

KAMARAJ COLLEGE (Autonomous)

Accredited with A+ Grade by NAAC

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

THOOTHUKUDI – 628 003

(4 Pages)

Reg. No:

Question. Code No : 2400031

Sub Code : 24UMCH11

UG Degree - End Semester Examinations, November 2024

First Semester

B.Sc. CHEMISTRY

Major - GENERAL CHEMISTRY - I

(For those who joined in July 2024 onwards)

Time : 3 Hours

Maximum : 75 Marks

PART A – (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer :

- Planck equation is
 - $E = hv$
 - $E = mc^2$
 - $E = h/ mv$
 - $E = mv/h$
- The value of radius of Bohr's 1st orbit of H-atom is
 - 0.0729nm
 - 0.0529nm
 - 1.0529nm
 - None

3. The wave function in quantum mechanics represents
(a) Shape of the system (b) probability
(c) State of the system (d) None
4. Mulliken's scale of electronegativity is based on
(a) IE (b) IE & EA
(c) effective nuclear charge (d) EA
5. The geometry of molecule involved sp hybridisation is
(a) tetrahedral (b) bent
(c) linear (d) octahedran
6. Which of the following molecule has zero dipole moment?
(a) H₂O (b) NH₃
(c) CH₄ (d) CCl₄
7. BF₃ is
(a) Electron pair acceptor (b) Electron pair donar
(c) Lewis base (d) All of these
8. The bond order for N₂ molecule is
(a) 0 (b) 1
(c) 2 (d) 3
9. In carbenes, carbon is
(a) tetravalent (b) divalent
(c) monovalent (d) trivalent
10. Ethoxide ion is
(a) Free radical (b) nucleophile
(c) Electrophile (d) None

PART B - (5X5=25 Marks)

**Answer ALL Questions choosing either (a) or (b).
Answer should not exceed 250 words.**

11. (a) Write notes on
(i) Hund's rule (ii) Pauli's exclusion principle
(OR)
(b) What is photo electric effect? Explain.
12. (a) Write Schrodinger wave equation. What is its application?
(OR)
(b) Define electronegativity. Explain the methods of determination of electronegativity.
13. (a) Define dipole moment. Give its application
(OR)
(b) Define lattice energy. Discuss the factors affecting it.
14. (a) Discuss the types of van der Waals forces.
(OR)
(b) Describe the band theory of metallic bonding.
15. (a) Explain how the inductive effect influence the basic strength of amines
(OR)
(b) What are electrophilic and nucleophilic reagents? Explain with examples.

PART C - (5 × 8 = 40 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 500 words.

16. (a) Derive de Broglie wave equation. How it is verified experimentally?

(OR)

(b) Describe Franck – Hertz experiment to explain discrete energy state in atoms.

17. (a) Explain the classification of elements on the basis of their electronic configuration.

(OR)

(b) Discuss the postulates of Quantum mechanics.

18. (a) Discuss the postulates of VSEPR theory. Explain the structure of NH_3 and BeCl_2 .

(OR)

(b) Discuss polarization of ions. Explain the application of Fajan's rule.

19. (a) Draw the MO diagram of NO and HF molecule. Calculate its bond order and magnetic properties.

(OR)

(b) What is meant by hydrogen bonding? What are the different types of hydrogen bonding? Explain the effects of hydrogen bonding.

20. (a) Define hyper conjugation affect and explain its influence as the reactivity of organic compounds

(OR)

(b) Explain about addition and substitution reaction with examples.