LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **APRIL 2013**

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

Date: 08/05/2013   Dept. No.   Max. : 100 Marks
Time: 9:00 - 12:00

PART – A

Answer All Questions: **(10x2=20 marks)**

1. Write down any two limitations of Thompson's parabola method.

2. What is Zeeman effect?

3. What are mirror nuclei? Give an example.

4. What is meant by the range of α-particle?

5. What is the value of spin and half life of the neutron?

6. State any two uses of nuclear reactor.

7. State any two similarities between a liquid drop and a nucleus.

8. Write any two differences between bosons and fermions.

9. What is meant by Larmor precession?

10. Write short notes on chemical shift.

PART – B

Answer ANY FOUR Questions   **(4X7.5=30 marks)**

11. Explain about i) L-S coupling   (3.5 marks)
                   ii) j-j coupling.   (4 marks)
12. Write short notes on i) binding energy of nucleus.   (3.5marks)
                   ii) What is meant by Nuclear Magneton? Calculate its value.   (4marks)
13. Explain in detail the nuclear chain reaction.

14. What are cosmic showers? Discuss the theory of their formation.
15. Discuss the basic ideas of Mossbauer spectroscopy.

PART–C

Answer ANY FOUR Questions :   **(4x12.5 = 50marks)**

16. What is Compton Effect? Give the theory and explain its experimental verification.

17. Explain   i) Beta ray spectra   (4.5 marks)
                 ii) Inverse beta decay   (4 marks)
                 iii) Detection of neutrino.   (4 marks)

18. Explain about i) Classification of neutrons   (2 marks)
                   ii) Neutron sources   (5 marks)
                   iii) Neutron detection   (5.5 marks)

19. i) Discuss the evidences that support the shell model.   (6.5 marks)
    ii) Explain the characteristics of nuclear reaction.   (6 marks)

20. i) Describe the interaction between Nuclear magnetic moment and applied
       external magnetic field.   (7.5 marks)
    ii) Discuss the important applications of NMR Spectroscopy.   (5 marks)

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