

B.Sc. Semester - 6 (CBCS) Examination
July-2025 (OLD COURSE)
NUCLEAR AND 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 one)	(07)
	1. Explain shell model in detail.	
	2. Explain semi empirical mass formula in detail.	
Que.1 (B)	Answer the following questions (any one)	(04)
	1. Explain liquid drop model in detail.	
	2. Explain binding energy.	
Que.1 (C)	Answer the following questions (any three)	(03)
	1. What are the units of radioactivity?	
	2. Define nucleus.	
	3. Nucleus is positively charged (True/False).	
	4. Define isotopes.	
	5. define magic numbers.	
Que.2 (A)	Answer the following questions (any one)	(07)
	1. Describe properties of alpha, beta and gamma ray .	
	2. Explain beta decay.	
Que.2 (B)	Answer the following questions (any one)	(04)
	1. Explain application of radio isotopes.	
	2. Explain natural radioactivity.	
Que.2 (C)	Answer the following questions (any three)	(03)
	1. Hydrogen atom carries Unit of positive charge.	
	2. The beta particle has charge.	
	3. Gamma rays travel with the velocity of	
	4. rays are not affected by magnetic field.	
	5. 1 Curie = Disintegration/sec.	
Que.3 (A)	Answer the following questions (any one)	(07)
	1. Explain ionization chamber.	
	2. Explain scintillation counter.	
Que.3 (B)	Answer the following questions (any one)	(04)
	1. Explain Rutherford experiment for artificial transmutation.	
	2. Describe types of nuclear reaction.	
Que.3 (C)	Answer the following questions (any three)	(03)
	1. Write the principle of GM counter.	
	2. and are heavy charged particles.	
	3. (n, ∞) reaction is belong to the transmutation by.....	
	4. Define range of nuclear radiation.	
	5. What is endoergic reaction?	
Que.4 (A)	Answer the following questions (any one)	(07)
	1. Explain synchrocyclotron.	
	2. Explain betatron.	
Que.4 (B)	Answer the following questions (any one)	(04)
	1. Explain chain reaction.	
	2. Describe moderator.	

- Que.4 (C) Answer the following questions (any three) (03)
1. Which materials are used for moderators?
 2. What is the reaction responsible for the production of light energy from the sun?
 3. An accelerator, consists of one dee is the modified form of
 4. $1 \text{ amu} = \dots\dots \text{ MeV}$
 5. What is a nuclear fission reaction?
- Que.5 (A) Answer the following questions (any two) (07)
1. Explain thermonuclear reactions.
 2. Explain quark model.
- Que.5 (B) Answer the following questions (any one) (04)
1. Explain hydrogen bomb.
 2. Write a note on classification of elementary particles.
- Que.5 (C) Answer the following questions (any three) (03)
1. What is tokamak.
 2. Pions, kaons are known as
 3. Positron is antiparticle of
 4. Proton and neutron jointly called
 5. Define fusion.
