# KAMARAJ COLLEGE (Autonomous)

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(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

**(4 Pages)** **Reg. No:……**

**Question Code: 26E00303** **Course Code : 24UMCH31**

**UG Degree - End Semester Examinations, April 2026**

**Third Semester**

**B.Sc., CHEMISTRY**

**General Chemistry - III**

**(For those who joined in July 2024 onwards)**

**Time : 3Hours** **Maximum : 75 Marks**

**PART – A (10 × 1 = 10 Marks)**

**Answer ALL Questions**

**Choose the correct answer :**

CO:1 K:1 1. Find out which one has maximum value of mean free path.

(a) $N_2$ (b) $CO_2$

(c) $O_2$ (d) $H_2$

CO:1 K:1 2. Select the no. of vibrational mode of $H_2O$ molecule.

(a) 3 (b) 2

(c) 1 (d) 4

CO:2 K:2 3. Which one of the following has fcc structure?

(a) NaCl (b) CsCl

(c) LiCl (d) KCl

CO:2 K:2 4. Choose the compound which has metal excess defect.

(a) NaCl (b) FeO

(c) AgBr (d) FeS

CO:3 K:1 5. Which of the isotope is used in carbon dating?

(a) C-12 (b) C-13

(c) C-14 (d) C-11

CO:3 K:1 6. Stellar energy is due to

(a) Nuclear fission (b) Nuclear Fusion

(c) Pyrolysis reaction (d) Isomerisation

CO:4 7. Find which is a best leaving group.

K:1 (a) $Cl^-$ (b) $I^-$

(c) Br- (d) $F^-$

CO:4 8. Tell the compound used in fire extinguisher,

K:1 (a) $CHCl_3$ (b) $CCl_4$

(c) $CH_3OH$ (d) $C_2H_5OH$

CO:5 9. Name the compound in which Cannizaro reaction is not possible

K:2 (a) Acetaldehyde (b) Benzaldehyde

(c) Formaldehyde (d) Trimethyl acetaldehyde

CO:5 10. Name the reaction which convert Sodium phenoxide to salicylic acid?

K:2 (a) Kolbe reaction (b) Gattermann reaction

(c) Libermann reaction (d) Schimidt reaction

**PART – B (5 X 5 = 25 Marks)**

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

**Answer should not exceed 250 words.**

CO:1 11. (a) Develop Maxwell Boltzman distribution law for molecular velocities and its significance.

K:4

**(OR)**

(b) List the collision properties of gas molecules and explain.

CO:2 12. (a) Analyse the crystal structure of sodium chloride and caesium chloride.

K:4

**(OR)**

(b) Classify liquid crystals and write its applications.

CO:3 13. (a) Examine nuclear stability using binding energy and mass defect.

K:3

**(OR)**

(b) Explain the methods used for the safe disposal of radioactive wastes.

CO:4 14. (a) Build the mechanism for $SN_2$ reaction and mention the factors affecting $SN_2$ mechanism.

K:4

**(OR)**

(b) Analyse the chemical properties of aromatic halogen compounds and infer their reactivity.

CO:5 K:3 15. (a) Utilize phenol for the preparation of salicylaldehyde by Riemer Tiemann reaction and write its mechanism.

**(OR)**

(b) Prepare resorcinol and write its properties and uses.

**PART – C (5 X 8 = 40 Marks)**

**Answer ALL Questions choosing either (a) or (b).**
**Answer should not exceed 500 words.**

CO:1 K:4 16. (a) Explain average velocity, root mean square velocity and most probable velocity and write the relationship between them.

**(OR)**

(b) Discuss the deviation of gases from ideal behaviour and explain how the compressibility factor vary with pressure for different gases.

CO:2 K:4 17. (a) Discuss the laws of crystallography.

**(OR)**

(b) i) Derive Bragg's equation and explain.

ii) Compare face centered cubic lattice and body centered cubic lattice.

CO:3 K:4 18. (a) Discuss for Fajan's - Soddy group displacement law and radioactive decay series.

**(OR)**

(b) i) Elaborate nuclear fission, mechanism and applications.

ii) Adapt safety measure against radio isotopes.

CO:4 K:4 19. (a) i) Propose the Benzyne mechanism.

ii) Discuss any three chemical tests used to distinguish alcohols from other organic compounds.

**(OR)**

(b) i) Classify alcohols and list out the uses of alcohols.

ii) Discuss the preparation of alcohol by reduction of carbonyl compounds and acids.

CO:5 K:5 20. (a) i) Prepare phenol by Dow's process and Raschig process

ii) Elaborate the preparation, properties and uses of picric acid.

**(OR)**

(b) i) Explain the preparation of benzyl alcohol by Cannizaro reaction and Grignard reagent.

ii) Discuss the reactions of benzyl alcohol with $PCl_5$, sodium and give its uses.