

Model Question- 9
Chemistry XII

Time :3 hours

Full marks: 75

Group 'A'

Circle the best alternative to the following questions. [11 × 1 = 11] Time: 25 mins

1. If 20 ml of 0.25 N strong acid and 30 ml of 0.2 N of the strong base are mixed, then the resulting solution is
a. 0.25 N acidic b. 0.25 N basic c. 0.2 N acidic d. 0.2 N basic
2. H₂O is
a) Bronsted acid b) Bronsted base c) neutral d) both a and b
3. The rate constant of a reaction is $5.8 \times 10^{-2} \text{ s}^{-1}$. The order of the reaction is
a) First order b) Second order c) zero order d) Third order
4. What is the function of the salt bridge?
a. hold the cell together
b. balance the charges to keep the solutions neutral
c. where oxidation occurs
d. where reduction occurs
5. Paramagnetism is common in
a. s-block elements b. p-block elements
c. d-block elements d. any of them
6. Which of the following sulphides when heated strongly in air gives the corresponding metal without undergoing separate reduction of oxide?
a. Cu₂S b. FeS c. HgS d. ZnS
7. What product is obtained when nitromethane is heated with chlorine in presence of NaOH
a. Chloropicrin b. Methanamine c. Chloretone d. Ethanamine
8. Which of the following is an Organo metallic compound ?
a. CH₃COONa b. CH₃ONa c. (CH₃CH₂)₂ Znd. CH₃CH₂COOAg.
9. White cement does not have
a. Fe b. Si c. Ca d. Al
10. Which of the following chemical can be used for bleaching the paper ?
a. hydrogen peroxide b. Conc.H₂SO₄ c. Na₂CO₃ d. H₃PO₄
11. Which one of the following has no charge?
a. Gamma rays b. Beta rays c. Alpha rays d. Cathode rays

Attempt all the questions:

Group 'B'

Short Answer Questions: [8×5=40]

1. a) Define indicator. Which indicator do you use in a titration of oxalic acid and sodium hydroxide? (1+1)

b) 7.5 g of dibasic acid is dissolved in water and the solution is made up to 250 cc. 25 cc of this acid requires 16.3 cc of 1N NaOH for complete neutralization. Calculate the molecular weight of acid.

OR

For a gaseous reaction $A + B \rightarrow C + D$ it is found that $\text{Rate} = k[A]^2[B]$ how many times the rate of reaction increased or decreased if

- The partial pressure of both A and B is doubled.
- Partial pressure of A double but B remains constant.
- The volume of reacting vessels is doubled.
- Inert gas is added to the reaction.
- Temperature is raised by 30°C .

[1+1+1+1+1]

2. When the reaction is carried out at non-standard condition, the free energy change differs from standard free energy change.

What is Gibb's free energy? How standard free energy is related with equilibrium constant. The equilibrium constant for the reaction $\text{PCl}_5(\text{g}) \leftrightarrow \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$ at 298K has been found to be 1.8×10^{-7} . Calculate ΔG° for the reaction. [1+2+2]

3. What is copper matte? What happens when calomel is treated with aqua regia solution? Draw a well-labelled diagram for the manufacture of steel by Bessemer's process? Why does copper turn into green when exposed to air for the long period of time? [1+1+2+1]

4. Write short note on crystal field theory. Mention any two ways to prevent rusting of iron. [3+2]

5. Treatment of 2-bromobutane with hot alcoholic KOH gives a mixture of two isomeric butenes (A) and (B). Ozonolysis of the minor product gives methanal and another aldehyde (C) in equimolar proportions whereas major alkene gives single product (D) on ozonolysis. What are the structural formulas of A, B, C and D. Give equations for all reactions. [5]

OR

Give reason:

- It is dangerous to boil old sample of ether.
 - Ethers are stored in the bottle containing iron wire.
 - The boiling point of ethers are low as compared to boiling point of corresponding alcohols.
 - Ethers are commonly used as solvents.
 - Ethers are considered as inert compounds.
6. This question is related to the organic compound containing hydroxyl as functional group.
- Write a reaction which distinguish primary alcohol from secondary alcohol. [2]
 - Write the isomer of alcohol having molecular formula $\text{C}_3\text{H}_8\text{O}$ which gives positive iodoform test. [2]
 - How can you prepare ethanol from cane sugar? Write a reaction only. [1]
7. A nitrogen containing compound evolved very bad smell on heating with CHCl_3 and alc. KOH.
- How that compound is nitrated? [3]
 - What happens when that compound is treated with phenyldiazonium chloride salt in presence of acid? [2]
8. A. What are natural and synthetic polymers? Give one example of each. What are the monomer of nylon-6,6? [1+1+1]
B. Write the name of any two fibrous and non-fibrous raw material for paper. [2]

Group 'C'

Long Answer Questions [3×8=24]

9. a) Define ionic product, pH, and pOH of a solution. [3]
b) what is a buffer solution? Give the example of acid and basic buffer solution [2]
c) What mass of KOH should be dissolved in 1 L of the solution to prepare a solution having pH 12 at 25°C? [3]

OR

- a. Given $E_{\text{Al}^{3+}/\text{Al}}^0 = -1.66\text{V}$ and $E_{\text{Zn}^{2+}/\text{Zn}}^0 = -0.76\text{V}$
- Calculate the standard emf of the cell and write the cell reaction. [2]
 - Construct the galvanic cell with Aluminium and Zinc as electrodes. [2]
 - Draw energy profile diagram for exothermic and endothermic reaction. [2]
 - Derive Gibb's Helmholtz equation. [2]
10. a) An aliphatic compound (A) react with SOCl_2 to give (B). The compound (B) on dehydrohalogenation yield (C). The compound (C) on ozonolysis gives a mixture of ethanal and methanal. If the compound (A) is an alcohol and gives positive iodoform test. Write the IUPAC name of A,B,C. [3]
- b) What product would you expect when benzaldehyde is heated with NaOH solution? [2]
- c. Write one example of coupling reaction. [1]
- d. How can you test 1° amine from 2° amine? Write a reaction only. [2]
11. A. How is propanone is prepared from
- Propan-2-ol
 - 2,2-dichloropropane
 - Propyne
- [3]
- B. An organic compound $\text{C}_5\text{H}_{10}\text{O}$ reacts with Phenylhydrazine to form phenyl hydrazone. The compound gives Fehling's solution test but does not give Iodoform test. The compound on wolf-kishner reduction gives pentane. Identify the organic compound giving the necessary chemical reactions. [5]

OR

- Aniline gives electrophilic substitution reaction more readily than benzene.
- Why is NH_2 group in aniline an ortho and para directing towards electrophilic substitution reaction? [2]
 - Starting from aniline how will you get sulphanilic acid, schiff's base and carbolic acid? [3]
 - Explain why it is necessary to protect NH_2 group in aniline before nitration? [3]