CHEMISTRY

BOOKS - KALYANI CHEMISTRY (ENGLISH)

SAMPLE PAPER 2013

Part I

1. In a galvanic cell, the movement of electrons in the external circuit is from.....to.........

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2. Racemic mixtures are optically ____ because of _____ compensation.

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3. Half life period of a _____ order reaction is _____ of the concentration of the reactant.

4. Benzaldehyde when treated with an alcoholic solution of _____ forms _____ .

5. Solubility of calcium oxalate is in the presence of _____ ammonium oxalate because of _____ . * *

6. The compound which is optically active is :

    A. 1-butanol

B. 2-butanol

C. 1-propanol

D. 2-methyl-l-propanol

Answer: B

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7. The salt which will not hydrolyse in aqueous solution is :

A. Copper sulphate

B. Sodium sulphate

C. Potassium cyanide

D. Sodium carbonate

Answer: D

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8. Copper has the face centred cubic structure. The coordination number of each ion is:

A. 4

B. 12

C. 14

D. 8

Answer: B

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9. For the reaction $2SO_2 + O_2 \rightarrow 2SO_3$, the unit of equilibrium constant is :

A. $Lmol^{-1}$

B. $Jmol^{-1}$

C. $molL^{-1}$

D. $\left[Lmol^{-1} \right]^2$

Answer: A

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10. The deficiency of vitamin D causes :

A. Rickets

B. Gout

C. Scurvy

D. Night blindness

Answer: A

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11. Two metallic elements A and B have the following standard oxidation potentials :

$A = 0.40V, B = -0\cdot80V$. What would you expect if element A was added to an aqueous salt solution of element B ? Give a reason for your answer.

12. Two moles of NH_3 when put into a previoulsy evacuted vessel (one litre), partially dissociated into N_2 and H_2 If ar equilibrium one mole of NH_3 is present , the equilibrium constant is :

13. Give balanced equation for the preparation of salicylaldehyde from phenol.

14. If the half life period for a first order reaction is $69 \cdot 3$ seconds, what is the value of its rate constant ?

15. Define cryoscopic constant.

16. Match the following :

(i)	Colligative property	(a)	Polysaccharide
(ii)	Nicol prism	(b)	Osmotic pressure
(iii)	Activation energy	(c)	Aldol condensa-tion
(iv)	Starch	(d)	Polarimeter
(v)	Acetaldehyde	(e)	Arrhenius equation

1. Ethylene glycol is used as an antifreeze agent. Calculate the amount of ethylene glycol to be added to 4 kg of water to prevent it from freezing at $-6°C$.

$\left(K_f \text{ for } H_2O = 1 \cdot 85 K \text{mole}^{-1} kg\right)$

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2. The freezing point of a solution containing $0 \cdot 3$ gms of acetic acid in 30 gms of benzene is lowered by $0 \cdot 45K$. Calculate the van't Hoff factor.

$\Big(At.\,wt.\,of C = 12, H = 1, 0 = 16, K_f \text{ for benzene } = 5.12 \text{ K kg mole}^{-}$

).

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3. Name the law or principle confirmed by the following observations :

When water is added to $0 \cdot 01M$ aqueous solution of acetic acid the

number of hydrogen ions increases.* *

4. Name the law or principle confirmed by the following observations :

When 96500 coulombs of electricity is passed through acidulated water, $5 \cdot 6$ litres of oxygen at s.l.p. is liberated at the anode.

5. Arrange Ag, Cr and Hg metals in the increasing order of reducing power. Given :

$$E^\circ_{Ag^+ / Ag} = +0 \cdot 80V$$

$$E^\circ_{cr^{+3} / Cr} = -0 \cdot 74V$$

$$E^\circ_{Hg^{+2} / Hg} = +0 \cdot 79V$$

6. In a first order reaction, 10% of the reactant is consumed in 25 minuts.

Calculate:

The half life of the reaction.

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

Calculate :

The time required for completing 17% of the reaction.

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8. Explain giving reasons why (Give equations in support of your answer)

:* *

A solution of NH_4Cl and NH_4OH acts as a buffer

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9. Explain giving reasons why (Give equations in support of your answer) :* *

Cu is precipitated as Cus while Zn is not precipitated when H_2S is passed through an acidic solution of $Cu(NO_3)_2$ and $Zn(NO_3)_2$ respectively.

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10. What is Schottky defect in a solid ?

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11. A bcc element (atomic mass 65) has cell edge of 420 pm. Calculate its density in gcm^{-3}.

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12. The rate of the reaction $H_2 + I_2 \rightarrow 2HI$ is given by :* *

Rate = $1 \cdot 7 \times 10^{-19}[H_2][I_2]$ at $25°C$

The rate of decomposition of gaseous $2HI \rightarrow H_2$ and I_2 is given by :

Rate $= 2 \cdot 4 \times 10^{-21}[H_2][I_2]$ at $25°C$.

Calculate the equilibrium constant for the formation of HI from

H_2 and I_2 at $25°C$.

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13. According to Lewis concept of acids and bases, ethers are

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14. The solubility of Ag_2CrO_4 at $25°C$ is $8 \cdot 0 \times 10^{-5}$ moles/litrel
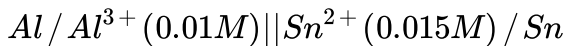
Calculate its solubility product. * *

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15. Define molar conductance of a solution. State its unit. How is it related

to the specific conductance of a solution ?

16. Calculate the value of E_{cell} at 298 K for the following cell:

$$Al / Al^{3+} (0.01M) || Sn^{2+} (0.015M) / Sn$$

$$\left[E^{\ominus}_{Al^{3+} / Al} = -1.66V \text{ and } E^{\ominus}_{Sn^{2+} / Sn} = -0.14V\right]$$

17. Calculate the degree of hydrolysis of $0 \cdot 2$ (M) sodium acetate solution. (Hydrolysis constant of sodium acetate = $5 \cdot 6 \times 10^{-10}$ and ionic product of $H_2O = 10^{-14}$ at $25° C$) "" ^ (* *)
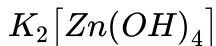
18. Explain why high pressure is used in the manufacture of ammonia by Haber's process. State the law or principle used.* *

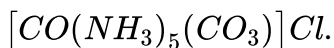**1.** Give the IUPAC names of the following coordina tion compounds :

$$K_2\left[Zn(OH)_4\right]$$

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2. Give the IUPAC names of the following coordina tion compounds :

$$\left[CO(NH_3)_5(CO_3)\right]Cl.$$

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3. For the complex ion $\left[Fe(CN)_6\right]^{3-}$ state The geometry of the ion.

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4. For the complex ion of $\left[Fe(CN)_6\right]^{3-}$:

State its magnetic property.

5. What type of structural isouters are $[Co(NH_3)_5Br]SO_4$ and $Co[(NH_3)_5SO_4]Br$? Give a chemical test to distinguish the isomers.

6. For the molecule XeF_2 :

Draw the structure of the molecule indicating the lone pairs.

7. For the molecule XeF_2 :

State the hybridisation of the central atom.

8. For the molecule XeF_2 :

Draw the structure of the molecule indicating the lone pairs.

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9. Give balanced chemical equations for the following reactions :

Fluorine treated with dilute sodium hydroxide solution

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10. Give balanced chemical equations for the following reactions :

Hydrogen sulphide treated with concentrated sulphuric acid.

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11. Give balanced chemical equation for the reaction when potassium iodide is treated with acidified potassium permanganate solution.

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12. In the extraction of zinc from zinc blende:

Give an equation to show how zinc oxide is converted to zinc.

13. In the extraction of zinc from zinc blende:

Give an equation to show how zinc oxide is converted to zinc.

14. Explain why:

(i) Transition elements form coloured compounds. (ii) Cu^+ is diamagnetic but Cu^{2+} is paramagnetic (Z=29)

15. Interhalogen compounds are more reactive than the individual halogens because

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16. Explain why:

Cu^+ is diamagnetic but Cu^{2+} is paramag netic. $(Z = 29)$

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Part Ii Section C

1. How can the following conversions be brought about:

Nitro benzene to benzene diazonium chloride.

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2. How can the following conversions be brought about:
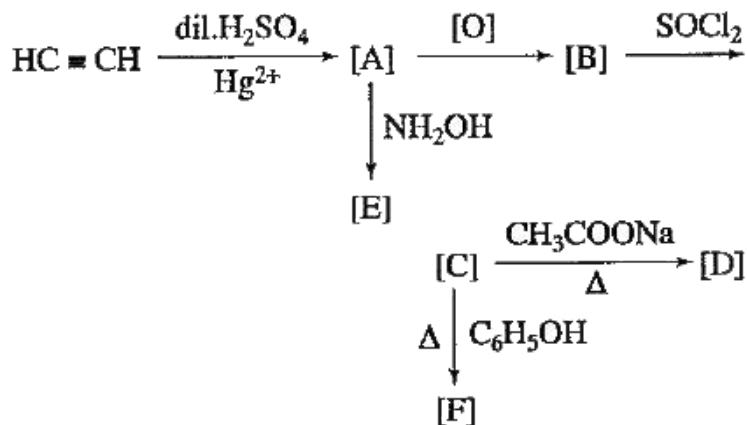
Propanoic acid to ethylamine.* *

3. How can the following conversions be brought about:

Benzoic acid to benzaldehyde.

4. Identify the compounds A, B, C, D, E and F: * *

$$HC \equiv CH \xrightarrow[\text{Hg}^{2+}]{\text{dil.H}_2\text{SO}_4} [A] \xrightarrow{\text{[O]}} [B] \xrightarrow{\text{SOCl}_2}$$

$$[A] \Big\downarrow \text{NH}_2\text{OH}$$

$$[E]$$

$$[C] \xrightarrow[\Delta]{\text{CH}_3\text{COONa}} [D]$$

$$\Delta \Big| \text{C}_6\text{H}_5\text{OH}$$

$$[F]$$

5. Give balanced equations for the following:

Acetamide is heated with sodium hydroxide.* *

6. Benzaldehyde is treated with 50% sodium hydroxide solution.

7. Give any chemical test to distinguish between the following pair of compounds : acetine and phenol.

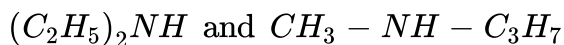**8.** Give one chemical test to distinguish between the following pairs of compound:

Formic acid and acetic acid.

9. Name the type of isomerism exhibited by the following pairs of compounds :

$(C_2H_5)_2NH$ and $CH_3 - NH - C_3H_7$

10. Draw the possible isomers of the compound with molecular formula C_3H_6O and also give their electron dot structures.

11. Write balanced chemical equations for the following reactions :

Oxalic acid is treated with acidified potassium permanganate solution.

12. Write balanced chemical equations for the following reactions :

Benzoic acid is treated with a mixture of concentrated nitric acid and concentrated sulphuric acid.

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13. Write balanced chemical equations for the following reactions :

Methyl magnesium iodide is treated with carbon dioxide and the product hydrolyzed in acidic medium.

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14. Write balanced chemical equations for the following reactions :

Ethylacetate is treated with ammonia.* *

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15. An organic compound [A] having molecular formula C_2H_7N on treatment with nitrous acid gives a compound [B] having molecular formula C_2H_6O.[B] on treatment with an organic compound (C) gives a carboxylic acid [D] and a sweet smelling compound (E). Oxidation of [B] with acidified potassium dichromate also gives [D].

Identify [A], [B], [C], [D] and [E].

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16. An organic compound [A] having molecular formula C_2H_7N on treatment with nitrous acid gives a compound [B] having molecular formula C_2H_6O.[B] on treatment with an organic compound (C) gives a carboxylic acid [D] and a sweet smelling compound (E). Oxidation of [B] with acidified potassium dichromate also gives [D].

Write balanced chemical equation of [D] with chlorine in the presence of red phosphorus and name the reaction.

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17. Acetamide is amphoteric in nature. Give two equations to support this statement. * *