JEE MAIN Sample Paper Chemistry

Duration: 1 Hour **Maximum Marks: 100**

Instructions

1. This paper contains TWO sections: Section I and Section II.
2. Section I contains 20 Multiple Choice Questions (MCQs).
3. Section II contains 5 Numerical Value Questions.
4. All questions are compulsory.
5. Each correct answer carries **+4 marks**.
6. Each incorrect answer carries **-1 mark**.
7. No negative marking for unattempted questions.

Section I — Multiple Choice Questions

Q1. Most stable conformation of 2,3-dimethylbutane C2-C3 rotation: *[2024]*

(A) 0°
(B) 60°
(C) 120°
(D) 180°

Q2. Final product (Z) in reaction sequence: *[2023]*

(A) Benzaldehyde
(B) Benzoic acid
(C) Benzyl alcohol
(D) Toluene

Q3. Radial probability curve for 3p orbital: *[2022]*

(A) 0 nodes
(B) 1 node
(C) 2 nodes
(D) 3 nodes

Q4. Correct graph for isothermal expansion of ideal gas: *[2025]*

(A) P vs V straight line through origin
(B) PV vs P horizontal straight line
(C) V vs T hyperbola
(D) P vs $1/V$ hyperbola

Q5. Major product P in hydroboration-oxidation: *[2024]*

(A) 1-methylcyclohexanol
(B) trans-2-methylcyclohexanol
(C) cis-2-methylcyclohexanol
(D) Cyclohexylmethanol

Q6. Frost diagram slope between M^{2+} and M^{3+} positive steeper than $M \to M^{2+}$: *[2021]*

(A) M^{2+} prone to disproportionation
(B) M^{3+} strong reducing agent
(C) M^{2+} most stable
(D) M is a noble metal

Q7. Ellingham diagram trend for CO and CO_2 formation: *[2023]*

(A) $C \rightarrow CO_2$ large positive slope

(B) $C \rightarrow CO$ negative slope

(C) $CO \rightarrow CO_2$ horizontal line

(D) All metal oxide lines negative slopes

Q8. Number of tetrahedral voids per small cube in CCP: *[2022]*

(A) 1

(B) 2

(C) 4

(D) 8

Q9. Red precipitate with Fehling's solution: *[2025]*

(A) CuO

(B) Cu_2O

(C) $Cu(OH)_2$

(D) Cu

Q10. HOMO of CO molecule: *[2024]*

(A) σ_{2p_z}

(B) π_{2p_x}

(C) σ^*_{2s}

(D) σ_{2s}

Q11. Arrhenius plot slope -4000 K, E_a: *[2021]*

(A) 33.26 kJ/mol

(B) 4000 J/mol

(C) 8.314 kJ/mol

(D) 1.0 kJ/mol

Q12. Δ_o for $[CoCl_6]^{4-} = 18000$ cm¹, find Δ_t for $[CoCl_4]^{2-}$: *[2023]*

(A) 18000 cm¹

(B) 8000 cm¹

(C) 16000 cm¹

(D) 20000 cm¹

Q13. d-orbitals pointing directly towards ligands in octahedral: *[2022]*

(A) d_{xy}, d_{yz}

(B) $d_{x^2-y^2}, d_{z^2}$

(C) d_{xz}, d_{z^2}

(D) All d-orbitals

Q14. Hydrogen bonds between Cytosine and Guanine: *[2025]*

(A) 2

(B) 3

(C) 1

(D) 0

Q15. Half-equivalence point in weak acid-strong base titration: *[2024]*

(A) $pH = 7$

(B) $pH = pK_a$

Salt $= 2 \times$ [Acid]

(C) $pOH = pK_b$

Q16. Structure of Inorganic Benzene: *[2021]*

(A) $B_3N_3H_3$

(B) $B_3N_3H_6$

(C) B_2H_6

(D) $C_3N_3H_3$

Q17. Ion with largest ionic radius: *[2023]*

(A) O^{2-}

(B) F^-

(C) Na^+

(D) Mg^{2+}

Q18. Major product of Reimer-Tiemann reaction: *[2022]*

(A) Salicylic acid

(B) Salicylaldehyde

(C) Phthalic acid

(D) Aspirin

Q19. Reaction of HBr with propene in presence of H_2O_2: *[2025]*

(A) Markonikov's rule

(B) Anti-Markonikov's rule

(C) Saytzeff's rule

(D) Hofmann's rule

Q20. Boiling point elevation constant (K_b) depends on: *[2024]*

(A) Nature of solute

(B) Nature of solvent

(C) Concentration of solution

(D) Pressure of system

Section II — Numerical Value Questions

Q21. Cubic crystal, distance between adjacent (111) planes with lattice edge 300 pm is $X\sqrt{3}$ pm. Find X: *[2024]*

Q22. First-order reaction, 50% complete in 20 min. Time to reduce to 1/8th: *[2023]*

Q23. Chiral carbons in open-chain D-glucose: *[2025]*

Q24. Standard reduction potential for $Cu^{2+}/Cu = +0.34$ V. Potential in 0.01 M solution at 25°C = 0.x V. Find x: *[2022]*

Q25. Total lone pairs in I_3^- ion: *[2024]*

Answer Key

Section I

1.(B)	2.(B)	3.(B)	4.(B)	5.(B)
6.(A)	7.(B)	8.(A)	9.(B)	10.(A)
11.(A)	12.(B)	13.(B)	14.(B)	15.(B)
16.(B)	17.(A)	18.(B)	19.(B)	20.(B)

Section II

21. 100	22. 60	23. 4	24. 0.281	25. 9