

Model Question- 2
Chemistry XII

Time :3 hours
Attempt all questions

Full marks: 75

Group 'A'

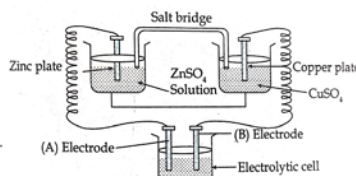
Circle the best alternative to the following questions. [11 × 1 = 11] Time: 25 mins

1. 10 mL of 10M H₂SO₄ is diluted to 250 mL, the strength of the diluted solution is
a. 0.80 N b. 0.40 N c. 1.0 N d. 0.60 N

2. What will be the pH of the solution obtained by mixing 100 c.c. of $\frac{N}{10}$ HCl and 100 c.c. of $\frac{N}{10}$ KOH ?
- a. 0 b. 7 c. 4 d. 14
3. The unit of rate constant for the second-order reaction is
- a. $L^{-1}mol S^{-1}$ $Lmol^{-1}S^{-1}$ c. $l^2mol^{-2}S^{-1}$ d. S^{-1}

4. Which statement is correct for given combination in working condition?

- a. Combination is in equilibrium
 b. electrons flow from anode to cathode
 c. current is produced
 d. current is consumed



5. Co-ordination number in $[Cu(NH_3)_4]^{++}$

- a. 2 b. 3 c. 4 d. 5

6. Cyanide process is used in the extraction of

- a. Gold b. Silver
 c. Both a and b d. copper

7. Reactivity order in nitration is

- a. benzene < nitrobenzene < bromobenzene < toluene
 b. nitrobenzene > benzene > bromobenzene > toluene
 c. benzene > nitrobenzene > bromobenzene > toluene
 d. toluene > benzene > bromobenzene > nitrobenzene

8. Which of the following compounds does not give a tertiary alcohol upon reaction with methyl magnesium bromide?

- a. 3-methylpentanal b. ethyl ethanoate
 c. Acetyl chloride d. 4-heptanone

9. The highest percent in OPC is

- a. alumina b. silica c. lime d. iron oxide

7. Which of the following organic compounds turn blue litmus red, produces effervescence with $NaHCO_3$ and produces silver mirror with Fehling's solution...

- a. CH_3COOH b. $HCOOH$ c. C_6H_5OH d. C_2H_5OH

7. When $C_6H_5N_2Cl$ is boiled with water, the resulting organic compound is

- a. C_6H_6 b. C_6H_5OH c. C_6H_5CHO d. C_6H_5COOH

8. Nylon-6,6 ispolymer

- a. addition b. condensation c. substitution d. none of these

9. Zinc metal is extracted from the ore.....

- a. Cinnabar b. Argentite
 c. Copper pyrites d. Calamine

10. Substance which brings body temperature down are known as

- a. antipyretics b. analgesics c. antibiotics d. none

11. Which of the following compounds does not give a tertiary alcohol upon reaction with methyl magnesium bromide?

- a. 3-methylpentanal b. ethyl benzoate
 c. 4,4-dimethylcyclohexane d. 4-heptanone

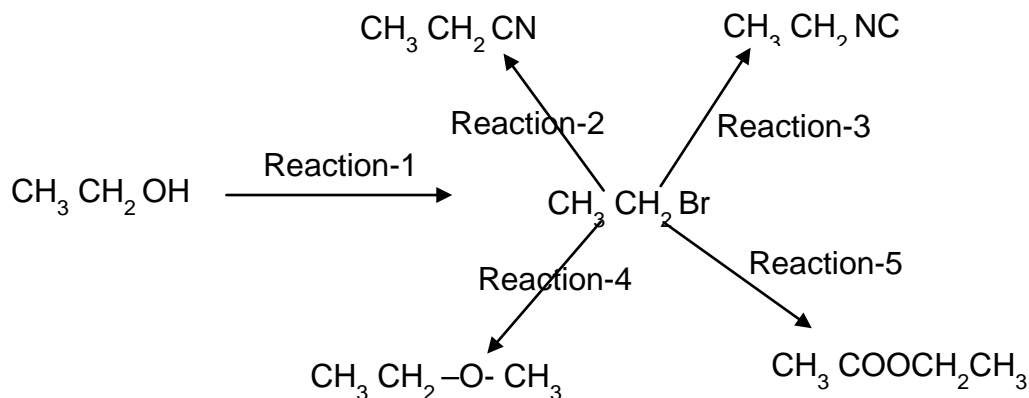
Group'B'

Short Answer Questions: [8×5=40]

- Strength of the solution is determined by preparing the standard solution.
 - Differentiate between primary standard solution and secondary standard solution. [2]
 - 'X' g of metal (eq.wt. = 12) was completely dissolved in 100 ml of N/2 HCl. The volume was then made up to 500ml. 25 ml of this solution requires 17.5 ml of N/10 NaOH for complete neutralization. Find the value of X. [3]

OR

- Write four differences between the order and molecularity of a reaction. [3]
 - For following reaction $2\text{HI} \rightarrow \text{H}_2 + \text{I}_2$. If the rate of formation of I_2 is $9.1 \times 10^{-6} \text{ mol L}^{-1}\text{S}^{-1}$, what will be the rate of disappearance of HI? [2]
- What is internal energy? What is entropy of fusion? Heat of formation of ethyl alcohol, water and carbondioxide are -64.1 Kcal, -68.5 Kcal, and -95 Kcal respectively. Calculate heat of combustion of ethyl alcohol.[1+4]
 - Write the balanced chemical equation for the reaction in which brown gas is obtained when copper is treated with conc. nitric acid. The roasted ore of zinc is reduced in a special type of furnace known as vertical retort furnace. Explain the reduction of the roasted ore of zinc with well labelled diagram. What happens when white vitriol is treated with hot and conc. caustic soda solution till excess? [1+2+2]
 - Why transition elements exhibit the variable oxidation state? Define the term i) coordination number ii) ligand iii) complex compound. [2+1+1+1]
 - Alkyl halides are used for the preparation of a number of other organic compounds. The most common starting compound in aliphatic organic synthetic are alcohols which give alkyl halides. The alkylhalide gives a number of organic compounds as shown in the given reaction sequence.



- For each of the reaction, state the reagent and solvent used. [1+1+1+1+1]

OR

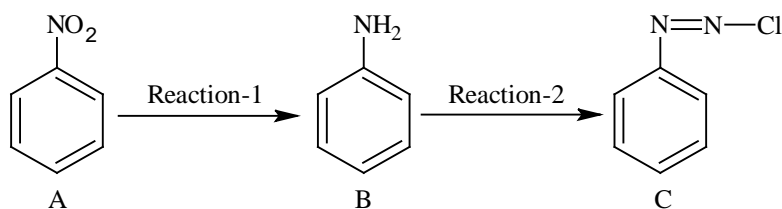
Benzene diazonium chloride (BDC) is prepared by reacting the primary aromatic amine with nitrous acid ($\text{NaNO}_2 + \text{HCl}$) in an ice-cold solution.

- Write the chemical reaction that takes place in the preparation of BDC. [1]
- Write the use of BDC in the Sandmeyer reaction and Gattermann reaction. [1]
- What happens when diazotized solution of aniline is reacted with KI. [1]
- Why does Chlorobenzene undergo electrophilic substitution reaction at ortho and para position. [2]

6. The given table shows the compounds and their molecular formula. The compound 'A' is a primary alcohol which gives yellow crystalline ppt. having hospital smell. The compound 'D' converts into propanoic anhydride. Write the reaction involved in the conversion of compound 'A' to propanoic anhydride.

Compound	Molecular formula
A	C_2H_6O
B	C_2H_5Br
C	C_3H_5N
D	$C_3H_6O_2$

7. This question is concerned with organonitrogen compounds. State the reagent needed to produce the two compounds A and B.



- What is the reagent for reaction-1 and reaction-2? [2]
 - Write the product when compound C is hydrolyzed? [1]
 - What product would you get when compound A is reduced with $LiAlH_4$? [1]
 - Convert compound B into p-aminoazobenzene. [1]
8. A. Write the molecular structures monomers of following polymers
 a. Nylon-6,6 b. PVC c. Teflon [1+1+1]
 B. Write the basic composition of OPC and PPC. [1+1]

Group 'C'

Long Answer Questions [8 × 3=24]

9. A. What are amphoteric substances? Show that HCO_3^- is an amphoteric substance. [2+2]
 B. The solubility product constant (K_{sp}) of $Ca(OH)_2$ at $25^\circ C$ is 4.42×10^{-5} . A 500ml of a saturated solution of $Ca(OH)_2$ is mixed with an equal volume of 0.4M NaOH. What mass of $Ca(OH)_2$ is precipitated out? [4]
 Or
 A. What is an electrochemical cell? How does it differ from an electrolytic cell? [2]
 B. What is standard electrode potential? How does it arise? [2]
 C. The equilibrium constant for the reaction:
 $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$ at $25^\circ C$ has been found to be 1.0×10^{-15} . Calculate the standard free energy change for the reaction. [2]
 D. Under what condition is the reaction expected to occur.

- i. spontaneous
ii. Non-spontaneous, if both ΔH and ΔS are negative for the reaction? [1+1]
10. A. Arrange the given compounds according to their ascending order of acidic strength and justify your order.
Phenol, O-nitrophenol, 2, 4, 6-trinitrophenol [1+1+1]
- B. 2, 4, 6-trinitrophenol gives effervescence with NaHCO_3 but phenol does not why? [2]
- C. What happens when
i. Nitrobenzene is treated with Zn dust and Aq. NH_4Cl
ii. Nitrobenzene is sulphonated
iii. Nitroethane is reduced catalytically. [1+1+1]
11. i. An alcohol (A) reacts with PCl_5 to produce (B), which on dehydrohalogenation yields a compound (C), then (C) on ozonolysis gives the mixture of ethanal and acetone. If the alcohol (A) responds positive iodoform test, identify A, B and C with related sequence of reactions. [5]
- ii. What is 2,4 – DNP test ? [2]
- iii. Convert acetone into propane. [1]

OR

- A.i. Write down a suitable chemical test to distinguish ethanamine from N-methylmethanamine [2]
- ii. How is ethanamine prepared from
a. Propanamide
b. Ethanenitrile [1+1]
iii. Convert ethanamine into methanamine [1]
- B. Arrange the following compounds in the increasing order of solubility in water and justify your answer.
 $\text{C}_6\text{H}_5\text{NH}_2$, $(\text{C}_2\text{H}_5)_2\text{NH}$, $\text{C}_2\text{H}_5\text{NH}_2$, [1+2]