CBSE
Solved Paper 2019

Chemistry

Class XII

Time : 3 hrs **Maximum Marks : 70**

General Instructions

(i) All questions are compulsory.

(ii) **Section A :** Questions number 1 to 5 are very short-answer type questions and carry 1 mark each.

(iii) **Section B :** Questions number 6 to 12 are short-answer questions and carry 2 marks each.

(iv) **Section C :** Questions number 13 to 24 are also short-answer questions and carry 3 marks each.

(v) **Section D :** Question number 25 to 27 are long answer questions and carry 5 marks each.

(vi) There is no overall choice. However, an internal choice has been provided in two questions of **one** mark, **two** questions of **two** marks, **four** questions of **three** marks and all the **three** questions of **five** marks weightage. You have to attempt only one of the choices in **such** questions.

(vii) Use log tables if necessary. Use of calculators is **not** allowed.

Section A

1. Out of NaCl and AgCl, which one shows Frenkel defect and why ? (1)

2. Arrange the following in increasing order of boiling points : (1)

$(CH_3)_3N, C_2H_5OH, C_2H_5NH_2$

3. Why are medicines more effective in colloidal state ?

OR (1)

What is difference between an emulsion and a gel ?

4. Define ambidient nucleophile with an example. (1)

5. What is the basic structural difference between glucose and fructose ?

OR (1)

Write the products obtained after hydrolysis of lactose.

SECTION B

6. Write balanced chemical equations for the following processes:

(i) XeF_2 undergoes hydrolysis

(ii) MnO_2 is heated with conc. HCl.

OR (2)

Arrange the following in order of property indicated for each set :

(i) H_2O, H_2S, H_2Se, H_2Te – increasing acidic character

(ii) HF, HCl, HBr, HI –decreasing bond enthalpy

7. State Raoult's law for a solution containing volatile components. Write two characteristics of the solution which obeys Raoult's law at all concentrations. (2)

8. For a reaction

$$2H_2O_2 \xrightarrow[\text{alkaline medium}]{I^-} 2H_2O + O_2$$

the proposed mechanism is as given below:

(1) $H_2O_2 + I^- \rightarrow H_2O + I\,O^-$ (slow)

(2) $H_2O_2 + IO^- \rightarrow H_2O + I^- + O_2$ (fast)

(i) Write rate law for the reaction.

(ii) Write the overall order of reaction.

(iii) Out of steps (1) and (2), which one is rate determining step? (2)

9. When MnO_2 is fused with KOH in the presence of KNO_3 as an oxidizing agent, it gives a dark green compound (A). Compound (A) disproportionates in acidic solution to give purple compound (B). An alkaline solution of compound (B) oxidises KI to compound (C) whereas an acidified solution of compound (B) oxidises KI to (D). Identify (A), (B), (C), and (D). (2)

10. Write IUPAC name of the complex $[Pt(en)_2Cl_2]$. Draw Structures of geometrical isomers for this complex

OR (2)

Using IUPAC norms write the formulae for the following:

(i) Hexaamminecobalt (III) sulphate

(ii) Potassium trioxalatochromate (III)

11. Out of $[CoF_6]^{3-}$ and $[CO(en)_3]^{3+}$, which one complex is

(i) Paramagnetic

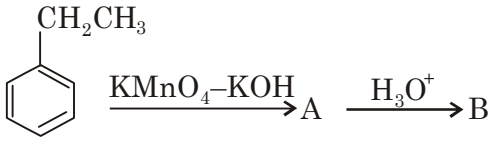
(ii) More stable

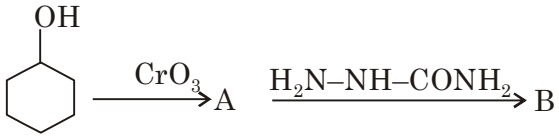
(iii) Inner orbital complex and

(iv) High spin complex

(Atomic no. of Co = 27) (2)

12. Write structures of compounds A and B in each of the following reactions: (2)

(i) 

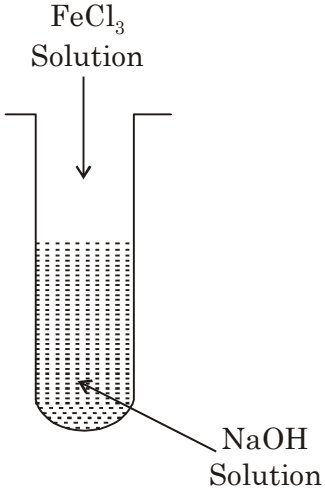
(ii) 

SECTION C

13. The decomposition of NH_3 on platinum surface is zero order reaction. If rate constant (k) is 4×10^{-3} Ms^{-1}, how long will it take to reduce the initial concentration of NH_3 from 0.1 M to 0.064 M. (3)

14. (i) What is the role of activated charcoal in gas mask?

(ii) A colloidal sol is prepared by the given method in figure. What is the charge on hydrated ferric oxide colloidal particles formed in the test tube? How is the sol represented ?



(iii) How does chemisorption vary with temperature? (3)

15. An element crystallizes in fcc lattice with a cell edge of 300 pm. The density of the element is 10.8 g cm^{-3}. Calculate the number of atoms in 108 g of the element. (3)

16. A 4 % solution (w/w) of sucrose (M = 342 g mol^{-1}) in water has a freezing point of 271.15 K. Calculate the freezing point of 5 % glucose (M =180 g mol^{-1}) in water.

(Given : Freezing point of pure water = 273.15 K) (3)

17. (a) Name the method of refining which is

(i) Used to obtain semiconductor of high purity,

(ii) Used to obtain low boiling metal

(b) Write chemical reactions taking place in the extraction of copper from Cu_2S. (3)

18. Give reasons for the following

(i) Transition elements and their compounds act as catalysts.

(ii) E° value for (Mn^{2+} | Mn) is negative whereas for (Cu^{2+} | Cu) is positive.

(iii) Actinoids show irregularities in their electronic configuration. (3)

19. Write the structures of monomers used for getting the following polymers:

(i) Nylon–6,6

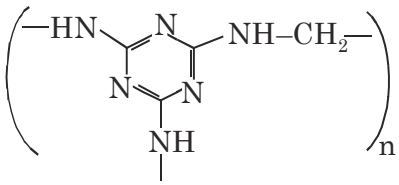
(ii) Glyptal

(iii) Buna–S

OR (3)

(i) Is $[-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-]_n$ a homopolymer or copolymer ? Give reason.

(ii) Write the monomers of the following polymer :



(iii) What is the role of Sulphur in vulcanization of rubber ?

20. (i) What type of drug is used in sleeping pills?

(ii) What type of detergents are used in toothpastes ?

(iii) Why the use of alitame as artificial sweetener is not recommended ?

OR (3)

Define the following terms with a suitable example in each :

(i) Broad-spectrum antibiotics

(ii) Disinfectants

(iii) Cationic detergents

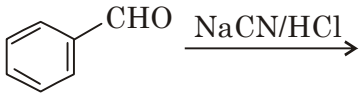
21. (i) Out of $(CH_3)_3$ C–Br and $(CH_3)_3$ C–I which one is more reactive towards S_N1 and why ?

(ii) Write the product formed when p-nitrochlorobenzene is heated with aqueous NaOH at 443 K followed by acidification.

(iii) Why *dextro* and *laevo* – rotatory isomers of Butan–2–ol are difficult to separate by fractional distillation ? (3)

22. An aromatic compound 'A' on heating with Br_2 and KOH forms a compound 'B' of molecular formula C_6H_7N which on reacting with $CHCl_3$ and alcoholic KOH produces a foul smelling compound 'C'. Write the structures and IUPAC names of compounds A, B and C. (3)

23. Complete the following reactions :

(i) 

(ii) $(C_6H_5CH_2)_2Cd + 2CH_3COCl \rightarrow$

(iii) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOH \xrightarrow[(ii)H_2O]{(i)Br_2/Red\,P_4}$

OR (3)

Write chemical equations for the following reactions :

(i) Propanone is treated with dilute $Ba(OH)_2$.

(ii) Acetophenone is treated with Zn (Hg)/Conc. HCl

(iii) Benzoyl chloride is hydrogenated in presence of $Pd/BaSO_4$

24. Differentiate between the following :

(i) Amylose and Amylopectin

(ii) Peptide linkage and Glycosidic linkage

(iii) Fibrous proteins and Globular proteins

OR (3)

Write chemical reactions to show that open structure of D–glucose contains the following:

(i) Straigth chain

(ii) Five alcohol groups

(iii) Aldehyde as carbonyl group

SECTION D

25. $E°_{cell}$ for the given redox reaction is 2.71 V

$$Mg_{(s)} + Cu^{2+}{}_{(0.01\,M)} \rightarrow Mg^{2+}{}_{(0.001\,M)} + Cu_{(s)}$$

Calculate E_{cell} for the reaction. Write the direction of flow of current when an external opposite potential applied is

(i) less than 2.71 V and

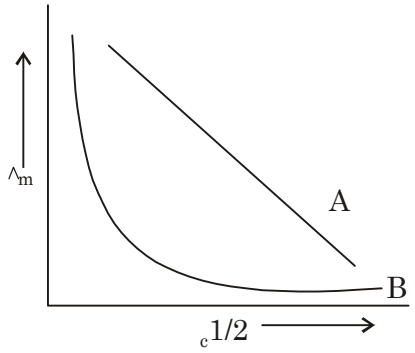
(ii) greater than 2.71 V

OR (5)

(a) A steady current of 2 amperes was passed through two electrolytic cells X and Y connected in series containing electrolytes $FeSO_4$ and $ZnSO_4$ until 2.8 g of Fe deposited at the cathode of cell X. How long did the current flow? Calculate the mass of Zn deposited at the cathode of cell Y.

(Molar mass : Fe = 56 g mol^{-1} Zn = 65.3 g mol^{-1}, 1F = 96500 C mol^{-1})

(b) In the plot of molar conductivity(Λ_m)vs square root of concentration ($c^{½}$) following curves are obtained for two electrolytes A and B :



Answer the following :

(i) Predict the nature of electrolytes A and B.

(ii) What happens on extrapolation of Λ_m to concentration approaching zero for electrolytes A and B ?

26. (a) How do you convert the following :

(i) Phenol to Anisole

(ii) Ethanol to Propan –2–ol

(b) Write mechanism of the following reaction:

$$C_2H_5OH \xrightarrow[443K]{H_2SO_4} CH_2 = CH_2 + H_2O$$

(c) Why phenol undergoes electrophilic substitution more easily than benzene?

OR (5)

(a) Account for the following :

(i) O-nitrophenol is more steam volatile than p-nitrophenol.

(ii) t-butyl chloride on heating with sodium methoxide gives 2-methylpropene instead of t–butylmethylether.

(b) Write the reaction involved in the following :

(i) Reimer–Tiemann reaction

(ii) Friedal–Crafts Alkylation of Phenol

(c) Give simple chemical test to distinguish between Ethanol and Phenol.

27. (a) Give reasons for the following :

(i) Sulphur in vapour state shows paramagnetic behaviour.

(ii) N-N bond is weaker than P–P bond

(iii) Ozone is thermodynamically less stable than oxygen.

(b) Write the name of gas released when Cu is added to

(i) Dilute HNO_3 and

(ii) conc. HNO_3

OR (5)

(a) (i)Write the disproportionation reaction of H_3PO_3.

(ii) Draw the structure of XeF_4.

(b) Account for the following :

(i) Although Fluorine has less negative electron gain enthalpy yet F_2 is strong oxidizing agent.

(ii) Acidic character decreases from N_2O_3 to Bi_2O_3 in group 15.

(c) Write a chemical reaction to test sulphur dioxide gas. Write chemical equation involved.