

B.Sc. Semester - 5 (Remedial) (CBCS) Examination**March/April-2022 (NEW COURSE)****Nuclear & Particle Physics (Core)****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que-1 (A) Answer the following questions (any two out of three) (10)

1. Discuss the Liquid drop model.
2. Write a short note on Variation of binding energy with mass number.
3. Discuss Semi-Empirical mass formula and significance of various terms.

Que-1 (B) Answer the following questions (any one out of two) (04)

1. Explain Rutherford's α -scattering experiment.
2. Calculate the binding energy per nucleon of ${}_{28}\text{Ni}^{64}$.
Mass of proton = 1.007275 amu and mass of neutron = 1.008665 amu, mass of ${}_{28}\text{Ni}^{64}$ nucleus = 63.8126 amu.

Que-2 (A) Answer the following questions (any two out of three) (10)

1. Discuss the law of radioactive decay.
2. Discuss half-life period of radioactive substance.
3. Discuss the properties of gamma rays.

Que-2 (B) Answer the following questions (any one out of two) (04)

1. Write any four applications of Radio Isotopes.
2. The half-life of Radon is 3.80 days. After how many days only twentieth of a Radon sample remain behind?

Que-3 (A) Answer the following questions (any two out of three) (10)

1. Discuss Rutherford's experiment for artificial transmutation.
2. Describe with example, any five types of nuclear reaction.
3. Explain conservation laws in nuclear reactions.

Que-3 (B) Answer the following questions (any one out of two) (04)

1. Write a note on Ionization chamber.
2. Explain Photomultiplier.

Que-4 (A) Answer the following questions (any two out of three) (10)

1. Write a note on main components of Nuclear reactors.
2. Describe construction and working of electron synchrotron.
3. Explain principle of Phase stability.

Que-4 (B) Answer the following questions (any one out of two) (04)

1. Write a note on Bohr & Wheeler's theory of nuclear fission.
2. Obtain the formula for cyclotron frequency.

Que-5 (A) Answer the following questions (any two out of three) (10)

1. Explain fusion reactors and conditions for fusion reaction.
2. Write a note on particles and antiparticles.
3. Give the classification of elementary particles.

Que-5 (B) Answer the following questions (any one out of two) (04)

1. Discuss the properties of three generation of quarks and leptons.
2. Can the following reaction occur?


