CHEMISTRY

BOOKS - KALYANI CHEMISTRY (ENGLISH)

SAMPLE PAPER 2016

Part I Question 1 Fill In The Blank

1. (Henry's aldol condensation, absence, do not, ohm, Raoult's, increases, common ion effect, easily, three, solubility product, ohm^{-1}, two, four, $ohm^{-1}cm^{2}$, Cannizzaro, $ohm^{-1}cm^{-1}$, zero, decreases, presence)

Ideal solutions obey_____law and they_____form azeotropic mixtures.

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2. (Henry's aldol condensation, absence, do not, ohm, Raoult's, increases, common ion effect, easily, three, solubility product, ohm^{-1}, two, four, $ohm^{-1}cm^2$, Cannizzaro, $ohm^{-1}cm^{-1}$, zero, decreases, presence)

Benzaldehyde undergoes_____reaction due to_____of α-hydrogen atom.

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3. (Increases, decreases, positive, efficient, 68, non-efficient, no α-hydrogen, negative, Rosenmund's, greater, Cannizzaro, 74, commonion effect, lesser, buffer action, diamagnetic, paramagnetic)

Solubility of silver chloride_____in the presence of sodium chloride because of_____.

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4. (Henry's aldol condensation, absence, do not, ohm, Raoult's, increases, common ion effect, easily, three, solubility product, ohm^{-1}, two, four, $ohm^{-1}cm^2$, Cannizzaro, $ohm^{-1}cm^{-1}$, zero, decreases, presence)

The unit of conductance is_____and that of specific conductance is_____

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5. (Henry's aldol condensation, absence, do not, ohm, Raoult's, increases, common ion effect, easily, three, solubility product,

ohm^{-1}, two, four, $ohm^{-1}cm^2$, Cannizzaro, $ohm^{-1}cm^{-1}$, zero, decreases, presence)

When the concentration of a reactant of first order reaction is doubled, the rate becomes_____times, but for_____order reaction, the rate remains same.

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Part I Question 1

1. Electrochemical equivalent is the amount of substance which gets deposited from its solution on passing electrical charge equal to :

A. 96,500 coulomb

B. 1 coulomb

C. 60 Coulomb

D. 965 coulomb

Answer: B

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2. The complex ion $\left[Ni(CN)_4\right]^{2-}$ is :

A. Square planar and diamagnetic

B. Tetrahedral and paramagnetic

C. Square planar and paramagnetic

D. Tetradedral and diamagnetic

Answer: A

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3. Wohler's synthesis is used for the preparation of :

A. Glycine

B. Amino acids

C. Urea

D. Proteins

Answer:

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4. When SO_2 gas is passed through acidified $K_2Cr_2O_7$ solution, the colour of the solution changes to

A. Red

B. Black

C. Orange

D. Green

Answer: D

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5. In the equation $CH_3COOH + Cl_2 \xrightarrow[-HCl]{\text{RedP}} A$, the compound A is :

A. CH_3CH_2Cl

B. $ClCH_2COOH$

C. CH_3Cl

D. CH_3COCl

Answer: B

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Part I Question 1 Answer The Following Questions

1. The unit of rate and rate constant are same for a

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2. What is the pH of a solution whose hydroxylion concentration is $10^{-2}M$?**

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3. Calculate the number of coulombs required to deposit 5.4g of Al when the electrode reaction is :

$Al^{3+} + 3e^- \rightarrow Al$ [Atomic weight of Al = 27 g/mol]

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4. Write the reaction to prepare acetaldehyde from hydrogen gas and an acid chloride.

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5. The edge length of unit cell of a body-centred cubic (bcc) crystal is 352 pm. Calculate the radius of the atom.

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Part I Question 1 Match The Following

1.

(i)	Weak electrolyte**	(a)	pH of a solution**
(ii)	Colour in crystals	(b)	Iodoform
(iii)	Acetone	(c)	Tollen's reagent
(iv)	Sorensen**	(d)	Ostwald dilution law**
(v)	Ammonical silver nitrate	(e)	F-centre

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Part Ii Section A Question 2 Answer Any Two Questions

1. A 10% aque us solution of cane sugar (mol wt. 342) is isotonic with 1.754% aqueous solution of urea. Find the molecular mass of urea.

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2. The molecular weight of an organic compound is 58 g mol^{-1}. What will be the boiling point of a solution containing 48 g of the solute in 1200 g of water?

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3. What will be the value of van't Hoff factor (i) of benzoic acid if it dimerises in aqueous solution ? How will the experimental molecular weight vary as compared to the normal molecular weight?

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4. Determine the pH value of 0.001 M acetic acid solution if it is 2% ionised at this concentration. How can the degree of dissociation of this acetic acid solution be increased?

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5. The solubility product of $PbCl_2$ at 298K is 1.7×10^{-5}. Calculate the solubility of $PbCl_2$ in gL^{-1} at 298K

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6. Graphite is anisotropic with respect to conduction of electric current. Explain.

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Part Ii Section A Question 3

1. In a body-centred and face-centred arrangement of atoms of an element, what will be the number of atoms present in respective unit cells. Justify your answer with calculation.

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2. A compound AB has a cubic structure and molecular mass 99. Its density is 3.4 g cm^{-3} . What is the length of the edge of the unit cell ?

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3. For the reaction :

$2NO_{(g)} \Leftrightarrow N_{2(g)} + O_{2(g)}, \Delta H = -\text{heat}^{**}$

$K_e = 2.5 \times 10^2 \quad \text{at } 298\,\text{K}$

What will happen to the concentration of N_2 if:

(1) Temperature is decreased to 273 K.

(2) Pressure is reduced.

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4. In a first order reaction, 10% of the reactant is consumed in 25 minutes. Calculate :

(1) The half-life period of the reaction.

(2) The time required for completing 87.5% of the reaction.

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5. Water acts as Bronsted acid as well as a Bronsted base. Give one example each to illustrate this statement.

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Part Ii Section A Question 4

1. Consider the following cell reaction at 298 K :

$2Ag^+ + Cd \rightarrow 2Ag + Cd^{2+}$

The standard reduction potentials (E°) for Ag^+ / Ag and Cd^{2+} / Cd are 0.80 V and $-0.40V$ respectively :

(1) Write the cell representation.

(2) What will be the emf of the cell if the concentration of Cd^{2+} is 0.1 M and that of Ag^+ is 0.2 M?

(3) Will the cell work spontaneously for the condition given in (2) above?

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2. What are buffer solutions and how are they prepared? Explain the buffer action of an acidic buffer solution. Derive Henderson's equation for an acidic buffer.

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3. Explain the following :

When NaCl is added to $AgNO_3$ solution, a white precipitate is formed.

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4. Give reasons for the following

An aqueous solution of the salt ammonium chloride is acidic in nature while an aqueous solution of sodium chloride is neutral.

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5. A 0.05 M NH_4OH solution offers the resistance of 50 ohm to a conductivity cell at 298 K. If the cell constant is $0.50cm^{-1}$ and molar conductance of NH_4OH at infinite dilution is $471.4ohm^{-1}cm^2mol^{-1}$, calculate :

Specific conductance

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6. A 0.05 M NH_4OH solution offers the resistance of 50 ohm to a conductivity cell at 298 K. If the cell constant is $0.50cm^{-1}$ and molar conductance of NH_4OH at infinite dilution is $471.4ohm^{-1}cm^2mol^{-1}$, calculate :

Molar conductance

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7. A 0.05 M NH_4OH solution offers the resistance of 50 ohm to a conductivity cell at 298 K. If the cell constant is $0.50cm^{-1}$ and molar conductance of NH_4OH at infinite dilution is $471.4ohm^{-1}cm^2mol^{-1}$, calculate :

Degree of dissociation

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Part Ii Section B Question 5

1. Write the IUPAC names of the following :

$[Co(NH_3)_4SO_4]NO_3$

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2. Write the IUPAC names of the following :

$K[Pt(NH_3)Cl_3]$

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3. What type of isomerism is exhibited by the following pairs of compounds :

$[PtCl_2(NH_3)_4]Br_2$ and $[PtBr_2(NH_3)_4]Cl_2$

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4. What type of isomersism is exhibited by the following pairs opf compound $\left[Cr(SCN)(H_2O)_5\right]^{2+}$ and $\left[Cr(NCS)(H_2O)_5\right]^{2+}$

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5. How does $K_2[PtCl_4]$ gets ionized when dissolved in water? Will it form precipitate when $AgNO_3$ solution is added to it? Give a reason for your answer.

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Part Ii Section B Question 6

1. Give balanced equations for the following reactions :

Silver nitrate is added to dilute solution of sodium thiosulphate.

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2. Give balanced equation for the following reaction : Potassium dichromate is treated with acidified ferrous sulfate solution.

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3. Give balanced equation for the following reaction : Phosphorus reacts with conc. H_2SO_4.

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4. How will you obtain pure potassium permanganate $(KMnO4_{\square})$ crystals from its ore, pyrosulfite ? Give the steps involved and the reactions.

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Part Ii Section B Question 7

1. Sulfur dioxide acts as an oxidising agent as well as a reducing agent. Give one reaction each to show its oxidising nature and its reducing nature.

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2. Explain why an aqueous solution of potassium hexacyanoferrate (II) does not give the test for ferrous ion.

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3. What is meant by Lanthanide contraction? Write the general electronic configuration of inner transition elements.

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Part Ii Section C Question 8

1. How can the following conversions be brought about :

Acetaldehyde to acetaldehyde phenyl hydrazone.

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2. How can the following conversions be brought about:

Benzoic acid to aniline

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3. How can the following conversions be brought about :

Methyl chloride to acetone.

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4. How can the following conversions be brought about:

Benzene to benzenediazonium chloride ?

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5. Glycerol (propane-1, 2, 3-triol) is more viscous than ethylene glycol (ethane-1, 2-diol).

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6. How can urea be detected by Biuret test?

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7. Identify the compounds A,B and C :

(a) $C_2H_5OH \xrightarrow{PCl_5} A \xrightarrow{KCN} B \xrightarrow{H_3O^+} C_2H_5COOH \xrightarrow[\Delta]{NH_3} C$

(b) $C_6H_5COOH \xrightarrow{SOCl_2} A \xrightarrow{NH_3} B \xrightarrow{Br_2/KOH} C$

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8. Identify the compounds A,B and C :

(a) $C_2H_5OH \xrightarrow{PCl_5} A \xrightarrow{KCN} B \xrightarrow{H_3O^+} C_2H_5COOH \xrightarrow[\Delta]{NH_3} C$

(b) $C_6H_5COOH \xrightarrow{SOCl_2} A \xrightarrow{NH_3} B \xrightarrow{Br_2/KOH} C$

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Part Ii Section C Question 9

1. Give balanced equations for the following name reactions :

Benzoin condensation

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2. Give balanced equations for the following name reaction

Wurtz - Fittig reaction.

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3. Give balanced equations for the following name reaction

Carbylamine reaction.

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4. Give chemical test to distinguish :

Formaldehyde and acetaldehyde

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5. Give chemical test to distinguish dimethyl ether and ethyl alcohol.

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6. Write the structures of three ethers with molecular formula $C_4H_{10}O$.

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7. Starting with Grignard's reagent, how will you prepare propanoic acid?

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Part Ii Section C Question 10

1. An organic compound A has the molecular formula of C_7H_6O. When A is treated with NaOH followed by acid hydrolysis, it gives two products, B and C. When B is oxidised, it gives A. When A and C are each treated separately with PCl_5, they give two different organic products D and E.

Identify A to E.

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2. An organic compound A has the molecular formula of C_7H_6O. When A is treated with NaOH followed by acid hydrolysis, it gives two products, B and C. When B is oxidised, it gives A. When A and C are each treated separately with PCl_5, they give two different organic products D and E.

Give the chemical reaction when A is treated with NaOH and name the reaction.

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3. What do you observe when glucose solution is heated with Tollen's reagent?

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4. Name the monomers and the type of polymerization in each of the following polyemers:

1. Terylene 2. Polyvinyl chloride

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5. Give balanced equations for the following reactions :

Ethylamine with nitrous acid.

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6. Give balanced equations for the following reaction :

Diethyl ether with phosphorus pentachloride.

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7. Give balanced equations for the following reactions :

Aniline with acetyl chloride.

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