| Roll Number | | |
|---|---|---|

SET A

# INDIAN SCHOOL MUSCAT
## SECOND PRE - BOARD EXAMINATION
## TERM II
## CHEMISTRY [043]

CLASS: XII

Time Allotted: 2 hrs

31.03.2022

Max. Marks: 35

GENERAL INSTRUCTIONS

Read the following instructions carefully.
1. There are 12 questions in this question paper with internal choice.
2. SECTION A - Q. No. 1 to 3 are very short answer questions carrying 2 marks each.
3. SECTION B - Q. No. 4 to 11 are short answer questions carrying 3 marks each.
4. SECTION C- Q. No. 12 is case based question carrying 5 marks.
5. All questions are compulsory.
6. Use of log tables and calculators is not allowed.

### SECTION A

1 a) Write the IUPAC name of $[Fe(H_2O)_5]^{2+}$.
b) Write the structural formula of tris(ethane-1,2-diamine)cobalt(III) ion.

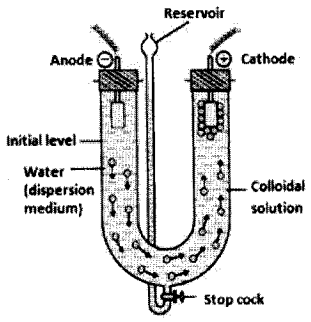
2 Illustrate
a) Hoffmann bromamide degradation reaction.
b) Carbylamine reaction.

3 a) Name the reagent used to convert allyl alcohol to propenal.
b) Give a chemical test to distinguish between benzaldehyde and ethanal.

### SECTION B

4 a) Write the IUPAC name of $(CH_3)_2CHNH_2$.
b) Aromatic primary amines cannot be prepared by Gabriel phthalimide synthesis. Why?
c) Complete the following
$C_6H_5NH_2 + Br_{2\,(aq)} \rightarrow$

5 a) What happens when sodium chloride is added to colloidal solution of ferric hydroxide?
b) Identify and define the process shown in the figure-




**OR**

i) Differentiate between lyophilic and lyophobic colloids.[two points]
ii) Define peptization.

6 a) Convert benzene to benzaldehyde.
b) Why is ethanoic acid weaker acid than benzoic acid?
c) Arrange the following in decreasing order of acidic strength-
Benzoic acid, p-Nitro benzoic acid, p-Methoxy benzoic acid.

**OR**

A compound 'P' with molecular formula $C_2H_4O$ undergoes haloform reaction. P on oxidation gives product 'Q' with molecular formula $C_2H_2O_2$.Q on treatment with $PCl_5$ gives R which on hydrogenation over Pd on $BaSO_4$ gave back compound P.
i) Identify Q and R
ii) Name a reagent that will help convert P to Q.
iii) Write the chemical equation to show the conversion of R to P.

7. a) Explain why $[Ti(H_2O)_6]^{2+}$ is a colored complex.[given Ti=22]
b) Using Crystal Field Theory, write electronic configuration of central metal atom/ion in $[Cu(NH_3)_6]^{2+}$. [given Cu = 29]
c) Define ambidentate ligands.

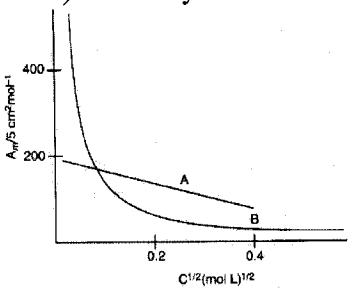
**OR**

i) A purple colored coordination compound with molecular formula $CoCl_3.4NH_3$ gave one mol of AgCl with silver nitrate. What is the structural formula of the compound?
ii) What is the difference between double salt and complex salt?
iii) What is the coordination number of the central metal in $[PtCl_4]^{2-}$ ion?

8 Identify the product obtained in the following reactions-
a) $C_6H_5CHO+CH_3NH_2\rightarrow$
b) $C_6H_5CH_3$ + alkaline $KMnO_4\rightarrow$
c) $C_6H_5COOH \xrightarrow{HNO_3+H_2SO_4}\rightarrow$

9 a) Which among the following is stable in aqueous solution: $V^{3+}$, $Mn^{3+}$, $Cr^{3+}$, $Ti^{3+}$ ?
[Given: Ti = 22,V = 23,Cr = 24, Mn = 25]
b) Give reason
i) Transition metals act as catalyst.
ii) Cu(I) is not stable in aqueous solution.

10 a) Identify the nature of electrolyte A and B depicted in the graph below-




b) Calculate the limiting molar conductivity of $NH_4OH$.Given limiting molar conductivity of $NH_4Cl$, NaOH and NaCl solution at 298K are respectively 129.8, 218.4 and 108.9 $Scm^2 mol^{-1}$.

**OR**

Write the overall cell reaction and calculate the emf of the cell-
$Zn \mid Ag^+ (0.1M) \parallel Zn^{2+} (0.001M) \mid Ag$
The standard potential of $Ag/Ag^+$ half-cell is + 0.80 V and $Zn/Zn^{2+}$ is – 0.76 V.

11 a) Account for the following: $E^\circ (M^{2+}/M)$ values for transition metals show irregular variation.

b) What happens if external potential applied becomes greater than $E^\circ_{cell}$ of electrochemical cell?

c) What are the products of electrolysis of aqueous NaCl with platinum electrodes?

## SECTION C

12 The *order* of a rate law is the sum of the exponents of its concentration terms. Once the rate law of a reaction has been determined, that same law can be used to understand the composition of the reaction mixture. More specifically, the reaction order is the exponent to which the concentration of that species is raised, and it indicates to what extent the concentration of a species affects the rate of a reaction, as well as which species has the greatest effect. A reaction in which one of the reactants is present in a large excess shows an order different from the actual order. The experimental order which is not the actual one is referred to as the pseudo order. Since for elementary reactions molecularity and order are identical, pseudo-order reactions may also be called pseudo molecular reactions.
Sucrose upon hydrolysis in the presence of a dilute mineral acid gives glucose and fructose.

$$C_{12}H_{22}O_{11} + H_2O \longrightarrow C_6H_{12}O_6 + C_6H_{12}O_6$$

sucrose (excess) glucose fructose

a) Write the rate law for the above reaction.

b) Predict the order and unit of rate constant for this reaction?

c) Find the concentration of sucrose if the rate of the reaction is 0.032 M $s^{-1}$ and rate constant $k = 0.005\ s^{-1}$. Also calculate the half-life of this reaction.

**OR**

c) For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction.

**End of the Question Paper**

| Roll Number | | |
|---|---|---|

SET B

# INDIAN SCHOOL MUSCAT
## SECOND PRE - BOARD EXAMINATION
## TERM II
## CHEMISTRY [043]

CLASS: XII

Time Allotted: 2 hrs

31.03.2022

Max. Marks: 35

GENERAL INSTRUCTIONS

Read the following instructions carefully.
1. There are 12 questions in this question paper with internal choice.
2. SECTION A - Q. No. 1 to 3 are very short answer questions carrying 2 marks each.
3. SECTION B - Q. No. 4 to 11 are short answer questions carrying 3 marks each.
4. SECTION C- Q. No. 12 is case based question carrying 5 marks.
5. All questions are compulsory.
6. Use of log tables and calculators is not allowed.

### SECTION A

1 a) Write the IUPAC name of $[Fe(CN)_6]^{3-}$.
b) Write the structural formula of tris(ethane-1,2-diamine)cobalt(III) chloride.

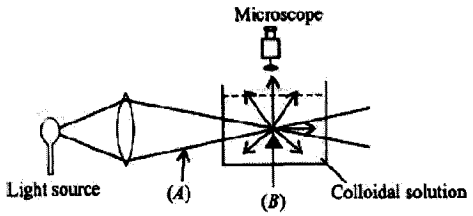
2 Illustrate
a) Hoffmann bromamide degradation reaction.
b) Carbylamine reaction.

3 a) Name the reagent used to convert allyl alcohol to propenal.
b) Give a chemical test to distinguish between propanal and ethanal.

### SECTION B

4 a) Write the IUPAC name of $(CH_3)_3N$.
b) Aromatic primary amines cannot be prepared by Gabriel phthalimide synthesis. Why?
c) Complete the following
$C_6H_5NH_2 + Br_{2\,(aq)} \rightarrow$

5 a) What happens when sodium chloride is added to colloidal solution of ferric hydroxide?
b) Identify and define the process occurring at (B) shown in the figure below-




**OR**

a) Differentiate between physisorption and chemisorption.[two points]
b) Define peptization.

6 a) Convert benzene to benzaldehyde.
b) Why is ethanoic acid weaker acid than benzoic acid?
c) Arrange the following in decreasing order of acidic strength
Benzoic acid, p-Nitro benzoic acid, p-Methoxy benzoic acid

**OR**

A compound 'P' with molecular formula $C_2H_4O$ undergoes haloform reaction. P on oxidation gives product 'Q' with molecular formula $C_2H_2O_2$.Q on treatment with $PCl_5$ gives R which on hydrogenation over Pd on $BaSO_4$ gave back compound P.

i) Identify Q and R
ii) Name a reagent that will help convert P to Q.
iii) Write the chemical equation to show the conversion of R to P.

7. a) Explain why $[Ti(H_2O)_6]^{2+}$ is a colored complex. [given Ti=22]
b) Using Crystal Field Theory, write electronic configuration of central metal atom/ion in $[Cu(NH_3)_6]^{2+}$ [Given Cu=29]
c) Define ambident ligands.

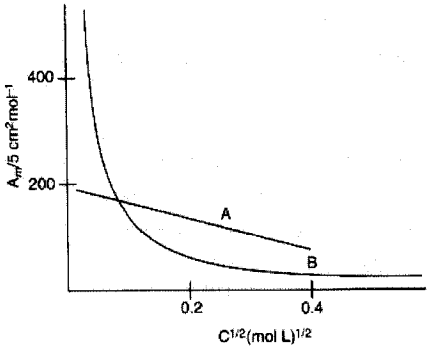
**OR**

i) A purple colored coordination compound with molecular formula $CoCl_3.4NH_3$ gave one mol of AgCl with silver nitrate. What is the structural formula of the compound?
ii) What is the difference between double salt and complex salt?
iii) What is the coordination number of the central metal in $[PtCl_4]^{2-}$ ion?

8 Identify the product obtained in the following reactions-
a) $C_6H_5CHO + CH_3NH_2 \rightarrow$
b) $C_6H_5CH_3$ + alkaline $KMnO_4 \rightarrow$
c) $C_6H_5COOH \xrightarrow{HNO_3 + H_2SO_4} \rightarrow$

9 a) Which among the following is stable in aqueous solution: $V^{3+}$, $Mn^{3+}$, $Cr^{3+}$, $Ti^{3+}$
[Given: Ti = 22, V = 23, Cr = 24, Mn = 25]
b) Give reason-
i) Transition metals act as catalyst
ii) Cu(I) is not stable in aqueous solution

10 a) Identify the nature of electrolyte A and B depicted in the graph below-




b) Calculate the limiting molar conductivity of $NH_4OH$. Given limiting molar conductivity of $NH_4Cl$, NaOH and NaCl solution at 298K are respectively 129.8, 218.4 and 108.9 $Scm^2 mol^{-1}$

**OR**

Write the overall cell reaction and calculate the emf of the cell-
$Zn \mid Ag^+ (0.1M) \parallel Zn^{2+} (0.001M) \mid Ag$
The standard potential of $Ag/Ag^+$ half-cell is + 0.80 V and $Zn/Zn^{2+}$ is – 0.76 V.

11 a) Account for the following: $E^\circ (M^{2+}/M)$ values for transition metals show irregular variation.

b) What happens if external potential applied becomes greater than $E^\circ_{cell}$ of electrochemical cell?

c) What are the products of electrolysis of aqueous NaCl with platinum electrodes?

## SECTION C

12 The *order* of a rate law is the sum of the exponents of its concentration terms. Once the rate law of a reaction has been determined, that same law can be used to understand the composition of the reaction mixture. More specifically, the reaction order is the exponent to which the concentration of that species is raised, and it indicates to what extent the concentration of a species affects the rate of a reaction, as well as which species has the greatest effect. A reaction in which one of the reactants is present in a large excess shows an order different from the actual order. The experimental order which is not the actual one is referred to as the pseudo order. Since for elementary reactions molecularity and order are identical, pseudo-order reactions may also be called pseudo molecular reactions.
Sucrose upon hydrolysis in the presence of a dilute mineral acid gives glucose and fructose.

$C_{12}H_{22}O_{11} + H_2O \longrightarrow C_6H_{12}O_6 + C_6H_{12}O_6$

sucrose (excess) glucose fructose

a) Write the rate law for the above reaction.

b) Predict the order and unit of rate constant for this reaction?

c) Find the concentration of sucrose if the rate of the reaction is 0.032 M $s^{-1}$ and rate constant $k = 0.005\ s^{-1}$. Also calculate the half-life of this reaction.

**OR**

c) For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction.

**End of the Question Paper**

| Roll Number | | |
|---|---|---|

SET C

# INDIAN SCHOOL MUSCAT
## SECOND PRE - BOARD EXAMINATION
## TERM II
## CHEMISTRY [043]

CLASS: XII

Time Allotted: 2 hrs

31.03.2022

Max. Marks: 35

GENERAL INSTRUCTIONS

Read the following instructions carefully.
1. There are 12 questions in this question paper with internal choice.
2. SECTION A - Q. No. 1 to 3 are very short answer questions carrying 2 marks each.
3. SECTION B - Q. No. 4 to 11 are short answer questions carrying 3 marks each.
4. SECTION C- Q. No. 12 is case based question carrying 5 marks.
5. All questions are compulsory.
6. Use of log tables and calculators is not allowed.

### SECTION A

1 a) Write the IUPAC name of $[Cr(NH_3)_6]^{3+}$.
b) Write the structural formula of tris(ethane-1,2-diamine)cobalt(III) ion.

2 Illustrate
a) Hoffmann bromamide degradation reaction.
b) Carbylamine reaction.

3 a) Name the reagent used to convert allyl alcohol to propenal.
b) Give a chemical test to distinguish between pentan-2-one and pentan-3-one.

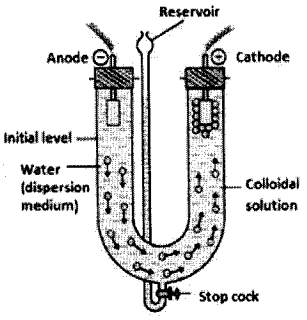
### SECTION B

4 Identify the product obtained in the following reactions-
a) $C_6H_5CHO + CH_3NH_2 \rightarrow$
b) $C_6H_5CH_3$ + alkaline $KMnO_4 \rightarrow$
c) $C_6H_5COOH \xrightarrow{HNO_3 + H_2SO_4} \rightarrow$

5 a) Differentiate between lyophilic and lyophobic colloids.[two points]
b) Define peptization.

**OR**

i) What happens when sodium chloride is added to colloidal solution of ferric hydroxide?
ii) Identify and define the process shown in the figure-




6 A compound 'P' with molecular formula $C_2H_4O$ undergoes haloform reaction. P on oxidation gives product 'Q' with molecular formula $C_2H_2O_2$.Q on treatment with $PCl_5$ gives R which on hydrogenation over Pd on $BaSO_4$ gave back compound P.
i) Identify Q and R.
ii) Name a reagent that will help convert P to Q.
iii) Write the chemical equation to show the conversion of R to P.

**OR**

a) Convert benzene to benzaldehyde.
b) Why is ethanoic acid weaker acid than benzoic acid?
c) Arrange the following in decreasing order of acidic strength-
Benzoic acid, p-Nitro benzoic acid, p-Methoxy benzoic acid

7. a) Explain why $[Ti(H_2O)_6]^{2+}$ is a colored complex.[Given Ti=22]
b) Using Crystal Field Theory, write electronic configuration of central metal atom/ion in $[Cu(NH_3)_6]^{2+}$ [Given Cu=29]
c) Define ambident ligands.

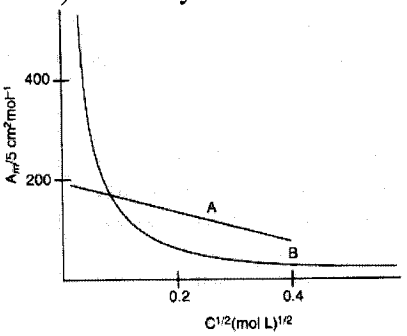
**OR**

i) A purple colored coordination compound with molecular formula $CoCl_3.4NH_3$ gave one mol of AgCl with silver nitrate. What is the structural formula of the compound?
ii) What is the difference between double salt and complex salt?
iii) What is the coordination number of the central metal in $[PtCl_4]^{2-}$ ion?

8 a) Write the IUPAC name of $(CH_3)_2CHNH_2$.
b) Aromatic primary amines cannot be prepared by Gabriel phthalimide synthesis. Why?
c) Complete the following
$C_6H_5NH_2 + Br_{2\,(aq)} \rightarrow$

9 a) Which among the following is stable in aqueous solution: $V^{3+}$, $Mn^{3+}$, $Cr^{3+}$, $Ti^{3+}$ ?
[Given: Ti = 22,V = 23, Cr = 24, Mn =25]
b) Give reason
i) Transition metals act as catalyst.
ii) Cu(I) is not stable in aqueous solution.

10 a) Identify the nature of electrolyte A and B depicted in the graph below-




b) Calculate the limiting molar conductivity of $NH_4OH$. Given limiting molar conductivity of $NH_4Cl$, NaOH and NaCl solution at 298K are respectively 129.8, 218.4 and 108.9 S cm$^2$ mol$^{-1}$.

**OR**

Write the overall cell reaction and calculate the emf of the cell-
Zn | $Ag^+$ (0.1M) ‖ $Zn^{2+}$ (0.001M) | Ag
The standard potential of $Ag/Ag^+$ half-cell is + 0.80 V and $Zn/Zn^{2+}$ is – 0.76 V.

11 a) Account for the following: $E^\circ$ ($M^{2+}/M$) values for transition metals show irregular variation.

b) What happens if external potential applied becomes greater than $E^\circ_{cell}$ of electrochemical cell?

c) What are the products of electrolysis of aqueous NaCl with platinum electrodes?

## SECTION C

12 The *order* of a rate law is the sum of the exponents of its concentration terms. Once the rate law of a reaction has been determined, that same law can be used to understand the composition of the reaction mixture. More specifically, the reaction order is the exponent to which the concentration of that species is raised, and it indicates to what extent the concentration of a species affects the rate of a reaction, as well as which species has the greatest effect. A reaction in which one of the reactants is present in a large excess shows an order different from the actual order. The experimental order which is not the actual one is referred to as the pseudo order. Since for elementary reactions molecularity and order are identical, pseudo-order reactions may also be called pseudo molecular reactions.
Sucrose upon hydrolysis in the presence of a dilute mineral acid gives glucose and fructose.

$C_{12}H_{22}O_{11} + H_2O \longrightarrow C_6H_{12}O_6 + C_6H_{12}O_6$

sucrose (excess) glucose fructose

a) Write the rate law for the above reaction.

b) What will be the order and unit of rate constant for this reaction?

c) Find the concentration of sucrose if the rate of the reaction is 0.032 M s$^{-1}$ and rate constant k = 0.005 s$^{-1}$. Also calculate the half-life of this reaction.

**OR**

c) For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction.

**End of the Question Paper**