

**S.No. 6629**

**P 16 PY 41**

(For candidates admitted from 2016-2017 onwards)

M.Sc. DEGREE EXAMINATION, APRIL 2021.

Physics

NUCLEAR AND PARTICLE PHYSICS

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20)

Answer ALL questions.

1. Define Parity.
2. State nuclear magnetic dipole moment.
3. What is nuclear isomerism?
4. Define Geisen–Nuttal law.
5. Write a note on magic numbers.
6. What are the significance of collective model?
7. Define solar fusion.
8. Write a note on heterogeneous reactor.
9. What is meant by leptons?
10. Define CPT theorem.

SECTION B — (5 × 5 = 25)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Describe n-p scattering at low energies.

Or

- (b) Obtain semi-empirical mass formula.

12. (a) Write a detail note on neutrino hypothesis.

Or

- (b) Explain in detail account of the selection rules of  $\beta$ -decay.

13. (a) State and Explain reciprocity theorem.

Or

(b) Discuss the shell model of nuclei in detail.

14. (a) Write a short note on controlled fusion reactor.

Or

(b) Explain in detail about the radioactive decay process

15. (a) State and explain  $su(3)$  symmetry.

Or

(b) Give a detailed account on

(i) Mesons                      (ii) hadrons

SECTION C — ( $3 \times 10 = 30$ )

Answer any THREE questions.

16. Derive an expression for magnetic dipole moment of deuteron.

17. Discuss the Gamow's theory of  $\alpha$ -decay.

18. Give the theory on collective model of a nucleus in detail.

19. Describe Bohr-Wheeler's theory of nuclear fission.

20. Write a short note on

(a) Leptons

(b) Fundamental forces.

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