



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PHYSICS

SIXTH SEMESTER – NOVEMBER 2023

UPH 6502 – ATOMIC AND NUCLEAR PHYSICS

Date: 03-11-2023

Dept. No.

Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

PART – A

Q.No	Answer ALL questions	(10 × 2 = 20 Marks)
1.	Define Pauli's exclusion principle.	
2.	What is called specific charge of an electron?	
3.	What is Zeeman Effect?	
4.	Define Paschen Back effect.	
5.	State Displacement Law.	
6.	List any two important properties of neutrino.	
7.	State any two similarities between a liquid drop and a nucleus.	
8.	Define nuclear fission reaction	
9.	What do you mean half-life period of a radioactive nucleus?	
10.	Define hyperons in particle physics.	

PART B

	Answer any FOUR questions	(4 × 7.5= 30 Marks)
11.	Explain about i) L-S coupling and ii) j-j coupling.	
12.	Explain the rotational spectra of molecules.	
13.	Explain in detail the nuclear chain reaction.	
14.	Mention the important properties of the neutrons.	
15.	Explain the components of Nuclear reactor with neat diagram.	
16.	Write notes on: (i) Larmor precession (ii) Relaxation processes.	

PART C

	Answer any FOUR questions	(4 × 12.5= 50 Marks)
17.	Discuss the various quantum numbers associated with vector atom model.	

18.	(a)What are the differences between normal and anomalous Zeeman effects? (b) Derive an expression for Lande's splitting factor and explain the anomalous Zeeman effect of sodium lines.
19.	Derive the Weizsaker formula for Nuclear binding energy based on Liquid drop model of nucleus.
20.	Discuss the evidences that support the shell model ii) Explain the characteristics of nuclear reaction
21.	Give an account of the β -ray spectrum. (b) Explain the role of neutrino hypothesis in understanding the spectrum.
22	Explain the quark model of elementary particles.

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