: 104018

Dated: 18-03-2026

Question No. 8

Replaced with "Important properties of Nuclear force"

Corrections/Modifications/Replacement of Questions if any shall be made available to all students. Take the print out of the Correction File in such cases and distribute to all students.

(Sd/-)

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