KAMARAJ COLLEGE (Autonomous)

Accredited with A+ Grade by NAAC

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(4 Pages) **Reg. No:……**

Question Code: 26E00308 **Course Code : 24UMCH41**

UG Degree - End Semester Examinations, April 2026

Fourth Semester

B.Sc., CHEMISTRY

General Chemistry - IV

(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:

CO:1 K:1 1. Choose the term used for the phenomenon in which molecules of a gas or liquid concentrate at the surface of a solid.

(a) Absorption (b) Adsorption

(c) Catalysis (d) Desorption

CO:1 K:1 2. Find the effect of adding a catalyst to a reaction system.

(a) Increases the rate of forward reaction only.

(b) Increases the rate of reverse reaction.

(c) Increases the rate of forward as well as backward reaction equally.

(d) Increases the rate of forward but decreases the rate of backward reaction.

CO:2 K:2 3. Select the emulsifying agent in milk

(a) Lactic acid (b) Fat

(c) Enzyme (d) Protein caesin

CO:2 K:2 4. The ratio of Mw/Mn is known as:

(a) Polarity index (b) Polydispersity index

(c) Ionic index (d) Catalytic index

CO: 3 K:1 5. Find the reason for the colour observed in transition metal compounds.

(a) s–p transitions (b) s–s transitions

(c) f–f transitions (d) d–d transitions

CO:3 K:1 6. Which of the following element shows the maximum number of oxidation states?

(a) Mn (b) Cr

(c) Fe (d) Co

CO:4 K:1 7. Find the element showing variable oxidation states from +3 to +7 among actinides.

(a) Thorium (b) Uranium

(c) Cerium (d) Neptunium

CO:4 K:2 8. Choose the ore in which uranium is commonly found.

(a) Bauxite (b) Carnotite

(c) Hematite (d) Malachite

CO:5 K:2 9. Identify the Epimer of Gluconic acid from the following

(a) Levulinic acid (b) Succinic acid

(c) Mannose (d) Mannonic acid

CO:5 K:1 10. Which one of the following is Polysaccharides?

(a) Sucrose (b) Stachyose

(c) Starch (d) Raffinose

PART – B (5 X 5 = 25 Marks)

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

Answer should not exceed 250 words.

CO:1 K:3 11. (a) Discuss the BET theory of Multilayer adsorption with plot.

(OR)

(b) Identify the general characteristics of catalytic reactions and explain.

CO:2 K:4 12. (a) Distinguish between the Tyndall effect and Brownian movement in colloidal systems.

(OR)

(b) i) Equal masses of polymer molecules with M1 = 10000 and M2 = 100000 are mixed. Calculate Mn and Mm.

(ii) The intrinsic viscosity of myosin is 217 cm^3 g^{-1}. Calculate the approximate concentration of myosin in water which would have a relative viscosity of 1.5.

CO:3 K:4 13. (a) Analyze the following aspects of transition elements

i) Stability of oxidation states

ii) Tendency to form complexes

(OR)

(b) Compare the transition elements with non-transition elements.

CO:4 K:4 14. (a) Analyze the consequences and cause of Lanthanide Contraction.

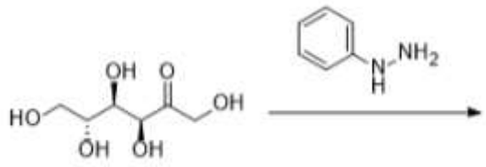
(OR)

(b) Account for the following

i) The colour of the lanthanoid ion

ii) Magnetic properties of the tri positive lanthanide ions

CO:5 K:3 15. (a) i) Complete the following reaction.



ii) Write the preparation of Maltose.

(OR)

(b) i) Identify the following conversion and write the reaction.

ii) Discuss any two industrial uses of cellulose.

PART – C (5 X 8 = 40 Marks)

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

Answer should not exceed 500 words.

CO:1 K:5 16. (a) (i) Derive an expression for Langmuir adsorption isotherm. Comment on the effect of pressure on the rate of adsorption.

(ii) Determine how long a hydrogen atom will remain on the surface of a solid at 1000 K if its desorption energy is 15 kJ mol^{-1}. Assume that $\tau_o = 10^{-13}$s.

(OR)

(b) Explain the mechanism and kinetics of Enzyme-catalyzed reactions.

CO:2 K:3 17. (a) Discuss the following

(i) Phenomenon of electrophoresis.

(ii) Applications of colloids.

(OR)

(b) Discuss the determination of molecular masses of macromolecules by Viscometry.

CO:3 K:5 18. (a) Compare the second and third transition series with the first transition series.

(OR)

(b) Explain the similarities and differences between iron, cobalt, and nickel with respect to magnetic properties, colour and catalytic properties.

CO:4 K:6 19. (a) Discuss the separation of lanthanides and actinides by ion-exchange chromatography.

(OR)

(b) Compile the preparation, properties and uses of ceric ammonium sulphate.

CO:5 K:5 20. (a) Determine the structure of glucose with suitable reaction.

(OR)

(b) Explain the synthetic route used for ascending the series of aldoses.