

**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

B.Sc. DEGREE EXAMINATION – CHEMISTRY

SIXTH SEMESTER – APRIL 2010

**CH 6606/CH 6600 - MOLECULAR DYNAMICS**

Date & Time: 15/04/2010 / 9:00 - 12:00 Dept. No.

Max. : 100 Marks

**PART – A**

***Answer ALL questions.***

***(10 x 2 = 20 marks)***

1. State Pauli's exclusion principle.
2. Calculate the energy of the photon associated with light of wavelength  $6057.8 \text{ \AA}$ .
3. Define the term degeneracy of an energy level.
4. Find the value of  $\ln 100!$ .
5. Define thermodynamic probability.
6. Define the term partition function.
7. Explain radiationless transitions.
8. Define Chemiluminescence.
9. What are thermal reactions? Give an example.
10. Mention any two methods of studying fast reactions.

**PART – B**

***Answer any EIGHT questions.***

***(8 x 5 = 40 marks)***

11. Explain the energy distribution in Black Body Radiation.
12. Explain the concept of orbitals and orbits.
13. Discuss Bohr's model of an atom.
14. State the postulates of quantum mechanics and explain any two of them.
15. Discuss on Schrodinger wave equation.
16. Explain Sackur – Tetrode equation and mention the terms involved.
17. Derive the relation between partition function and energy.
18. Explain primary and secondary photochemical processes.
19. State and explain Stark-Einstein law of photochemical equivalence.
20. Explain the mechanism of photosynthesis.

(P.T.O)

21. Describe flash photolysis.

22. Explain the kinetics of photochemical reaction between  $H_2$  and  $Br_2$ .

**PART – C**

**Answer any FOUR questions.**

**(4 x 10 = 40 marks)**

23. Explain (i) Zeeman effect (ii) Photoelectric effect.
24. (i) What are quantum numbers? Give its significance.  
(ii) Define the term operators. Give any two examples.
25. Derive the expressions for eigen value and eigen function for a particle in one dimensional box.
26. Derive Maxwell - Boltzmann statistics. Give its application.
27. Explain the following  
(i) Jablonski's Diagram (ii) Actinometers
28. (i) Derive the Stern-Volmer equation.  
(ii) Explain photosensitisation with an example.

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