M.Sc. II Semester (CBCS) Degree Examination, September/October - 2022
PHYSICS
21PHY2C8L : Nuclear Physics

Time : 3 Hours   Maximum Marks : 70

Note :   *Answer **any five** of the following questions with question no.**1** is **Compulsory**.*
*Each question carries **equal** marks.*

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1. (a) What is nuclear charge radius ? Describe the mirror nuclei method of   **9**
estimating nuclear radius.
   (b) Write a note on magnetic moment of deuteron.   **5**

2. (a) What is Q-valve and threshold energy of nuclear reaction ? Obtain the   **10**
expression for threshold energy for endoergic nuclear reaction.
   (b) Enumerate the evidences for existence of magic numbers.   **4**

3. Outline the Gamow's theory of alpha decay. Discuss how it is related to
Gieger-Nuttal law.   **14**

4. (a) Describe in detail how charged particle interacts with matter.   **7**
   (b) Explain about interaction of gamma rays with matter.   **7**

5. (a) What is thermal reactor ? Obtain the four-factor formula for a neutron cycle **7**
in a thermal reactor.
   (b) Discuss on stellar nucleosynthesis and hence give an account of abundance   **7**
of the chemical elements in the universe.

6. (a) Write semi-empirical mass formula, discuss the various energies contribute   **7**
to the mass of a nucleus.
   (b) List the assumptions by which Fermi given theory of beta decay and explain   **7**
the significance of Kurie plots.

7. (a) Give the construction and working of surface barrier detector.   **7**
   (b) Discuss the characteristic features of fundamental interactions of nature.   **7**

8. (a) Give a brief account of energetics of exoergic and endoergic reactions.   **5**
   (b) Write a note on scintillation detector.   **5**
   (c) Discuss about fission chain reaction.   **4**

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