CHEMISTRY

BOOKS - KALYANI CHEMISTRY (ENGLISH)

SAMPLE PAPER 2011

Part I

1. Nitrogen atom in ammonia undergoes _____ hybridization and the geometry of the molecule is_____ .

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2. For a first order reaction, the unit of rate is _____ and that of rate constant is _____ .

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3. When acetamide is treated with bromine and caustic soda, it gives _____ as the main product and the reaction is called_____.

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4. _____ is an example of trihydric alcohol and _____ is an example of dihydric alcohol.

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5. Aqua regia is a mixture of _____ and _____ in the ratio of 3:1.

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6. Out of following solutions, the one having the highest boiling point will be:

A. $0 \cdot 1MNaCl$

B. $0 \cdot 1MBaCl_2$

C. $0 \cdot 1MKNO_3$

D. $0 \cdot 1MK_4\left[Fe(CN)_6\right)]$

Answer: D

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7. 75% of a first order reaction was completed in 32 minutes. When was 50% of the reaction completed ?

A. 24 minutes

B. 16 minutes

C. 8 minutes

D. 4 minutes

Answer: B

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8. When zinc granule is dipped into copper sulphate solution, copper is precipitated because :

A. Both, copper and zinc have a positive reduction potential.

B. Reduction potential of copper is higher than that of zinc.

C. Reduction potential of zinc is higher than that of copper.

D. Both, zinc and copper have a negative reduction potential.

Answer: B

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9. Among the following compounds, the one showing geometric isomerism is : * *

A. 2-chloro propane

B. 2-bromo-2-chlorobutane

C. 1, 2 dichloro ethene

D. Glycine

Answer:

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10. of the following compounds, the one which is a Lewis acid is : * *

A. PCl_3

B. $AlCl_3$

C. NCl_3

D. $AsCl_3$

Answer:

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11. $0 \cdot 1$ M urea solution shows less depression in freezing point than $0 \cdot 1 MMgCl_2$ solution. Explain.

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

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13. If neutral litmus solution is added to sodium acetate solution, what will you observe and why ?**

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14. State why the boiling point of HF is very high.

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15. Define piezoelectricity and give one use of piezoelectric crystals.

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16. Match the following:

(i)	*Biuret***	(a)	*DNA*
(ii)	*Urotropine*	(b)	*Amines*
(iii)	*Purine*	(c)	*Urea***
(iv)	*Frasch process*	(d)	*Formaldehyde*
(v)	*Hinsberg's reagent*	(e)	*Sulphur*

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Part Ii Section A

1. 46 gms of ethyl alcohol is dissolved in 18 gms of water. Calculate the mole fraction of ethyl alcohol. (At. wt of C = 12, 0 = 16, H= 1).

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2. The osmotic pressure of 0.01 molar solution of an electrolyte is found to be 0.65 atm at $27^{\circ}C$. Calculate the van.t Hoff factor. What

conclusion can you draw about the molecular state of the solute in the solution?

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3. State Faraday's first law of electrolysis.

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4. How many electrons will flow when a current of 5 amperes is passed through a solution for 200 seconds ?

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5. Give reasons for the following :* *

A reaction/process will be spontaneous when it is exothermic and randomness is increasing.

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6. Give reasons for the following : * *

The number of hydronium ions increases when one litre of water is added to 1M acetic acid.

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7. What are semiconductors ? What is the effect of increasing temperature on the conductivity of a semiconductor ?

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8. A compound AB has a cubic structure and molecular mass 99. Its density is $3 \cdot 4 gcm^{-3}$. What is the length of the edge of the unit cell?

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9. What is the maximum work that can be obtained by the isothermal expansion of one mole of an ideal gas at 273 K from $2 \cdot 24dm^3 \rightarrow 22 \cdot 4dm^3$?**

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10. State the geometry of PCl_5 molecule. Draw its structure.

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11. Give two differences between a sigma bond and a pi bond.**

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12. What is meant by common ion effect ?**

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13. What is meant by the conjugate acid-base pair? Find the conjugate acid/base for the following species:

$HNO_2, CN^-, HClO_4, F^-, OH^-, CO_{3^{2-}}$ and S^{2-}

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14. Consider the reaction $2Ag^+ + Cd \rightarrow 2Ag + Cd^{2+}$. The standard reduction potentials of Ag^+/Ag and Cd^{2+}/Cd are + $0 \cdot 80$ volt and $0 \cdot 40$ volt, respectively.

Give the cell representation.

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15. Consider the reaction $2Ag^+ + Cd \rightarrow 2Ag + Cd^{2+}$. The standard reduction potentials of Ag^+/Ag and $Cd^{2+}/Cd$are $+0 \cdot 80$ volt and $0 \cdot 40$ volt,

respectively.

What is the standard cell emf, E° ?

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16. Consider the reaction $2Ag^{+} + Cd \rightarrow 2Ag + Cd^{2+}$. The standard reduction potentials of Ag^{+}/Ag and $Cd^{2+}/Cdare + 0 \cdot 80$ volt and $0 \cdot 40$ volt, respectively.

What will be the emf of the cell if concentration of $Cd^{2+}is0 \cdot 1M$ and $Ag^{+}is0 \cdot 2M$?

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17. Consider the reaction $2Ag^{+} + Cd \rightarrow 2Ag + Cd^{2+}$. The standard reduction potentials of Ag^{+}/Ag and $Cd^{2+}/Cdare + 0 \cdot 80$ volt and $0 \cdot 40$ volt,

respectively.

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

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18. What is meant by promoter ? Give an example.

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19. The solubility product of $BaSO_4, is 7 \cdot 5 \times 10^{-9}$. Find out its solubility in pure water.**

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20. What is the dissociation constant of $0 \cdot 1M$ solution of a weak acid HA which is $4 \cdot 5\%$ ionized at $20^\circ C$?**

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Part Ii Section B

1. Give the IUPAC names for the following :

(i) $Na_3[AlF_6]$

(ii) $[Co(NH_3)_6]Cl_3$

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2. Give the IUPAC names of the following compound $[Co(NH_3)_6]Cl_3$

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

Show the hybridization diagrammatically.

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

Is it an inner orbital complex or an outerorbital complex ?

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

State its magnetic property.

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6. Give balanced chemical equations for the following:

Chlorine gas is passed through cold, dilute NaOH.

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7. Give balanced chemical equations for the following:

Sulphur dioxide gas is passed through NaOH solution.

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8. Give balanced chemical equations for the following:

Zinc is added to sodium argentocyanide solution.

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9. Iron is ferromagnetic in nature. Explain why.

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10. The most common oxidation state exhibited by lanthanoids and actinoids is .....

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11. State the common oxidation state of :

Actinides

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12. In a given transition series, there is no significant change in the atomic radii of elements with increse in atomc number. Explain why.

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13. Give reactions and the conditions required for preparation of the following compounds :

XeF_6

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14. Give reactions and the conditions required for preparation of the following compounds :

$XeOF_4$

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15. Carry out the following conversions :

Methyl chloride to acetic acid.

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16. Carry out the following conversions :

Benzene to benzoic acid.

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17. Carry out the following conversions :

Ethanol to acetone.

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18. Deficiency of what vitamins will cause the following diseases :

Night blindness.

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

Scurvy

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20. Give balanced equations for the following:

Glycerol is heated with oxalic acid at $110^{\circ} C(383K)$

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21. Give balanced equations for the following:

Acetamide is heated with sodium hydroxide.* *

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22. Give balanced equations for the following:

Acetone reacts with hydrogen in the presence of heated copper.

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23. Identify A to F :

$$A \xrightarrow{LiAlH_4} C_2H_5OH \xrightarrow{PBr_3} B \xrightarrow{KCN} C \xrightarrow{D} C_3H_7NH_2 \xrightarrow{HNO_2} E \xrightarrow[K_2Cr_2O_7 / H^+]{[O]} F$$

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24. Give one good chemical test to distinguish between the following pairs of organic compounds :

Benzaldehyde and acetone.

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25. Give one good chemical test to distinguish between the following pair of compounds: Methylamine and dimethylamine.

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26. Draw the isomers of 2-hydroxy propionic acid. * *

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27. Give an example (equation) for each of the following name reactions :

Aldol condensation.

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28. Give an example (equation) for each of the following name reactions :

Reimer-Tiemann reaction.

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29. Give an example (equation) for each of the following name reactions :

Rosenmund's reduction.

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30. 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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31. 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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32. Draw a pair of isomers for each of the following and name the type of isomerism :**

C_4H_{10}

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33. Draw a pair of isomers for each of the following and name the type of isomerism :**

$C_2H_2Cl_2$

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34. Draw a pair of isomers for each of the following and name the type of isomerism :**

CH_3COCH_3

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35. Draw a pair of isomers for each of the following and name the type of isomerism :**

$C_4H_{10}O$

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36. What are polyamides? Give one example of a polyamide and name its monomers

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