

# PHYSICS Paper-C

## (Nuclear & Particle Physics-II)

Time Allowed : Three Hours

Maximum Marks : 44

**Note :** Paper consists of seven questions comprising of three Sections. First two Section comprise of three questions from each of Unit-I and II, the third section comprises of one compulsory question of ten short answer type parts. Student will attempt any two questions from each of the first two sections and any eight parts of the compulsory question. The use of non-programmable calculator is allowed.

### SECTION - I

1. Discuss the interaction of heavy charged particles with matter. Derive expression for the energy loss and stopping power. 9
2. Write short notes on :
  - (i) Bremsstrahlung 4
  - (ii) Pair production 5
3. Explain in detail the principle, construction and working of a Scintillation Counter. 9

### SECTION - II

4. (i) Discuss the theory, construction and working of a Linear accelerator. 6
- (ii) Give a brief account of the term 'Isospin' in the context of elementary particles. 3
5. (i) Give a brief account of the accelerator facilities available in India. 6
- (ii) What is the origin of cosmic rays ? 3
6. (i) What are the quarks ? Give a qualitative account of quark model. 5
- (ii) Discuss in detail the strange particles. 4

### SECTION - III

#### (Compulsory Questions)

7. Do any eight parts :
  - (i) What is the principle of a Van de Graaff generator ?
  - (ii) What is straggling ?
  - (iii) What do you mean by 'Charge conjugation' ?
  - (iv) What do you understand by dead time in a G.M. counter ?
  - (v) Can alpha and beta particles be detected using an ionization chamber ?

- <https://questionpaperresult.com/>
- (vi) On what factors does Compton Shift depend ?
  - (vii) Cyclotron cannot be used for accelerating electrons. Why ?
  - (viii) Is parity conserved in all types of interactions ?
  - (ix) Distinguish between a photon and a neutrino.
  - (x) List few advantages of using semiconductor detectors. 1×8