CBSE Board
Class XII Chemistry
Sample Paper - 5

Time: 3 Hrs Total Marks: 70

(a) All questions are compulsory.

(b) Marks for each question are indicated against it. Question 26 is a value based question carrying four marks.

(c) Question nos. 9 to 18 are short answer questions and carry 2 marks each. Use of calculator is not permitted.

(d) Question nos. 19 to 27 are also short answer questions and carry 3 marks each

(e) Question nos. 28 to 30 are long answer questions and carry 5 marks each

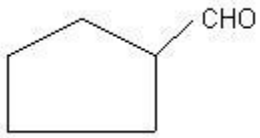
(f) Use log tables if necessary, use of calculators is not allowed.

---

1. Refractive index of a solid is observed to have the same value along all directions. Comment on the nature of this solid.

2. Finely divided substance is more effective as an absorbent. Why?

3. Give IUPAC name of.



4. The depression in freezing point of water observed for same amount of acetic acid, trichloro acetic acid and trifluoro acetic acid increases in above given order. Account to the observation.

5. A sample of iron contains 3% C in it. Name the type of iron.

6. Complete the equation:

$$I_2 + HNO_3 \longrightarrow$$

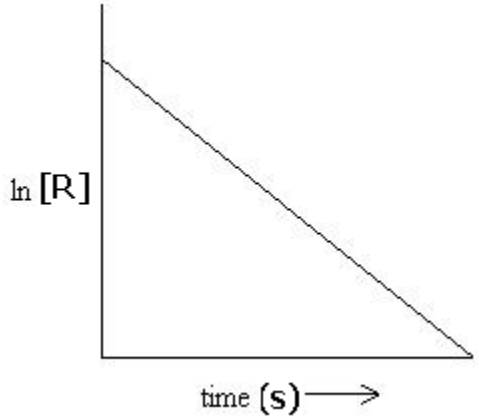
7. Allyl chloride is more reactive than n – propyl chloride towards nucleophilic substitution reaction. Why?

8. Bi does not form pentahalide while P does. Why?

9. An antifreeze solution is prepared from 222.6 g of ethylene glycol $[C_2H_4(OH)_2]$ and 200g of water. Calculate the molality of the solution. If density of solution is $1.072\,g\,mL^{-1}$, calculate its molarity.

10. 2g of C_6H_5COOH dissolved in 25 g of benzene shows a depression in freezing point equal to 1.62 K. Molal depression constant for benzene is 4.9 K kg mol^{-1}. What is the percentage association of acetic acid if it forms dimer solution?

11. For a certain chemical reaction, variation in concentration ln [R] vs time (s) plot is given below:



(a) What are the units of rate constant k?

(b) What does the slope of graph indicate?

OR

Dissociation of SO_2Cl_2 in gas phase is a first order reaction with rate constant $2.3\times10^{-5}\,s^{-1}$ at 600 K. Calculate the percentage of SO_2Cl_2 that would remain after 200 min of reaction time.

12. **(a)** Classify the following into monosaccharide and disaccharide:

Sucrose, lactose, Ribose, galactose.

(b) Which type of linkage is present in primary structure of protein?

13. What happens when D – glucose is treated with HI, Δ and conc. HNO_3 Give only equations involved.

14. Account for the following.

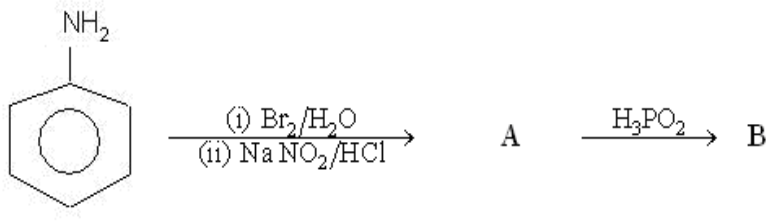
a) Nitration of aniline gives substantial amount of m – nitroaniline.

b) pK_b of aniline is more than that of methylamine.

15.

a) Why do primary amines have higher boiling points than tertiary amines?

b) Identify A & B



16. Give equations for:

a) Nitration of anisole

b) Coupling reaction of phenol and benzene diazonium chloride

17. Phenol is a weak acid. What substitution in the molecule can make it a stronger acid & a weaker acid? Give reasons.

18.

(a) Explain why pine oil is used in froth flotation process.

(b) Define collectors.

19.

(a) What is the co-ordination number of each sphere in bcc structure?

(b) What is the formula of a crystalline compound in which atoms of A are present in all eight corners & atoms of B at center of all six faces?

(c) Give an example of a compound of group 12-16.

20. A reaction $A + B \rightleftharpoons C + D$ is a single step reversible reaction. The energy of activation for forward reaction is 38.9 kJ & that of backward reaction is $51.8 kJ$. Draw energy level diagram indicating $E_a(f)$, $E_a(b)$ & ΔH

OR

(a) Give en expression showing the variation of rate constant with concentration.

(b) A reaction is 50% complete in 2 hrs and 75% complete in 4 hrs. What is the order of the reaction? Explain your answer.

21. Shruti wanted to give her baby a medicine for fever. She added boiled and3 cooled water as per the instruction, to the contents of the bottle, upto the mark. She shook the bottle. Then gave a spoonful of the medicine to the baby. As a student of chemistry answer the following questions:

a. Why did she shake up the contents? What is the process called?

b. What is the value associated with selling medicine in this form?

22. Account for the following:

(a) SO_2 is a powerful reducing agent in alkaline medium than in acidic medium

(b) Compounds of fluorine and oxygen are called fluorides & not oxides.

(c) H_2S can't be dried by passing over conc. H_2SO_4.

23. An aq. solution of gas 'A' gave following reactions:

(a) It decolorizes acidified $KMnO_4$ solution.

(b) On boiling with H_2O_2 followed by cooling & then adding an aq. solution of $BaCl_2$, a white ppt. insoluble dil. HCl was obtained.

(c) On passing H_2S gas through solution of the gas turbidity was obtained.
Identify the gas and give equations involved in above steps.

24. **(a)** Why does NH_3 readily form complexes but NH_4^+ does not?
(b) Write the following:
(i)Ionisation isomer of $[Co(NH_3)_5Br]SO_4$
(ii)Linkage isomer of $[Co(NH_3)_5ONO]Cl_2$

25.

(a) What are biodegradable polymers? Give an example.

(b) In which classes, the polymers are classified on the basis of molecular forces?

26. Write the structure of the major organic product in each of the following reactions:

(i) $(CH_3)_3\,CBr + KOH \xrightarrow[\text{heat}]{\text{ethanol}}$

(ii) $C_6H_5\,CH_2\,CI + C_2H_5\,ONa \rightarrow$

(iii)

27.

(a) **(**What problem arises in using alitame as an artificial sweetener?

(b) If water contains dissolved calcium hydrogen carbonate, out of soaps and detergents which one will you use for cleaning clothes and why?

28.

(a) Predict the product of electrolysis on each of the following:

(i) An aqueous solution of $CuSO_4$ at copper electrodes

(ii) An aqueous solution of $CuCl_2$ with Platinum electrodes

(b) There electrolytic cell A, B, C containing solution of $ZnSO_4$, $AgNO_3$ and $CuSO_4$ resp. are connected in series. A steady current of 1.5 amperes was passed through then until 1.45 g of silver deposited at the cathode of cell B. How long did the current flow? What mass of copper and of zinc were deposited? (Molar Mass of Zn= 65.4, Ag =107.9, Cu = 63.5)

OR

(a) In the button cell, widely used in watches and other devices, the following reaction takes place:

$$Zn(s) + Ag_2O(s) + H_2O(l) \longrightarrow Zn^{2+}(aq) + 2Ag(s) + 2OH^-(aq)$$

Determine E^{θ}_{cell} and $\Delta_r G^{\circ}$ for the reaction. Given

$$E^{\theta}_{Ag^+/Ag} = +0.80\,V,\ E^{\theta}_{Zn^{2+}/Zn} = -0.76\,V$$

(b) Explain with examples the terms weak and strong electrolytes. How can these be distinguished?

29.

(a) Which of the following ions would form white complexes and why?: Cu^{2+}, Zn^{2+}, Ti^{3+}, V^{4+}

(b) What happens when (write the balanced chemical reactions):

(i) Acidified potassium permanganate solution reacts with aqueous potassium iodide solution; write the colour change taking place if any.

(ii) Acidified solution of potassium dichromate reacts with aqueous solution of Sn(II) chloride. Write the colour change taking place, if any.

OR

Give reasons:

(a) Cr^{2+} is a strong reducing agent whereas Mn^{2+} is not. (Cr = 24, Mn = 25)

(b) The transition metal ions such as Cu^+, Ag^+ and Sc^{3+} are colourless.

(c) The enthalpies of atomization of transition metals of 3d series do not follow a regular trend throughout the series.

(d) The radius of Fe^{2+} (Z = 26) is less than that of Mn^{2+} (Z = 25)

(e) Chemistry of the actinoids is much more complicated than that of the lanthanoids.

30.

(a) How will you convert acetaldehyde into the following compounds?

(i) Butan – 2 one (ii) Butan –1,3 –diol

(b) An organic compound with the molecular formula $C_9H_{10}O$ forms 2, 4 -DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro reaction. On vigorous oxidation, it gives 1, 2 – benzene carboxylic acid. Identify the compound.

OR

(a) How will you convert acetaldehyde into the following compounds?

(i) But 2- enal (ii) But – 2-enoic acid.

(b) Write a chemical test to distinguish between propanal and propanone.