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Total No. of Pages : 02

Total No. of Questions : 09

# B.Sc. (Non-Medical) (Sem.–6) NUCLEAR & PARTICLE PHYSICS Subject Code : BSNM-604-18 M.Code : 79496 Date of Examination : 09-01-2023

Time: 3 Hrs.

Max. Marks : 50

### **INSTRUCTIONS TO CANDIDATES :**

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

#### **SECTION-A**

- 1. Write briefly :
  - (a) Write a relation between mass number and radius of the nucleus.
  - (b) What do you understand by nuclear spin?
  - (c) Compute the energy of 1 a.m.u. in MeV.
  - (d) What is meant by range of an  $\alpha$ -particle?
  - (e) Define Q-value of a nuclear reaction.
  - (f) What is the frequency of 5 KeV photon?
  - (g) What are Cerenkov radiations?
  - (h) What are Cosmic rays?
  - (i) What are Baryons?
  - (j) Explain the concept of '*charm*'.

#### **SECTION-B**

- 2. Derive an expression for the total magnetic moment of a nucleus.
- 3. Write a short note on Geiger Nuttall law and discuss its importance.
- 4. State the advantages and disadvantages of a G.M. counter. '*A G.M. counter cannot detect neutrons*'. Why?
- 5. How is the life time determined for muon?
- 6. Discuss the conservation laws which govern the elementary particle reactions and decay.

## **SECTION-C**

- 7. Obtain an expression for the binding energy of a nucleus based on liquid drop model.
- 8. Show that the law of conservation of energy and momentum are not obeyed in beta decay. Show how neutrino hypothesis explains this discrepancy.
- 9. Discuss the principle, construction and operation of a scintillation radiation counter. Briefly explain why a scintillation counter is superior to a G.M. counter?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.