



CHEMISTRY

BOOKS - KALYANI CHEMISTRY (ENGLISH)

SAMPLE PAPER 2014

Part I

1. An electrochemical cell converts _____ energy to ____ energy.

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2. The crystal of graphite is made up of _____ while that of sodium chloride is made up of _____ .

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3. Ethyl isocyanide, on hydrolysis with dilute sulfuric acid gives and

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4. The molar conductance of a solution with dilution, while its specific conductance

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

(inversely, more, less, directly, ideal, Raoult's, non-ideal, do not)

The van't Hoff factor of acetic acid solution is than one and the value of normal colligative property is than the observed colligative property of this solution.

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6. Of the following terms used for denoting concentration of a solution the one which does not get affected by temperature is :

A. Molarity

B. Molality

C. Normality

D. Formality

Answer: B



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7. The solubility of calcium hydroxide is s mol litre⁻¹. The solubility product under the same condition will be : * *

A. $4s^3$

B. $2s^3$

C. $2s^2$

D. s^3

Answer:



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8. A current liberates 0.50 g of hydrogen in 2 hours. The weight of copper (At. wt. = 63.5) deposited at the same time by the same current through copper sulphate solution is :

A. 63.5 g

B. 31.8 g

C. 15.9 g

D. 15.5 g

Answer: D



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9. Natural rubber is a:

A. Polyester

B. Polyamide

C. Polyisoprene

D. Polysaccharide

Answer: C



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10. Among the following halogens, the one which does not form an oxyacid is :

A. Fluorine

B. Chlorine

C. Bromine

D. Iodine

Answer: A

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11. What is the $[OH^-]$ concentration of an acid whose pH is 5 at $25^\circ C$? **

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12. What happens when a nickel rod is dipped into a copper sulphate solution? Justify your answer.

$$\left[E_{Ni^{+2}/Ni}^\circ = 0.25V \text{ and } E_{Cu^{+2}/Cu}^\circ = +0.34V \right]$$

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13. Write the equation for the preparation of acetanilide from aniline. **

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14. Define Raoult's law for the elevation of boiling point of a solution.

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15. An ionic compound is made up of A cations and B anions. If A cations are present at the alternate corners and B anion is present on the body of the diagonal, what is the formula of the ionic compound ?

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16. Match the following columns

- | | |
|-------------------------------|---|
| (i) Molal depression constant | (a) Infinite dilution |
| (ii) Acetaldehyde | (b) $\text{mol l}^{-1} \text{sec}^{-1}$ |
| (iii) Rate of reaction | (c) Iodoform |
| (iv) Optical activity | (d) K kg mol^{-1} |
| (v) Kohlrausch's law | (e) Lactic acid |

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1. What will be the vapour pressure of a solution containing 5 moles of sucrose ($C_{12}H_{22}O_{11}$) in 1 kg of water, if the vapour pressure of pure water is $4 \cdot 57$ mm of Hg ? [$C = 12, H = 1, O = 16$]

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2. A 2 molal solution of sodium chloride in water causes an elevation in the boiling point of water by $1 \cdot 88K$. What is the value of van't Hoff factor? What does it signify ? [$K_b = 0 \cdot 52 \text{ K kg mol}^{-1}$]

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3. Write the mathematical expression relating the variation of rate constant of a reaction with temperature.

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4. How can you graphically find the activation energy of the reaction from the above expression?

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5. The slope of the line in the graph of $\log k$ (k = rate constant) versus $\frac{1}{T}$ is -5841 . Calculate the activation energy of the reaction.

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6. Define Frenkel defect in solid crystal.

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7. Explain giving reasons why ionic solids conduct electricity in molten state, but not in solid state.

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8. Explain giving reasons why :

Solution of sodium chloride has no effect on litmus, but a solution of zinc chloride turns blue litmus red.* *

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9. For a crystal of diamond, state :

The number of carbon atoms present per unit cell.

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10. For a crystal of diamond, state :

The type of lattice in which it crystallizes.

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11. In a crystal of diamond :

How many carbon atoms surround each carbon atom



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12. In a crystal of diamond :

How many carbon atoms surround each carbon atom



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13. What is standard hydrogen electrode ? Give the reaction that occurs at this electrode when it acts as a positive electrode in an electrochemical cell.



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14. $0.05MNaOH$ solution offered a resistance of 31.6 ohm in a conductivity cell at 298 K . If the cell constant of the cell is 0.367cm^{-1} calculate the molar conductivity of the $NaOH$ solution.

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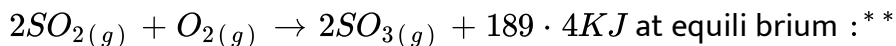
15. K_c for the reaction $SO_2(g) + \frac{1}{2}O_2(g) \rightarrow SO_3(g)$ is 61.7 at $60^\circ C$. What is its unit? Calculate K_p for the reaction and write its unit.* *

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16. What happens to the equilibrium in a reversible reaction if a catalyst is added to it ?* *

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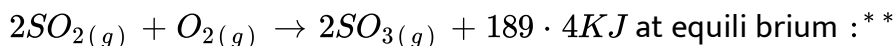
17. State the effect of the following on the reaction



Temperature is increased.

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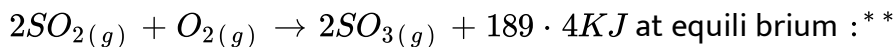
18. State the effect of the following on the reaction



Concentration of SO_2 is increased.

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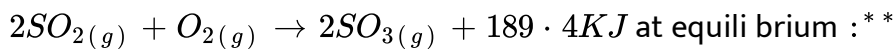
19. State the effect of the following on the reaction



Pressure is decreased.

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20. State the effect of the following on the reaction



Helium is added at constant pressure.

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21. 0.3605 g of a metal is deposited on the electrode by passing 1.2 amperes of current for 15 minutes through its salt solution. The atomic weight of the metal is 96. What is the valency of the metal ?

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22. Explain why phenolphthalein is used as an indicator in acid-base titration. * *

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1. Write the formula of the following compounds :

Triamminetriaquachromium (III) chloride.

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2. Write the formula of the following compounds :

Potassiumhexacyanoferrate (III).

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3. Name the types of isomerism shown by the following pairs of compound $[CoCl(H_2O)(NH_3)_4]Cl_2$ and $[CoCl_2(NH_3)_4]Cl \cdot H_2O$

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4. Name the types of isomerism shown by the following pairs of compound $[Pt(NH_3)_4][PtCl_6]$ and $[Pt(NH_3)_4Cl_2][PtCl_4]$



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5. For the complex ion of $[Co(NH_3)_6]^{3+}$

State the hybridization of the complex.

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6. For the complex ion of $[Co(NH_3)_6]^{3+}$:

State the magnetic nature of the complex.

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7. Write balanced chemical equations for the following reactions :

(i) Ozone and lead sulfide

(ii) Chlorine is passed through hot concentrated NaOH solution

(iii) Sulfuric acid is treated with phosphorus.

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(i) Ozone and lead sulfide

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9. Write balanced chemical equations for the following reactions :

Sulphuric acid is treated with phosphorus.

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10. Give reasons for the following:

Zn^{2+} salts are white but Cu^{2+} salts are blue.

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11. Give reasons for the following:

Fluorine gives only one oxide but chlorine gives a series of oxides.

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12. How is potassium dichromate prepared from a sample of chromite ore

? Give balanced equations for the chemical reactions involved.

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13. For the molecule of IF_7 :

(i) Draw the structure of the molecule

(ii) State the hybridization of the central atom.

(iii) State the geometry of the molecule.

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14. For the molecule of IF_7 :

- (i) Draw the structure of the molecule
- (ii) State the hybridization of the central atom.
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Part II Section C

1. Bring out the following conversions :

acetic acid to methyl cyanide



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2. How can the following conversions be brought about :

Acetaldehyde to formaldehyde. * *



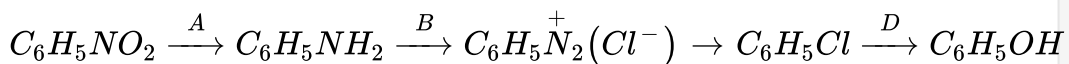
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3. How can the following conversion be brought about : Nitrobenzene to 2,4,6-tribromoaniline.



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4. Identify the reagents A, B, C, D, E and F required for the following conversion :



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5. The deficiency of which vitamin will cause the following diseases:

Scurvy

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6. The deficiency of which vitamin will cause the following diseases:

Haemorrhages

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7. Give one chemical test to distinguish between the following pairs of compounds :

Ethanol and 2 propanol.

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8. Give chemical tests to distinguish between the following pairs of compounds :

(a) Aniline and Ethylamine (b) Ethylamine and Dimethylamine

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9. Write the structures of all enantiomers possible for lactic acid.* *

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10. Give balanced equations for the following reactions :

Acetaldehyde is heated with hydroiodic acid in the presence of red phosphorous.

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11. Give balanced equations for the following reactions :

Calcium acetate is subjected to dry distillation.

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12. Give balanced equations for the following reactions :

Sodium ethoxide is treated with ethyl bromide.

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13. Give balanced equations for the following reactions :

Benzaldehyde is treated with sodium bisulphite.

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14. (i) An organic compound A with molecular formula C_7H_8 on oxidation by chromyl chloride in the presence of CCl_4 gives a compound B which gives positive Tollen's test. The compound B on treatment with NaOH followed by acid hydrolysis gives two products C and D. C on oxidation gives B which on further oxidation gives D. The compound D on distillation with sodalime gives a hydrocarbon E. Below $60^\circ C$, concentrated nitric acid reacts with E in the presence of concentrated sulphuric acid forming a compound F. Identify the compounds A, B, C, D, E

and F.

(ii) Give chemical test to distinguish : Formaldehyde and acetaldehyde.

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15. Give balanced equations for the following name reactions :

Clemmensen's reduction.

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16. Give balanced equations for the following name reactions :

Kolbe's electrolytic reaction.

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17. Give balanced equation for Balz-Schiemann's reaction.

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18. What do you observe when glucose is treated with bromine water?

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19. (i) What do you observe when glucose is treated with bromine water?

(ii) What is isoelectric point ?

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20. Answer the following : * *

What is biuret test?

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21. Answer the following : * *

Write balanced equation for the formation of biuret.

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