

QB365
Model Question Paper - 2
12th Standard CBSE

Chemistry

Reg.No. :

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Time : 02:00:00 Hrs

Total Marks : 100

Section - A

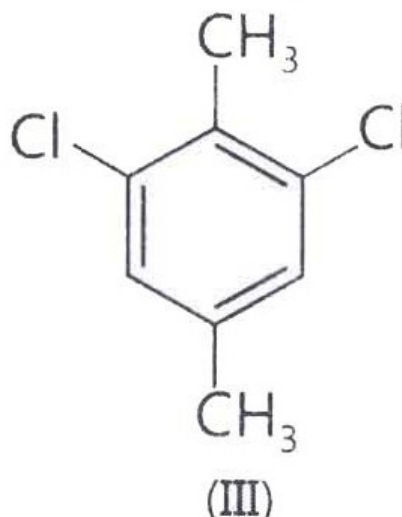
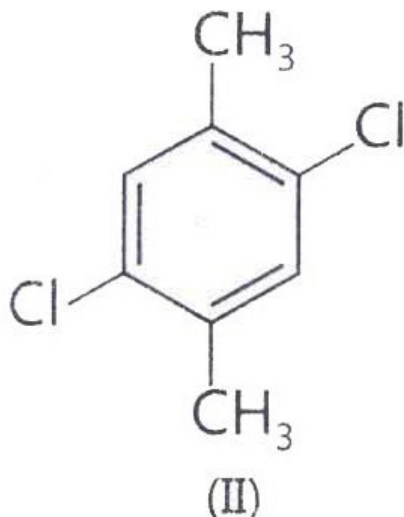
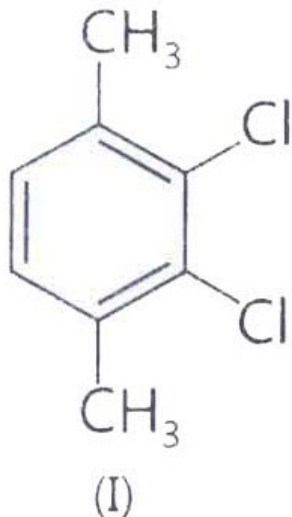
- 1) Which of the following is true about the charge acquired by p-type semiconductors? 1
(a) positive (b) neutral (c) negative (d) depends on concentration of p impurity
- 2) A metal has cubic close packed (ccp) arrangement, the layer sequence of which is shown below: A face diagonal passes through the centre of atom 4 and the centre(s) of which other atom(s)? 1
(a) 1 (b) 2,5 (c) 8,12 (d) 9,10
- 3) Frenkel defect is also known as..... 1
(a) stoichiometric defect (b) dislocation defect (c) impurity defect (d) non-stoichiometric effect
- 4) The solubility of a substance in ether is 2.0×10^{-3} M. The distribution coefficient of the substance in ether - water mixture is 4. The solubility of the substance in water is. 1
(a) 3.0×10^{-4} M (b) 5.0×10^{-4} M (c) 6.0×10^{-4} M (d) 8.0×10^{-4} M
- 5) K_H value for Ar(g), CO₂(g), HCHO (g) and CH₄ (g) are 4.39, 1.67, 1.83×10^{-5} and 0.413 respectively. Arrange these gases in the order of their increasing solubility. 1
(a) HCHO < CH₄ < CO₂ < Ar (b) HCHO < CO₂ < CH₄ < Ar (c) Ar < CO₂ < CH₄ < HCHO (d) Ar < CH₄ < CO₂ < HCHO
- 6) Use the data of Q.8 and find out the most stable oxidised species. 1
(a) Cr³⁺ (b) MnO₄⁻ (c) Cr₂O₇²⁻ (d) Mn²⁺
- 7) $\Delta_m^0(H_2O)$ is equal to ----- 1
(a) $\Delta_m^0(HCl) + \Delta_m^0(NaOH) - \Delta_m^0(NaCl)$ (b) $\Delta_m^0(HNO_3) + \Delta_m^0(NaNO_3) - \Delta_m^0(NaOH)$
(c) $\Delta_m^0(HNO_3) + \Delta_m^0(NaOH) - \Delta_m^0(NaNO_3)$ (d) $\Delta_m^0(NH_4OH) + \Delta_m^0(HCl) - \Delta_m^0(NH_4Cl)$
- 8) Ionic mobility of Ag⁺ is ($\lambda_{Ag^+} = 5 \times 10^{-4} \text{ ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$) 1
(a) 5.2×10^{-9} (b) 2.4×10^{-9} (c) 1.52×10^{-9} (d) 8.25×10^{-9}
- 9) Choose the correct reason (s) for the stability of lyophobic colloidal particles. 1
(a) Preferential adsorption of ions on their surface from the solution
(b) Preferential adsorption of solvent on the surface from the solution
(c) Attraction between different particles having opposite charges on their surface
(d) Potential difference between the fixed layer and the diffused layer of opposite charges around the colloidal particles

- 10) Which of the following plot will not be linear ? 1
- (a) Plot of $\log \frac{x}{m}$ versus P (b) Plot of $\frac{P}{x/m}$ versus P (c) Plot of $\frac{m}{x}$ versus $\frac{1}{P}$
- (d) Plot of $\log \frac{m}{x}$ versus $\log P$
- 11) In which of the following reactions heterogenous catalysis is involved? (i) $2 \text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \xrightarrow{\text{NO}(\text{g})} 2 \text{SO}_3(\text{g})$ 1
- (ii) $2 \text{SO}_2(\text{g}) \xrightarrow{\text{Pt}(\text{s})} 2 \text{SO}_3(\text{g})$ (iii) $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \xrightarrow{\text{Fe}(\text{s})} 2 \text{NH}_3(\text{g})$ (iv)
- $\text{CH}_3\text{COOCH}_3(\text{l}) + \text{H}_2\text{O}(\text{l}) \xrightarrow{\text{HCL}(\text{l})} \text{CH}_3\text{COOH}(\text{aq}) + \text{CH}_3\text{OH}(\text{aq})$
- (a) (ii), (iii) (b) (ii), (iii), (iv) (c) (i), (ii), (iii) (d) (iv)
- 12) Which of the following statements are correct? 1
- (a) S-S bond is present in $\text{H}_2\text{S}_2\text{O}_6$ (b) In peroxosulphuric acid (H_2SO_5) sulphur is in +6 oxidation state.
- (c) Iron powder along with Al_2O_3 and K_2O is used as a catalyst in the preparation of NH_3 by Haber's process.
- (d) Changes in enthalpy is positive for the preparation of SO_3 by catalytic oxidation of SO_2
- 13) P_4O_{10} is the anhydride of 1
- (a) H_3PO_2 (b) H_3PO_3 (c) H_3PO_4 (d) $\text{H}_4\text{P}_2\text{O}_7$
- 14) Gadolinium belongs to 4f series. Its atomic number is 64. Which of the following is the correct electronic configuration of gadolinium ? 1
- (a) $[\text{Xe}]4f^7 5d^1 6s^2$ (b) $[\text{Xe}]4f^6 5d^2 6s^2$ (c) $[\text{Xe}]4f^8 6s^2$ (d) $[\text{Xe}]4f^9 5s^1$
- 15) Which of the following actinoids show oxidation states upto +7 ? 1
- (a) Am (b) Pu (c) U (d) Np
- 16) Iodoform test is not given by 1
- (a) 2-pentanone (b) 3-pentanone (c) ethanal (d) ethanol
- 17) The acid D obtained through the following sequence of reactions is : $\text{C}_2\text{H}_5\text{Br} \xrightarrow{\text{Alc. KOH}} \text{A} \xrightarrow{\text{Br}_2} \text{B} \xrightarrow{\text{KCN}} \text{C} \xrightarrow{\text{H}_3\text{O}^+} \text{D}$ 1
- CCl_4 (excess)
- (a) succinic acid (b) malonic acid (c) maleic acid (d) oxalic acid
- 18) $\text{CH}_3\text{CH}_2 \xrightarrow{\text{Aq. KOH}} \Delta \text{A} \xrightarrow{\text{KMnO}_4 / \text{H}^+} \text{B} \xrightarrow{\text{NH}_3} \Delta \text{C} \xrightarrow{\text{Br}_2} \text{Alkali D}$; D is 1
- (a) CH_3Br (b) CH_3CONH_2 (c) CH_3NH_2 (d) CHBr_3
- 19) Bakelite is obtained from phenol by reaction with 1
- (a) HCHO (b) $(\text{CH}_2\text{OH})_2$ (c) CH_3CHO (d) CH_3COCH_3
- 20) Which of the following are biodegradable polymers? 1
- (a) Nylon-6,6 (b) PHBV (c) Nylon-2-Nylon-6 (d) Polychloroprene

Section - B

- 21) (a) Why is it that only sulphide ores are concentrated by froth floatation process? (b) Which of the following ores can be concentrated by froth floatation method and Why? 2
- 22) What is the oxidation number of phosphorus in H_3PO_2 molecule? 2
- 23) Calculate the magnetic moment of a divalent ion in aqueous solution if its atomic number is 25. 2

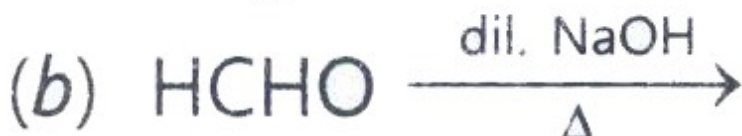
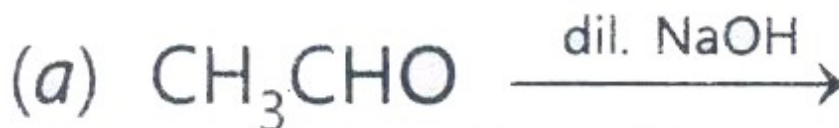
- 24) Write down the formula of the following coordination compounds: (i) hexaaquairon (II) sulphate (ii) potassium tetracyanonickelate (III) (iii) chlorodiammineplatinum (II) (iv) potassium hexacyanoferrate (III) (v) chlorodiammineplatinum (II) ion (vi) dichlorotetraamminecobalt (III) ion (vii) potassium pentacyanonitrosylcobaltate (III) (viii) bis (acetylacetonato) oxovanadium (IV). 2
- 25) Give two examples of ligands which form coordination compounds useful in analytical chemistry. 2
- 26) Where does the water present in the egg go after boiling the egg? 2
- 27) Give one example of a (i) bactericidal antibiotic (ii) bacteriostatic antibiotic. 2
- 28) Name the method used for refining of copper metal. 2
- 29) Which of the following compounds will have the highest melting point and why? 2



- 30) Oxidation of ketones involves carbon-carbon bond cleavage. Name the products formed on oxidation of 2,5-dimethylhexan-3-one. 2
- 31) What is the difference between multimolecular and macromolecular colloids? Give one example of each. How are associated colloids different from these two types of colloids? 2
or
Distinguish between multimolecular, macromolecular and associated colloids. Give one example of each.
- 32) Draw the structures of the following molecules: (i) XeF_2 (ii) HClO_4 2
- 33) How would you account for the following? (i) Cr^{2+} is reducing in nature while with the same d-orbital configuration (d^4) Mn^{3+} is an oxidising agent. (ii) In a transition series of metals, the metal which exhibits the greatest number of oxidation states occurs in the middle of the series. 2
OR Name the element showing maximum number of oxidation states among the first series of transition metal Sc(21) to Zn(30).
- 34) Predict the order of reactivity of the following compounds in $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ reactions: (a) The four isomeric bromobutanes (b) $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$, $\text{C}_6\text{H}_5\text{CH}(\text{C}_6\text{H}_5)\text{Br}$, $\text{C}_6\text{H}_5\text{CH}(\text{CH}_3)\text{Br}$, $\text{C}_6\text{H}_5\text{C}(\text{CH}_3)(\text{C}_6\text{H}_5)\text{Br}$ 2

35) Complete the following reactions and give the names of major products:

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36) Write IUPAC names of the following compounds and classify them into primary, secondary and tertiary amines. (i) $(\text{CH}_3)_2\text{CHNH}_2$ (ii) $\text{CH}_3(\text{CH}_2)_2\text{NH}_2$ (iii) $\text{CH}_3\text{NHCH}(\text{CH}_3)_2$ (iv) $(\text{CH}_3)_3\text{CNH}_2$

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37) (a) A blackish brown coloured solid 'A' when fused with alkali metal hydroxides in presence of air, produces a dark green coloured compound 'B', which on electrolytic oxidation in alkaline medium gives a dark purple coloured compound C. Identify A, B and C and write the reactions involved. (b) What happens when an acidic solution of the green compound (B) is allowed to stand for some time? Give the equation involved. What is this type of reaction called?

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38) Give reasons for each of the following: (a) Sulphur in vapour state exhibits paramagnetic behaviour. (b) Hydrogen fluoride is weaker acid than hydrogen chloride in water. (c) NH_3 has higher proton affinity than PH_3 .

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39) How would you account for the following? (a) Of the d^4 species, Cr^{2+} is strongly reducing while manganese (III) is strongly oxidising. (b) Cobalt (II) is stable in aqueous solution but in the presence of complexing reagents it is easily oxidised. (c) The d^1 configuration is very unstable in ions.

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40) Complete the following reactions: (i) $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{SOCl}_2} \text{A}' \xrightarrow{\text{KCN}} \text{B}'$ (ii) $\text{CH}_3 - \text{CH} - \text{CH}_3 \xrightarrow{\text{PCl}_5} \text{A}' \xrightarrow{\text{AgCN}} \text{B}'$ | $\text{OH} \xrightarrow{\text{AgNO}_2} \text{A}'$ (iv) $(\text{CH}_3)_2\text{CHCl} + \text{CH} \equiv \text{CNa} \xrightarrow{\text{dry ether}} \text{A}'$ (v) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} + \text{CH}_3\text{COOAg} \rightarrow \text{A}' + \text{B}'$ (vi) $2(\text{CH}_2)_2\text{CHBr} + 2\text{Na} \rightarrow$

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Section - C

41) Define the following and give one example of each:

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- (a) Isoelectric point
- (b) Mutarotation
- (c) Enzymes

42) A colourless substance 'A' ($\text{C}_6\text{H}_7\text{N}$) is sparingly soluble in water and gives a water soluble compound 'B' on treating with mineral acid. On reacting with CHCl_3 and alcoholic potash 'A' produces an obnoxious smell due to the formation of compound 'C'. Reaction of 'A' with benzenesulphonyl chloride gives compound 'D' which is soluble in alkali. With NaNO_2 and HCl , 'A' forms compound 'E' which reacts with phenol in alkaline medium to give an orange dye 'F'. Identify compounds 'A' to 'F'.

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43) (a) Explain the following:

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- (i) Henry's law about dissolution of a gas in a liquid.
- (ii) Boiling point elevation constant for a solvent.
- (b) A solution of glycerol ($\text{C}_3\text{H}_8\text{O}_3$) in water was prepared by dissolving some glycerol in 500 g of water. This solution has a boiling point of 100.42°C . What mass of glycerol was dissolved to make this solution? (K_b for water = $0.512 \text{ K kg mol}^{-1}$)

- 44) (a) Define the terms osmosis and osmotic pressure. What is the advantage of using osmotic pressure as compared to other colligative properties for the solutes in solutions? 5
- (b) A solution prepared from 1.25 g of oil of wintergreen (methyl salicylate) in 90.0 g of benzene has a boiling point of 80.31 °C. Determine the molar mass of this compound. (Boiling point of pure benzene = 80.10 °C and K_b for benzene = 2.53 °C kg mol⁻¹)
- 45) (a) Explain the following terms: 5
- (i) Order of a reaction
- (ii) Molecularity of a reaction
- (b) The rate of a reaction increases four times when the temperature changes from 300 K to 320 K. Calculate the energy of activation of the reaction, assuming that it does not change with temperature.
- ($R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$)
- 46) The K_a and K_b values of α - amino acids are very low. Explain. 5
- 47) Due to hectic and busy schedule, Mr. Singh started taking junk food in the lunch break and slowly became habitual of eating food irregularly to excel in his field. One day during meeting he felt severe chest pain and fell down. Mr. Khanna, a close friend of Mr. Singh took him to doctor immediately. The doctor diagnosed that Mr. Singh was suffering from acidity and prescribed some medicines. Mr. Khanna advised him to eat home made food and change his lifestyle by doing yoga, meditation and some physical exercise. Mr. Singh followed his friend's advice and after few days he started feeling better. 5
- After reading the above passage, answer the following:
- (i) What are the values (at least two) displayed by Mr. Khanna?
- (ii) What are antacids? Give one example.
- (iii) Would it be advisable to take antacids for a long period of time? Give reason
- 48) (a) When 2.56 g of sulphur was dissolved in 100 g of CS₂, the freezing point lowered by 0.383 K. Calculate the formula of sulphur (S_x). (K_f for CS₂ = 3.83 K kg mol⁻¹, Atomic mass of sulphur = 32 g mol⁻¹). 5
- (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?
