

APEEJAY SCHOOL, SCHOOL, SHEIKH SARAI-I

Time allowed : 3 Hrs. Chemistry Maximum Marks : 70
Class – XII

General Instructions :

Q. 1-8 carry 1 mark each.

Q. 9-18 carry 2 marks each.

Q. 19-27 carry 3 marks each.

Q. 28-30 carry 5 marks each.

Section-A

1. What type of solids are electrical conductors, malleable and ductile ? Give one example. ½+½
2. Why are pentahalides more covalent than trihalides ? 1
3. Which is a better reducing agent PH_3 or BiH_3 and why ? ½+½
4. $\text{NH}_4\text{Cl} + \text{NaNO}_2 \xrightarrow{\Delta}$ ½+½
5. In the series Sc to Zn which has the lowest enthalpy of atomisation and why? ½+½
6. Write the formula of Hexa ammine cobalt (III) sulphate. 1
7. Give one example each of didentate and ambident ligand. ½+½
8. Give an example of a drug which is both antipyretic and analgesic. ½+½
9. An element with molar mass $2.7 \times 10^{-2} \text{ kg mol}^{-1}$ forms a cubic unit cell with edge length 405 p.m. If its density is $2.7 \times 10^3 \text{ kg m}^{-3}$, what is the nature of the cubic unit cell? 2
10. What type of defect can arise when a solid is heated ? Which physical property is affected by it and in what way ? 2
11. When 1.8 g of a non volatile solute was dissolved in 90 g benzene, the boiling point is raised by 0.88°C . Calculate the molar mass of the solute. K_b for benzene is $2.53 \text{ K Kg mol}^{-1}$. 2
12. For a first order reaction show that time required for 99% completion is twice the time required for the completion of 90% of the reaction. 2
13. Write cathode and anode reactions of a fuel cell. 2

R/4

[P.T.O.]

14. (a) Why does river form delta when it meets sea ?
 (b) Write in increasing order of flocculating power of a negative sol.
 AlCl_3 , BaCl_2 , NaCl 1+1
15. (a) Although Mg is more reactive than Si but under certain conditions Si can reduce MgO. What are those conditions ?
 (b) For the reaction $\text{Cr}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Cr}$ $\Delta G = -421 \text{ KJ}$. Why this reaction does not take place at room temperature although it is thermodynamically feasible ? 1+1
16. Write short note on vapour phase refining. 2
17. Give reasons
- (a) There is a considerable increase in covalent radius from N to P, however from As to Bi only small increase in covalent radius is observed. 2
- (b) $\text{R}_3\text{P} = \text{O}$ exists but $\text{R}_3\text{N} = \text{O}$ does not. 2
18. (a) Why does NO_2 dimerise ?
 (b) What is the covalence of N in N_2O_5 . 2
- OR**
18. (a) $\text{Pb}(\text{NO}_3)_2 \xrightarrow{\Delta}$
 $\text{Cu} + \text{dilute HNO}_3 \longrightarrow$
19. Calculate the mass of a non-volatile solute ($\text{MM} = 40 \text{ g mol}^{-1}$) which should be dissolved in 114 g of octane to reduce its vapour pressure to 80%. 3
20. State Raoult's law for volatile solute. Explain positive and negative deviation from Raoult's Law. 1+2
21. The molar conductivity of 0.025 mol L^{-1} HCOOH is $46.1 \text{ S cm}^2 \text{ mol}^{-1}$. Calculate its degree of dissociation and dissociation constant. Given $\lambda^\circ_{\text{H}^+} = 349.6 \text{ S cm}^2 \text{ mol}^{-1}$ and $\lambda^\circ_{\text{HCOO}^-} = 54.6 \text{ S cm}^2 \text{ mol}^{-1}$. 3
22. Rusting is essentially an electrochemical phenomenon, explain. Give one method for prevention of corrosion. 2+1
23. Explain what is observed when
- (a) a beam of light is passed through a colloidal sol.
 (b) an electrolyte is added to hydrated ferric oxide sol.
 (c) electric current is passed through a colloidal sol.

OR

23. (a) Explain Brownian movement
(b) What is zeta potential ?
(c) Give one example each of oil in water and water in oil type of emulsion.
24. $\text{XeF}_6 + \text{H}_2\text{O} \rightarrow$
 $\text{XeF}_2 + \text{PF}_5 \rightarrow$
 $\text{Ca}(\text{OH})_2 + \text{Cl}_2 \rightarrow$ **3**
25. (a) $E^\circ_{\text{Mn}^{3+}/\text{Mn}^{2+}} > E^\circ_{\text{Cr}^{3+}/\text{Cr}^{2+}}$ why ?
(b) Cobalt (II) is stable in aqueous solution but in presence of complexing agent it is easily oxidised; why ?
(c) Although Sc does not show variable oxidation states but it is considered a transition element, why? **3**
26. (a) For $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$ to show isomerism it has to have square planar shape but not tetrahedral, why ?
(b) Although CO is a weak base but it is a strong ligand, why ?
(c) Write one limitation of crystal field theory. **3**
27. (a) Name the macromolecules that are chosen as drug targets (any two).
(b) Why cimetidine or ranitidine better antacids than NaHCO_3 ?
(c) How do antiseptics differ from disinfectants ? **3**
28. (a) Give the preparation of KMnO_4 from pyrolusite ore
(b) Complete the reactions **2+2+1=5**
 $\text{MnO}_4^- + \text{I}^- + \text{H}_2\text{O} \rightarrow$
 $\text{NO}_2^- + \text{MnO}_4^- + \text{H}^+ \rightarrow$
(c) Draw the structures of manganate and permanganate ions.

OR

28. (a) What is lanthanoid contraction ? State one of its consequences. **2+1+1+1=5**
(b) Why do transition metal ions have colour?
(c) Why transition metals and their compounds act as good catalyst?
(d) The ability of oxygen to stabilise high oxidation states exceeds that of fluorine in case of transition metals, why ?

29. (a) Give chemical reaction to show
- low volatility of conc. H_2SO_4
 - dehydrating property of conc. H_2SO_4
 - oxidising property of conc. H_2SO_4 .
- (b) Why is ozone a good oxidising agent? How is O_3 estimated? (5)

OR

29. (a) Draw the structures of peroxodisulphuric acid, pyrophosphoric acid.
- (b) Why does PCl_5 exist as ionic solid?
- (c) $\text{H}_3\text{PO}_3 \xrightarrow{\Delta}$
- (d) Why is basicity of H_3PO_3 two?
- (e) $\text{AgNO}_3 + \text{H}_3\text{PO}_2 + \text{H}_2\text{O} \longrightarrow$

30. For a first order reaction $\text{A}(\text{g}) \rightarrow \text{B}(\text{g}) + \text{C}(\text{g})$

Time	P(mm Hg)
0	35
350	54
720	63

- (a) Calculate the rate constant.
- (b) What will be the order of reaction having rate const $4 \times 10^{-2} \text{ mol}^{-1/2} \text{ L}^{-1/2} \text{ s}^{-1}$
- (c) Why Arrhenius equation cannot predict the value of rate constant for reaction involving polyatomic molecules.

OR

- (a) Give an example of a zero order reaction.
- (b) What is activation energy?
- (c) A first order reaction takes 40 min for 30% decomposition. Calculate $t_{1/2}$.

Set-2
APEEJAY SCHOOL SHEIKH SARAI
FIRST TERMINAL EXAMINATION, 2012-13

SS

Time allowed : 3 Hrs.

Chemistry
Class – XII A,B

Maximum Marks : 70

General Instructions :

Q.1-8 are of 1 mark each

Q.09-18 are of 2 marks each

Q.19-27 are of 3 marks each

Q.28-30 are of 5 marks each.

1. What type of solids are insulators and have low melting point? Give one example.
2. PH_3 has lower boiling point than NH_3 , why?
3. Which is more basic and why; N_2O_3 or Bi_2O_3 ?
4. $\text{AgCl} + \text{NH}_3 \longrightarrow$
5. In the series Sc to Zn, which element has the highest enthalpy of atomization and why?
6. Write the formula of Dichloridobis(ethane-1,2-diamine)platinum (IV) nitrate
7. Give an example each of linkage isomerism and solvate isomerism .
8. Give an example of a chemical which is both an antiseptic and a disinfectant.
9. In $\text{Ni}_{0.98}\text{O}$ Ni exists as both Ni^{2+} and Ni^{3+} . Find out the fraction of Ni^{2+}
10. Give two differences between a conductor and a semiconductor.
11. Calculate the molality of 2M NaOH solution having density 1.2g/mL.
12. For a first order reaction show that time required for 99% completion is twice the time required for 90% of the reaction.
13. What are the products formed when CUSO_4 solution is electrolysed with.
(a) Cu electrodes (b) Pt electrodes
14. Give four differences between physisorption and chemisorption.
15. What is the role of NaCN in (a) froth floatation (b) extraction of gold ?
16. Why is chromatography used for purification of f-block elements?
17. Give reasons (a) N_2 is less reactive at room temperature (b) PH_4^+ has more bond angle than PH_3 .
18. Give 4 differences between white and red phosphorous .

OR

(a) $\text{P}_4 + \text{SOCl}_2 \longrightarrow$ (b) $\text{PCl}_5 + \text{heat} \longrightarrow$

R/3

[P.T.O.]

19. Calculate the mass of a non-volatile solute (MM=40g/mol) which should be dissolved in 114g of octane to reduce its vapor pressure by 80%.
20. (a) State Henry's law. Give one of its applications.
(b) Which will have higher K_H in water NH_3 or H_2 , why?
21. Rusting is essentially an electrochemical phenomenon, explain. Mention the conditions for rusting to take place.
22. The molar conductivity of 0.025 M HCOOH is $46.1 \text{ Scm}^2 \text{ mol}^{-1}$. Calculate its degree of dissociation and dissociation constant. Given molar conductance of H^+ and HCOO^- at infinite dilution are 349.6 and $54.6 \text{ Scm}^2 \text{ mol}^{-1}$ respectively.
23. Explain multimolecular, macromolecular and associated colloids.

OR

Explain peptization, dialysis and Tyndall effect.

24. (a) $\text{XeF}_4 + \text{H}_2\text{O} \rightarrow$ (b) $\text{XeF}_6 + \text{NaF} \rightarrow$
(c) $\text{Cl}_2 + \text{conc. NaOH} \rightarrow$
25. (a) Distinguish between lanthanoids and actinoids (any two) (b) Cr^+ is less stable in water than Cr^{+3} , why?
26. (a) Give evidence that $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$ and $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Cl}$ are ionization isomers
(b) Give an example each of inner orbital complex and outer orbital complex.
27. Classify synthetic detergents. Give one example in each case.
28. (a) Write all the equations involved in preparation of $\text{K}_2\text{Cr}_2\text{O}_7$ from chromite ore
(b) Draw the structures of chromate and dichromate ion
(c) Complete the reactions
(i) $\text{Cr}_2\text{O}_7^{2-} + \text{H}_2\text{S} \rightarrow$ (ii) $\text{MnO}_4^- + \text{I}^- + \text{H}_2\text{O} \rightarrow$

OR

- (a) Which is a stronger reducing agent in aqueous medium, Cr^{2+} or Fe^{2+} , why?
(b) Eu^{2+} is a strong reducing agent while Ce^{4+} is a strong oxidizing agent, why?
(c) What is lanthanoid contraction? Mention one of its consequences.
(d) Although Cu^+ has stable configuration but in aqueous medium Cu^{2+} is more stable, why?
29. (a) How do you explain reducing character of H_3PO_2 on the basis of its structure?
(b) Why do noble gases have low boiling points?
(c) Why are halogens good oxidizing agents?
(d) Why are interhalogens better oxidizing agents than halogens?

(e) What inspired N. Bartlett for carrying out reactions between Xe and PtF_6 ?

OR

(a) Draw the structures of perchloric acid and XeOF_4

(b) Why is F_2 a better oxidizing agent than Cl_2 although latter has more -ve electron gain enthalpy ?

(c) $\text{NH}_3 + \text{excess Cl}_2 \rightarrow$

(d) Why is basicity of H_3PO_3 two ?

(e) Why for H_2SO_4 $K_{a1} \gg K_{a2}$?

30. (a) For a first order reaction $\text{A(g)} \rightarrow \text{B(g)} + \text{C(g)}$

T(sec)	P(mm Hg)
0	35.0
360	54.0
720	63.0

Calculate the rate constant

(b) What is the order of a reaction having rate constant $4 \times 10^2 \text{ mol}^{1/2} \text{ L}^{-1/2} \text{ S}^{-1}$?

(c) Why Arrhenius equation cannot predict the value of rate constant accurately for polyatomic molecules?

OR

(a) Give an example of pseudo first order reaction?

(b) Why on addition of a catalyst rate of reaction increases?

(c) A first order reaction takes 40 min for 30% decomposition. Calculate $t_{1/2}$.