(041130202)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2017

THIRD SEMESTER

**Branch – Physics**

**Paper II — NUCLEAR AND PARTICLE PHYSICS**

**(New Syllabus)**

*Time : 3 Hours* *Max. Marks : 70*

**PART – A**

Answer any FOUR questions.

(Marks : 4 × 5 marks = 20 marks)

1. Explain proton-proton scattering.
2. Obtain the energy levels of nuclear shell model.
3. Explain the working principles of linear accelerator.
4. Explain Brier-Wigher formula.
5. Explain selection rules of $\beta$–decay.
6. What do you understand by pair production?
7. Explain about $\alpha$–decay paradox. Find the probability of $\alpha$–particle penetration through potential barrier.
8. Explain about iso-spin and charge conjugation.

**PART – B**

Answer ONE questions from each Unit.

(Marks : 4 × 12.5 marks = 50 marks)

**UNIT – I**

9. Obtain an expression for the total wave function for the ground state of deutron.

**Or**

10. Discuss in detail how the nuclear shell model predicts the magic numbers.

**UNIT – II**

11. Discuss different types of nuclear reactions.

**Or**

12. Obtain the Q-value of a nuclear reaction and discuss its significance.

[P.T.O]

## UNIT – III

13. Discuss in detail about synchrotron and microtron.

Or

14. Write about four factor formula for controlled fission.

## UNIT – IV

15. Explain the conservation laws for elementary particles.

Or

16. Discuss differences interactions between elementary particles.

---