CBSE Board
Class XII Chemistry
Sample Paper - 7

Time: 3 Hrs   Total Marks: 70

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
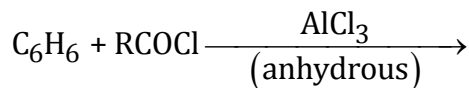6. Use log tables if necessary, use of calculators is not allowed.

Q1:State the condition resulting in reverse osmosis.

Q2:Name an ionization isomer of $[Cr(H_2O)_5 Br]SO_4$.

Q3:Give IUPAC name of
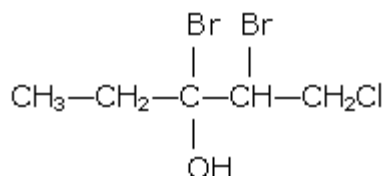
Q4:Complete the reaction equation:

$$C_6H_6 + RCOCl \xrightarrow[\text{(anhydrous)}]{AlCl_3}$$

Q5:Why do primary amines have higher boiling point than tertiary amines?

Q6:Mention two classes of nitrogen containing bases found in nucleotides.

Q7:Write formulae of the monomers of polythene and Teflon.

Q8:Write the structural formula for sulphanilic acid and mention any one of its uses.

Q9:A metal (atomic mass = 50) has a body–centered cubic lattice. The density of metal is 5.91 g cm^{-3}. Find out the volume of unit cell?

Q10:In terms of band theory, what is the difference between
(i) A conductor and an insulator

(ii) A conductor and a semiconductor

Q11: Calculate the freezing point of a solution containing 0.520 g of glucose ($C_6H_{12}O_6$) dissolved in 80.20 g of water.
[For water K_f = 1.86 K kg mol^{-1}]

Q12: How much charge is required for the reduction of
(i) 1 mol of Al^{3+} to Al
(ii) 1 mol of Cu^{2+} to Cu

Q13: How would you account for the following?
(i) Scandium the first member of first transition series does not exhibit variable oxidation state.
(ii) Only transition metals form complex compounds with ligands such as CO.

**Q14**: Write the formulae for the following coordination compounds:
(i) Tetraamminediaquacobalt (III) chloride
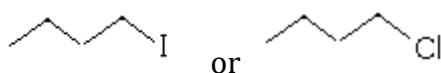(ii) Potassium tetracyanonickelate (II)

OR

Q14: Draw the structures of geometrical isomers of $[Fe(NH_3)_2(CN)_4]^-$.

Q15: What is Saytzeff's rule? Illustrate with a suitable example.

Q16: In the following pairs of halogen compounds which is faster undergoing S_N2 reaction?

i. or

ii. or
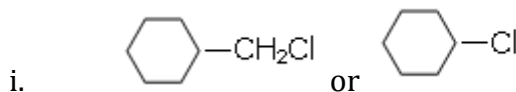
Q17: How can you differentiate between addition and condensation polymerization?

Q18:
(a) Why are cimetidine and ranitidine better antacids than sodium hydrogen carbonate or magnesium or aluminum hydroxide?
(b) What is tincture of iodine? What is its use?

Q19: What are paramagnetic and ferromagnetic substances? Account for the paramagnetic character of transition metal compounds. How does the

paramagnetic character of the bivalent ions of first transition metal series vary from Ti (Z = 22) to Cu (Z = 29)?

Q20: Vapour pressure of pure water at 298 K is 23.8 mm Hg. 50 g of urea (NH_2CONH_2) is dissolved in 850 g of water. Calculate the vapour pressure of water for this solution and its relative lowering.

Q21:

$$Cu^{2+} + 2e^- \rightarrow Cu, E^0 = + 0.34 \, V$$
$$Ag^+ + e^- \rightarrow Ag, E^0 = + 0.80 \, V$$

      (i) Construct a galvanic cell using the above data.
      (ii) For what concentration of Ag^+ ions will the emf of the cell be zero at 25°C, if the concentration of Cu^{2+} is 0.01 M?

Q 22: Explain Freundlich adsorption isotherm. Plot a graph between log (x/m) and log P.

Q23:
    (a) Why is the reduction of a metal oxide easier if the metal formed is in liquid state at the temperature of reduction?
    (b) Why is the extraction of copper from pyrite difficult than that from its oxide ore through reduction?
    (c) Differentiate between minerals and ores?

Q24: At an exhibition a FORTUNE TELLER predicts your future. Ram and Shyam ran to get their fortune read. The fortune teller asked them to take a paper from the lot. He put the paper into a trough of water. Both the children read what was given in the paper.
    (a) Give a plausible reason for this.
    (b) What value do you get from this?

Q25: Write one chemical equation each to exemplify the following reaction:
    (i) Carbylamine reaction
    (ii) Hoffmann bromamide degradation reaction

<div align="center">OR</div>

Q 25. Write structures and IUPAC names of:
    (i) the amide which gives propanamine by Hoffmann bromamide degradation reaction.
    (ii) the amine produced by the Hoffmann bromomamide degradation of benzamide.

Q26:
    (a) State two main differences between globular protein and fibrous proteins.
    (b) What are essential and non – essential amino acids? Give two examples of each.

Q27: Give reaction of glucose with HI, Br_2 water and acetic anhydride.

Q28:
    (i) Calculate the overall order of a reaction which has the rate expression

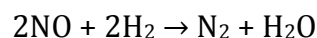   (a) Rate = $k[A]^{\frac{1}{2}}[B]^{\frac{3}{2}}$

        (b) Rate = $k[A]^{\frac{3}{2}}[B]^{-1}$

    (ii) Identity the reaction order from each of the following rate constants:
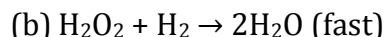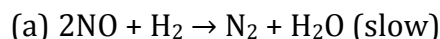   (a) $k = 2.3 \times 10^{-5}$ L mol^{-1} s^{-1}
        (b) $k = 3 \times 10^{-4}$ s^{-1}
    (iii) What is the order of radioactivity decay?
    (iv) What will be the effect of temperature on the rate constant?
    (v) Nitric oxide reacts with H_2 to give N_2 and water
              $2NO + 2H_2 \rightarrow N_2 + H_2O$
     The kinetics of this reaction is explained by following steps:
        (a) $2NO + H_2 \rightarrow N_2 + H_2O$ (slow)
        (b) $H_2O_2 + H_2 \rightarrow 2H_2O$ (fast)
    What is the predicted rate law?

OR

Q28:
    (i) At 300 K a certain reaction is 50% completed in 20 minutes. At 350 K, the same reaction is 50% completed in 5 minutes. Calculate the activation energy for the reaction.
    (ii) Plot a graph between ln k and 1/T. What is the slope and intercept?

Q29: X_2 is greenish yellow gas with an offensive smell used in water purification. It partially dissolves in water to give a solution which turns blue litmus red.
    When X_2 is passed through NaBr Solution, Br_2 is obtained.
    (a) Identify X_2
    (b) Name the group to which it belong
    (c) Write general electronic configuration of this group
    (d) What are products obtained when X_2 reacts with H_2O? Write chemical equation.
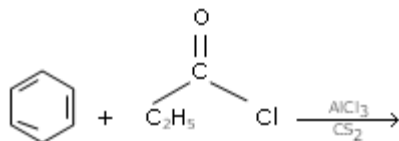   (e) What happens when X_2 reacts with hot and conc. NaOH? Give equations.

OR

Q29:
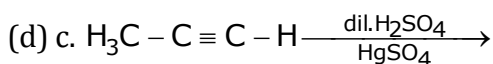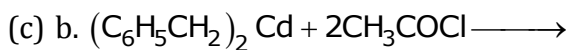   (i) Draw the structure of $XeOF_4$
   (ii) Concentrated HNO_3 can be stored in an aluminium container but cannot be stored in a zinc container. Why?
   (iii) Does the hydrolysis of XeF_6 lead to a redox reaction?

   (iv) Burning magnesium continues to burn whereas burning sulphur gets extinguished when dropped in gas containing NO. Explain.

   (v) Sulphur disappears when boiled with sodium sulphite. Why?

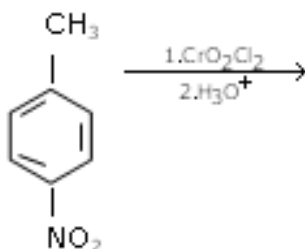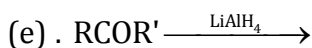**Q30:** Write the structures of the major products of the following reactions:
  (a)

  (b)

  (c) b. $\left(C_6H_5CH_2\right)_2 Cd + 2CH_3COCl \longrightarrow$

  (d) c. $H_3C - C \equiv C - H \xrightarrow{\frac{dil.H_2SO_4}{HgSO_4}}$

  (e) d.

  (f)

  (e) . $RCOR' \xrightarrow{LiAlH_4}$

OR

Q30. Write chemical reactions to affect the following transformations:

  (i) Butan-1-ol to butanoic acid
  (ii) 3-Nitrobromobenzene to 3-nitrobenzoic acid
  (iii) 4-Methylacetophenone to benzene-1, 4-dicarboxylic acid
  (iv) Cyclohexene to hexane-1,6-dioic acid