



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PHYSICS

FIFTH SEMESTER – NOVEMBER 2016

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

Date: 01-11-2016

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

Answer **ALL** questions:

(10 x 2 =20 marks)

1. State Pauli's exclusion principle.
2. Calculate the wavelength separation between the un-modified line of wavelength 6000\AA and the modified lines when a magnetic induction of 1 Wb/m^2 is applied under normal Zeeman effect.
3. Explain the terms mass defect and packing fraction.
4. Define the terms isotopes and isobars.
5. Write the classification of neutrons and explain.
6. Define chain reaction.
7. What are cosmic rays?
8. Give the electric charge and strangeness of any two quarks.
9. What is Larmor precession?
10. Explain relaxation process and relaxation time.

PART –B

Answer any **FOUR** questions:

(4 x 7.5 =30 marks)

11. What are positive rays? Describe Thomson's method for positive ray analysis. (7.5)
12. How do you measure the range of α particle using Geiger and Nuttal experiment? (7.5)
13. a) Explain nuclear fission and fusion with suitable schematic chemical equation. (3.5)
b) Explain controlled thermonuclear reaction. (4)
14. Discuss the origin of cosmic rays. (7.5)
15. Write a brief note on (i) Mossbauer sources and (ii) absorbers. (7.5)

PART -C

Answer any **FOUR** questions:

(4 x 12.5=50 marks)

16. Outline the theory of Zeeman Effect and Anomalous Zeeman effect. (12.5)
17. Discuss the Rabi's method of determination of nuclear magnetic moment. (12.5)
18. a) Describe the construction and working of nuclear reactor. (9)
b) Write few uses of a nuclear reactor. (3.5)
19. a) Write short notes on classification elementary particles and Conservation laws in elementary particle. (6.5)
b) Write short note on weak nuclear interaction and strange particles. (6)
20. Give a brief note on chemical shift and its measurement in NMR spectroscopy. (12.5)

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