

SHIVAJI COLLEGE, UNIVERSITY OF DELHI
DEPARTMENT OF CHEMISTRY
INTERNAL ASSIGNMENT
(Academic Year 2023-24)

Submission date: 30.10.2023

Name of the teacher: Dr. Richa Arora

Course: B.Sc(P) Life Science Semester V Section B
Paper: Chemistry of d-Block Elements, Quantum Chemistry & Spectroscopy

Physical Chemistry

Total Marks = 10

Attempt all questions:

Q-1 Prove that the function $A e^{ikx}$ (A & k are constants) is an eigen function of the operator p_x . What is the eigen value?

or
Which of the following are eigen functions of the d^2/dx^2 operator: $\sin 3x$, $5x^2$? (3)

Q-2 What is an acceptable wave function? State which of the following wave functions are acceptable in wave mechanics over the range $x=0$ to $x=2\pi$!
(i) $\sin x$ (ii) $\csc x$ (iii) $\tan x$ (4)

Q-3 Determine whether or not the operators $x \frac{d}{dx}$ & $\frac{d^2}{dx^2}$ commute.
or

Write an energy expression for a particle of mass ' m ' confined to move in a one-dimensional box of length ' a '. Calculate the energy required for a particle of mass 1×10^{-30} kg to move from energy level 3 to 4, the length of the box is 973 pm. (3)

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