

B.Sc. Semester - 5 (CBCS) Examination
Oct/Nov - 2025 (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.

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- Que.1(A) Answer the following questions (any two out of three) (10)
(1) Discuss Semi-Empirical mass formula and significance of various terms.
(2) Write a note on Liquid Drop Model.
(3) Explain the Shell Model and provide the evidences of shell model.
- Que.1(B) Answer the following questions (any one out of two) (04)
(1) Discuss nuclear density.
(2) Describe the classification of nuclei.
- Que.2(A) Answer the following questions (any two out of three) (10)
(1) Explain the theory of beta decay and neutrino hypothesis.
(2) Explain half-life and mean life.
(3) Explain the applications of radio isotopes.
- Que.2(B) Answer the following questions (any one out of two) (04)
(1) Derive the age of the earth.
(2) Write properties of gamma rays.
- Que.3(A) Answer the following questions (any two out of three) (10)
(1) Describe the interaction between energetic particle and matter.
(2) Explain principle and construction of scintillation counter.
(3) Explain principle and working of G.M. counter.
- Que.3(B) Answer the following questions (any one out of two) (04)
(1) Write any four conservation laws for nuclear reaction.
(2) Explain Photomultiplier.
- Que.4(A) Answer the following questions (any two out of three) (10)
(1) Describe cyclotron frequency and energy of an ion.
(2) Discuss the main components of nuclear reactor.
(3) Write a note on discovery of nuclear fission.
- Que.4(B) Answer the following questions (any one out of two) (04)
(1) Write a note on Atom bomb.
(2) Explain critical size in nuclear reactor.
- Que.5(A) Answer the following questions (any two out of three) (10)
(1) Explain the proton-proton cycle and carbon-nitrogen cycle.
(2) Discuss particles and antiparticles.
(3) Discuss the classification of elementary particles.
- Que.5(B) Answer the following questions (any one out of two) (04)
(1) Explain any four elementary particle quantum number.
(2) Explain magnetic bottle for plasma confinement.
