

# JEE Main Chemistry Mock Test - April 2025 Attempt

## Multiple Choice Questions (MCQs)

Q1. Which of the following salts will NOT undergo hydrolysis in aqueous solution?

- (1)  $\text{NH}_4\text{Cl}$
- (2)  $\text{Na}_2\text{CO}_3$
- (3)  $\text{NaCl}$
- (4)  $\text{CH}_3\text{COONa}$

Q2. The IUPAC name of the compound  $\text{CH}_3\text{-CH(OH)-CH}_2\text{-CH(CH}_3\text{)-CHO}$  is:

- (1) 4-methylpentanal-2-ol
- (2) 2-hydroxy-4-methylpentanal
- (3) 4-methyl-2-hydroxypentanal
- (4) 2-hydroxy-4-methylvaleraldehyde

Q3. The complex  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$  exhibits which type of isomerism?

- (1) Geometrical isomerism only
- (2) Optical isomerism only
- (3) Both geometrical and optical isomerism
- (4) Neither geometrical nor optical isomerism

Q4. Which of the following statements is INCORRECT about hydrogen bonding?

- (1) It leads to association of molecules
- (2) It exists between molecules having F, O or N atoms
- (3) It is stronger than covalent bonding
- (4) It affects the boiling points of compounds

Q5. The correct order of acidic strength is:

- (1)  $\text{HClO} > \text{HClO}_2 > \text{HClO}_3 > \text{HClO}_4$
- (2)  $\text{HClO}_4 > \text{HClO}_3 > \text{HClO}_2 > \text{HClO}$
- (3)  $\text{HClO}_3 > \text{HClO}_4 > \text{HClO}_2 > \text{HClO}$
- (4)  $\text{HClO}_2 > \text{HClO} > \text{HClO}_4 > \text{HClO}_3$

Q6. The rate of a first order reaction doubles when the temperature changes from 300 K to 310 K. The activation energy of the reaction is ( $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$ ):

- (1)  $35.28 \text{ kJ mol}^{-1}$
- (2)  $43.67 \text{ kJ mol}^{-1}$
- (3)  $54.20 \text{ kJ mol}^{-1}$
- (4)  $60.13 \text{ kJ mol}^{-1}$

Q7. In the complex ion  $[\text{Fe}(\text{CN})_6]^{4-}$ , the oxidation state and coordination number of Fe are respectively:

- (1) +2 and 6
- (2) +2 and 4

(3) +4 and 6

(4) +3 and 6

Q8. Which of the following statements is NOT correct?

(1) The value of Henry's constant increases with increase in temperature

(2) Molality of a solution remains unchanged with temperature

(3) Osmotic pressure is a colligative property

(4) Addition of non-volatile solute to a solvent decreases its vapor pressure

Q9. The hybridization of central atoms in  $\text{BrF}_5$ ,  $\text{SF}_4$ , and  $\text{XeF}_4$  respectively are:

(1)  $\text{sp}^3\text{d}^2$ ,  $\text{sp}^3\text{d}$ ,  $\text{sp}^3\text{d}^2$

(2)  $\text{sp}^3\text{d}^2$ ,  $\text{sp}^3\text{d}$ ,  $\text{sp}^3$

(3)  $\text{sp}^3\text{d}$ ,  $\text{sp}^3\text{d}^2$ ,  $\text{sp}^3\text{d}^2$

(4)  $\text{sp}^3\text{d}^2$ ,  $\text{sp}^3$ ,  $\text{sp}^3\text{d}$

Q10. The correct decreasing order of basicity among the following is:

(I) Ethylamine ( $\text{C}_2\text{H}_5\text{NH}_2$ )

(II) Aniline ( $\text{C}_6\text{H}_5\text{NH}_2$ )

(III) Dimethylamine ( $(\text{CH}_3)_2\text{NH}$ )

(IV) Nitroaniline ( $p\text{-NO}_2\text{C}_6\text{H}_4\text{NH}_2$ )

(1) III > I > II > IV

(2) II > I > III > IV

(3) I > II > III > IV

(4) III > II > I > IV

Q11. When cyclohexanol is treated with hot concentrated  $\text{H}_2\text{SO}_4$ , the major product formed is:

(1) Cyclohexane

(2) Cyclohexene

(3) Cyclohexyl hydrogen sulfate

(4) 1,1-dicyclohexyl ether

Q12. The reaction of acetylene with  $\text{H}_2\text{SO}_4$  and  $\text{HgSO}_4$  in the presence of water produces:

(1) Ethanal

(2) Ethanoic acid

(3) Ethanol

(4) Glyoxal

Q13. Which of the following contains both ionic and covalent bonds?

(1) NaCl

(2)  $\text{CH}_4$

(3) KCN

(4)  $\text{NH}_3$

Q14. Which of the following is a biodegradable polymer?

(1) Nylon-6,6

- (2) Polythene
- (3) Polyglycolic acid
- (4) Polyvinyl chloride

Q15. For the reaction  $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$ , the equilibrium constant  $K_c$  is related to the equilibrium constant  $K_p$  as:

- (1)  $K_p = K_c(\text{RT})^{-2}$
- (2)  $K_p = K_c(\text{RT})^2$
- (3)  $K_p = K_c(\text{RT})$
- (4)  $K_p = K_c$

Q16. Which of the following compounds will form racemic mixture during monobromination in presence of light?

- (1) 2-methylbutane
- (2) 2,2-dimethylbutane
- (3) 2-methylpropane
- (4) Propane

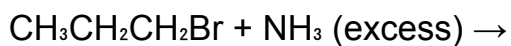
Q17. The pH of a buffer solution containing 0.2 M  $\text{CH}_3\text{COOH}$  and 0.3 M  $\text{CH}_3\text{COONa}$  is ( $\text{pK}_a$  of  $\text{CH}_3\text{COOH} = 4.76$ ):

- (1) 4.46
- (2) 4.76
- (3) 5.06
- (4) 4.94

Q18. The compound formed when benzaldehyde reacts with concentrated KOH is:

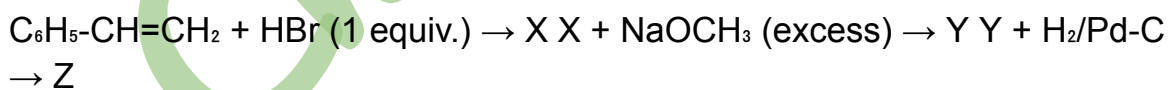
- (1) Potassium benzoate and benzyl alcohol
- (2) Benzyl alcohol only
- (3) Potassium benzoate only
- (4) Benzyl alcohol and potassium benzyloxide

Q19. The major product of the following reaction is:



- (1)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$
- (2)  $(\text{CH}_3\text{CH}_2\text{CH}_2)_2\text{NH}$
- (3)  $(\text{CH}_3\text{CH}_2\text{CH}_2)_3\text{N}$
- (4)  $(\text{CH}_3\text{CH}_2\text{CH}_2)_4\text{N}^+\text{Br}^-$

Q20. Identify the major product formed in the following reaction sequence:



- (1)  $\text{C}_6\text{H}_5\text{-OCH}_3$
- (2)  $\text{C}_6\text{H}_5\text{-CH}_2\text{-CH}_2\text{-OCH}_3$
- (3)  $\text{C}_6\text{H}_5\text{-CH(OCH}_3\text{)-CH}_3$
- (4)  $\text{C}_6\text{H}_5\text{-CH}_2\text{-OCH}_3$

Q21. Which of the following reactions represents a redox reaction?

- (1)  $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- (2)  $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
- (3)  $2\text{FeCl}_3 + \text{SnCl}_2 \rightarrow 2\text{FeCl}_2 + \text{SnCl}_4$
- (4)  $\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl}$

Q22. The decreasing order of basic strength of the following compounds is:

- (1)  $(\text{CH}_3)_3\text{N} > (\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > \text{NH}_3$
- (2)  $(\text{CH}_3)_3\text{N} > (\text{CH}_3)_2\text{NH} > \text{NH}_3 > \text{CH}_3\text{NH}_2$
- (3)  $\text{NH}_3 > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_2\text{NH} > (\text{CH}_3)_3\text{N}$
- (4)  $\text{CH}_3\text{NH}_2 > (\text{CH}_3)_2\text{NH} > (\text{CH}_3)_3\text{N} > \text{NH}_3$

Q23. During the electrolysis of aqueous sodium chloride ( $\text{NaCl}$ ) using inert electrodes, different species compete for reduction and oxidation at the electrodes. Which of the following represents the main reaction occurring at the **cathode**?

- (1)  $2\text{H}_2\text{O} + 2\text{e}^- \rightarrow \text{H}_2 + 2\text{OH}^-$
- (2)  $\text{Na}^+ + \text{e}^- \rightarrow \text{Na}$
- (3)  $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$
- (4)  $2\text{H}_2\text{O} \rightarrow \text{O}_2 + 4\text{H}^+ + 4\text{e}^-$

Q24. Which of the following compounds can act as both oxidizing and reducing agent?

- (1)  $\text{MnO}_2$
- (2)  $\text{H}_2\text{O}_2$

(3)  $\text{KMnO}_4$

(4)  $\text{K}_2\text{Cr}_2\text{O}_7$

Q25. The product formed when acetone reacts with Grignard reagent followed by hydrolysis is:

(1) Secondary alcohol

(2) Primary alcohol

(3) Tertiary alcohol

(4) Aldehyde

Numerical Value Type Questions (Integer Answer)

Q26. A saturated solution of  $\text{Mg}(\text{OH})_2$  has  $\text{pH} = 10$ . The solubility product ( $K_{\text{sp}}$ ) of  $\text{Mg}(\text{OH})_2$  is \_\_\_\_\_  $\times 10^{-12}$  (Round off to the nearest integer).

Q27. Assuming complete ionization, the  $\text{pH}$  of  $0.004 \text{ M H}_2\text{SO}_4$  is \_\_\_\_\_  $\times 10^{-1}$  (Round off to the nearest integer).

Q28. In the titration of  $20 \text{ mL}$  of  $0.1 \text{ M}$  oxalic acid solution with  $0.1 \text{ M KMnO}_4$  solution in acidic medium, the volume of  $\text{KMnO}_4$  required for complete reaction is \_\_\_\_\_  $\text{mL}$  (Round off to the nearest integer).

Q29. The number of structural isomers possible for a compound with molecular formula  $\text{C}_4\text{H}_9\text{Br}$  is \_\_\_\_\_. (Round off to the nearest integer).

Q30. When 2-bromopentane reacts with alcoholic  $\text{KOH}$ , 80% of the product mixture is the Zaitsev product. If  $15.1 \text{ g}$  of 2-bromopentane is completely



reacted, calculate the mass of the Zaitsev product formed. (Molar mass of 2-bromopentane = 151 g/mol, molar mass of the Zaitsev product = 70 g/mol)

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