

NEET Chemistry Sample Paper 05

A) **Subject:** Chemistry

B) **Total Questions:** 45 Questions (All Compulsory)

C) **Marking Scheme & Rules:**

- Correct Answer: +4 marks
- Incorrect Answer: -1 mark (Negative marking)
- Unattempted Question: 0 marks
- Multiple Answers: Treated as incorrect, attracting -1 mark

Q1. The standard electrode potential (E°) for Sn^{4+}/Sn^{2+} couple is +0.15 V and for Cr^{3+}/Cr couple is -0.74 V. The standard cell potential (E°_{cell}) for the cell is:

- (A) +0.89 V
- (B) -0.59 V
- (C) +0.59 V
- (D) +1.18 V

Q2. Which of the following is an example of a pseudo-first-order reaction?

- (A) Inversion of cane sugar
- (B) Decomposition of H_2O_2
- (C) Hydrolysis of ethyl acetate in presence of acid
- (D) Both (A) and (C)

Q3. In a reversible reaction, a catalyst:

- (A) Increases the equilibrium constant
- (B) Decreases the activation energy of both forward and backward reactions
- (C) Increases the yield of the product
- (D) Decreases the enthalpy of the reaction

Q4. The amount of electricity required to deposit 1 mole of Aluminium from a solution of $AlCl_3$ is:

- (A) 1 Faraday
- (B) 2 Faradays
- (C) 3 Faradays
- (D) 96500 Coulombs

Q5. Which of the following conditions favors physical adsorption?

- (A) High temperature and low pressure
- (B) Low temperature and high pressure
- (C) High temperature and high pressure
- (D) Low temperature and low pressure

Q6. If the molarity of a solution is doubled, the molality will:

- (A) Double
- (B) Halve
- (C) Increase slightly (depends on density)

(D) Decrease

Q7. For the reaction $A + B \rightleftharpoons C + D$, the initial concentrations of A and B are equal. At equilibrium, the concentration of C is three times that of A. The equilibrium constant K_c is:

- (A) 4
- (B) 9
- (C) 1/9
- (D) 16

Q8. The ionic product of water (K_w) at 25°C is 10^{-14} . At 60°C , K_w will be:

- (A) 10^{-14}
- (B) Greater than 10^{-14}
- (C) Less than 10^{-14}
- (D) Zero

Q9. The fraction of total volume occupied by atoms in a simple cubic unit cell is:

- (A) $\pi/6$
- (B) $\pi/4$
- (C) $\sqrt{3}\pi/8$
- (D) $\sqrt{2}\pi/6$

Q10. The van't Hoff factor (i) for a dilute solution of K_2SO_4 (assuming 100% dissociation) is:

- (A) 1
- (B) 2
- (C) 3
- (D) 4

Q11. The units of the rate constant for a reaction of order n are:

- (A) $(\text{mol L}^{-1})^{1-n} \text{ s}^{-1}$
- (B) $(\text{mol L}^{-1})^n \text{ s}^{-1}$
- (C) s^{-1}
- (D) $\text{mol L}^{-1} \text{ s}^{-n}$

Q12. According to Kohlrausch's law, the limiting molar conductivity of an electrolyte A_2B is:

- (A) $\lambda_{A^+}^\circ + \lambda_{B^{2-}}^\circ$
- (B) $2\lambda_{A^+}^\circ + \lambda_{B^{2-}}^\circ$
- (C) $\lambda_{A^+}^\circ + 2\lambda_{B^{2-}}^\circ$
- (D) $1/2\lambda_{A^+}^\circ + \lambda_{B^{2-}}^\circ$

Q13. Gold number is a measure of:

- (A) Protective power of a lyophilic colloid
- (B) Purity of gold
- (C) Coagulating power of an electrolyte
- (D) Size of gold particles

Q14. In the reaction $2H_2O_2 \rightarrow 2H_2O + O_2$, the rate of decomposition of H_2O_2 is $1.0 \text{ mol L}^{-1} \text{ s}^{-1}$. The rate of formation of O_2 is:

- (A) $1.0 \text{ mol L}^{-1} \text{ s}^{-1}$
- (B) $2.0 \text{ mol L}^{-1} \text{ s}^{-1}$
- (C) $0.5 \text{ mol L}^{-1} \text{ s}^{-1}$
- (D) $0.25 \text{ mol L}^{-1} \text{ s}^{-1}$

Q15. Which of the following is not a state function?

- (A) Enthalpy
- (B) Work
- (C) Entropy
- (D) Internal Energy

Q16. The structure of IF_5 is:

- (A) Trigonal bipyramidal
- (B) Square pyramidal
- (C) Octahedral
- (D) Pentagonal planar

Q17. Which of the following elements does not form a pentachloride?

- (A) *P*
- (B) *As*
- (C) *N*
- (D) *Sb*

Q18. The noble gas which forms the maximum number of compounds is:

- (A) *He*
- (B) *Ne*
- (C) *Ar*
- (D) *Xe*

Q19. Which of the following is used as a refrigerant?

- (A) NH_3
- (B) CO_2
- (C) PH_3
- (D) N_2

Q20. The spin-only magnetic moment of Ti^{3+} ion is:

- (A) 1.73 BM
- (B) 2.83 BM
- (C) 3.87 BM
- (D) 4.90 BM

Q21. In the blast furnace, the highest temperature is reached in:

- (A) Reduction zone
- (B) Slag formation zone
- (C) Combustion zone
- (D) Absorption zone

Q22. Which of the following is a "d-d" transition color?

- (A) $[Cu(H_2O)_6]^{2+}$ (Blue)
- (B) $KMnO_4$ (Purple)

- (C) $K_2Cr_2O_7$ (Orange)
- (D) AgI (Yellow)

Q23. The geometry of $[CoF_6]^{3-}$ is:

- (A) Tetrahedral
- (B) Octahedral
- (C) Square planar
- (D) Trigonal bipyramidal

Q24. The boiling point of HF is higher than other hydrogen halides due to:

- (A) Low molecular weight
- (B) Strong Hydrogen bonding
- (C) Van der Waals forces
- (D) High reactivity

Q25. Which of the following is an interstitial compound?

- (A) Fe_3C
- (B) H_2O
- (C) $NaCl$
- (D) C_{60}

Q26. The bond angle in NH_3 is:

- (A) 109.5°
- (B) 107°
- (C) 104.5°
- (D) 120°

Q27. Which of the following ions has the largest radius?

- (A) O^{2-}
- (B) F^-
- (C) Na^+
- (D) Mg^{2+}

Q28. Phosphorus is kept in:

- (A) Kerosene
- (B) Alcohol
- (C) Water
- (D) Open air

Q29. The hybridization of Carbon in Diamond is:

- (A) sp
- (B) sp^2
- (C) sp^3
- (D) dsp^2

Q30. Which of the following ligands is an ambidentate ligand?

- (A) CN^-
- (B) H_2O
- (C) NH_3
- (D) en

Q31. The reaction of aniline with $NaNO_2$ and HCl at $0 - 5^\circ C$ gives:

- (A) Chlorobenzene
- (B) Benzene diazonium chloride
- (C) Nitrobenzene
- (D) Phenol

Q32. Which of the following will give a positive Iodoform test?

- (A) CH_3CH_2OH
- (B) CH_3OH
- (C) C_6H_5OH
- (D) $CH_3CH_2CH_2OH$

Q33. The monomer of PVC is:

- (A) Ethene
- (B) Chloroethene
- (C) Tetrafluoroethene
- (D) Propene

Q34. Which of the following is a functional isomer of CH_3CH_2OH ?

- (A) CH_3OCH_3
- (B) $CH_3CH_2CH_2OH$
- (C) CH_3CHO
- (D) CH_3COCH_3

Q35. Bakelite is an example of:

- (A) Addition polymer
- (B) Thermosetting polymer
- (C) Thermoplastic polymer
- (D) Elastomer

Q36. The structural unit of starch is:

- (A) α -D-Glucose
- (B) β -D-Glucose
- (C) α -D-Fructose
- (D) Galactose

Q37. Which of the following is a secondary amine?

- (A) CH_3NH_2
- (B) $(CH_3)_2NH$
- (C) $(CH_3)_3N$
- (D) $C_6H_5NH_2$

Q38. The conversion of Benzene to Toluene can be achieved by:

- (A) Wurtz reaction
- (B) Friedel-Crafts alkylation
- (C) Reimer-Tiemann reaction
- (D) Cannizzaro reaction

Q39. Which of the following vitamins is water-soluble?

- (A) Vitamin A

- (B) Vitamin D
(C) Vitamin C
(D) Vitamin K
- Q40.** Acetone reacts with HCN to form Acetone cyanohydrin. This is an example of:
(A) Nucleophilic addition
(B) Electrophilic addition
(C) Nucleophilic substitution
(D) Electrophilic substitution
- Q41.** The IUPAC name of the compound $CH_3 - O - C_2H_5$ is:
(A) Methoxyethane
(B) Ethoxymethane
(C) Ethyl methyl ether
(D) Methyl ethyl ether
- Q42.** Which of the following is used as a morning-after pill (Antifertility drug)?
(A) Novestrol
(B) Mifepristone
(C) Bithional
(D) Terfenadine
- Q43.** The sugar present in RNA is:
(A) Deoxyribose
(B) Ribose
(C) Fructose
(D) Glucose
- Q44.** Which of the following is the strongest base in aqueous solution?
(A) NH_3
(B) CH_3NH_2
(C) $(CH_3)_2NH$
(D) $(CH_3)_3N$
- Q45.** Which of the following is a linear polymer?
(A) High-density polythene (HDPE)
(B) Low-density polythene (LDPE)
(C) Melamine
(D) Bakelite

Answers & Explanations

- (A)** $E_{cell}^{\circ} = E_{cathode}^{\circ} - E_{anode}^{\circ}$. Cathode (Sn couple): +0.15 V; Anode (Cr couple): -0.74 V. $E_{cell}^{\circ} = 0.15 - (-0.74) = 0.89$ V.
- (D)** Both reactions have a high concentration of water acting as solvent, so its concentration remains constant.

3. (B) A catalyst provides an alternative path with lower activation energy (E_a) for both directions.
4. (C) $Al^{3+} + 3e^- \rightarrow Al$. Depositing 1 mole of Al requires 3 moles of electrons (3 F).
5. (B) Physisorption is exothermic; low temperature and high pressure favor the adsorption of gas molecules.
6. (C) Molality is calculated per kg of solvent, while molarity is per liter of solution.
7. (B) Using stoichiometry: let initial concentrations be x . At eq, A is $(x - z)$ and C is z . Given $z = 3(x - z) \implies z = 0.75x$. Ratio calculations give $K_c = 9$.
8. (B) The auto-ionization of water is endothermic, so K_w increases with temperature.
9. (A) Packing fraction = $\frac{4/3\pi r^3}{a^3}$. For simple cubic, $a = 2r$, resulting in $\pi/6$.
10. (C) K_2SO_4 dissociates into 3 ions ($2K^+ + SO_4^{2-}$).
11. (A) General units for n^{th} order: $(\text{mol L}^{-1})^{1-n} \text{s}^{-1}$.
12. (B) Limiting molar conductivity is the sum of molar conductivities of its constituent ions.
13. (A) Measures the milligrams of a lyophilic colloid required to prevent a color change in gold sol.
14. (C) Rate = $-\frac{1}{2} \frac{d[H_2O_2]}{dt} = \frac{d[O_2]}{dt}$. If decomposition rate is 1.0, formation is 0.5.
15. (B) Work depends on the path (isothermal vs adiabatic expansion).
16. (B) IF_5 has 5 bond pairs and 1 lone pair, leading to square pyramidal geometry.
17. (C) Nitrogen lacks d-orbitals in its valence shell to expand its octet.
18. (D) Xenon has the lowest ionization energy among noble gases, making it the most reactive.
19. (A) Ammonia is a traditional refrigerant due to high heat of vaporization.
20. (A) Ti^{3+} is $3d^1$. Spin-only moment = $\sqrt{n(n+2)} = \sqrt{1(3)} = 1.73$ BM.
21. (C) Combustion zone (bottom) reaches highest temp to provide heat for the entire furnace.
22. (A) Transition metal complexes like Cu^{2+} exhibit color due to promotion of electrons between d-orbitals.
23. (B) A coordination number of 6 always yields an octahedral arrangement.
24. (B) High electronegativity of Fluorine allows for strong intermolecular H-bonding.
25. (A) Carbon fits into the small holes within the lattice of iron atoms.
26. (B) Lone pair repulsion reduces the tetrahedral angle of 109.5° to 107° .

27. (A) Among isoelectronic ions, the one with the least nuclear charge (lowest atomic number) is largest.
28. (C) White phosphorus is highly reactive in air and must be stored under water.
29. (C) Carbon in diamond is bonded to four others in a 3D network.
30. (A) CN^- can coordinate through C (cyanide) or N (isocyanide).
31. (B) Forms a diazonium salt which is an essential intermediate for dyes.
32. (A) Ethanol is oxidized to acetaldehyde/acetyl groups which form CHI_3 .
33. (B) Polymerization of chloroethene.
34. (A) Same formula C_2H_6O but one is an alcohol and the other an ether.
35. (B) Bakelite forms permanent cross-links that cannot be softened by heat once set.
36. (A) Starch is a storage polysaccharide made of α -glucose chains.
37. (B) It has two alkyl groups attached to the nitrogen atom.
38. (B) Friedel-Crafts alkylation uses an alkyl halide and a Lewis acid catalyst.
39. (C) Vitamin C (Ascorbic acid) is water-soluble; A, D, E, K are fat-soluble.
40. (A) Nucleophilic attack of CN^- on the polarized carbonyl group.
41. (A) Smallest alkoxy group + parent alkane chain.
42. (B) Mifepristone blocks progesterone, used as a medicinal antifertility agent.
43. (B) Ribonucleic acid is named after its ribose sugar backbone.
44. (C) Secondary amines in aqueous medium are most basic due to inductive and hydration effects.
45. (A) HDPE has high density because chains are unbranched and linear.