CLASS 12 – CHEMISTRY

ANSWER KEY

(SET–2)

Section A (1×16 = 16 Marks)

Q1. (b) Number of solute particles

Q2. (b) s^{-1}

Q3. (b) $[Co(en)_3]^{3+}$

Q4. (c) Polythene

Q5. (c) Acetic acid

Q6. (b) +6

Q7. (c) Vitamin A

Q8. (d) Trigonal pyramidal

Q9. (b) Cu

Q10. (b) $(CH_3)_2NH$

Q11. (b) Independent of concentration

Q12. (c) Starch solution

Assertion–Reason

13. ✓ Both A and R are true and R is correct explanation.

14. ✓ Both A and R are true and R is correct explanation.

15. ✓ Both A and R are true and R is correct explanation.

16. ✓ A is true but R is false.
(Activation energy remains constant)

Section B (2 Marks Each)

Q17. Molar Conductivity

Definition:
Molar conductivity is the conductance of all ions produced by dissolving 1 mole of electrolyte in solution.

$$\Lambda_m = \frac{\kappa \times 1000}{C}$$

Unit: $S\,cm^2\,mol^{-1}$

Q18. Arrhenius Equation

$$k = Ae^{-E_a/RT}$$

Where:
k = Rate constant
A = Frequency factor
E_a = Activation energy
R = Gas constant
T = Temperature

Q19. Difference between SN1 and SN2

SN1	SN2
Two-step reaction	One-step reaction
Forms carbocation	No carbocation
Rate depends on substrate only	Rate depends on substrate & nucleophile

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Q20. Coordination Number

Definition:
Number of ligand donor atoms directly bonded to central metal atom.

Example:
$[Co(NH_3)_6]^{3+}$ → Coordination number = 6

Q21. Difference between Glucose & Fructose

Glucose	Fructose
Aldohexose	Ketohexose
–CHO group	–CO group
Less sweet	More sweet

Section C (3 Marks Each)

Q22. Elevation in Boiling Point

When non-volatile solute is added, boiling point increases.

$$\Delta T_b = K_b m$$

Where:
K_b = Boiling point constant
m = Molality

Q23. Integrated Rate Equation (First Order)

For first order reaction:

$$\ln \frac{[A]_0}{[A]} = kt$$

Or

$$k = \frac{2.303}{t} \log \frac{[A]_0}{[A]}$$

Half-life:

$$t_{1/2} = \frac{0.693}{k}$$

Q24. Crystal Field Splitting (Octahedral)

In octahedral complex:

d orbitals split into:

- t_2g (lower energy)

- e_g (higher energy)
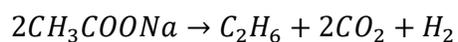
Energy gap = Δ_0
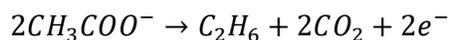
Strong field → Low spin
Weak field → High spin

Q25. Kolbe's Electrolysis

Electrolysis of sodium salt of carboxylic acid.

Example:

$$2CH_3COONa \rightarrow C_2H_6 + 2CO_2 + H_2$$

Anode reaction:

$$2CH_3COO^- \rightarrow C_2H_6 + 2CO_2 + 2e^-$$

Q26. Detergents

Definition:
Cleaning agents effective in hard water.

Types:

1. Anionic

2. Cationic

3. Non-ionic

Advantages:

- Work in hard water

- Better cleansing action

Q27. Adsorption

Definition:
Accumulation of molecules at surface.

Factors affecting:

1. Nature of adsorbent

2. Surface area

3. Temperature

4. Pressure

Q28. Preparation & Properties of Alcohols

Preparation:

From alkyl halide:

$$RX + KOH \rightarrow ROH$$

Properties:

- Oxidation

- Dehydration

- Esterification

Section D (Case Study)

Q29. Electrochemical Cell

(i) Cell notation:
Zn | Zn^{2+} || Cu^{2+} | Cu

(ii) Anode reaction:
Zn → Zn^{2+} + 2e$^-$
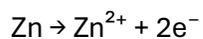
(iii) Cathode reaction:
Cu^{2+} + 2e$^-$ → Cu
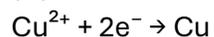
(iv) EMF:
Difference between electrode potentials.

Q30. Amines (Diazotisation)

(i) Product: Benzene diazonium chloride

(ii) Reaction:

$C_6H_5NH_2 + HNO_2 + HCl \rightarrow C_6H_5N_2^+Cl^- + 2H_2O$

(iii) Diazotisation:
Conversion of primary aromatic amine into diazonium salt at 0–5°C.

(iv) Use:
Preparation of azo dyes.

Section E (5 Marks Each)

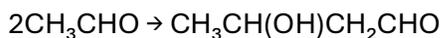**Q31. Nernst Equation**

$$E = E^0 - \frac{0.0591}{n} \log Q$$

Applications:

1. Calculate EMF

2. Predict spontaneity

3. Determine equilibrium constant

Q32. Aldol Condensation

Reaction of aldehyde/ketone having α-H in presence of base.

Example:

$2CH_3CHO \rightarrow CH_3CH(OH)CH_2CHO$

Mechanism:

1. Enolate formation

2. Nucleophilic attack

3. Dehydration

Q33. Types of Isomerism in Coordination Compounds

1. Structural Isomerism

   o Ionisation

   o Linkage

   o Coordination

2. Stereoisomerism

   o Geometrical

   o Optical