K20P 1121

Reg. No. : ....

Name : ....

III Semester M.Sc. Degree (CBSS – Reg./Suppl./Imp.)
Examination, October 2020
(2014 Admission Onwards)
PHYSICS
PHY 3C 12 : Nuclear and Particle Physics

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer **both** questions (either **a** or **b**). (2×12=24)

1. a) Explain the evidences of shell model and how it explains the properties of nuclei.

   OR

   b) Explain magnetic and inertial confinement.

2. a) Classify elementary particles based on their spin and explain conservation laws.

   OR

   b) Explain Fermi theory of beta decay.

SECTION – B

Answer **any 4** (1 mark for Part **a**, 3 marks for Part **b** and 5 marks for Part **c**). (4×9=36)

3. a) Define internal conversion.

   b) Explain significance of internal conversion coefficient.

   c) Discuss angular momentum and parity selection rules.

4. a) Discuss important properties of a deuteron.

   b) Discuss on why radius of nucleus is not precisely defined.

   c) Elaborate on exchange forces.

P.T.O.

5. a) Calculate nuclear density of Helium nucleus.

b) Describe characteristics of nuclear force.

c) Explain how binding energy per nucleon curve leads to semi empirical mass formula.

6. a) Beta ray spectrum is continuous. Why ?

b) Explain terms in semi empirical mass formula.

c) Discuss nuclear reaction cross sections.

7. a) What are basic fusion processes ?

b) Obtain the expression for critical energy for fission.

c) What are the characteristic of magnetic dipole radiation ?

8. a) What are the characteristics of fission?

b) Discuss Carbon-Nitrogen cycle and it's importance.

c) Calculate the activation energy of fission using Liquid Drop Model.