CBSE Sample Paper - 2015
Class – XII
Subject – Chemistry

Time: 3 Hrs   Marks: 70

1   What criterion is followed for the selection of the stationary phase in chromatography?   1
2   Write balanced chemical equation: 1
    NaCl is heated with sulphuric acid in the presence of MnO_2.
3   Why $C_6H_5NH_2$ cannot be prepared by Gabriel Phthalimide synthesis?   1
4   What is the significance of 'D' and '+' before the name of glucose in D (+) – glucose?   1
5   A coordination compound has the formula $CoCl_3. 4NH_3$. It does not liberate ammonia on heating but   1
    forms a precipitate with $AgNO_3$.
    Write the formula and IUPAC name of the complex compound.
6   Why does soap solution act as colloid at higher concentration but electrolyte at lower concentration?   1
7   Frenkel defects are not found in alkali metal halides.   1
8   Write IUPAC name: 1
        $CH_3 O CH_2CH_2 O CH_3$
9   In the electrolytic refining of copper name the common elements present in the anode mud. Why are   2
    they so present?
10 (i) Find the charge in Coulombs required to oxidize water to obtain 1 mol of oxygen.   2
    (ii) Set up Nernst Equation for the following cell at 298K:
        $Cr/Cr^{3+}_{(0.01M)} // Ce^{4+}_{(0.001M)}/ Ce^{3+}_{(0.01M)}$
11 Explain the following with an application: 2
    (i) Reaction of nitrous acid with aliphatic primary amine
    (ii) Diazotization

12 Justify: 2
    (i) Mn^{2+} is more stable than Fe^{2+} towards oxidation?

    (ii) The E^0 value for Cu^{2+}/Cu is positive while that of Zn^{2+}/Zn is negative.
13 Why is ozone a powerful oxidizing agent? How is ozone estimated?   2

14 (i)The K_b for water is 0.52 K kg mol^{-1}. What will be the elevation of boiling point of 1molal $CaCl_2$ 2
    assuming that it is completely ionized?

    (ii) Why can't we purify a mixture containing 95% ethanol and 5% water?

                                                                                                      2

15 (i) Write mechanism for the cleavage of unsymmetrical ether, having one of the alkyl groups smaller than the other, by reaction with HI.

(ii) Why ethyl ter-butyl ether cannot be prepared starting with ethanol and tert- butyl halide?

16 How do you convert?   2
(i) Phenol to anisole   (ii) Phenol to Aspirin

17 Explain why $[Co(NH_3)_6]^{3+}$ is an inner orbital entity while $[Ni(NH_3)_6]^{2+}$ is an outer orbital entity?   2
OR
What is crystal field splitting energy? How does the magnitude of Δ_0 decide the actual configuration of d orbitals in a coordination entity?

18 Distinguish beteen: 2
(a) Benzyl amine and N-methyl amino benzene
(b) Di-methyl aniline and Tri-methyl amine

19 (a) Why chloramphenicol is regarded as a broad spectrum antibiotic.   3
(b) Write one example each of anionic and cationic detergents.
(i) State the Raoult's law for a solution of two volatile liquids and obtain a relationship for vapour   3
pressure of the solution.

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pressure of the solution.

(ii) Calculate (a) molality (b) molarity (c) mole fraction of 20% (w/w) aqueous KI if its density is 1.2 g
mL^{-1} (molar mass of KI =166)

21 Calculate the standard cell potential of galvanic cell in which the following reactions take place: 3
$2\ Cr\ (s) + 3\ Cd^{2+}\ (aq) \longrightarrow 2\ Cr^{3+}(aq) + 3\ Cd\ (aq)$.
Calculate the Gibb's energy change and the equilibrium constant for the reaction.
$E^0\ Cr^{3+}/Cr = - 0.74\ V$, $E^0\ Cd^{2+}/Cd = -0.40\ V$
OR
Conductivity of 0.00241 M acetic acid is $7.896 \times 10^{-5}\ S\ cm^2\ mol^{-1}$. Calculate the molar conductivity and if Λ^{∞} for acetic acid is $390.5\ S\ cm^2\ mol^{-1}$. What is its dissociation constant?

22 (i) Describe the following (i) Gycosidic linkage (ii) Peptide linkage   3
(ii)What happens when D-glucose is treated with the following reagents?
        (i) HNO_3 (ii) HI

23 (i) Atoms of element N forms hcp lattice and those of the element M occupy 1/3rd of tetrahedral voids.   3
What is the formula of the compound?
(ii) Chromium crystallizes in bcc structure with cell edge of 288 pm and has density 7.2 g/cm^3. How
many atoms are present in 208g of the element?

24 (i) A compound 'A' contains carbon and hydrogen only and has molecular mass of 72. Its photo   3
chlorination gives a mixture containing only one monochloro and two dichloro hydrocarbons.
Deduce the structure of A and chlorinated products.

(ii) Which out of benzene and chlorobenzene can be nitrated easily and why?

25 (i) What is electrokinetic potential?   3
(ii) Why is $FeCl_3$ solution used to stop bleeding?
(iii) What is the role of MnO_2 in the decomposition of Hydrogen peroxide?

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26 (a) Classify following an addition and condensation polymer: 3
    Bakelite, Polythene, Nylon – 6 6, Polyacrylonitrile
    (b) What is copolymerisation?
    (c) Give the monomer and preparation of Buna – S.

27 A mixed oxide of iron and chromium is fused with sodium carbonate in the presence of air to form a   3
    yellow coloured compound 'A'. On acidification the compound 'A' forms an orange coloured
    compound 'B' which is a strong oxidizing agent. Identify compounds 'A' & 'B'. Write balanced
    equation for each step.
    OR
    Account for the following:
    Lower oxides of transition elements are basic while higher oxides are acidic.
    Of the d^4 species, Cr^{2+} is strongly reducing while Mn^{3+} is strongly oxidizing.
    Cobalt (II) is stable in aq. solution but in the presence of complexing reagents it is easily oxidized.

28 Arrange the following in order of property indicated.   5
    NH_3, PH_3, AsH_3, SbH_3, BiH_3- Decreasing basic strength
    HOCl, HOClO, $HOClO_2$, $HOClO_3$- increasing acid strength
    H_2O, H_2S, H_2Se, H_2Te – increasing Boiling point.
    (ii) An aqueous solution of a gas (X) shows following reactions:
    It turns red litmus blue.
    When added in excess to a copper sulphate solution, a deep blue colour is obtained.
    On addition of ferric chloride solution a brownish precipitate soluble in HNO_3 is obtained.
    Identify (X) and give equations for the reactions in step (ii) and (iii).
    OR
    (a) Illustrate the oxidizing power of halogens.

    (b) A monobasic acid (A) which is formed by the reaction between an element (X) and an alkali act as
    reducing agent. It reduces silver nitrate to silver and is itself oxidized to tribasic acid (B). Tribasic acid
    (B) on heating gives another acid (C) which is tetra basic. Identify A, B, C & X.
    Also write the reactions involved.

29 (i) Draw a graph for: 5
     (i) Concentration of reactant against time for a zero order reaction.
     (ii) log [Ro]/ [R] against time for a first order reaction.

(ii) The reaction 2N2O5 (g) ⟶ 2NO2 (g) +O2 (g) was studied and the following data were collected :

S.N	[N2O5] mol L-1	Rate of disappearance of [N2O5] (mol/L/min
1	1.13×10^{-2}	34×10^{-5}
2	0.84×10^{-2}	25×10^{-5}
3	0.62×10^{-2}	18×10^{-5}

 Determine: i) The order   ii) The rate law.   iii) Rate constant for the reaction.
 OR
(a) A chemical reaction 2A ⟶ 4B+C in gas phase occurs in a closed vessel. The
concentration of B is found to be increased by 5 X 10^{-3} mole L^{-1} in 10 second. Calculate:
 (i) the rate of appearance of B
(ii) the rate of disappearance of A?

(b) For a second order bimolecular reaction, it appears that the concentration of one of the reactants
remains unchanged during the reaction. Suggest the type of reaction and give an example.

30 (a) How do you convert the following?   5
          (i) Benzaldehyde to α –hydroxy phenyl ethanoic acid
          (ii) Ethanol to to 1,3 di- hydroxy butane
(b) Account for the following:
Carboxyl group attached to aryl & vinyl carbon increases acidic strength.
pKa of chloro acetic acid is higher than acetic acid.
Methanal is the most reactive carbonyl compound towards nucleophiles.

OR
(i) Two moles of compound (A) on treatment with a strong base gives 1 mol of compounds (B) and 1
mol of (C). The compound (B) on dehydrogenation with Cu gives (A) while acidification of (C) gives
carboxylic acid (D) having molecular formula CH_2O_2. Identify (A) to (D).
(ii) Write equations for:
(a) Cross aldol condensation between propanal and ethanal in the presence of
    dil NaOH
(b) Preparation of 2-methyl propan-2-ol from a Grignard reagent.

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