Roll No. 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: 08-07-22

Time: 3 Hrs. Max. Marks: 50

## **INSTRUCTIONS TO CANDIDATES:**

- 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 7.5 KeV photon?
- (g) What are Cerenkov radiations?
- (h) What are cosmic rays?
- (i) What are Leptons?
- (j) Explain the concept of 'strangeness'.

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## **SECTION-B**

- 2. Derive an expression for the electric quadrupole 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. 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. What are magic number nuclei? How does the shell model explain the existence of magic numbers 2, 8, 20 and 28 only?
- 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.

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