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D 51329 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2023

(CBCSS)

Physics

PHY 3C 10—NUCLEAR AND PARTICLE PHYSICS

(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

Section A

Answer **all** *questions.*
Each question carries weightage 1.

1. Write a note on electric dipole moment.
2. What are the allowed and forbidden beta decay.
3. State the three components of total angular momentum Z of the deuteron.
4. Explain Scattering cross sections.
5. What are gauge bosons ?
6. List the particles affected and not affected by Strong force.
7. Explain symmetric and antisymmetric functions.
8. What are the features of a photo multiplier tube.

(8 × 1 = 8 weightage)

Section B

Answer any **two** *questions.*
Each question carries weightage 5.

9. With figure explain the structure, constituents and working of nuclear reactor.
10. With figure explain the energy level diagram of Shell model of nucleus.

Turn over

11. With details of quantum numbers and other properties of various elementary particles, explain Sakata model.

12. With suitable examples and figures explain eight fold way of symmetry.

(2 × 5 = 10 weightage)

Section C

Answer any **four** *questions.*
Each question carries weightage 3.

13. Explain proton and neutron separation energies.

14. Compute the total binding energy for (a) $_{7}Li$; (b) $_{20}Ne$; (c) $_{56}Fe$; (d) $_{235}U$.

15. Explain how The Nucleon - Nucleon Force Is charge symmetric and Nearly Charge Independent

16. Briefly explain forbidden decays.

17. What is a Moderator ? Explain its working with example.

18. Write a note on Proportional counter.

19. Write a note on coloured quarks.

(4 × 3 = 12 weightage)