

# KAMARAJ COLLEGE (Autonomous)

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(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

THOOTHUKUDI – 628 003

(5 Pages)

Reg. No: .....

Question Code No: 25000310

Course Code: 24UFCH11

UG Degree - End Semester Examinations, November 2025

First Semester

B.Sc. CHEMISTRY

Foundation Course for Chemistry

(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:

- The angular momentum of an electron moving in an orbit is given by  
(a)  $mvr=nh/2\pi$  (b)  $mv=nh/2\pi$   
(c)  $mvr=h/2\pi$  (d)  $mv=nh/\pi$
- ${}_4\text{Be}^{10}$ ,  ${}_5\text{B}^{10}$  and  ${}_6\text{C}^{10}$  are \_\_\_\_\_  
(a) Isotopes (b) Isobars

- (c) Isotones (d) Isomers
3. The geometry of  $\text{BF}_3$  molecule is \_\_\_\_\_
- (a) Linear (b) Trigonal planar  
(c) Pyramidal (d) Tetrahedral
4. \_\_\_\_\_ is an example of neutral ligand.
- (a) Py (b)  $\text{Cl}^-$   
(c)  $\text{OH}^-$  (d)  $\text{NO}_2^-$
5. The IUPAC name for  $\text{CH}_3\text{NH}_2$  is
- (a) Methanamine (b) Alkanamide  
(c) Ethanamine (d) Alkanone
6. Which of the following is named as alkanol?
- (a) Alcohol (b) Aldehyde  
(c) Ketone (d) Carboxylic acid
7. The radius ratio of a crystal is 0.732. It has \_\_\_\_\_ geometry.
- (a) Octahedral (b) Tetrahedral  
(c) Trigonal planar (d) Cubic
8. The surface tension of a liquid \_\_\_\_\_ with rise of temperature.
- (a) Increase (b) Decrease  
(c) Remains constant (d) None of the above
9. The reciprocal of wave length is called
- (a) Phase (b) Frequency

(c) Wave number (d) Amplitude

10. Pure vibrational spectrum is observed in

(a) Visible region

(b) IR region

(c) UV region

(d) Microwave region

**PART - B (5X5=25 Marks)**

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

**Answer should not exceed 250 words.**

11. (a) Sketch the shapes of s,p & d orbitals and name them.

**(OR)**

(b) Define electron affinity. How does it vary across a period and down a group?

12. (a) Explain paramagnetism and diamagnetism with an example.

**(OR)**

(b) Discuss valence bond theory.

13. (a) Differentiate meso compounds from racemic mixture.

**(OR)**

(b) Carbon is unique among the elements - Explain.

14. (a) List the differences between crystalline solids and amorphous solids.

**(OR)**

(b) List and explain the factors affecting surface tension.

15. (a) Summarize the selection rule for rotational and electronic spectroscopy.

**(OR)**

(b) Explain Born-Oppenheimer approximation.

**PART - C (5 X 8 = 40 Marks)**

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

**Answer should not exceed 500 words.**

16. (a) Write notes on quantum numbers.

**(OR)**

(b) State and explain: (i) Pauli's exclusion principle.

(ii) Hund's rule (iii) Aufbau's principle.

17. (a) Illustrate  $sp$  and  $sp^2$  hybridisation with suitable examples.

**(OR)**

(b) Discuss the following (i) Dipole moment (ii) percentage ionic character of covalent bond.

18. (a) Categorize structural isomerism into its types and explain.

**(OR)**

(b) Sketch the structural formula of the following compounds. (i) 2-ethyl butane (ii) 1,4 butadiene (iii) 2-propanol (iv) pentanol (v) azole (vi) propane -2- thiol.

19. (a) Discuss the postulates of kinetic theory of gases.

**(OR)**

(b) Identify the different types of intermolecular forces in liquids.

20. (a) Analyze the principle and selection rules of vibrational spectroscopy.

**(OR)**

(b) Highlight the principle and application of ESR spectroscopy.

