M.Sc - IV

Nuclear and Particle physics (Paper - 401)

Expected Questions for End Semester Exam - 2020

Long answer type Questions

1. Electric Quadrupole moment
2. Ground state of deuteron
3. n-p scattering at low energies/ Partial wave analysis of n-p scattering at low energies.
4. Effective range theory of n-p scattering
5. Meson theory of nuclear forces
6. coherent n-p scattering and spin dependence of nuclear force.
7. Liquid drop model and Bohr's theory of nuclear fission.
8. Shell model and its success and limitations.
9. Semi empirical mass formula
10. Resonance in nuclear reactions - Breit - Wigner dispersion formula for $l = 0$ neutrons.
11. Fermi's theory of β-decay.
12. classification of fundamental forces and elementary particles
13. Strangeness - Gell-Mann and Nishijima formula
14. Quark model

Short answer type Questions and notes

1. concept of ~~bin~~ nuclei and binding energy
2. electric and magnetic moment.
3. Parity and statistics of nucleus.
4. Nuclear forces and its characteristics.
5. conclusions from n-p and p-p scattering at low energy.
6. Exchange forces and tensor forces (notes)
7. charge independence and charge symmetry of nuclear forces (notes)

(8) Q - value and threshold energy

(9) Compound nucleus theory (notes)

(10) electromagnetic interaction with nuclei

(11) two component theory of neutron decay.

(12) Yukawa interaction.

(13) symmetries and conservation laws.

(14) Iso-spin

(15) C.P.T invariance