M.Sc DEGREE EXAMINATION,APRIL 2019
II Year III Semester
Nuclear Physics and Particle Physics

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. What is Tensor forces.
2. Define Yukawa potential.
3. How many types of reactions.
4. What are conservation laws.
5. Define Direct reactions.
6. Define Magic numbers.
7. What is Spin-orbit coupling.
8. Define Beta decay.
9. Define Angular momentum and parity selection rules.
10. What is CP and CPT invariance.
11. Discuss about the conversation of charge and hypercharge.
12. Explain mass of neutrino

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Write a note on salient features of nuclear forces.
14. Discuss the effective range theory of n-p scattering.
15. Explain Q-value equation.
16. Explain Fermi theory of beta decay.
17. Explain the Types of interaction between elementary particles.
18. What are fermions and Bosons? Discuss the classification of Fermions and Bosons.
19. What are hadrons? Discuss their SU(3) classifications.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Describe the basic ideas in Yukawas meson exchange theory of nuclear forces. From the Yukawa theory form, If a nucleon emits a Virtual pions of rest mass 270 me, estimate the range of nuclear force.
21. Describe the Breit-Wigner dispersion formula for σ r (the reaction cross section) and σ s (the scattering cross section) for spinless neutron.
22. Explain Shell model with Spin-orbit coupling and Magic numbers.
23. Explain the Non-conservation of parity and Internal conversion.
24. What is CP invariance? Combined operation of charge and space or simultaneous reversal of charge and position coordinate on the particle.

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