LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PHYSICS**

FIFTH SEMESTER – **APRIL 2016**

PH 5507/PH 5504/PH 5500 – ATOMIC & NUCLEAR PHYSICS

Date: 26-04-2016 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

PART-A

Answer ALL questions **(10x 2 = 20 marks)**

1. State Pauli's exclusion principle.
2. What is Stark Effect?
3. Define mass defect and packing fraction.
4. State Geiger-Nuttal law.
5. What is four factor formula?
6. Classify neutrons based on energy consideration.
7. What are Van-Allen belts?
8. How do you classify elementary particles as Bosons and Fermions?
9. What is the working principle of NMR spectroscopy?
10. Explain Larmor precession.

PART-B

Answer any FOUR questions. **(4 x7. 5 = 30 marks)**

11. Explain LS and jj coupling schemes.
12. Using BE/A Vs. A curve explain nuclear fission and fusion.
13. Discuss the continuous spectra of β-decay. Outline Pauli's hypothesis of neutrino.
14. Write a short note on Nuclear forces and Yukawa's Meson field theory.
15. What is a chemical shift? How is it measured? Mention any two uses.

PART-C

Answer any FOUR questions **(4 x 12.5 = 50 marks)**

16. Explain with necessary theory and the diagram the Thomson's parabola method for positive ray analysis.
17. In detail discuss, the quantum theory of alpha decay. Derive Geiger- Nuttal law.
18. Describe the construction and working of a nuclear reactor.
19. a) Classification of elementary particles. b) Write a note on conservation laws.
20. Outline the theory of Mossbauer spectroscopy.

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