Tirupathur District – First Revision Examination – Jan - 2025

12th Std – Chemistry – Answer Key

Part **– I** **15 x 1 = 15**

Q. No	Answer	Q. No	Answer
1	a) Al	9	b) Strongly acidic
2	a) Metal borides	10	a) I and IV
3	c) gamma	11	a) Silica gel
4	mere attempt	12	a) Dimethyl Sulfoxide (DMSO)
5	a) Both assertion and reason are true and reason is the correct explanation of assertion	13	a) formic acid
6	b) Actinoides	14	b) blue solution
7	b) Activation energy	15	d) tetrafluroethylene
8	d) Kr		

Part **– II**

Answer any 6 questions and question No. 24 is compulsory. **6 x 2 = 12**

16 **Complete the reaction $B_2H_6 + CH_3OH \longrightarrow$?** — 2 | 2

$B_2H_6 + 6\ CH_3OH \longrightarrow 2\ B(OCH)_3 + 6\ H_2$

17 **How will you convert white phosphorus into red phosphorus?** — 2 | 2

The white phosphorus can be changed into red phosphorus by heating it to 420 ºC in the absence of air and light.

18 **Write any two applications of co-ordination complexes.** — 2 | 2

Coordination compound used in medicine:

Ca- EDTA chelate	radioactive poisoning	removing lead and radioactive metal ions from body.
Cis- Platin	Anti tumour drug	cancer treatment

(or)

Biologically important coordination compounds:

Vitamin B_{12} (cyanocobalamine) - only vitamin consist of metal ion (Co^{2+}) surrounded by Porphyrin ligand.

Hemoglobin (RCB) - Oxygen career in blood

Chlorophyll - useful in photosynthesis in plants

(or) any two suitable applications

19 **Differentiate Lewis acids and bases? (any two)** — 2 | 2

	Lewis acids	Lewis bases
1	Electron deficient molecules **Eg:** BF_3, $AlCl_3$, BeF_2 etc...	Molecules with one (or) more lone pairs of electrons. **Eg:** NH_3, H_2O, R-O-H, R-NH_2
2	All metal ions. **Eg:** Fe^{2+}, Fe^{3+}, Cr^{3+}, Cu^{2+}	All anions **Eg:** F^-,Cl^-,CN^-,SCN^- ,SO_4^{2-}
3	Molecules that contain a polar double bond **Eg:** SO_2, CO_2, SO_3 etc...	Molecules that contain carbon – carbon multiple bond **Eg:** $CH_2{=}CH_2$, CH≡CH etc...
4	Molecules in which the central atom can expand its octet due to the availability of	All metal oxides **Eg:** CaO, MgO, Na_2O, etc...

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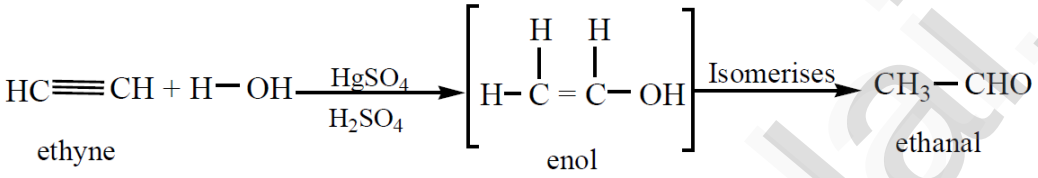
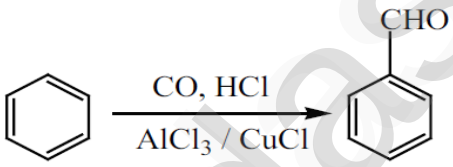
		empty d–orbitals **Eg:** SiF_4, SF_4, $FeCl_3$ etc			
	5	Carbonium ion **Eg:** $(CH_3)_3\,C^+$	Carbanion **Eg:** CH_3^-		
20	**State Faraday's Second Laws of electrolysis?** When the same quantity of charge is passed through the solutions of different electrolytes, the amount of substances liberated at the respective electrodes are directly proportional to their electrochemical equivalents. **(or)** $\mathbf{m \propto Z}$			2 1	2
21	**How are colloids purified by Ultrafiltration?** The pores of ordinary filter papers permit the passage of colloidal solutions. In ultra filtrations, the membranes are made by using collodion cellophane or visiking. When a colloidal solution is filtered using such a filter, colloidal particles are separated on the filter and the impurities are removed as washings.			2	2
22	**How will you prepare acetaldehyde from ethylene?**  ethyne enol ethanal **(or)** Explanation only			2 1	2
23	**Give an example for reducing and non – reducing sugars?** **Reducing sugars: Eg:** Glucose, lactose, maltose **Non reducing sugar: Eg:** Sucrose			2	2
24	**Aromatic amines are less basic than ammonia – Justify.** In aniline, the NH_2 group is directly attached to the benzene ring. The lone pair of electrons on nitrogen atom in aniline gets delocalised over the benzene ring and hence it is less available for protonation makes the, aromatic amines (aniline) less basic than NH_3.			2	2

Part – III

Answer any 6 questions and question No. 33 is compulsory. **6 x 3 = 18**

25	**Write the preparation of Alum? (2)** $K_2SO_4.Al_2(SO_4)_3.4Al(OH)_3 + 6H_2SO_4 \longrightarrow K_2SO_4 + 3Al_2(SO4)_3 + 12H_2O$ $K_2SO_4 + Al_2(SO4)_3 + 24H_2O \longrightarrow K_2SO_4.Al_2(SO_4)_3.24H_2O$ **(or)** Explanation only	1½ 1½ 1	3
26	**Explain Lanthanide contraction?** As we move across 4f series, the atomic and ionic radii of Lanthanoids show gradual decrease with increase in atomic number. This decrease in ionic size is called Lanthanoid contraction. **Causes of Lanthanoid contraction:** 1. Increase of nuclear charge 2. The shielding effect of 4f elelctrons were relatively poor	3	3
27	**What are hydrate isomers? Explain with example.** The exchange of water molecules in the crystal lattice with a ligand in the coordination entity will give different isomers. These types of isomers are called hydrate isomers. Example : $CrCl_3.6H_2O$ has three hydrate isomers as shown below.	3	3

		$[Cr(H_2O)_6]Cl_3$	Violet colour	gives three chloride ions in solution		
		$[Cr(H_2O)_5Cl]Cl_2.H_2O$	Pale green colour	gives two chloride ions in solution		
		$[Cr(H_2O)_4Cl_2]Cl.2H_2O$	Dark green colour	gives one chloride ion in solution.		
28	**Write Arrhenius equation and explain the terms involved.** $K = Ae^{-Ea/RT}$ k = Rate constant, A = Frequency factor, E_a = Activation energy, R = Gas constant, T = Absolute temperature in K.				1 2	3
29	**Explain common ion effect with an example?** When a salt of a weak acid is added to the acid itself, the dissociation of the weak acid is suppressed further. **Eg:**Tthe addition of sodium acetate to acetic acid solution leads to the suppression in the dissociation of acetic acid which is already weakly dissociated. In this case, CH_3COOH and CH_3COONa have the common ion, CH_3COO^-				2 1	3
30	**How are colloids prepared by electro dispersion method?** An electrical arc is struck between electrodes dispersed in water surrounded by ice. When a current of 1 amp/100 V is passed an arc produced forms vapours of metal which immediately condense to form colloidal solution. By this method colloidal solution of many metals like copper, silver, gold, platinum, etc. can be prepared. Alkali hydroxide is added as a stabilising agent for the colloidal solution.				3	3
31	**Explain Gattermann – Koch reaction.**  **(or)** Explanation only				3 1	3
32	**Give any three differences between DNA and RNA.**					

	DNA	RNA
1	It is mainly present in nucleus, mitochondria and chloroplast	It is mainly present in cytoplasm, nucleolus and ribosomes
2	It contains deoxyribose sugar	It contains ribose sugar
3	Its life time is high	It is Short lived
4	It is stable and not hydrolysed easily by alkalis	It is unstable and hydrolyzed easily by alkalis
5	Double stranded molecules	Single stranded molecules
6	Base pair A = T. G ≡ C	Base pair A = U. C ≡ G
7	It can replicate itself	It cannot replicate itself It is formed from DNA

32					3 x 1	3
33	**Identify, compounds A, B and C.** $C_6H_5NO_2 \xrightarrow{Fe\ /\ HCl} \mathbf{A} \xrightarrow[273K]{HNO_2} \mathbf{B} \xrightarrow{C_6H_5OH} \mathbf{C}$ $C_6H_5NO_2 \xrightarrow{Fe\ /\ HCl} C_6H_5NH_2 \xrightarrow[273K]{HNO_2} C_6H_5N_2^+Cl^- \xrightarrow{C_6H_5OH} C_6H_6 + N_2 + CH_3CHO + HCl$ **(or)** A B C A = Aniline (or) $C_6H_5NH_2$ B = Benzene diazonium chloride (or) $C_6H_5N_2^+Cl^-$ C = Benzene (or) C_6H_6				3 3 x 1	3

Part – IV

Answer all the questions. **5 x 5 = 25**

34

a) i) What are the various steps involved in extraction of pure metals from their ores? (3) — 3 x 1

i) Concentration of ores
ii) Extraction of crude metal
iii) Refining of crude metal

ii) Write down the uses of alum? (2) — 2 x 1

1. For purification of water
2. For waterproofing and textile.
3. Used in dyeing, paper and leather tanning industries.
4. It is employed as a styptic agent to arrest bleeding.

(or) b) i) Write any one test for sulphate radical. (2) — 2

Aqueous solution of sulphates gives white precipitate (barium sulphate) with barium chloride solution. It can also be detected using lead acetate solution. Here a white precipitate of lead sulphate is obtained. **(or)** — 2

$$BaCl_2 + H_2SO_4 \longrightarrow \underset{\substack{\text{Barium sulphate}\\\text{(White precipitate)}}}{BaSO_4\downarrow} + 2HCl$$

$$(CH_3COO)_2Pb + H_2SO_4 \longrightarrow \underset{\substack{\text{Lead sulphate}\\\text{(White precipitate)}}}{PbSO_4\downarrow} + 2CH_3COOH$$

ii) Why transition elements form co-ordination compounds? (3) — 3

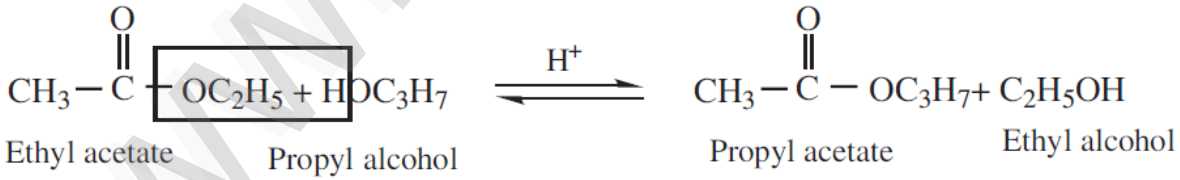
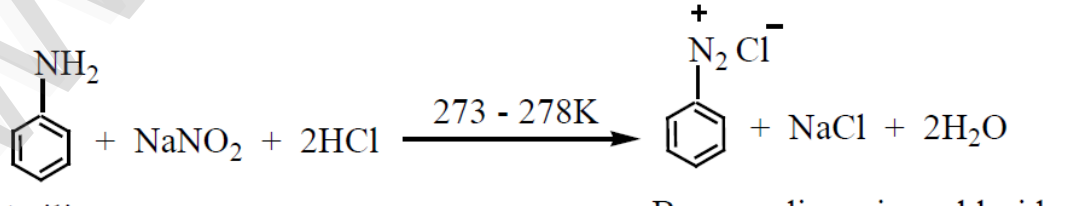
- Transition metal ions are small
- Highly charged
- They have vacant low energy d-orbitals

35

a) i) Compare lanthanoids and actinoides. (5) — 5 x 1

	Lanthanoids	Actinoids
1.	Differentiating electrons enters in 4f orbital.	Differentiating electrons enters in 5f orbital.
2.	Binding energy of 4f orbitals are higher.	Binding energy of 5f orbitals are lower.
3.	They show less tendency to form Complexes.	They show greater tendency to form complexes.
4.	Most of the lanthanoids are colourless	Most of the actinoids are coloured.
5.	They do not form oxocations	They do form oxocations
6.	Besides +3 oxidation states lanthanoids show +2 and +4 oxidation states in few cases.	Besides +3 oxidation states actinoids show higher oxidation states such as +4, +5, +6 and +7.

	(or) b) Write the oxidation state, coordination number, nature of ligand, magnetic property and electronic configuration in octahedral crystal field for the complex $K_4[Mn(CN)_6]$. (5) 1. Oxidation state = +2 2. Coordination number = 6 3. Nature of ligand = Strong field ligand (CN^-) 4. Magnetic property = Paramagnetic (one unpaired electron) 5. Electronic configuration in octahedral crystal field = $t_{2g}^5\ e_g^0$	5 x 1	
36	**a) i) Mention the names of seven types of unit cell. (3)** 1.Cubic ,2.Rhombohedral, 3.Hexagonal, 4.Tetragonal, 5.Orthorhombic, 6.Monoclinic, 7.Triclinic	3	5
	ii) Identify the order for the following reactions (2) **i) Rusting of iron** = First order **ii) Radioactive disintegration of $_{92}U^{238}$** = First order **iii) 2A + 3B ⟶ products; rate = $k[A]^{½}[B]^2$** $= \frac{1}{2} + 2 = \frac{1+4}{2} = \frac{5}{2}$	½ ½ 1	
	(or) b) Derive an expression for the hydrolysis constant and degree of hydrolysis of salt of strong acid and weak base? (5) consider the reactions between a strong acid, HCl, and a weak base, NH_4OH, to produce a salt, NH_4Cl, and water $HCl_{(aq)} + NH_4OH_{(aq)} \rightleftharpoons NH_4Cl_{(aq)} + H_2O_{(l)}$ $NH_4Cl_{(aq)} \longrightarrow NH_4^+{}_{(aq)} + Cl^-{}_{(aq)}$ NH_4^+ is a strong conjugate acid of the weak base NH_4OH and it has a tendency to react with OH^- from water to produce unionised NH_4OH shown below. $NH_4^+{}_{(aq)} + H_2O_{(l)} \rightleftharpoons NH_4OH_{(aq)} + H^+{}_{(aq)}$ There is no such tendency shown by Cl^- and therefore $[H^+] > [OH^-]$; the solution is acidic and the pH is less than 7. $K_h = \frac{[NH_4OH][H^+]}{[NH_4^+]}$ Dissociation of weak base (NH_4OH) is, $NH_4OH_{(aq)} \rightleftharpoons NH_4^+{}_{(aq)} + OH^-{}_{(l)}$ $K_b = \frac{[NH_4^+][OH^-]}{[NH_4OH]}$ we can establish a relationship between the K_h and K_b as, $K_h \times K_b = \frac{[NH_4OH][H^+]}{[NH_4^+]} \times \frac{[NH_4^+][OH^-]}{[NH_4OH]}$ $K_h \cdot K_b = [H^+]\,[OH^-]$ $K_h \cdot K_b = K_w$ $K_h = \frac{K_w}{k_b}$ From Ostwald's dilution law, K_h may be written as, $K_h = h^2C$ (or) $h^2 = \frac{K_h}{C}$ (or) $h = \sqrt{\frac{K_h}{C}}$ (or) $h = \sqrt{\frac{K_W}{K_b.C}}$	1 1 1 1	

	So, $[H^+] = \sqrt{K_h . C}$ (or) $[H^+] = \sqrt{\frac{K_w . C}{K_b}}$ pH of the Solution: $pH = -\log [H^+] = -\log \left[\frac{K_w . C}{K_b}\right]^{\frac{1}{2}} = -\frac{1}{2}\log K_w - \frac{1}{2}\log C + \frac{1}{2}\log K_b$ $\boxed{pH = 7 - \frac{1}{2} pK_b - \frac{1}{2}\log C}$	1	
37	**a) Explain Mercury button cell? (5)** Mercury button cell is a primary battery (non-rechargeable) **Anode:** Zinc amalgamated with Mercury. **Cathode:** HgO mixed with graphite. **Electrolyte:** paste of KOH and ZnO. **Oxidation at anode:** $Zn_{(S)} + 2OH^-_{(aq)} \longrightarrow ZnO_{(S)} + H_2O_{(l)} + 2e^-$ **Reduction at cathode:** $HgO_{(S)} + H_2O_{(l)} + 2e^- \longrightarrow Hg_{(l)} + 2OH^-_{(aq)}$ **Overall reaction:** $Zn_{(S)} + HgO_{(S)} \longrightarrow ZnO_{(S)} + Hg_{(l)}$ **emf:** 1.35V **Uses:** In pacemakers, electronic watches, camera, etc.	½ ½ ½ 1 1 ½ ½ ½	5
	(or) b) i) What is auto catalysis? (3) In some reactions one of the products formed acts as a catalyst to the reaction. It is called as auto catalysis. (or) Eg: $CH_3COOC_2H_5 + H_2O \longrightarrow CH_3COOH + C_2H_5OH$ In the above reaction acetic acid (CH_3COOH) formed, acts as autocatalyst.	3 1	
	ii) Mention the various methods of coagulation. (2) The various methods of coagulation are, i) Addition of electrolytes ii) Electrophoresis iii) Mixing oppositively charged sols iv) Boiling	4 X ½	
38	**a) i) What is meant by Trans-esterification? (3)** Esters of an alcohol can react with another alcohol in the presence of a mineral acid to give the ester of second alcohol. The interchange of alcohol portions of the esters is termed Transesterification **(or)**  	2 3	5
	ii) Write short note on Diazotisation reaction.(2)  **(or)** Explanation only	2 1	

	(or) b) i) Name the vitamins which causes the following deficiency? (Sep-20) **i) Rickets** - Deficiency of Vitamin D **ii) Scurvy** - Deficiency of Vitamin C **iii) Haemorrhagic** - Deficiency of Vitamin K	3 x 1	
	ii) What is the mode of the action of antacids? Give an example. (2) Antacids are the substance which neutralizes the acid in the stomach that causes acidity. **Uses:** To relieve symptoms such as burning sensation in the chest/throat area (heart burns) caused by acid reflux. **Eg:** Milk of Magnesia	1 1	