



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PHYSICS

SIXTH SEMESTER – APRIL 2015

PH 6611 - ATOMICS AND NUCLEAR PHYSICS

Date : 15/04/2015
Time : 09:00-12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer ALL questions:

(10x2=20 marks)

1. What are the limitations of Thomson's parabola method?
2. State Pauli's exclusion principle.
3. What is Stark effect?
4. What is anomalous Zeeman effect?
5. Classify isobar and isotope with examples.
6. State Geiger-Nuttal law.
7. Write a note on magnetic moment of a neutron.
8. Define chain reaction.
9. Name the four fundamental interactions.
10. What are cosmic ray showers?

PART – B

Answer any FOUR questions:

(4x7.5=30 marks)

11. Explain about (i) L-S coupling and(ii) j-j coupling. (4+3.5)
12. What is Raman effect? Explain the formation of stoke's and antistoke's lines. (2.5+5)
13. Explain (i) mass defect (ii) binding energy and (iii) packing fraction. (3x2.5)
14. Explain the concept of line and continuous spectrum of β decay. (4+3.5)
15. Discuss the liquid drop model of a nucleus.
16. a) State the conservation laws in elementary particle physics.
b) Explain the conservation of baryon and lepton numbers with examples. (2.5+5)

PART – C

Answer any FOUR questions:

(4x12.5=50 marks)

17. Discuss Thomson's parabola method to measure the specific charge of positive ion.
18. Derive an expression for Lande's splitting factor and explain the anomalous Zeeman effect of sodium lines D_1 and D_2 .
19. Discuss in detail Gamow's theory of α - decay.
20. Write a note on discovery and production of neutrons. (6.5+6)
21. Explain the construction and working of a nuclear reactor. (3.5+9)
22. Explain the variation of cosmic ray intensity with (i) altitude, (ii) latitude and east-west direction. (4+4+4.5)

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