

SCHOOL OF SCIENCES



UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)
उत्तराखण्ड मुक्त विश्वविद्यालय, हल्द्वानी (नैनीताल)

M.Sc. Physics (MSCPHY12)

Second Year Assignment

Last Date of Submission: 15 May 2014

Course Title: Nuclear Physics and Analytical Techniques Course Code: PHY-551

Year : 2013-14

Maximum Marks :40

Section A

Section 'A' contains 08 short answer type questions of 5 marks each. Students are required to answer 4 questions only. Answers of short answer type questions should be in 250 words approximately.

- 1- Discuss fine structure of α spectrum, Geiger-Nuttal law and Gamow's theory of α decay.
- 2- Explain Fermi theory of β decay and parity violation in β decay.
- 3- Define internal conversion, Mossbauer Effect and its application.
- 4- Explain transient and secular equilibrium. How the age of fossil or dead tree can be determined by carbon dating technique.
- 5- What is Q equation? Find out the solution of Q equation. Calculate the Q value of reaction $^{14}_7N(\alpha, p)^{17}_8O$ which occurred in Rutherford's α range in nitrogen experiment.
- 6- Explain Gell-Mann-Nishijima relation and Feynman diagrams.
- 7- Give the principle and application of ESR.
- 8- Write down a short note in Linear accelerator. Give an introduction on particle accelerators in India.

Section B

Section 'B' contain 04 long answers type question of 10 marks each and students are required to answers 02 questions only.

- 1- Explain liquid drop model and obtain the Bethe-Weizsacker formula and explain the alpha decay with the help of semi-empirical formula.
- 2- Give the classification of fundamental interactions, elementary particle and conservation laws.
- 3- Give the principle, theory and application of SEM, and TEM.
- 4- Give the principle, theory and application of NMR and NMR spectrometers. Explain the NMR spectra of Ethyl alcohol.