



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PHYSICS

FIFTH SEMESTER – APRIL 2017

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

Date: 20-04-2017
01:00-04:00

Dept. No.

Max. : 100 Marks

PART-A

Answer ALL questions:

(10 X 2 = 20 Marks)

1. Mention any two properties of canal rays.
2. State Pauli's exclusion principle.
3. Define packing fraction. What is the packing fraction of C-12?
4. What is neutrino? Mention its characteristics.
5. Classify neutrons in terms of energy.
6. What is chain reaction? Mention its types.
7. What are mesons?
8. What are cosmic rays?
9. What is called chemical shift?
10. What is spin-spin relaxation?

PART-B

Answer any FOUR questions:

(4 X 7.5 = 30 Marks)

11. Describe Dunnington's method to determine the charge to mass ratio of electrons.
12. Write a note on the range and stopping power of α -particles.
13. Explain the construction and working of a nuclear reactor.
14. Discuss about the fundamental interactions exist in nature.
15. Explain the basics of Möussbauer spectroscopy.

PART-C

Answer any FOUR questions:

(4 X 12.5 = 50 Marks)

16. (a) Explain the Stern-Gerlach experiment with principle in support of spatial quantization. **(8)**
(b) Explain the phenomenon of Paschen-Bach effect. **(4.5)**
17. Describe Rabi's method for determining nuclear magnetic moment.
18. (a) Write a note on thermonuclear reactions. **(5)**
(b) Give an account on the sources and detection of neutrons. **(7.5)**
19. (a) Write the Weizacker's semi-empirical mass formula for binding energy of a nucleus and explain it. **(10)**
(b) What do you mean by East-West asymmetry in cosmic rays? **(2.5)**
20. Give a brief note on Nuclear Magnetic Resonance (NMR) spectroscopy.
