

B.Sc. Semester - 5 (Remedial) (CBCS) Examination**March/April-2026 (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 question (any two). (10)
- (1) Write a note on the Shell model.
 - (2) Write the semi-empirical mass formula and explain its terms.
 - (3) Explain the graph of the average binding energy per nucleon against atomic mass number.
- Que.1(B) Answer the following question (any one). (04)
- (1) Write a note on the nuclear force.
 - (2) Discuss nuclear size.
- Que.2(A) Answer the following question (any two). (10)
- (1) Drive and explain the exponential law of radioactive decay.
 - (2) Describe Gamow's explanation of alpha decay.
 - (3) Explain Pauli's neutrino hypothesis for beta decay.
- Que.2(B) Answer the following question (any one). (04)
- (1) Write the properties of γ -rays.
 - (2) Explain Carbon dating.
- Que.3(A) Answer the following question (any two). (10)
- (1) Explain the interaction of γ -rays with matter.
 - (2) Describe the construction and working principle of a scintillation counter.
 - (3) Explain the working principle and construction of the G.M. counter.
- Que.3(B) Answer the following question (any one). (04)
- (1) Describe Rutherford's experiment of artificial transmutation.
 - (2) Explain the Q-value of a nuclear reaction.
- Que.4(A) Answer the following question (any two). (10)
- (1) Explain the construction and working of a linear accelerator
 - (2) Describe the construction and working mechanism of a Cyclotron.
 - (3) Explain the energy release in fission.
- Que.4(B) Answer the following question (any one). (04)
- (1) Explain the atomic bomb.
 - (2) Write the working principle of the Betatron.
- Que.5(A) Answer the following question (any two). (10)
- (1) Give a classification of elementary particles.
 - (2) Explain plasma confinement.
 - (3) Write a note on the quark model.
- Que.5(B) Answer the following question (any one). (04)
- (1) Write a note on antimatter.
 - (2) Explain the lepton quantum number.
