CBSE Class 12 Chemistry 2016 - 056-1 - South

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

Time Allowed: 3 Hours **Maximum Marks: 70**

General Instructions

(i) All questions are compulsory.
(ii) Questions 1 to 5 are very short answer questions and carry 1 mark each.
(iii) Questions 6 to 10 are short answer questions and carry 2 marks each.
(iv) Questions 11 to 22 are short answer questions and carry 3 marks each.
(v) Question 23 is a value based question and carries 4 marks.
(vi) Questions 24 to 26 are long answer questions and carry 5 marks each.
(vii) Use log tables, if necessary. Use of calculators is not allowed.

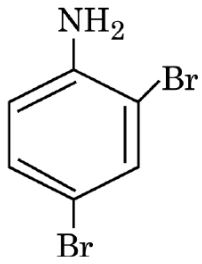
Questions

1. Out of CH_2=CH-CH_2Cl and CH_3-CH_2-CH_2Cl, which is more reactive towards S_N1 reaction?

2. On heating Zn granules with conc. HNO_3, a brown gas is evolved which undergoes dimerization on cooling. Identify this gas.

3. What type of magnetism is shown by a substance if its domains are arranged in equal number and in opposite directions?

4. Write the IUPAC name of the given compound:



5. What is the reason for the stability of colloidal sols?

6. For the given cells: Lead storage cell, Mercury cell, Fuel cell and Dry cell.

Answer the following:

(i) Which cell is used in hearing aids?

(ii) Which cell was used in Apollo space programme?

(iii) Which cell is used in automobiles and inverters?

(iv) Which cell does not have long life?

7. When pyrolusite ore MnO_2 is fused with KOH in presence of air, a green coloured compound (A) is obtained which undergoes disproportionation reaction in acidic medium to give a purple coloured compound (B).

(i) Write the formulae of the compounds (A) and (B).

(ii) What happens when compound (B) is heated?

8. When a coordination compound $PdCl_2.4NH_3$ is mixed with $AgNO_3$, 2 moles of AgCl are precipitated per mole of the compound. Write:

(i) Structural formula of the complex

(ii) IUPAC name of the complex

9. For a reaction: $2NH_3(g) \xrightarrow{Pt} N_2(g) + 3H_2(g)$, Rate = k.

(i) Write the order and molecularity of this reaction.

(ii) Write the unit of k.

10. Write the chemical equations involved in the following reactions:

(i) Clemmensen reduction

(ii) Hell-Volhard-Zelinsky reaction

OR

How do you convert:

(i) Toluene to benzaldehyde

(ii) Ethanoyl chloride to ethanal

11. An element crystallizes in a f.c.c. lattice with cell edge of 400 pm. The density of the element is 7 g cm^{-3}. How many atoms are present in 280 g of the element?

12. The rate constant for the first order decomposition of H_2O_2 is given by the following equation:

$\log k = 14.2 - (1.0 \times 10^4\ K)/T$

Calculate E_a for this reaction and rate constant k if its half-life period be 200 minutes. (Given: R = 8.314 $JK^{-1}\ mol^{-1}$)

13. (i) Out of silica gel and anhydrous $CaCl_2$, which will adsorb the water vapours more?

(ii) Out of H_2SO_4 and H_3PO_4, which one is more effective in causing coagulation of positively charged sol? Give reason.

(iii) Out of sulphur sol and proteins, which one forms macromolecular colloids?

14. (i) Name the method of refining Zirconium.

(ii) In the extraction of Al, impure Al_2O_3 is dissolved in conc. NaOH to form sodium aluminate and leaving impurities behind. What is the name of this process?

(iii) What is the function of limestone in the extraction of iron from its oxides?

15. Calculate E_{cell} for the following reaction at 298 K:

$2\ Cr(s) + 3\ Fe^{2+}(0.01\ M) \rightarrow 2\ Cr^{3+}(0.01\ M) + 3\ Fe(s)$

Given: $E^{\circ}_{cell} = 0.261\ V$

16. Give reasons:

(i) Mn shows the highest oxidation state of +7 with oxygen but with fluorine it shows the highest oxidation state of +4.

(ii) Zn is soft whereas Cr is hard.

(iii) Eu^{2+} is a good reducing agent.

17. What happens when:

(i) 2, 4, 6-trinitrochlorobenzene is treated with warm water.

(ii) 2-chlorobutane is treated with alcoholic KOH.

(iii) Ethyl chloride is treated with Na metal in presence of dry ether.

Write the equations involved in the above reactions.

18. Give reasons for the following:

(a) Aldehydes (R-CHO) are more reactive than ketones (R-CO-R) towards nucleophilic addition reaction.

(b) Benzaldehyde does not undergo aldol condensation reaction.

(c) Benzoic acid does not give Friedel-Crafts reaction.

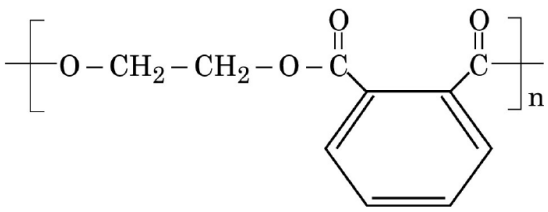
19. Complete the following reactions:

(i) $C_6H_5-COO^-NH_4^+ \xrightarrow{\Delta} A \xrightarrow{Br_2/KOH} B \xrightarrow{CH_3COCl/pyridine} C$

(ii) $C_6H_5N_2^+BF_4^- \xrightarrow[\Delta]{NaNO_2/Cu} A \xrightarrow{Sn/HCl} B \xrightarrow[\Delta]{CHCl_3+alc.\ KOH} C$

20. (i) What is the role of t-butyl peroxide in the polymerization of ethene?

(ii) Identify the monomers in the following polymer:



(iii) Arrange the following polymers in the increasing order of their intermolecular forces: PVC, Nylon-6, Buna-N

OR

Write the mechanism of free radical polymerization of ethene.

21. (i) Write the name of two monosaccharides obtained on hydrolysis of maltose sugar.

(ii) Name the vitamin whose deficiency causes convulsions.

(iii) Write one example each for Fibrous protein and Globular protein.

22. (a) For the complex $[CoF_6]^{3-}$, write the hybridization, magnetic character and spin of the complex. (At. number: Co = 27)

(b) Draw one of the geometrical isomers of the complex $[Co(en)_2Cl_2]^+$ which is optically active.

23. Due to extreme busyness, Mr. Awasthi kept his life stretched and stressful. He started taking sleeping pills without a doctor's advice to overcome depression. Mr. Awasthi's friend, Mr. Roy, advised him not to take sleeping pills and instead suggested improving his lifestyle with yoga and exercise. Mr. Awasthi started living according to his friend's advice and soon started feeling good.

Read the above paragraph and answer the following:

(i) What are the values (at least two) shown by Mr. Roy?

(ii) Why should sleeping pills not be taken without a doctor's advice?

(iii) What are tranquilizers? Give two examples.

24. (a) Account for the following:

(i) H_2Te is more acidic than H_2S.

(ii) PCl_5 is more covalent than PCl_3.

(iii) Boiling points of interhalogens are little higher as compared to pure halogens.

(b) Draw the structures of: (i) $HClO_4$ (ii) $XeOF_4$

OR

(i) Arrange the following in the increasing order of their reducing character: H_3PO_3, H_3PO_2, H_3PO_4

(ii) Out of He and Xe, which one can easily form compound and why?

(iii) Write the conditions to maximize the yield of ammonia in Haber's process.

(iv) Write two uses of Chlorine gas.

(v) How can you detect the presence of SO_2 gas?

25. (a) Write the product(s) in each of the following reactions:

(i) $CH_2{=}CH\text{-}CH_2OH \xrightarrow{PCC} ?$

(ii) Phenol $\xrightarrow{Zn\ dust} ?$

(iii) Anisole + $CH_3COCl \xrightarrow{anhyd.\ AlCl_3} ?$

(b) Write the mechanism of the following reaction:

$2\ CH_3CH_2OH \xrightarrow{conc.\ H_2SO_4/413\ K} CH_3CH_2\text{-}O\text{-}CH_2CH_3$

OR

(a) Write equations of the following reactions:

(i) Bromine in CS_2 with phenol

(ii) Treating phenol with chloroform in the presence of aq. NaOH

(iii) Anisole reacts with HI

(b) Distinguish between:

(i) Ethanol and Diethyl ether

(ii) Propanol and t-butyl alcohol

26. (a) Calculate the boiling point of solution when 2 g of Na_2SO_4 (M = 142 g mol^{-1}) was dissolved in 50 g of water, assuming Na_2SO_4 undergoes complete ionization.

(K_b for water = 0.52 K kg mol^{-1})

(b) Define the following terms:

(i) Colligative properties (ii) Ideal solution

OR

(a) When 2.56 g of sulphur was dissolved in 100 g of CS_2, the freezing point lowered by 0.383 K. Calculate the formula of sulphur (S_x).

(K_f for CS_2 = 3.83 K kg mol^{-1}; Atomic mass of Sulphur = 32 g mol^{-1})

(b) Blood cells are isotonic with 0.9% sodium chloride solution. What happens if we place blood cells in a solution containing?

(i) 1.2% sodium chloride solution

(ii) 0.4% sodium chloride solution

- End of Question Paper -