CHEMISTRY

BOOKS - KALYANI CHEMISTRY (ENGLISH)

SELF ASSESSMENT PAPER 02

Questions

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

(greater, trigonal, tetrahedral, oxidising, reducing, electropositivity, cations, atoms, anion, $ohm^{-1}cm^{2}$, $ohm^{-1}cm^{-1}$, electronegativity, smaller).

Q. In ether, the bond angle is lightly ___than the __angle.

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

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Q. Halogens are strong__agents because of their high ____

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Q. The defect in which__and ___missing in the stoichiometric ratio of compound is known as Schottky defect.

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

(greater, trigonal, tetrahedral, oxidising, reducing, electropositivity, cations, atoms, anion, $ohm^{-1}cm^{2}$, $ohm^{-1}cm^{-1}$, electronegativity, smaller).

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5. For a dissociated solute in solution, the value of van't Hoff factor is :

1) zero

2) one

3) greater than one

4) less than one

A. Zero

B. One

C. Greater than one

D. Less than one

Answer:

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6. The product formed when aniline is warmed with chloroform and caustic potash is :

A. Phenyl chloride

B. Methyl isocyanide

C. Phenyl isocyanide

D. Nitrophenol

Answer:

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7. An ether is more volatile than alcohol having the same molecular formula. This is due to

A. Dipolar character of ethers

B. alcohols having resonance structures

C. intra-molecular hydrogen bonding in alcohols

D. inter-molecular hydrogen bonding in alcohols

Answer:

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8. Electrolytic refining is used to purify which of the following metals?

A. Cu and Zn

B. Ge and Si

C. Zr and Ti

D. Zn and Hg

Answer:

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9. Match the following:

(i) Acetaldehyde — Glycine

(ii) Zwitter ion— Due to the neutralization Of Charge

(iii) Number of collisions-Iodoform

(iv) Coagulation-Energy barrier

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10. Write the formuae of the following coordination compounds :

(i) Potassium tetracyanonickelate(0)

(ii) Triammine trinitrocobalt (III)

(iii) Tetraammine dichloroplatinum (IV) tetrachloroplatinate (II)

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

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

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13. A solution is prepared by dissolving three moles of glucose in one litre of water and a solution Y is prepared by dissolving 1.5 moles of sodium chloride in one litre of water. Will the osmotic pressure of X be higher, lower or equal to that of Y? Give a reason for your answer.

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14. What is activation energy.

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

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16. Define the following:

(a) Anionic detergents

(b) Limited spectrum antibiotics

(c) Antiseptics

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17. Define the following terms with a suitable example in each:

(i) Broad-spectrum antibiotics.

(ii) Disinfectants

(iii) Cationic detergents.

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18. Give balanced equations and explain what happens when glycerol reacts with conc. H_2SO_4.

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19. State the reagents for the following conversions : Benzene $\xrightarrow{(A)}$ Nitrobenzene $\xrightarrow{(B)}$ Aniline $\xrightarrow{(C)}$ Anilline Hydrochloride $\xrightarrow{(D)}$ Benzenediazonium chloride.

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20. Identify the product A,B,C and D

$$C_6H_6 \xrightarrow[\text{Anhyd. } AlCl_3]{CH_3Cl} A \xrightarrow[CCl_4]{CrO_2Cl_2} B \xrightarrow[NaOH]{Conc.} C + D.$$

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

(i) Scurvy

(ii) haemorages.

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22. (i) Write the mathematical expression relating the variation of rate constant of a reaction with temperature.

(ii) How an you graphically find the activation energy of the reaction from the above expression ?

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

Ethanol and 2 propanol.

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24. The rate of a reaction quadruples when the temperature changes from 293 K to 313 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature

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25. Albumins are the most abundant proteins in blood. At $25^{\circ}C$, 3.5 g of albumin in 100 ml of water produces and osmotic pressure is 0.014 atm. What is the molecular weight of albumin?

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26. In a crystal of diamond :

(i) How many carbon atoms are present per unit cell ?

(ii) What type of lattice does diamond crystallize in ?

(iii) How many carbon atoms suround each carbon atom ?

(iv) How are they arranged ?

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27. Name the two groups into which phenomenon of catalysis can be divided. Give an example of each group with the chemical equation involved.

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28. Why the freezing point depression $\left(\Delta T_f\right)$ of 0.4 M NaCl solution is nearly twice than that of 0.4M glucose solution ?

Among equimolal aqueous solutions of

$MgCl_2, NaCl, FeCl_2$ and $C_{12}H_{22}O_{11}$, which has high osmotic pressure ? Why ?

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29. (a) Name the types of isomerrism shown by the following pairs of compounds:

(i) $\left[CoCl(H_2O)(NH_3)_4\right]Cl_2$ and $\left[CoCl_2(NH_3)_4\right]Cl.\ H_2O$

(ii) $\left[Pt(NH_3)_4\right]PtCl_6\right]$ and $\left[Pt(NH_3)_4Cl_2\right]\left[PtCl_4\right].$

(b) Write the IUPAC name of $\left[Co(en)_2Cl_2\right]^+$ ion and draw the structure of its geometrical isomers.

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30. Explain the following :

The paramagnetic character in 3d-transition series elements increases upto Mn and then decreases.

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31. How can the following conversions be brought about :

Ethanol to methylamine.

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32. (i) Name the element of 3d transition series which shows maximum number of oxidation states. Why does it show so ?

(ii) Out of Cr_{3+} and Mn^{3+} which is a stronger oxidising agent and why?

(iii) Why is zinc not regarded as a transition element ? (At. no. Zn=3)

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33. (a) Describe the method of refining crude nickel metal.

(b) Name the common element present in the anode mud in electrolytic refining of copper. Why are they present in anode mud?

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34. 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 is the standard cell emf, E° ?

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

$A = 0.40V, B = -0 \cdot 80V$. What would you expect if element A was added to an aqueous salt solution of element B ? Give a reason for your answer.

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36. (A) For the molecule IF_7

(i) Draw the structure of the molecule.

(ii) State the hybridization of the central atom.

(iii) State the geometry of the molecule.

(B) Give reactions and conditions required for the preparation of the following compounds :

(i) XeF_6

(ii) $XeOF_4$.

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37. Write balanced chemical equations for the reaction:

Chlorine is passed through hot concentrated NaOH solution.

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38. (i) Identify A to F:

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

(ii) How can the following conversion be brought about : propanoic acid to ethylamine.

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39. 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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