Q1. A salt gives a white precipitate with barium chloride in dilute HCl. The anion is:

A. CO_3^{2-}
B. SO_4^{2-}
C. NO_3^-
D. CH_3COO^-

Answer: B
Explanation: $BaCl_2$ reacts with SO_4^{2-} to form $BaSO_4$, a white precipitate that is insoluble in dilute HCl.

Q2. When dilute HCl is added to a salt, a colorless gas is evolved that turns lime water milky. The anion is:

A. NO_3^-
B. CO_3^{2-}
C. SO_4^{2-}
D. Cl^-

Answer: B
Explanation: CO_3^{2-} reacts with acid to release CO_2, which turns lime water milky due to formation of $CaCO_3$.

Q3. On adding $AgNO_3$ to a salt solution, a white curdy precipitate forms which dissolves in dilute NH_4OH. The anion is:

A. I^-
B. Br^-
C. Cl^-
D. SO_4^{2-}

Answer: C
Explanation: $Ag^+ + Cl^- \rightarrow AgCl$ (white curdy ppt), which dissolves in NH_4OH forming a soluble complex.

Q4. A salt solution gives a yellow precipitate with KI. The cation is likely to be:

A. Cu^{2+}
B. Pb^{2+}
C. Fe^{3+}
D. Al^{3+}

Answer: B
Explanation: Pb^{2+} reacts with KI to form PbI_2, a yellow precipitate.

Q5. A salt solution gives a deep blue color when treated with excess NH_4OH. The cation is:

A. Cu^{2+}
B. Fe^{2+}
C. Ni^{2+}
D. Zn^{2+}

Answer: A
Explanation: Cu^{2+} forms $[Cu(NH_3)_4]^{2+}$, a deep blue complex in excess NH_4OH.

Q6. A brown ring is formed at the junction of two liquids in the nitrate test. This confirms the presence of:

A. Cl^-
B. CO_3^{2-}
C. NO_3^-
D. CH_3COO^-

Answer: C
Explanation: NO_3^- in the presence of Fe^{2+} and conc. H_2SO_4 forms a brown ring due to $[Fe(NO)]^{2+}$.

Q7. On heating a salt with dil. H_2SO_4 and MnO_2, a greenish-yellow gas is evolved. The anion is:

A. I^-
B. Br^-
C. Cl^-
D. SO_4^{2-}

Answer: C
Explanation: MnO_2 oxidizes Cl^- to Cl_2 gas (greenish-yellow) in the presence of acid.

Q8. A salt gives a violet vapour on heating with conc. H_2SO_4. The anion is:

A. Cl^-
B. Br^-

C. I^-
D. NO_3^-

Answer: C
Explanation: I^- is oxidized to I_2, which forms violet vapors upon heating with conc. H_2SO_4.

Q9. A salt gives a reddish-brown precipitate with NaOH which is insoluble in excess. The cation is:

A. Fe^{3+}
B. Cu^{2+}
C. Zn^{2+}
D. Pb^{2+}

Answer: A
Explanation: $Fe^{3+} + 3OH^- \rightarrow Fe(OH)_3$, reddish-brown precipitate, does not dissolve in excess NaOH.

Q10. Which cation produces a dirty green precipitate with NaOH?

A. Fe^{2+}
B. Cu^{2+}
C. Al^{3+}
D. Mg^{2+}

Answer: A
Explanation: $Fe^{2+} + 2OH^- \rightarrow Fe(OH)_2$, a dirty green precipitate.

Q11. Which anion gives a fruity smell when warmed with alcohol and conc. H_2SO_4?

A. NO_3^-
B. CH_3COO^-
C. CO_3^{2-}
D. Cl^-

Answer: B
Explanation: CH_3COO^- forms an ester (ethyl acetate) when heated with alcohol and acid, giving fruity smell.

Q12. A salt solution gives a buff-colored precipitate with NH_4OH that is insoluble in excess. The cation is:

A. Zn^{2+}
B. Fe^{3+}
C. Mn^{2+}
D. Cr^{3+}

Answer: C
Explanation: $Mn^{2+} + 2OH^- \rightarrow Mn(OH)_2$, a buff-colored precipitate, insoluble in excess NH_4OH.

Q13. A student adds NaOH to an organic compound and warms it with $FeCl_3$. A violet-colored complex is formed. This confirms the presence of:

A. Aldehyde
B. Phenol
C. Carboxylic acid
D. Alcohol

Answer: B
Explanation: Phenol gives a violet-colored complex with $FeCl_3$ due to phenolate ion formation.

Q14. A compound gives a brisk effervescence with sodium bicarbonate. The functional group present is:

A. Alcohol
B. Ketone
C. Carboxylic acid
D. Aldehyde

Answer: C
Explanation: Carboxylic acids liberate CO_2 with $NaHCO_3 \rightarrow$ effervescence.

Q15. Which of the following gives a silver mirror with Tollen's reagent?

A. Acetone
B. Benzaldehyde
C. Acetic acid
D. Ethanol

Answer: B

Explanation: Aldehydes (like benzaldehyde) reduce Tollen’s reagent to metallic silver.

Q16. What is the principle involved in paper chromatography?

A. Adsorption
B. Partition
C. Ion exchange
D. Precipitation

Answer: B
Explanation: Paper chromatography is based on partition of components between stationary and mobile phases.

Q17. Which of the following can be used to identify carbohydrates in a solution?

A. Fehling's test
B. Biuret test
C. Sudan III test
D. Baeyer's test

Answer: A
Explanation: Fehling’s test gives a brick-red ppt with reducing sugars (like glucose).

Q18. Biuret test is used to detect the presence of:

A. Fats
B. Proteins
C. Aldehydes
D. Carbohydrates

Answer: B
Explanation: Proteins give a violet complex with Biuret reagent due to peptide bonds.

Q19. Sudan III test is used to detect:

A. Proteins
B. Sugars

C. Ketones
D. Fats

Answer: D
Explanation: Fats dissolve in Sudan III stain and give orange-red color.

Q20. The melting point of a pure compound is:

A. Sharp and specific
B. Always above 200°C
C. Varies every time
D. Higher in impure samples

Answer: A
Explanation: A pure substance has a sharp and constant melting point.

Q21. Boiling point is measured to identify:

A. Inorganic salts
B. Covalent compounds
C. Organic liquids
D. Crystals

Answer: C
Explanation: Boiling point helps identify organic liquids and check their purity.

Q22. A student measures the pH of lemon juice using universal indicator and finds it to be around 2. The juice is:

A. Weakly acidic
B. Neutral
C. Strongly acidic
D. Basic

Answer: C
Explanation: pH 2 indicates strong acidity, consistent with citric acid in lemon.

Q23. Which of the following would turn blue litmus red?

A. Soap solution
B. NaOH
C. Dilute HCl
D. Na_2CO_3

Answer: C
Explanation: Acids (like HCl) turn blue litmus red.

Q24. A compound with amino group (-NH_2) gives a positive result with:

A. Benedict's test
B. Tollen's reagent
C. Ninhydrin test
D. Iodoform test

Answer: C
Explanation: Amines and amino acids react with ninhydrin to give a blue/purple color.

Q25. In crystallization, impure crystals are usually dissolved in:

A. Alcohol
B. Ether
C. Water or appropriate solvent
D. Acid

Answer: C
Explanation: Crystals are dissolved in minimum amount of hot solvent and cooled to form pure crystals.

Q26. The best solvent for crystallization of benzoic acid is:

A. Cold water
B. Boiling alcohol
C. Hot water
D. Dil. HCl

Answer: C

Explanation: Benzoic acid is soluble in hot water and crystallizes on cooling.

Q27. In paper chromatography of leaf pigments, which of the following travels the farthest?

A. Chlorophyll-b
B. Chlorophyll-a
C. Xanthophyll
D. Carotene

Answer: D
Explanation: Carotene is most soluble in solvent and least attracted to paper → travels farthest.

Q28. In protein test, the violet color in Biuret test appears due to:

A. Carboxyl group
B. Amino group
C. Peptide linkage
D. Sulphur atom

Answer: C
Explanation: Biuret test detects peptide bonds in proteins → gives violet color.

Q29. Which compound does NOT give a positive Fehling's test?

A. Glucose
B. Fructose
C. Formaldehyde
D. Acetone

Answer: D
Explanation: Acetone is a ketone and does not reduce Fehling's solution.

Q30. Why is ethanol used during the preparation of soap (saponification)?

A. To act as an acid
B. To remove water
C. To dissolve the fat

D. To increase temperature

Answer: C
Explanation: Ethanol dissolves fats/oils and helps in uniform saponification reaction.