LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

SIXTH SEMESTER – **APRIL 2022**

UCH 6502 – MOLECULAR DYNAMICS

Date: 17-06-2022 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

PART – A

Answer ALL Questions. **(10 x 2 = 20 Marks)**

1. Using Balmer's formula, Calculate the wavelength for n=3 of the visible region of the Hydrogen spectrum.
2. Find the Eigen function and Eigen value of the operator d /dx.
3. Give the symmetry elements for C_{2h} point group.
4. Verify whether C_{2v} group is an abelian group.
5. Calculate the frequency of the Ultraviolet light having a wavelength of 3000ºA.
6. What are excimers and exciplexes?
7. Write about primary process.
8. What is photochemical equilibrium?
9. Why true solutions and suspension do not exhibit Brownian movement?
10. What is Tyndall effect?

PART – B

Answer any EIGHT Questions. **(8 x 5 = 40 Marks)**

11. Give the postulates of Quantum mechanics.
12. Discuss various series in Hydrogen spectrum and calculate the levels of Hydrogen atom.
13. Determine whether the following operator is linear or nonlinear $\check{A}f(x)=x^2f(x)$.
14. Discuss the symmetry operation and symmetry with suitable examples.
15. Construct the multiplication table for water molecule.
16. What is Quantum yield? Give reasons for low and high quantum yield.
17. Write short notes on Chemiluminescence.
18. How is flash photolysis used to investigate reactions in solutions?
19. Discuss the kinetics of Hydrogen and chlorine reaction in the absence of oxygen.
20. Differentiae Chemisorption and Physisorption.
21. Give the applications of Colloids.
22. What is adsorption Isotherm? Deduce Langmuir adsorption Isotherm.

PART – C

Answer any FOUR Questions. **(4 x 10 = 40 Marks)**

23. Derive an expression for one dimensional box and discuss the allowed energy levels.
24. Discuss the properties of groups and subgroups with suitable examples.
25. State and explain (i) Grothus Drapers law (ii) Stark Einstein law (5+5)
26. Discuss the Jablonski diagram for radiative and non-radiative transitions.
27. (a) Explain the techniques of different chemical acidometers.
    (b) Derive stern Volmer equation (5+5)
28. (a) Write BET equation and mention the terms in it.
    (b) What are colloids? Discuss the stability of colloids (5+5)

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