SARASWATI MAHILA MAHAVIDHYALAYA, PALWAL

LESSON-PLAN

Class: M.Sc Physics **Semester: IInd**

Subject: Quantum Mechanics II **Session: 2021-2022**

1.	Unit I – Approximation Methods in Quantum Mechanics.
2.	Perturbation Theory.
3.	Time dependent Perturbation theory
4.	Helium atom by Perturbation theory
5.	Hydrogen atom by Perturbation theory
6.	Numericals of Perturbation theory
7.	Variational method Explanation
8.	Ground state of Helium by both variational
9.	Numericals on Variational method
10.	The hydrogen molecule
11.	The hydrogen molecule
12.	Evaluation of transition Probability in Time dependent perturbation theory.
13.	Constant perturbation
14.	Harmonic perturbation
15.	Fermi's golden rule
16.	Adiabatic and sudden approximation
17.	WKB approximation
18.	WKB approximation

19.	Unit 1 : Practice of Numerical
20.	Revision of Unit 1
21.	CLASS TEST
22.	Unit-2 : Semi-classical theory of radiation Explaination
23.	Transition probability for absorption and induced emission
24.	Transition probability for absorption and induced emission
25.	Electric dipole transition and selection rules
26.	Electric dipole transition and selection rules
27.	Forbidden transitions.
28.	Magnetic dipole transitions
29.	Higher order transitions
30.	Higher order transitions
31.	Einstein's coefficients
32.	Einstein's coefficients
33.	Unit 2 : Practice of Numerical
34.	Revision of Unit 2
35.	CLASS TEST
36.	Unit III Collision in 3D Explaination.
37.	Types of reference frames : Laboratory and C.M. reference frames

38.	Elastic Collison in Laboratory and C.M. reference frames
39.	Inelastic Collison in Laboratory and C.M. reference frames
40.	Relation between scattering angles in lab and CM frame
41.	Differential scattering cross section
42.	total scattering cross section
43.	Scattering amplitude
44.	Scattering amplitude
45.	The optical theorem
46.	Scattering by spherically symmetric potentials
47.	Scattering by spherically symmetric potentials
48.	Green's function
49.	Partial waves
50.	Partial waves and phase shifts
51.	Scattering by a perfectly rigid sphere
52.	Scattering by square well potential
53.	Numericals on scattering
54.	Complex potential and absorption
55.	The Born approximation
56.	The Born approximation
57.	Numericals using Born approximation

58.	Unit 3 : Practice of Numerical
59.	Revision of Unit 3
60.	Presentation by students
61.	Presentation by students
62.	Presentation by students
63.	Presentation by students
64.	Presentation by students
65.	Identical particles: The principle of indistinguishibility
66.	Symmetric and antisymmetric wave functions
67.	Spin and statistics of identical particles
68.	The Slater determinant
69.	The Pauli exclusion principle Collision of identical particles.
70.	Spin states of a two electron system
71.	States of the helium atom
72.	States of the helium atom
73.	Collision of identical bosons.
74.	Collision of identical Fermions.
75.	Relations of identical particles.
76.	Unit 4 : Practice of Numerical

77.	Revision of Unit 4
78.	CLASS TEST