



DELHI PUBLIC SCHOOL

SAIL TOWNSHIP, RANCHI

HALF YEARLY EXAMINATION (2017-18)

Class:-XII
Time- 3 Hrs.

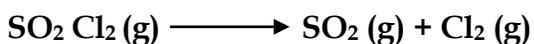
Subject:- Chemistry
M.M-70

General Instructions:-

1. All questions are compulsory.
2. Question No. 1 to 5 are very short answer questions and carry 1 mark each.
3. Question No. -6 to 10 are short answer questions and carry 2 marks each.
4. Question No. 11 to 22 are short answer questions and carry 3 marks each.
5. Question No.- 23 is a value based questions and carry 4 marks.
6. Question No. 24 to 25 are long answer questions and carry 5 marks each.
7. Use Log table if necessary. Use of Calculator is not allowed.

- Q.1 Name the type of binding force present in dry ice. [1]
- Q.2 A reaction is 50 % complete in 2 hours and 75 % complete in 4 hours. What is the order of the reaction? [1]
- Q.3 What is the shape of graph between $\log k$ vs $\frac{1}{T}$? What is the relation between it's slope and activation energy (E_a)? [1]
- Q.4 An alcohol having molecular formula C_4H_9OH is optically active. What is its structure? [1]
- Q.5 Name the alcohol that is used to make the following ester. [1]
- $$\begin{array}{c} \text{O} \\ || \\ \text{CH}_3 - \text{C} - \text{O} - \text{CH} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$$
- Q.6 Derive a relation between relative lowering of vapour pressure and molar mass of the solute. (For non volatile solute) [2]
- Q.7 Mention the reactions occurring at anode and cathode during working of a mercury cell. Why does the voltage of a mercury cell remains constant during it's operation? [2]
- Q.8 What happens when: (write chemical reactions) [2]
- (i) Chloro benzene is treated with $\text{Cl}_2/\text{FeCl}_3$.
- (ii) 2-Bromo pentane is treated with alcoholic KOH.
- OR
- What is meant by chirality of compound? Explain with example.
- Q.9 Write the mechanism of hydration of ethene to yield ethanol. [2]
- Q.10 (i) Arrange the following in increasing order of basic strength in aqueous solution [2]
- $\text{NH}_3, \text{CH}_3\text{NH}_2, (\text{CH}_3)_2\text{NH}, (\text{CH}_3)_3\text{N}$
- (ii) Explain Diazotisation process. [2]

- Q.11 An element occurs in bcc structure. It has a cell edge length of 250 pm. Calculate the molar mass if its density is 8.0 gm/cm^3 . Also calculate the radius of an atom of this element. [3]
- Q.12 What is the significance of Henry's Law Constant? What do you mean by bends or decompression effect? How this type of effect can be avoided by Scuba diver? [3]
- Q.13 Assign reason of the following
 (i) Phosphorus doped with silicon is a semiconductor.
 (ii) Electrical conductivity of a metal decreases with rise in temperature.
 (iii) ZnO white in colour but appears yellow upon heating. [3]
- Q.14 (i) Calculate the efficiency of packing in case of metal crystal for face centred cubic (with the assumption that atoms are touching each other).
 (ii) What kind of magnetic property and defect is exhibited by NaCl? [3]
- Q.15 Two platinum electrodes are dipped in aqueous solution of copper sulphate (blue colour). A current is passed through it.
 (i) What will happen on the two electrodes?
 (ii) What will happen to the colour of the solution?
 (iii) Predict the nature of the solution left in the electrolytic cell. [3]
- Q.16 The following data were obtained during first order thermal decomposition of SO_2Cl_2 at a constant volume.



Expt	Time /s	Total pressure/(atm)
1	0	0.5
2	100	0.6

Calculate the rate of reaction when total pressure is 0.65 atmosphere. [3]

OR

The activation energy of a 1st order reaction at 300 K is 60 KJ/mol. In the presence of a catalyst, the activation energy is lowered by 50 KJ/mol at the same temperature. How many times the rate of reaction will change?

- Q.17 Define the following
 (i) order of reaction
 (ii) activated complex
 (iii) collision frequency [3]
- Q.18 (i) State Hardy Schulze rule.
 (ii) Why NH_3 gas adsorbs more readily than N_2 gas on the surface of charcoal.
 (iii) Why Brownian movement provides stability to the colloidal Sol? [3]
- Q.19 (i) In Kolbe's reaction instead of phenol, phenoxide ion is treated with CO_2 . Why?
 (ii) Write the equation for the preparation of 2-methoxy-2-methylpropane by Williamson's synthesis.

(iii) Write the products formed in the following reaction [3]



Q.20 (i) Chloroform is stored in closed dark coloured bottles, Why? [3]

(ii) Racemic mixture is optically inactive, why?

(iii) Why the presence of nitro group at ortho or para position increases the reactivity of halo arene.

Q.21 (i) Draw the structure of 3 - phenyl prop-2-enal

(ii) Explain this reaction with example.

(a) Cannizzaro's reaction.

(b) HVZ reaction. [3]

Q.22 An organic compound 'A' on treatment with aq ammonia and heating forms compound 'B' which on heating with Br_2 and KOH forms a compound 'C' of molecular formula $\text{C}_6\text{H}_7\text{N}$. Write the structure and IUPAC names of A, B, and C. [3]

Q.23 Rohan and Som are two workers of Coal India Ltd. They go to their work with a mask and before going inside the Coal mine they wear the mask.

Answer the following questions.

(i) Why do they use mask ?

(ii) What is the process involved in working of mask?

(iii) What is the material used in the mask?

(iv) What values do you obtain from used of mask in Coal mines? [4]

Q.24 A strip of nickel metal is placed in a 1 molar solution of $\text{Ni}(\text{NO}_3)_2$ and a strip of silver metal is placed in a 1 molar solution of AgNO_3 . An electrochemical cell is created when the two solutions are connected by a salt bridge and the two strips are connected by wires to a voltmeter.

(i) Write the balanced equation occurring in above electrochemical cell and also represent the cell.

(ii) Calculate the cell potential (emf) at 25°C for the cell if the initial concentration of $\text{Ni}(\text{NO}_3)_2$ is 0.1 molar and initial concentration of AgNO_3 is 1.00 molar.

$$[E^\circ_{\text{Ni}^{2+}/\text{Ni}} = -0.25 \text{ V}]$$

$$[E^\circ_{\text{Ag}^+/\text{Ag}} = 0.80 \text{ V}] \quad [2+3=5]$$

OR

(i) Using E^0 values of A and B predict which is better for coating the surface of iron in order to prevent the corrosion and why?

$$(E^\circ_{\text{Fe}^{2+}/\text{Fe}} = -0.44 \text{ V})$$

$$[E^\circ_{\text{A}^{2+}/\text{A}} = -2.37 \text{ V and } E^\circ_{\text{B}^{2+}/\text{B}} = -0.14 \text{ V}]$$

(ii) Conductivity of 2.5×10^{-4} M methanoic acid is $5.25 \times 10^{-5} \text{ scm}^{-1}$. Calculate its molar conductivity and degree of dissociation.

$$\text{(Given } \lambda_{\text{H}^+}^{\circ} = 349.5 \text{ scm}^2 \text{ mol}^{-1}$$

$$\lambda^{\circ} \text{ HCOO}^- = 50.5 \text{ s cm}^2 \text{ mol}^{-1})$$

Q.25 (i) Equimolecular solution (A) of Benzoic acid in benzene and (B) of benzoic acid in water are taken. How are the Van't Hoff factors of the two solutions are related?

(ii) 3.9 gm of benzoic acid is dissolved in 49 gm of benzene shows a depression in freezing point of 1.62 K. Calculate the Van't Hoff factor and predict the nature of solute. (associated or dissociated)

$$[\text{Molar mass of benzoic acid} = 122 \text{ gm/mol}]$$

$$K_f \text{ for benzene } 4.9 \text{ k kg/mol}]$$

[2+3=5]

OR

(i) List any four factors on which the colligative properties of a solution depend.

(ii) Calculate the boiling point of one molar solution of kBr whose density is 1.06 gm/mol.

$$[K_b \text{ for H}_2\text{O} = 0.52 \text{ k kg/mol}]$$

$$\text{Atomic mass of k} = 39$$

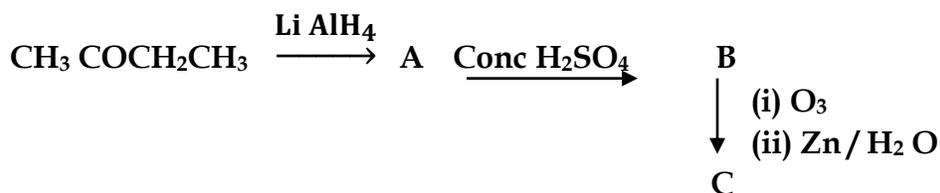
$$\text{Br} = 80]$$

Q.26 (i) Give the simple chemical test to distinguish between

(a) Acetophenone and Benzophenone

(b) Phenol and Benzoic acid

(ii) Complete the following reactions and draw the structures of A, B, and C



[2+3=5]

OR

(i) Predict the product obtained when cyclohexane carbaldehyde reacts with the following reagent

(a) Zinc amalgam and conc HCl.

(b) Tollen's reagent

(ii) How will you bring about the following conversions.

(a) Benzene to m-Nitro acetophenone

(b) Benzoic acid to benzaldehyde

(c) Ethanol to 3-hydroxybutanal