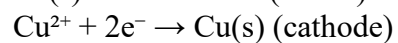
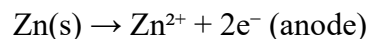


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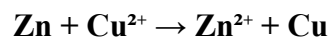
Q No.	Correct Option	Answer	Marks
1	A	Nernst eqn: $E = E^\circ - \frac{0.059}{2} \log \frac{[Cu^{2+}]}{[Zn^{2+}]}$	1
2	B	Lanthanide contraction $\rightarrow$ similar ionic radii $\rightarrow$ difficult separation	1
3	A	Ti ⁴⁺ has no d-electrons $\rightarrow$ colorless	1
4	B	Phenoxide is resonance-stabilized	1
5	A	Comparing electron density is scientific approach	1
6	B	Conc. H ₂ SO ₄ causes dehydration	1
7	C	Correct method: dissolve solute first $\rightarrow$ dilute to mark	1
8	B	Polar C–X $\rightarrow$ electron-deficient carbon $\rightarrow$ faster S _N reaction	1
9	A B	a) Zero-order reaction: rate independent of concentration b) First-order: rate constant is constant	1+1
10	B A	a) PCC etc. stop oxidation at aldehyde stage b) Lucas reagent distinguishes 1° and 3° alcohols	1+1
11	C D	a) Glucose ring opens $\rightarrow$ free – CHO $\rightarrow$ reduces Tollen's reagent b) Maltose is reducing sugar	1+1

12	C	Higher ΔT_f means dissociation → lower molar mass	1
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13. Cell Reaction (2 marks)



Cell reaction:



Marks:

- Half-reactions (1 mark)
- Net reaction (1 mark)

14. Temperature doubles rate → low activation energy (2 marks)

A small rise in T doubles rate → reaction has **low activation energy (E_a)**.

According to Arrhenius equation, lower E_a gives strong temperature dependence.

Marks:

- Explanation of doubling (1 mark)
- Link to Arrhenius/ E_a (1 mark)

15. Lanthanide contraction (2 marks)

Poor shielding by 4f electrons → gradual decrease in ionic radius across lanthanides.

Example: $\text{La}^{3+} > \text{Lu}^{3+}$ in size.

Marks:

- Definition (1 mark)
- Example (1 mark)

16. Role of ligands (2 marks)

Student A correct → groups donate lone pair → behave as **Lewis bases** → ligands.

Student B incorrect: ligands are electron-pair donors, not acids.

Marks:

- Evaluation of both views (1 mark)
- Correct identification (1 mark)

17. Ether formation (2 marks)

Ethanol + sodium ethoxide → **diethyl ether**

Structure: $\text{CH}_3\text{--CH}_2\text{--O--CH}_2\text{--CH}_3$

Marks:

- Name (1 mark)
- Structure (1 mark)

18. Essential amino acids & peptide bond (2 marks)

Essential amino acids: lysine, leucine, valine, isoleucine etc. (Any one)

Bond: **peptide bond** (--CO--NH--)

Marks:

- Essential amino acid (1 mark)

- Peptide bond (1 mark)

19. Alternatives to CFCs (2 marks)

Alternatives: **HCFCs, HFCs, hydrocarbons (propane), CO₂**

Why safer: lower ozone depletion potential (ODP), shorter atmospheric lifetime.

Marks:

- Names of alternatives (1 mark)
- Justification (1 mark)

20. Corrosion conflict question (3 marks)

(a) Moist soil → electrolyte; wastewater → oxidizers; lack of protection → accelerates corrosion (1 mark)

(b) Sacrificial anode, cathodic protection, galvanization (1 mark)

(c) Justification → safety, longer tank life (1 mark)

21. EMF Calculation (3 marks)

Use Nernst eqn:

$$E = E^{\circ} - \frac{0.059}{2} \log \frac{[Zn^{2+}]}{[Cu^{2+}]}$$

$$= 1.10 - 0.0295 \log(0.02/0.2)$$

$$= 1.10 - 0.0295 \log(0.1)$$

$$= 1.10 - 0.0295 (-1)$$

$$= \mathbf{1.1295\ V \approx 1.13\ V}$$

Marks:

- Substitution (1)

- Calculation (1)
- Final answer (1)

22. First-order integrated rate law (3 marks)

Derivation:

$$k = \frac{1}{t} \ln \frac{[A]_0}{[A]}$$

Constant half-life → first-order.

Use eqn to calculate time for 90% decay.

Marks:

- Derivation (2)
- Application to pollutant decay (1)

23. Identification (3 marks)

A: **KMnO₄** (Mn⁷⁺, purple, strong oxidizer)

B: **K₂Cr₂O₇** (Cr⁶⁺, orange-green, oxidizer for alcohols)

Marks:

- Identify A (1)
- Identify B (1)
- Property justification (1)

24. SN1 vs SN2 (3 marks)

SN1 → rearrangements possible.

SN2 → no rearrangement, single step.

Rearrangement-prone substrate → **avoid SN1**, use SN2.

Marks:

- Comparison with example (1)
- Analysis (1)
- Correct choice (1)

25. Tests for aldehydes vs ketones (3 marks)

(Any 3)

Tollen's → aldehyde gives silver mirror

Fehling's → aldehyde gives brick-red

2,4-DNP → both react, but derivatives differ

Schiff's → aldehyde pink

Marks:

- 3 tests with reaction (1)
- Working (1)
- Interpretation (1)

26. Carbohydrates (3 marks)

Structure: polyhydroxy aldehydes/ketones

Classification: mono-, di-, polysaccharides

Functions: energy source, storage, structure, cell signaling

Marks:

- Structure (1)
- Classification (1)
- Functions (1)

27. Raoult's law + ΔT_b derivation (5 marks)

- (a) Raoult's law (1)
 (b) Derivation: $\Delta T_b = K_b m$ (2)
 (c) Significance of K_b (2)

28. Nucleophilic addition mechanism (5 marks)

Mechanism: nucleophile attacks carbonyl carbon (1)
 Effect of α -H: enolization, aldol reaction, reduced reactivity (2)
 Examples (2)

29. CFT Octahedral (5 marks)

Splitting diagram (1)
 CFSE formula (1)
 High vs low spin (1)
 Color explanation (1)
 Magnetic properties (1)

30. Amines (5 marks)

Factors affecting basicity: inductive, steric, solvation (2)
 Physical + chemical properties (2)
 Applications (1)