CLASS: MSc/IMSc   SEMESTER : III/IX
BRANCH: PHYSICS   SESSION : MO/2024

SUBJECT: PH502 ADVANCED QUANTUM MECHANICS

TIME: 3 Hours   FULL MARKS: 50
INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Discuss the essential elements of non-degenerate perturbation theory.	[5]	I	IV
Q.1(b)	Find out the first order correction to energy.	[5]	I	I
Q.2(a)	Explain Zeeman effect using perturbation theory.	[5]	I	II
Q.2(b)	Discuss briefly the Born-Oppenheimer approximation for the study of molecule.	[5]	II	IV
Q.3(a)	Develop an expression for vector potential for pure radiation field using method of separation of variables.	[5]	III	III
Q.3(b)	Find the Hamiltonian of the radiation field.	[5]	III	I
Q.4(a)	Discuss briefly the time dependent perturbation theory for a two-level system.	[5]	IV	IV
Q.4(b)	Develop Klein-Gordan equation.	[5]	V	III
Q.5(a)	Starting from the Dirac Hamiltonian, Develop Dirac relativistic equation for a free particle.	[5]	V	III
Q.5(b)	Find suitable forms of Dirac matrices.	[5]	V	I

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