CBSE Board
Class XII Chemistry
Sample Paper - 13

Time: 3 Hrs Total Marks: 70

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1. All questions are compulsory.
2. Question nos. **1 to 8** are very short answer questions and carry 1 mark each
3. Question nos. **9 to 18** are short answer questions and carry 2 marks each. Use of calculator is not permitted.
4. Question nos. **19 to 27** are also short answer questions and carry 3 marks each
5. Question nos**. 28 to 30** are long answer questions and carry 5 marks each
6. Use log tables if necessary, use of calculators is not allowed.

Q.1 What does x/m represent?

Q.2 Write a balanced chemical equation for the reaction between acetic acid and PCl_5?

Q.3 Why is N_2 less reactive at room temperature?

Q.4 Arrange the following compounds in the increasing order of their boiling points: CH_3CHO, CH_3CH_2OH, CH_3OCH_3, $CH_3CH_2CH_3$.

Q.5 An alkyl halide having molecular formula C_4H_9Cl is optically active. Draw its structure and mark the optically carbon atom?

Q.6 How are nucleotides linked together in nucleic acids?

Q.7 Give the IUPAC name of the following compounds: $CH_3CH(Cl)CH(Br)CH_3$

Q.8. Name the purest form of commercial iron.

Q.9 What are non-ideal solutions? Explain as to why non-ideal solutions deviate from Raoult's law.

Q.10 Define non-stoichiometric defect in crystals. ?

Q.11 Calculate the density of silver which crystallize in the face centered cubic structure the distance between the nearest silver atoms in this structure is 287 pm.

(Molar mass of silver = 107.87 g / mol, N_A=6.02 x 10^{23} mol^{-1})

OR

Silver crystallizes in an fcc lattice. The edge length of its unit cell is 4.077×10^{-8} cm. and its density is 10.5 g cm^{-3}. Calculate on this basis the atomic mass of silver. (N_A=6.022 x 10^{23} mol^{-1})

Q.12. How is leaching carried out in case of low grade copper ores?

Q.13.What is mischmetall? Mention its important use?

Q.14.How does molar conductivity vary with concentration for:

(i) Weak electrolyte and
(ii) Strong electrolyte

Give reasons for these variations.

Q.15.

(i) Why do the transition metals show variability in their oxidation states?
(ii) Write formula of a compound where the transition metal is in +7 oxidation state.

Q.16. How would you convert methylamine into ethylamine. Write the sequence of chemical reactions.

Q.17

(a) Write the reactions of an (i) aromatic and (ii) aliphatic primary amine with nitrous acid.
(b) Write the balanced chemical reaction for Hoffmann bromamide degradation reaction.

Q.18

(a) Give the balanced equation for the manufacture of chlorine by Deacon's Process.
(b) Write the formula and draw the structure of Pyrophosphoric acid.

Q.19

(a) How can a colloid and a true solution of the same colour be distinguished from each other?
(b) List four applications of adsorption.

Q.20
What are transition elements and why are they called transition elements? Which of the *d*-block elements may not be regarded as the transition elements?

Q.21.200 cm^3 of an aqueous solution of protein contains 1.26g of the protein. The osmotic pressure of such a solution of 300 K is found to be 2.57×10^{-3} bar. Calculate the molar mass of the protein.

Q.22. Calculate ΔG^0 for the reaction

$Cu^{2+}(aq) + Fe(s) \rightarrow Fe^{2+}(aq) + Cu(s)$

(Given: $E^0_{Cu2+/Cu} = 0.34V$, $E^0_{Fe2+/Fe} = -0.44$ V ; F = 96500 C mol^{-1})

Q.23.

(a) Write the molecular formulae of the compounds A, B, C and D in the following sequence of reaction:-

$$C_2H_5OH \xrightarrow[443K]{Conc.H_2SO_4} A \xrightarrow{HBr} B \xrightarrow[I_2]{KOH(aq)} C \xrightarrow[NaOH]{I_2} D$$

(b) Explain why propanol has higher boiling point than that of the hydrocarbon, butane?

Q.24.Name and write the formula of the monomer of Nylon-6.Write the stepwise preparation of Nylon-6.

OR

Define (a) Branch chain polymers and (b) Cross linked polymers.

Q.25.Shahid is a football player. After playing he had sever muscle pain. His brother's friend Rakesh asked him to take ENO along with the medicine.
(a) Why?
(b) What value can you get from this fact?

Q.26.

(a) How do you explain the absence of aldehyde group in the pentaacetate of D-Glucose?
(b) Explain the term mutarotation giving an example

Q.27.Explain the following

(a) $[Co(NH_3)_6]^{3+}$ is diamagnetic, whereas $[CoF_6]^{3-}$ is paramagnetic
(b) $[Fe(H_2O)_6]^{3+}$ is more paramagnetic than $[Fe(CN)_6]^{3-}$

Q.28.Give a reason for each of the following observation:

(i) Noble gases are mostly chemically inert
(ii) Nitrogen does not form penta halides
(iii) Bismuth is a strong oxidizing agent in pentavalent state

(iv) (iv)Of the noble gases only xenon is known to form real chemical compounds
(v) Despite its lower electron affinity fluorine is stronger oxidizing agent then chlorine.

OR

Q.28

i) Describe the manufacture of H_2SO_4 by contact process? Write all the chemical reactions involved in the process.
ii) Mention the conditions required to maximise the yield of ammonia.

Q.29

(i) Describe the preparation of acetic acid from acetylene
(ii) How can the following be obtained from acetic aid
(a) acetone
(b) acetaldehyde
(iii) Write a chemical test to distinguish between acetic acid and acetone.
(iv) Why do carboxylic acids not give the characteristic reactions of carbonyl groups?

OR

Q.29

How will you prepare the following compounds from benzene? You may use any inorganic and any organic reagent having not more than one carbon atom.

(a) Methylbenzoate
(b) m- nitro benzoic acid
(c) p-nitro benzoic acid
(d) phenyl acetic acid
(e) p-nitro benzaldehyde

Q.30.

(a) Derive the general form of the expression for the half life of a first order reaction
(b) The decomposition of NH_3 on platinum surface is a zero order reaction. What are the rates of production of N_2 and H_2 if k = 2.5 X 10^{-4} mol $^{-1}$ L s^{-1}

OR

Q.30

a) A first order reaction has a rate constant 1.15 x 10^{-3} s^{-1}. How long will 5 g of this reactant take to reduce to 3 g?

b) In a reaction between A and B, the initial rate of reaction (r_0) was measured for different initial concentrations of A and B as given below:

A/ mol L^{-1}	0.20	0.20	0.40
B/ mol L^{-1}	0.30	0.10	0.05
r_0/ mol L^{-1} s^{-1}	5.07×10^{-5}	5.07×10^{-5}	1.43×10^{-4}

What is the order of the reaction with respect to A and B?