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BOARD SAMPLE PAPER-I (2025-26)

Time : 03 Hours | **CLASS - XII CHEMISTRY (043)** | **M. M. : 70**

Read the following instructions carefully.

(a) **15- minute prior reading time alloted for Q-paper reading.**

(b) **There are 33 questions in this question paper with internal choice.**

(c) **SECTION A consists of 16 multiple -choice questions carrying 1 mark each.**

(d) **SECTION B consists of 5 short answer questions carrying 2 marks each.**

(e) **SECTION C consists of 7 short answer questions carrying 3 marks each.**

(f) **SECTION D consists of 2 case - based questions carrying 4 marks each.**

(g) **SECTION E consists of 3 long answer questions carrying 5 marks each.**

(h) **All questions are compulsory.**

(i) **Use of log tables and calculators is not allowed.**

Section-A

The following are the multiple choice questions, each carry one mark

1. Which of following aldehyde does not have alpha hydrogen ?

(a) HCHO (b) C_6H_5CHO (c) CCl_3CHO (d) All of these

2. Which of the following is not a colligative property

(a) Relative lowering of vapour pressure (b) Depression in freezing point

(c) osmotic pressure (d) lowering of vapour pressure

3. Which one of the following pairs will form an ideal solution

(a) Chloroform and acetone (b) Ethanol and acetone

(c) n-hexane and n-heptane (d) Phenol and aniline

4. The geometry of complex $Ni(CO)_4$, is:

(a)Square planer (b) Tetrahedral (c)Octahedral (d)Trigonal planar

5. Lucas test can be used to distinguish between:

(a)Phenol and p-cresol (b)Propan-1-ol and ethanol

(c)Butan-1-ol and 2-methylpropan-2-ol (d)Ethanol and glycol

6. Which of the following is steam volatile?

(a) p-Nitrophenol (b)o-Nitrophenol (c)Phenol (d) Resorcinol

7. The product of reaction between any aliphatic primary amine with chloroform and ethanolic solution of KOH is

(a) Alkyl cyanide (b) alkyl isocyanide (c)alcohol (d)amide

8. Which of the following reagent does not react with glucose?

(a)NH_2OH (b)HCN (c)2,4-DNP reagent (d)Br_2 water

9. The conductivity is measured in

(a)$Ohm^{-1}cm^{-1}$ (b) $Ohmcm^{-1}$ (c) $Ohm^{-1}cm$ (d) $Ohm^{-1}cm^2mol^{-1}$

10. In a lead storage battery

(a)PbO_2 is reduced to $PbSO_4$ at the cathode

(b) Pb is oxidised to $PbSO_4$ at the anode

(c) Both electrodes are immersed in the same aqueous solution of H_2SO_4

(d) All the above are true

11. SN^1 reaction of chiral alkyl halides leads to

(a) Retention of configuration (b) Inversion of configuration

(c) Racemisation (d) None of these

12. The molar conductivity of a 0.5 mol L^{-1} solution of $AgNO_3$ with electrolytic conductivity of $5.76X\ 10^{-3}$ S cm^{-1} at 298 K in S cm^2 mol^{-1} is

(a) 2.88 (b)11.52 (c) 0.086 (d) 28.8

For Questions number (13-16) , two statements are given - one labelled as Assertion (A) and the other labelled as Reason (R) . Select the correct answer to these questions from the codes (A), (B), (C) , and (D) as given below.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason(R) is not the correct explanation of the Assertion(A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

13. Assertion (A): Hydrolysis of an ester follows first order kinetics

Reason(R): Concentration of water remains constant during the course of the reaction.

14. Assertion (A): Actinoids show larger number of oxidation states than lanthanoids.

Reason(R): Lanthanoids show highest +4 oxidation state while actinoids shows +7.

15. Assertion (A): Order and molecularity are same.

Reason(R): Order is determined experimentally and molecularity is the sum of the stoichiometric coefficient of the rate determining elementary step.

16. Assertion(A): Cu^+ ion is not stable in aqueous solution.

Reason (R) : Cu^+ contains 3d fully filled subshell.

Section-B

Section B carry 5 question - 2 marks each with internal choice.

The following questions, Q.No 17 - 21 are short answer type and carry 2 marks each.

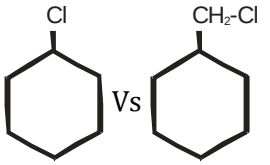
17. A first order reactions has a rate constant $1.15 \times 10^{-3}\ s^{-1}$. How long will 5 g of this reactant take to reduce to 3 g? [log 5 = 0.69, log 3 = 0.40]

OR

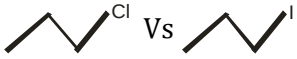
A first order reaction takes 40 min for 30% decomposition. Calculate $t_{\frac{1}{2}}$

18. (i) In reactin of Alcohol with KI to form alkyl Iodide, H_3PO_4 is taken and not H_2SO_4 why.

(ii) Which compound is more reactive toward S_N^1

(a) 

Vs

(b) 

19. λ_m^0 for NaCl, HCl and NaAc are 126.4, 425.9 and 91.0 Scm^2mol^{-1} respectively. Calculate λ_m^0 for HAc.

20. Distinguish between the following pairs of compounds by giving chemical test :

(i) Benzaldehyde and Acetophenone

(ii) Propanal and Propanone

21. Write the reaction involved in the following:

(i)Hoffmann bromamide degradation reaction

(ii) Gabriel phthalimide synthesis

Section-C

Contain 7 question with 3 marks each with internal choice.

22. Write the hybridisation and magnetic character of the following complexes:

(i) $[Ni(CN)_4]^{-2}$ (ii)$[CoF_6]^{-3}$ (iii) $[Fe(H_2O)_6]^{2+}$

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

OR

Draw the structural formula of two isomers of the complex ion $[Co(NH_3)_5NO_2]^{2+}$. Name the type of isomerism and give their IUPAC names.

24. Write the reaction for the following:

(i) Chloroethane is treated with AgCN

(ii) Bromopropane is treated with alcoholic KOH

(iii) Chlorobenzene is treated with Na in preasence of dry ether.

25. What happens when D-glucose is treated with the following reagents?

(i) HI (ii) Bromine water (iii) Conc. HNO_3

26. Give the answer of the following

(i) Denaturation of proteins

(ii) Give an example each for fibrous protein and globular protein.

(iii)Write one difference between nucleoside and a nucleotide.

27. How will you convert the following:

(i) Ethanoic acid to methanamine

(ii) Benzene diazonium chloride to Phenol

(iii) 4 - nitrotoluene to 4 - Nitrobenzoic acid

28. (i) Show that in a first order reaction, time required for completion of 99.9% is 10 times of half-life ($t_{1/2}$) of the reaction.

(ii) Plot a graph between log $[R]_0/[R]$ vs time for a first order reaction and find the slope of the curve.

Section-D

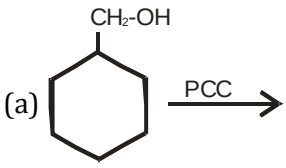
Following questions are case based question. each question carry 4 marks with internal choice.

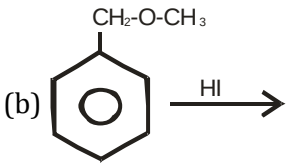
29. When phenol is refluxed with chloroform in the presence of aq.NaOH/KOH, followed by hydrolysis, an aldehyde group is introduced in the benzene ring at a position - ortho to the phenolic group. The product is called ortho hydroxy benzaldehyde. In addition to o-product, a small amount of p-product is also formed but the major product is ortho if one of the position is occupied, then para product is formed. The reaction is electrophillic substitution reaction.

Answer the following questions:

(i) What is the name of the reaction discussed in given Paragraph.

(ii) Complete the reaction





(iii) What is denatured alcohol

(iv) Write the product when salicylic acid react with acetic anhydride in the presence of conc. H_2SO_4.

OR

(iv) Write Kolbe's reaction

30. Read the passage carefully and answer the questions: Redox reactions play an important role in chemistry. Whenever a redox reaction takes place directly in a single beaker, chemical energy in the form of heat is produced. By suitable means, it is possible to bring about the redox reactions indirectly so as to convert the chemical energy into electrical energy. A device used to convert the chemical energy produced in a redox reaction into electrical energy is called an electrochemical cell. If a redox reaction is allowed to take place in such a way that oxidation half reaction takes place in one beaker and the reduction half reaction in another beaker, the electrons given out by the former will be taken by the latter and the current will flow. The two portions of the cell are called half cells. The values of standard redox potential (E°) of two half cell reactions decides in which way the reaction will proceed. A redox reaction is feasible when the substance having higher

reduction potential gets reduced and the one having lower reduction potential gets oxidised. For example, in Daniell cell, zinc goes into solution and copper gets deposited.

1. Formulate the galvanic cell for the reaction: $Zn(s) + 2Ag^{+1}(aq) \rightarrow Zn^{+2} + (aq) + 2Ag(s)$

OR

In Daniell cell, which electrode works as anode and which one as cathode?

2. Is it safe to stir AgNO3 solution with a copper spoon? Why or why not?

Given: $E^{o}_{Ag+/Ag} = 0.80$ volt and $E^{\circ}_{Cu2+/Cu} = +0.34$ volt

3. Calculate E^{o}_{cell} of the following reaction $2Al(s) + 3Cu^{+2}(0.01\ M) \rightarrow 2Al^{+3}(0.01\ M) + 3Cu$
Given Ecell = 1.98V

OR

3. (i) Can E^{o} cell for cell reaction ever be equal to zero?

(ii) Give product of electrolysis when aq. $AgNO_3$ is electrolysed between Pt electrodes.

Section-E

This section carry three question of five marks each.

31. (a) Which of 1.0 M aqueous glucose solution and 1.0 M NaCl aqueous solution has higher boiling point and why?

(b) Name the colligative property that is best for determining molecular masses of macromolecules? Also give reason for the same.

(c) A 0.01 m aqueous solution of $AlCl_3$ freezes at -0.068°C. Calculate Percentage of dissouciatin.

[Given K_f for water = 1.86 K kg mol^{-1}]

OR

(a) Why is ethylene glycol mixed with water in the car radiators in cold countries?

(b) Which of the solutions below given has:

(1) Lowest vapour pressure? (2) Highest osmotic pressure

(A) 0.1 M $NaNO_3$ (B) 0.1 M $MgCl_2$ (C) 0.1 M CH_3COOH (D) 0.1 M Glucose

(c) Calculate the boiling point of solution when 4g of MgSO4 (M = 120 g/mol) was dissolved in 100 g of water. Assume complete dissociation. (K_b for water = 0.52 K kg mol^{-1})

32. (A) Give reason for the following observations:

(i) Transition metals show catalytic properties.

(ii) Transition metals form coloured complexes.

(iii) With d^4 configuration Cr^{+2} is reducing agent but Mn^{+3} is oxidizing agent. Why?

(B) A black coloured manganese compound (X) on heating with KOH in air produces a green coloured compound (Y). Which on acidification give purple colour compound Z, Identify (Y) and (Z)

OR

(A) Complete following reactions:

(i) $MnO_4^- + Fe^{2+} + H^+ \rightarrow$

(ii) MnO_4^- + Br^{-1} (Basic Medium) $\rightarrow$

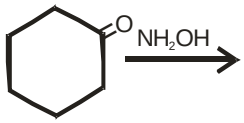
(B) Give reason for the following:

(1) Name the transition metal that is strongest oxidizing agent in +3 oxidation state among all 3d- transition metals.

(2) Cu^{+1} compounds undergo disproportionation in aqueous medium.

33. (a) Arrange following in increasing order of reactivity with HCN:

(i) CH_3-CO-CH_3 (ii) CH_3-CO-Ph (iii) CH_3-CHO (iv) CH_3-CH_2-CHO

(b) Complete 

(c) Distinguish between following pair of organic compounds with the help of suitable chemical test: Acetophenone and benzophenone

(d) Write Stephen reaction.

(e) Compare acidic strength of acetic acid, benzoic acid and formic acid.

OR

(a) Complete following reaction:

(i) HCHO + CH_3OH (Excess) $\xrightarrow{\text{Dry HCl}}$

(ii) C_6H_5-CHO + $[Ag(NH_3)_2]^{+1}$ $\rightarrow$

(b) Write structure of 2-methylbut-3-enoic acid

(c) Write Cross-Aldol condensation reaction between acetaldehyde and benzaldehyde

(d) Write Cannizzaro's reaction of Benzaldehyde

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