



## 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  $\alpha$ -hydrogen atom.

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3. (Increases, decreases, positive, efficient, 68, non-efficient, no  $\alpha$ -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  $[Ni(CN)_4]^{2-}$  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  $CH_3COOH + Cl_2 \xrightarrow[-HCl]{RedP} A$ , 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 :



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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% aqueous 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  $58 \text{ g mol}^{-1}$ . 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  $1.7 \times 10^{-5}$ . 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

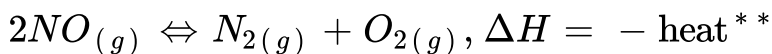
1. In a body-centred and face-centred arrangement of atoms of an element, what will be the number of atoms present in respective unit cells. Justify your answer with calculation.

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

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3. For the reaction :



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

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.



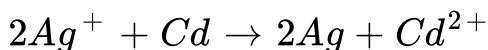
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5. Water acts as Bronsted acid as well as a Bronsted base. Give one example each to illustrate this statement.

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### Part II Section A Question 4

1. Consider the following cell reaction at 298 K :



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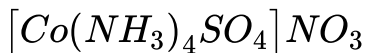
7. A 0.05 M  $NH_4OH$  solution offers the resistance of 50 ohm to a conductivity cell at 298 K. If the cell constant is  $0.50cm^{-1}$  and molar conductance of  $NH_4OH$  at infinite dilution is  $471.4ohm^{-1}cm^2mol^{-1}$ , calculate :

Degree of dissociation

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## Part II Section B Question 5

1. Write the IUPAC names of the following :



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2. Write the IUPAC names of the following :



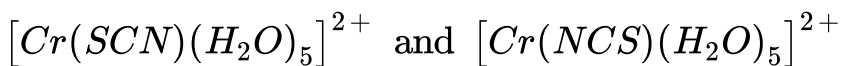
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3. What type of isomerism is exhibited by the following pairs of compounds :



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4. What type of isomerism is exhibited by the following pairs of compound



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5. How does  $K_2[PtCl_4]$  get 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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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 ( $KMnO_4$ ) 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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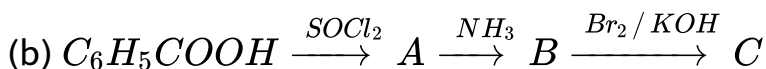
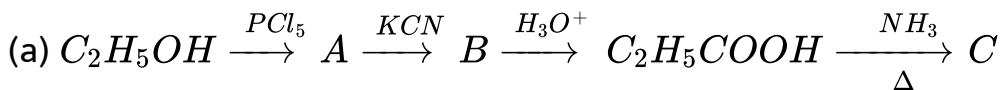
5. Glycerol (propane-1, 2, 3-triol) is more viscous than ethylene glycol (ethane-1, 2-diol).

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6. How can urea be detected by Biuret test?

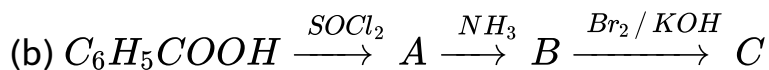
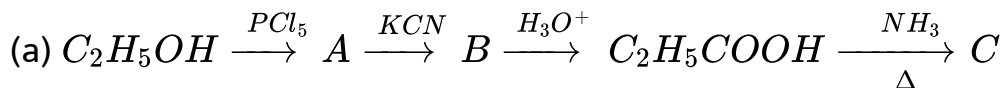
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7. Identify the compounds A, B and C :



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8. Identify the compounds A,B and 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 polymers:

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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