CHEMISTRY

BOOKS - ARIHANT PUBLICATION

SAMPLE PAPER 1

Group A Choose And Write The Correct Answer

1. The reagent used in Clemmensen.s reduction is

A. conc. H_2SO_4

B. Zn-Hg/conc.HCl

C. aq.KOH

D. alc.KOH

Answer: B

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2. Which of the following reagent is required by the following conversion?

$$C_6H_5CH_2Cl \rightarrow C_6H_5CH_2 - \underset{\underset{CH_3}{|}}{N} - CH_3$$

A. CH_3NH_2, CH_3Cl

B. CH_3Cl, NH_3

C. NH_3, CH_3Cl

D. $CH_3CH_2NH_2$

Answer: A

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3. The water soluble vitamin is

A. vitamin B

B. vitamin A

C. vitamin K

D. vitamin E

Answer: A

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4. The rate law for the reaction, $cA + dB \rightarrow mP + nQ$ is rate $= k[A]^c[B]^d$. What is the total order of the reaction?

A. $(x + y)$

B. $(m + n)$

C. $(c + d)$

D. $\frac{x}{y}$

Answer: C

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5. Co-ordination number of HCP crystal is -

A. 12

B. 10

C. 8

D. 6

Answer: A

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6. The outer electronic configuration of Gd (Atomic number 64) is

A. $4t^3 5d^5 6s^2$

B. $4f^8 5d^0 6s^2$

C. $4f^4 5d^4 6s^2$

D. $4f^7 5d^1 6s^2$

Answer: D

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7. Enthalpy of adsorption is quite low in case of physisorption because of

A. strong bonding forces

B. weak van der Waals. forces

C. mechanical forces

D. H-bonding

Answer: B

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Group A

1. Which noble gas is used in atomic reactor ?

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2. For a chemical reaction. ...A... can never be a fraction. Here, A refers to

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3. An element of group 13 element if added in small amount to Ge, ... is formed.

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4. Give the simple chemical test to distinguish between ethanal and propanal.

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5. State the main advantage of molality over molarity as the unit of concentration.

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6. Magnetic moment of $[MnCl_4]^{2-}$ is 5.92 BM. Give reason.

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7. Write the IUPAC name of the compound given below

$$CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{C} = \underset{\underset{CH_2OH}{|}}{C} - OH$$

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Group B

1. Benzaldehyde can be obtained from benzal chloride. Write the reactions for obtaining benzal chloride and then benzaldehyde from it.

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2. Classify the following as amorphous or crystalline solids. Polyurethane, naphthalene, benzoic acid, teflon, potassium nitrate, cellophane, polyvinyl chloride, fibre glass, copper.

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3. How do antihistamines cure allergy in the body?

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4. Write the IUPAC name of the following complex. $\left[Co(NH_3)_5Cl\right]^{2+}$

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5. Write the formula for the following complex. Potassium tetrachloridonickelate(II)

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6. Name the common elements present as anode mud in the electrolytic refining of copper. Why are they so present?

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7. The vapour pressure of water is 12.3 kPa at 300 K. Calculate the vapour pressure of one molal solution of non-volatile solute in water.

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8. Explain why NH_3, is basic, while BiH_3 , is only feebly basic?

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9. Which compound in each of the following pairs will react faster in S_N^2 reaction with OH^- and why?

(a) CH_3Br or CH_3I

(b) $(CH_3)_3CCl$ or CH_3Cl

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10. How are synthetic detergents better than soaps?

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11. For the reaction, $2A + B \rightarrow A_2B$,

The rate $= k[A][B]^2$ with

$k = 2.0 \times 10^{-6}\ \text{mol}^{-2}\ \text{L}^2\ \text{s}^{-1}$

Calculate the initial rate of reaction when $[A] = 0.1 \text{mol L}^{-1}, [B] = 0.2 \text{ mol L}^{-1}$. Calculate the rate of reaction after [A] is reduced to 0.06mol L^{-1}.

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12. Differentiate between rubbers and plastics on the basis of intermolecular forces.

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13. Examine the given defective crystal :

$$\begin{array}{ccccc} X^+ & Y^- & X^+ & Y^- & X^+ \\ Y^- & O & Y^- & X^+ & Y^- \\ X^+ & Y^- & X^+ & O & X^+ \\ Y^- & X^+ & Y^- & X^+ & Y^- \end{array}$$

Answer the following questions.

Is the above defect stoichiometric or non-stoichiometric?

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14. Examine the given defective crystal :

$$\begin{array}{lllll} X^+ & Y^- & X^+ & Y^- & X^+ \\ Y^- & O & Y^- & X^+ & Y^- \\ X^+ & Y^- & X^+ & O & X^+ \\ Y^- & X^+ & Y^- & X^+ & Y^- \end{array}$$

Answer the following questions.

Write the term used for this type of defect. Give an example of the compound which shows this type of defect.

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15. Examine the given defective crystal :

$$\begin{array}{lllll} X^+ & Y^- & X^+ & Y^- & X^+ \\ Y^- & O & Y^- & X^+ & Y^- \\ X^+ & Y^- & X^+ & O & X^+ \\ Y^- & X^+ & Y^- & X^+ & Y^- \end{array}$$

Answer the following questions.

How does this defect affect the density of the crystal?

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16. How would you account for the following?

(a) Transition metals exhibit variable oxidation states.

(b) Zr(Z = 40) and Hf (Z = 72) have almost identical radii.

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17. Amino acids may be acidic, alkaline or neutral. How does this happen? What are essential and non-essential amino acids? Name one of each type.

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18. What is the difference between a colloidal solution and emulsion? What is the role of emulsifier in forming emulsion?

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19. A 5% solution (by mass) of cane sugar in water has freezing point of 271 K. Calculate the freezing point of 5%

solution (by mass) of glucose in water of the freezing point of pure water is 273.15 K. [Molecular masses glucose $C_6H_{12}O_6 =$ 180 amu, cane sugar $C_{12}H_{22}O_{11} =$ 342 amu]

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20. Discuss briefly giving an example in each case, the role of coordiantion compounds in

(i) biologycal systems (ii) medical chemistry

(iii) analytical chemistry

(iv) extraction / metallurgy of metals

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21. Give one reaction to show that phenol is acidic in nature.

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22. Describe a method for the identification of primary, secondary and tertiary amines

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23. How would you differentiate between S_N1 and S_N2 mechanism of substitution reactions? Give one example of each.

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Group C

1. A strip of nickel metal is dipped in a 1 molar solution of $Ni(NO_3)_2$ and a strip of silver metal is dipped in a 1 molar solution of $AgNO_3$. An electrochemical cell is created when the two solutions are joined by salt bridge and two strips are joined by wire to a voltmeter.

Answer the following questions.

Write the balanced equation for the overall cell reaction and calculate the cell potential.

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2. A strip of nickel metal is dipped in a 1 molar solution of $Ni(NO_3)_2$ and a strip of silver metal is dipped in a 1 molar solution of $AgNO_3$. An electrochemical cell is created when the two solutions are joined by salt bridge and two strips are joined by wire to a voltmeter.

Answer the following questions.

Calculate the cell potential (E_{cell}) at $25^\circ C$ for the cell if the initial concentration of $Ni(NO_3)_2$, is 0.100 molar and the initial concentration of $AgNO_3$ is 1.00 molar.

$\left[E_{Ni^{2+}/Ni} = -0.25V, E_{Ag^+/Ag} = 0.80V, \log 10^{-1} = -1\right]$

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3. What is the crystal field stabilisation energy? How does the magnitude of Δ_0 decide the actual configuration of d-orbital in a coordination entiity?

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4. A solution $\left[Ni(H_2O)_6\right]^{2+}$ is green while a solution of $\left[Ni(CN)_4\right]^{2-}$ is colourless. Explain.

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5. Distinguish between order and molecularity.

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6. Define rate constant of a reaction .

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7. A first order reaction takes 20 minutes for 25% decomposition. Calculate the time when 75% of the reaction will be completed.

Given : log 2 = 0.3010, log 3=0.4771, log 4 = 0.6021

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8. State the products of the following reactions :

$CH_3CH_2CH_2OCH_3 + HBr \rightarrow$

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9. State the products of the following reactions :

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10. State the products of the following reactions :

$(CH_3)_3C - OC_2H_5 \xrightarrow{HI}$

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11. Give the structures and IUPAC names of monohydric phenols of molecular formula, C_7H_8O.

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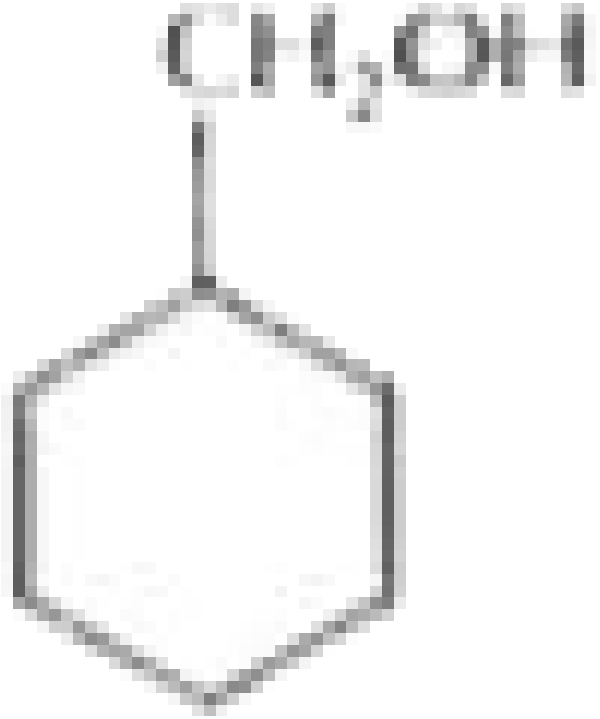
12. Show how are the following alcohols prepared by the reaction of a suitable Grignard reagent on methanal?

$$CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle |}{CH}} - CH_2OH$$



(b)

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13. An organic compound A (molecular formula $(C_8H_{16}O_2)$ was hydrolysed with dilute sulphuric acid to give a

carboxylic acid B and an alcohol C. Oxidation of C with chromic acid also produced B. On dehydration C gives but-1-ene. Write the equations for the reactions involved.

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14. Explain following Friedel-Crafts acetylation of anisole.

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