Roll No. .....

DD–751

M. Sc. (Fourth Semester) EXAMINATION, 2020

PHYSICS

Paper First

(Nuclear and Particle Physics)

Time : Three Hours

Maximum Marks : 80

Note : Attempt all the *five* questions. *One* question from each Unit is compulsory. All questions carry equal marks.

Unit—I

1. (a) Explain *two* nucleon system. 8

   (b) Explain tensor forces. 8

   Or

   (a) Explain Iso-spin formalism. 6

   (b) Describe Meson's theory of nuclear forces. 10

Unit—II

2. (a) Describe threshold energies. 6

   (b) Establish Breit-Wigner single-level formula. 10

   Or

   (a) Explain direct and compound nuclear reactions. 8

   (b) Describe scattering matrix. 8

P. T. O.

Unit—III

3. (a) What is Beta Decay ? 3

(b) Describe shape of the beta spectrum. 5

(c) Derive angular momentum and parity selection rules for beta decay. 8

Or

(a) Explain two component theory of neutrino decay. 6

(b) What is Gamma decay ? Explain multiple transition in nuclei. 6

(c) Explain nuclear isomerism. 4

Unit—IV

4. (a) Explain liquid-drop model in detail. 8

(b) Explain single particle shell model. 8

Or

(a) Explain spin-orbit interaction. 8

(b) Describe magic numbers. 4

(c) Explain magnetic moments. 4

Unit—V

5. (a) Describe fundamental interactions. 8

(b) Explain Leptons and Hadrons. 8

Or

Explain SU(2) and SU(3) multiples and their properties. 16