

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2025**(Regular/Improvement/Supplementary)****PHYSICS****GPHY6B12T: NUCLEAR PHYSICS AND PARTICLE PHYSICS****Time: 2 Hours****Maximum Marks: 60****SECTION A: Answer the following questions. Each carries *two* marks.
(Ceiling 20 marks)**

1. What is a nuclear reaction?
2. Define cyclotron frequency.
3. Mention the use of Cadmium rod in nuclear reactors.
4. Write a note on standard model.
5. What are Higg's Bosons?
6. What is nuclear fusion? Where does the energy come from?
7. Give names of three synthetic elements.
8. What is a proportional counter?
9. What is the nature and origin of nuclear force?
10. State the binding energy curve of nuclei.
11. Comment on Mossbauer effect.
12. Give an account on field particles.

**SECTION B: Answer the following questions. Each carries *five* marks.
(Ceiling 30 marks)**

13. The critical energy for the ^{239}U is 7.3 MeV. Explain.
14. What is the principle of intersecting beam accelerator?
15. Classify the principles of nuclear radiation detection.
16. Give three uses of Cerenkov counter.
17. Tritium $^3\text{H}_1$ has half-life of 12.5 years against β – decay. What fraction of the sample of pure tritium will remain unchanged after 25 years?
18. What is meant by enrichment of Uranium?
19. A cyclotron with dees of radius 0.9 m has a magnetic field of 0.8 T. Calculate the generator frequency required to accelerate proton to 25 MeV.

SECTION C: Answer any *one* question. The question carries *ten* marks.

20. Give salient features of nuclear shell model and point out its success and failures.
21. List the families of elementary particles. Discuss the conservation law in particle interaction.

(1 × 10 = 10 Marks)