

Tripti Saini

XII-B

39.

& Shruti Goswami

St. Mary's School, Dwarka
First Terminal Examination
Class XII
Subject: Chemistry (043)

Reading Time: 15 mins.

Writing Time: 3 hrs.

No. of questions: 26

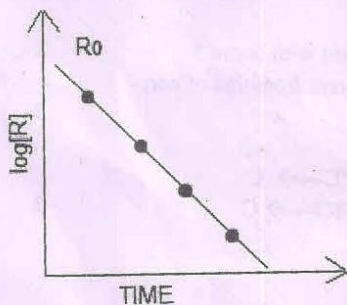
M.M.: 70

General Instructions :

- (i) All questions are compulsory.
- (ii) Question numbers 1 to 5 are very short answer question, each of 1 mark. Answer them in one word or one sentence each.
- (iii) Question numbers 6 to 10 are short answer questions of 2 marks each. Answer them in about 30 words each.
- (iv) Question numbers 11 to 22 are also short answer questions of 3 marks each. Answer them in about 40 words each.
- (v) Question number 23 is a Value Based Questions and carries 4 marks. Answer in about 50 words.
- (vi) Question numbers 24 and 26 are long answer questions of 5 marks each. Answer them in about 70 words each.
- (vii) Use log table, if necessary.
- (viii) Please check that this question paper contains 26 questions.

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- S1 Q1. Draw the structure of 2-aminotoluene. 1
- Q2. Lanthanoids form primarily +3 ions, while the actinoids usually have higher oxidation states in their compounds, +4 or even +6 being typical. Give reason. 1
- T Q3. Which reducing agent is employed to get copper from the leached low grade copper. 1 ✓
- Q4. Describe the principle involved in column chromatography for purification of rare elements. 1 ✓
- Q5. In reference to Freundlich adsorption isotherm, write the expression for adsorption of gases on solids in the form of an equation. 1 ✓
- S Q6. The two complexes of nickel, $[\text{Ni}(\text{CN})_4]^{2-}$ and $[\text{Ni}(\text{CO})_4]$, have different structures but possess same magnetic behaviour. Explain. 2
- Q7. Derive the relationship between relative lowering of vapour pressure and mole fraction of the volatile liquid. 2 ✓
- // Q8. After 24 hrs, only 0.125 gm out of the initial quantity of 1 gm of a radioactive isotope remains behind. What is its half-life period? 2 ✓
- Q9. (i) Why LiCl acquires pink colour when heated in Li vapours.
(ii) (a) Which defect occurs when AgCl is doped with CdCl_2 .
(b) What type of semiconductors is produced when silicon is doped with boron? 2 ✓
- ST Q10. Is the variability in oxidation number of transition elements different from that of non-transition elements? Illustrate with examples. 2
- Q11. Give the structures of A, B and C in the following reactions.
(i) $\text{CH}_3\text{CH}_2\text{Br} \xrightarrow{\text{KCN}} \text{A} \xrightarrow{\text{LiAlH}_4} \text{B} \xrightarrow{\text{HNO}_2; 0^\circ\text{C}} \text{C}$
ST (ii) $\text{CH}_3\text{COOH} \xrightarrow{\text{NH}_3, \Delta} \text{A} \xrightarrow{\text{NaOBr}} \text{B} \xrightarrow{\text{NaNO}_2/\text{HCl}} \text{C}$ 3

- ST Q12. Account for the following:
- d-block elements exhibit more oxidation states than f-block elements.
 - Orange solution of potassium dichromate turns yellow on adding sodium hydroxide to it.
 - Zirconium (Z=40) and Hafnium (Z=72) have almost similar atomic radii.
- ST Q13. Describe the preparation of potassium permanganate from pyrolusite ore. Write balance chemical equation for one reaction to show the oxidizing nature of potassium permanganate.
- Q14. The edge length of a unit cell of a metal having molecular mass 75g/mol is 5 \AA which crystallises in a cubic lattice. If the density is 2 g/cc, then find the radius of the metal atom.
- T Q15. (i) A mixture of X and Y was loaded in the column of silica. It was eluted by alcohol water mixture. Compound Y eluted in preference to compound X. Compare the extent of adsorption of X and Y on column.
- Why copper matte is put in silica lined converter? Write reactions involved.
 - Name the method and write reactions used for the refining of Zr.
- Q16. (i) Complete the following chemical equations.
- ST (a) $\text{NH}_4\text{Cl (aq.)} + \text{NaNO}_2 \text{ (aq.)} \rightarrow$
- S (b) $\text{P}_4 + 3\text{NaOH} + 3\text{H}_2\text{O} \rightarrow$
- (ii) Why is $K_{a2} \ll K_{a1}$ for H_2SO_4 in water?
- ST Q17. Write the correct formulae for the following coordination compounds:
- $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ (violet with 3 chloride ions precipitated as AgCl)
 - $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ (light green colour, with 2 chloride ions precipitated as AgCl)
 - $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ (dark green colour, with 1 chloride ion precipitated as AgCl)
- Q18. Give reasons for the following observations:
- p-dichlorobenzene has higher melting point than those of o and m-isomers.
 - Haloarenes are less reactive than haloalkanes towards nucleophilic substitution reaction.
 - The treatment of alkyl chloride with aqueous KOH leads to the formation of alcohol but in the presence of alcoholic KOH, alkene is the major product.
- Q19. (i) Why does leather get hardened after tanning?
- (ii) On the basis of Hardy-Schulze rule explain why the coagulating power of phosphate is higher than chloride.
- (iii) Do the vital functions of the body such as digestion get affected during fever? Explain your answer.
- Q20. Calculate the mass of a non-volatile solute (molar mass 40 g/mol) which should be dissolved in 114 g octane to reduce its vapour pressure to 80%.
- Q21. Observe the graph in diagram and answer the following questions.



$$\frac{1.414}{2} = \frac{5}{10.70}$$

- (i) If slope is equal to $-2.0 \times 10^{-6} \text{ sec}^{-1}$, what will be the value of rate constant? 3 ✓
 (ii) How does the half-life of zero order reaction relate to its rate constant?
- Q22. (a) Draw the structures of the following :
 XeF_2 and BrF_3
 (b) Arrange the following in the order of property indicated against each set.
 (i) HF , HCl , HBr , HI (increasing bond dissociation enthalpy)
 (ii) H_2O , H_2S , H_2Se , H_2Te (increasing acidic character) 3
- Q23. Vedanta Singh is a student of chemistry. One day, His supervisor has sent him to perform an experiment for the preparation of primary and secondary amines using alkyl halides as a starting material. He started the experiment and completed the reaction properly but he did not get the good yield of primary and secondary amines. He choose the another method and found the desired result.
 Answer the following questions:
 (i) Which type of reaction was going to perform by Vedanta Singh ?
 (ii) Write all the possible products of the above reaction.
 (iii) Can you choose more precise method for the preparation of primary amine as a product mainly?
 (iv) What values do you obtained? 4
- Q24. (i) State the relationship amongst cell constant of a cell, resistance of the solution in the cell and conductivity of the solution. How is molar conductivity of a solution related to conductivity of its solution?
 (ii) A voltaic cell is set up at 25°C with the following half cell;
 Al/Al^{3+} (0.001M) and Ni/Ni^{2+} (0.50 M)
 Calculate the cell voltage.
 $[E^\circ \text{Ni}^{2+}/\text{Ni} = -0.25 \text{V}, E^\circ \text{Al}^{3+}/\text{Al} = -1.66 \text{V}]$ 5 ✓
- Q25. Complete the following reactions :
 (i) $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{SOCl}_2} \text{'A'} \xrightarrow{\text{KCN}} \text{'B'}$
 (ii) $\text{CH}_3\text{-CH(OH)-CH}_3 \xrightarrow{\text{PCl}_3} \text{'A'} \xrightarrow{\text{AgCN}} \text{'B'}$
 (iii) $\text{CH}_3\text{CH}_2\text{Cl} \xrightarrow{\text{AgNO}_2} \text{---}$
 (iv) $(\text{CH}_3)_2\text{CHCl} + \text{CH}\equiv\text{CNa} \xrightarrow{\text{---}} \text{---}$
 (v) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} + \text{CH}_3\text{COOAg} \xrightarrow{\text{---}} \text{'A'} + \text{'B'}$ 5
- Q26. (a) Account for the following- :
 (i) Bond angle in NH_4^+ is higher than NH_3 .
 (ii) H_2S has lower boiling point than H_2O .
 (iii) Reducing character decreases from SO_2 to TeO_2 .
 (iv) Fluorine is stronger oxidizing agent than chlorine.
 (b) Which noble gas has the lowest boiling point ? 5



3

$K = \frac{[R]}{[P]}$

$R =$

$\log \frac{[R]}{[P]}$