CBSE Class 12 Chemistry 2016 - 056-3 - South

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

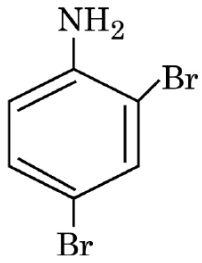
Time Allowed: 3 Hours **Maximum Marks: 70**

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. Write the IUPAC name of the given compound:



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

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

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

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

6. 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?

7. 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

8. 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?

9. 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

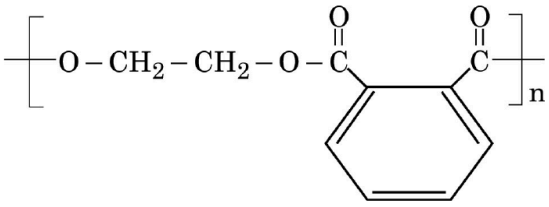
10. For a reaction: $2NH_3(g) \xrightarrow{Pt} N_2(g) + 3H_2(g)$, Rate = k.

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

(ii) Write the unit of k.

11. (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.

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. 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.

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

(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?

15. 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.

16. 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.

17. Complete the following reactions:

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

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

18. (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.

19. (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?

20. (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.

21. Calculate E^o_{cell} for the following reaction at 298 K:

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

Given: $E_{cell} = 0.261\ V$

22. 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?

23. Due to hectic and busy schedule, Mr. Awasthi made his life full of tensions and anxiety. He started taking sleeping pills to overcome the depression without consulting the doctor. Mr. Roy, a close friend of Mr. Awasthi, advised him to stop taking sleeping pills and suggested to change his lifestyle by doing Yoga, meditation and some physical exercise. Mr. Awasthi followed his friend's advice and after few days he started feeling better.

After reading the above passage, answer the following:

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

(ii) Why it is not advisable to take sleeping pills without consulting doctor?

(iii) What are tranquilizers? Give two examples.

24. (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 when we place blood cells in a solution containing:

(i) 1.2% sodium chloride solution

(ii) 0.4% sodium chloride solution

25. (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) $HClO_3$ (ii) $XeOF_4$

OR

(a) Arrange the following in the increasing order of their reducing character:

H_3PO_3, H_3PO_2, H_3PO_4

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

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

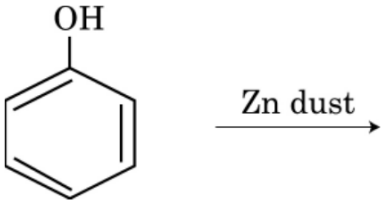
(iii) Write two uses of Chlorine gas.

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

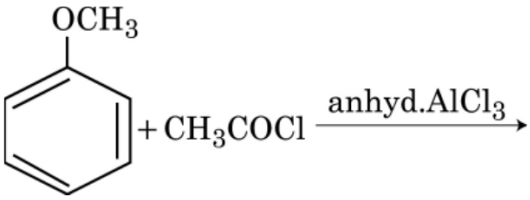
26. (a) Write the product(s) in each of the following reactions:

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

(ii)



(iii)



(b) Write the mechanism of the following reaction:

$2\ CH_3CH_2OH \xrightarrow[413\ K]{\text{Conc. } H_2SO_4} CH_3CH_2\text{-}O\text{-}CH_2CH_3$

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

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