CHEMISTRY

BOOKS - ICSE MODEL PAPER

SAMPLE PAPER 2022

Part I

1. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

(hydrolysis, reduction, oxidation, vacant, osmotic, above, benzoic acid, phenol, aniline, below, can, decreases, increases, cannot, crystal, ionization, rate, rate constant.)

A catalyst _____ start a reaction but it can increase the _____ of the reaction.

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2. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

(hydrolysis, reduction, oxidation, vacant, osmotic, above, benzoic acid, phenol, aniline, below, can, decreases, increases, cannot, crystal, ionization, rate, rate constant.)

Electrons trapped in the _____ sites of the _____ lattice are called F-centres.

3. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

(hydrolysis, reduction, oxidation, vacant, osmotic, above, benzoic acid, phenol, aniline, below, can, decreases, increases, cannot, crystal, ionization, rate, rate constant.)

An aqueous solution of sugar boils _____ $100^\circ C$ and freezes _____ 0° C.

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4. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

(hydrolysis, reduction, oxidation, vacant, osmotic, above, benzoic acid, phenol, aniline, below, can, decreases, increases, cannot, crystal, ionization, rate, rate constant.)

Toluene on _____ with alkaline potassium permanganate gives_____.

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5. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

(hydrolysis, reduction, oxidation, vacant, osmotic, above, benzoic acid, phenol, aniline, below, can, decreases, increases, cannot, crystal, ionization, rate, rate constant.)

The degree of _____ of ammonium hydroxide _____ on addition of ammonium chloride.

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6. For reaction $2N_2O_5 = 2NO_2 + O_2$, the rate and rate constants are 1.02×10^{-4} mole litre

$^{-1}\sec^{-1}$ and $3.4 \times 10^{-5}\sec^{-1}$ respectively.

The concentration of N_2O_5 at that time will be

A. $1.732 \ \text{mol lit}^{-1}$

B. $3 \ \text{mol lit}^{-1}$

C. $1.02 \times 10^{-4} \ \text{mol lit}^{-1}$

D. $3.2 \times 10^{5} \ \text{mol lit}^{-1}$

Answer:

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7. Complete the following statements by selecting the correct alternative from the choices given:-

Ethanoic acid dimerises in solution. Its molecular mass determined from its depression of freezing point of the solution will be:

A. Same as the theoretical value

B. Half its theoretical value

C. Double its theoretical value

D. One third of its theoretical value.

Answer:

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8. Complete the following statements by selecting the correct alternative from the choices given:-

Magnesium displaces hydrogen from dilute acid solution because:

A. The oxidation potential of magnesium is

less than that of hydrogen.

B. The reduction potential of magnesium is

less than that of hydrogen

C. Both magnesium and hydrogen have

same oxidation potential

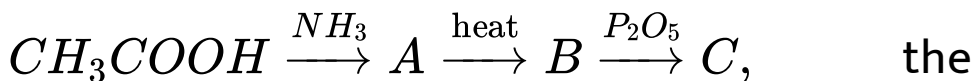D. Both magnesium and hydrogen have

same reduction potential.

Answer:

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9. Complete the following statements by selecting the correct alternative from the choices given:-

In the series of reactions

$$CH_3COOH \xrightarrow{NH_3} A \xrightarrow{\text{heat}} B \xrightarrow{P_2O_5} C,$$ the product C is :

A. Acetyl chloride

B. Ammonium acetate

C. Acetic anhydride

D. Methyl cyanide.

Answer:

10. Complete the following statements by selecting the correct alternative from the choices given:-

In the reaction

$$PCl_3(g) + Cl_2(g) \rightarrow PCl_5(g),$$ the

equilibrium will shift in the opposite direction, if :

A. Chlorine is added ,

B. PCl_3 is added

C. Pressure is increased

D. Pressure is reduced.

Answer:

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11. Answer the following questions :

Among equimolal aqueous solutions of $MgCl_2$, $NaCl$, $FeCl_3$ and $C_{12}H_{22}O_{11}$, which will show minimum osmotic pressure ? Why ?

12. Answer the following questions :

If K_c for the reaction $N_2 + 3H_2 \rightarrow 2NH_3$ is $1.5 \times 10^{-5} (\text{mol/lit})^{-2}$ write the value of K_{c^1} for the reaction $\frac{1}{2}N_2 + \frac{3}{2}H_2 \rightarrow NH_3$

13. Answer the following questions :

The pH of acetic acid decreases on dilution. State the Law governing this statement.

14. Answer the following questions :

Xenon gives a series of fluorides, but Helium and Neon do not. Why?

(At. No: Xe = 54, Ne = 10, He = 2)

15. Answer the following questions :

Calculate the number of coulombs required to deposit 20.25 g of aluminium (at. mass = 27) from a solution containing Al^{+3}

16. Match the following

(i)	$CHCl_3 + NaOH$	(a)	Fluorine
(ii)	Proteins	(b)	Starch
(iii)	Carbohydrate	(c)	Ammonia
(iv)	Lewis base	(d)	Peptide linkage
(v)	KHF_2	(e)	Isocyanide test

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Part Ii Section A

1. A certain aqueous solution boils at $100.303°C$. What is its freezing point ?

K_b for water = 0.5 mol^{-1} and K_f = 1.87 K mol^{-1}

2. A solution containing 1g of sodium chloride in 100g of water freezes at $-0.604°C$.

Calculate the degree of dissociation of sodium chloride. (Na = 23, Cl = 35.5, Kf for water = 1.87 k mol^{-1})

3. Explain graphically how the rate of a reaction changes with every $10°C$ rise in temperature.

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4. Give one example of zero order reaction.

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5. The half life period for the decomposition of a substance is 2.5 hours. If the initial weight of the substance is 160 g, how much of the substance will be left after 10 hours?

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6. Explain Frenkel defect in ionic crystals. What type of compounds exhibit this defect ?

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7. Iron has an edge length 288 pm. Its density is $7.86 gm/cm^3$. Find the type of cubic lattice to which crystal belongs. (At. mass of iron = 56)

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8. Explain giving reasons why:

(i) $Mg(OH)_2$ is sparingly soluble in water but highly soluble in ammonium chloride solution.

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9. When H_2S is passed through acidified zinc sulphate solution, white precipitate of zinc sulphide is not formed.

10. At $440°C$, the equilibrium constant (K) for the following reaction is $49.5, H_2(g) + I_2(g) \Leftrightarrow 2HI(g)$. If 0.2 mol of H_2 and 0.2 mol of I_2 are placed in a $10 - L$ vessel and permitted to react at this

temperature, what will be the concentration of each substance at equilibrium?

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11. What is specific conductance of a solution and what is its unit? How is it related to the equivalent conductance of the solution?

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12. 2.5 amperes of current is passed through copper sulphate solution for 30 minutes. Calculate the number of copper atoms deposited at the cathode (Cu = 63.54).

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13. Four metals W, X, Y and Z have the following values of E_{red}° :

E_{red}°

W = - 0.140 V

X = - 2.93 V

Y = +0.80 V

Z = +1.50 V

Arrange them in the increasing order of reducing power.

14. On adding sodium acetate to aqueous solution of acetic acid, what happens to the pH of the solution? Give a reason for your answer.

15. Calculate the pH of an aqueous solution of $1.0M$ ammonium formate assuming complete dissociation. (pK_a fo atomic acid is 3.8 and pK_a of ammonia is 4.8).

16. Explain auto catalysis with one example.

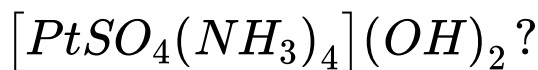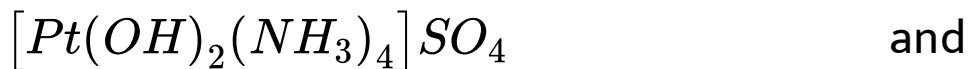**1.** State the geometry and magnetic property of tetracarbonyl nickel (0) according to the valence bond theory.

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2. What type of structural isomers are $\left[Pt(OH)_2(NH_3)_4\right]SO_4$ and $\left[PtSO_4(NH_3)_4\right](OH)_2$?

How will you identify the isomers with a chemical test?

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3. Name the coordination compound used for the following:

Treatment of cancer.

(ii) Treatement of lead poisoning.

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4. Name the coordination compound used for the following:

Treatment of cancer.

(ii) Treatement of lead poisoning.

5. Draw the resonating structure of

a) Ozone molecule

b) nitrate ion

6. Explain why :

Halogens are coloured and the colour deepens on moving down in the group from fluorine to iodine.

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7. In the transition series, with an increase in atomic number, the atomic radius does not change very much. Why is it so?

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8. Give equations to show the use of aqua regia in dissolving platinum

9. Draw the structure of xenon hexaluoride (XeF_6) molecule and state the hybridisation of the central atom.

10. Write balanced equations for the following reactions

Ozone and alkaline potassium iodide.

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11. Write balanced equations for the following reactions

Sodium sulphite and acidified potassium permanganate.

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1. Write equations for the following reactions and name the reactions:

Benzene diazonium chloride is treated with copper and hydrochloric acid.

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2. Write equations for the following reactions and name the reactions:

Formaldehyde is treated with 50% caustic soda solution.

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3. How can chloroform be obtained from ethanol?

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4. Give reactions to show how aniline and nitrobenzene are separately treated with

chlorine in the presence of iron

5. Give one good chemical test to distinguish
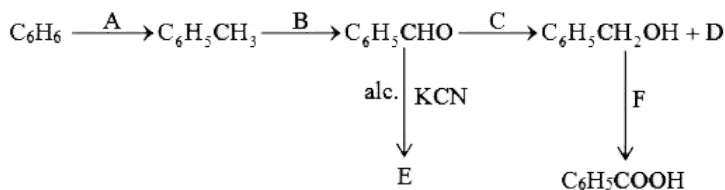
between the following pairs of compounds

Urea and acetamide

6. Give one good chemical test to distinguish

between the following pairs of compounds:

1-propanol and 2-propanol.

7. Identify the compounds A, B, C, D, E and F.

$$C_6H_6 \xrightarrow{A} C_6H_5CH_3 \xrightarrow{B} C_6H_5CHO \xrightarrow{C} C_6H_5CH_2OH + D$$

alc. $\Big|$ KCN → E

F $\Big|$ → C₆H₅COOH

8. How can the following conversions be brought about?

Methane to Ethanoic acid.

9. How can the following conversions be brought about?

Aniline to benzoic acid

10. An organic compound (A) on treatment with ethyl alcohol gives a carboxylic acid (B)

and compound (C). The hydrolysis of (C) under acidic conditions gives (B) and (D). Oxidation of (D) with $KMnO_4$ also gives (B). (B) on heating with $Ca(OH)_2$ gives (E) (molecular formula, C_3H_6O). (E) does not give Tollens test and does not reduce Fehling's solution but forms a $2, 4-$ dinitrophenyl hydrazone. Identify $(A), (B), (C), (D),$ and (E).

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11. An organic compound (A) on treatment with ethyl alcohol gives a carboxylic acid (B) and compound (C). The hydrolysis of (C) under acidic conditions gives (B) and (D). Oxidation of (D) with $KMnO_4$ also gives (B). (B) on heating with $Ca(OH)_2$ gives (E) (molecular formula, C_3H_6O). (E) does not give Tollens test and does not reduce Fehling's solution but forms a $2, 4 -$ dinitrophenyl hydrazone. Identify $(A), (B), (C), (D),$ and (E).

12. Name the functional groups that distinguish glucose and fructose. How will you distinguish between the two compounds?

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13. What are polyesters? Give one example of polyester and the monomers

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14. Give balanced equations for the following

Aniline and benzoyl chloride.

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15. Give balanced equations for the following

Diethyl ether and hydroiodic acid (cold).

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