

FACULTY OF SCIENCE

M.Sc. IV – Semester Examination, May / June 2015

Subject: Physics

Paper – I
Nuclear Physics

Time: 3 Hours

Max.Marks: 80

Note: Answer all questions from Part-A and Part-B.

Each question carries 4 marks in Part-A and 12 marks in Part-B.

PART – A (8x4 = 32 Marks)

[Short Answer Type]

- 1 Explain about the Yukawa hypothesis
- 2 Discuss the inadequacies of liquid drop model
- 3 What do you mean by α – decay?
- 4 Describe gamma decay
- 5 Pair production interaction cannot occur at photon energies less than 1.02 MeV. Why? Explain.
- 6 Explain the principle of G.M. Counter.
- 7 What do you mean by a compound nucleus?
- 8 Explain nuclear reaction.

PART – B (4x12 = 48 Marks)

[Essay Answer Type]

- 9 a) Discuss the theory of ground state of deuteron and explain why the excited states of deuterons do not exist.
OR
b) Deduce the equation for electric quadrupole moment.
- 10 a) Outline the Fermi's theory of beta decay and show how it explains the observed systematics of beta decay.
OR
b) Discuss in detail about Gamow's theory of α – decay.
- 11 a) Describe interaction of gamma rays with matter with special reference to their dependence on gamma energy and the atomic number of target.
OR
b) Describe the principle and operation of a solid state detector.
- 12 a) What are stripping and pick-up reactions? Give the theory of (d, p) stripping reactions.
OR
b) Give the classification of fundamental forces and elementary particles.
