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

Submission date: 03.11.2023

Name of the teacher: Dr. Richa Arora

Name of the Course: B.Sc (P) Life Science Semester V, Section A

Name of the Paper: Chemistry of d-block elements, Quantum Chemistry and Spectroscopy

Maximum 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 px. what is the eigen value?

Or

which of the following are eigen functions of the d^2/dx^2 operators: $\sin 3x$, $5x^2$? (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 $x^2 \frac{d^2}{dx^2}$ & $\frac{d^2}{dx^2}$ 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^{-20} kg to move from energy level 3 to 4, the length of the box is 973 pm. (3)