CBSE Board
Class XII Chemistry
Sample paper - 11

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.

Q1: Solid A is a very hard electrical insulator in solid as well as in molten state and melts at extremely high temperature. Name the type of solid.

Q2: Define ferromagnetic substances. Give any one example of a ferromagnetic substance.

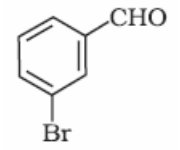
Q3: Can activation energy for a chemical reaction be zero? Explain why?

Q4: It has been found that for a reaction a large number of colliding molecules have energy more than threshold values, yet the reaction is slow. Why?

Q5: Why does NO_2 dimerise?

Q6: The para isomer of dichlorobenzene has higher melting point than ortho and meta isomer. Why?

Q7: Give the IUPAC name of the compound given below:



Q 8: Name the base which is not present in RNA?

Q 9: An element with molar mass 2.7×10^{-2} kg mol^{-1} forms a cubic unit cell with edge length 405 pm. If the density is 2.7×10^3 kg m^{-3}, what is the nature of the cubic unit cell? (Given $N_A = 6.022 \times 10^{23}$ mol^{-1})

Q10: Predict the products of electrolysis of silver electrodes in an aqueous solution of $AgNO_3$.

OR

Q10: Write the reactions taking place at anode and cathode in a dry cell.

Q11: Explain what is observed when:

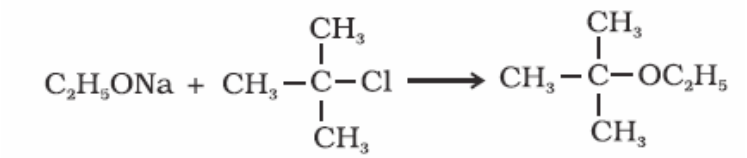
(a) An electrolyte, NaCl is added to hydrated ferric oxide sol.
(b) An electric current is passed through a colloidal sol.

Q12: State any two points of difference between physisorption and chemisorption.

Q13: Draw the structure of N_2O_5 .What is the oxidation state of nitrogen in N_2O_5 ?

Q14: Explain why is dioxygen a gas but sulphur a solid?

Q 15: Following is not an appropriate reaction for preparation of t-butyl ethyl ether.



(i) What would be the major product of this reaction? Give reason.
(ii) Write a suitable reaction for the preparation of t-butyl ethyl ether.

Q16: Name the test that you will use you to distinguish between 2-methylbutan–2–ol and butanol. Name the chemical test and write the chemical reactions involved.

Q17: Complete the following reactions:

(a) $C_6H_5NH_2 + Br_2(aq) \longrightarrow$

(b) $C_6H_5NH_2 + (CH_3CO)_2O \xrightarrow{\text{pyridine}}$

Q18: Give a plausible explanation for each of the following:

(a) Why are amines less acidic than alcohols of comparable molecular masses?
(b) Why do primary amines have higher boiling points than tertiary amines?

Q19: Represent the cell in which following reaction takes place:

$$Mg(s) + 2Ag^{+}(0.0001M) \rightarrow Mg^{2+}(0.130M) + 2Ag(s)$$

Write the individual reactions taking place at anode and cathode.

Q20: In a pseudo first order hydrolysis of ester in water, the following results were obtained:

t (s)	0	30	60	90
[Ester] (mol L^{-1})	0.55	0.31	0.17	0.085

(i) Calculate the average rate of reaction between the time intervals 30 to 60 seconds.
(ii) Calculate the pseudo first order rate constant for the hydrolysis of ester.

OR

Q20: Show that time required for 99% completion of a chemical reaction is twice the time required for the completion of 90% reaction.

Q 21:

(a) Give one point of difference between mineral and ore.
(b) Give an example of ore that can be concentrated by magnetic separation method.
(c) How does sodium cyanide act as depressant in preventing ZnS from forming the forth?

Q 22:

(a) Ammonia is a good complexing agent. Explain with an example.
(b) SO_3 has zero dipole moment. Explain?
(c) Noble gases have low boiling points. Explain.

Q 23: On the basis of valence bond theory, explain the formation of square planar $[Pt(CN)_4]^{2-}$ ion. Calculate the number of unpaired electrons present in the square planar $[Pt(CN)_4]^{2-}$ ion. (Atomic number of Pt =78)

Q24: How will you bring the following conversions?

(a) Ethanol to ethyl fluoride
(b) Benzene to biphenyl
(c) Bromomethane to propanone

Q.25 Define the following terms related to proteins:

(a) Peptide linkage
(b) Primary structure of proteins
(c) Denaturation of proteins

Q26: Write the names and structures of the monomers of the following polymers:

(a) Buna-S
(b) Neoprene

Q27: Sushil and swetha are arguing about the effect of soaps and detergents on environment. Sushil says soaps are better and swetha says that detergents are better for environment.

(a) State the major difference between soaps and detergents.
(b) Which one is better for environment: soaps or detergents?
(c) What values do you get from this?

Q 28: Vapour pressure of chloroform ($CHCl_3$) and dichloromethane (CH_2Cl_2) at 298 K are 200 mm Hg and 415 mm Hg respectively.

(a) Calculate the vapour pressure of the solution prepared by mixing 25.5 g of $CHCl_3$ and 40 g of CH_2Cl_2 at 298 K
(b) Calculate the mole fractions of each component in vapour phase.

OR

Q 28: Calculate the depression in the freezing point of water when 10 g of $CH_3CH_2CHClCOOH$ is added to 250 g of water. $K_a = 1.4 \times 10^{-3}$, $K_f = 1.86$ K kg mol^{-1}. (Atomic mass of C=12, H=1, Cl=35.5, O=16)

Q 29:

(a) Why do transition elements exhibit higher enthalpies of atomization?
(b) Copper is regarded as transition metal though it has completely filled d-orbitals (d^{10}). Explain.
(c) Use Hund's rule to derive the electronic configuration of Ce^{3+} ion and calculate its magnetic moment on the basis of 'spin-only' formula.
(d) Why do Zr and Hf exhibit similar properties?
(e) How would you account for increasing oxidizing power in the series?

$$VO_2^+ < Cr_2O_7^{2-} < MnO_4^-$$

OR

Q 29:

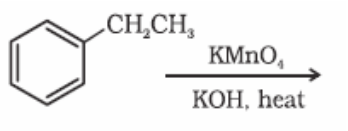
(a) (Which out of $Lu(OH)_3$ and $La(OH)_3$ is more basic and why?
(b) Explain how the colour of $K_2Cr_2O_7$ solution depends on pH of the solution?
(c) Though both Cr^{2+} and Mn^{3+} have d^4 configuration, yet Cr^{2+} is reducing agent while Mn^{3+} is good oxidising agent. Explain why?
(d) Calculate the magnetic moment of a divalent and a trivalent ion in aqueous solution of an element if its atomic number is 25.

Q30: An organic compound (A) (molecular formula $C_8H_{16}O_2$) was hydrolysed with dilute sulphuric acid to give a carboxylic acid (B) and an alcohol (C). Oxidation of (C) with chromic acid produced (B). (C) on dehydration gives but–1–ene. Deduce the structures of A, B, C and D. Write equations for the reactions involved.

OR

Q30: Complete each synthesis by giving missing starting material, reagents or products

(a)



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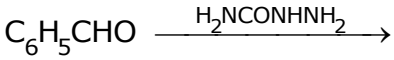

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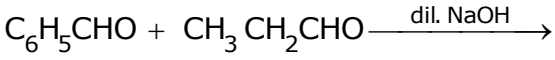
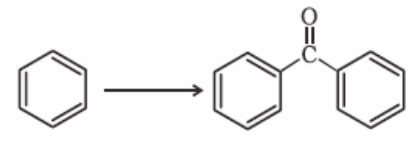


(d)



(e)