(Qii) A 10 ml of 0.1N solution of NaOH is given. How much volume of 0.1N phosphinic acid is required to neutralise given solution.

Ans to

Solution

 phosphinic acid is $H_3PO_2$.

\[ N_1V_1 = N_2V_2 \quad \mid \quad V=10\text{ml} \]

\[ 10 \times 0.1 = V \times 0.1 \]
5. Volume of H₂O solution is given (d = 1.0g/ml)

Calculate mass and molality of the solution

\[ \text{Molarity} = \frac{\text{St. mol}}{\text{Vol. L}} \]

(1) \(2.9\), 0.5
(2) \(1.9\), 0.25
(3) \(0.85\), 0.25
(4) \(0.5\), 0.5

\[ \text{Molar mass} = \frac{\text{Molar mass}}{1000 \times \text{density}} \]

\[ \text{Molar mass} = \frac{10 \times 34}{11.2} = 0.5 \]

\[ \text{Molality} = \frac{\text{Molality}}{\text{Vol. L}} \]

\[ \text{Molality} = \frac{1}{11.2} = 0.09\]
(b) Correct order of reactivity towards SN2 reaction will be

1. i > ii > iii > iv
2. i > iii > ii > iv
3. i > ii > iii > iv
4. iii > i > ii > iv

Solution: Reactivity α + charge at α-carbon

C(SN3) It is increased by EWG.

Ans: (3)
Our what is the valency of an atom having

1. $\text{F}_3 = 925 \text{kJ/mol}$, $\text{F}_2 = 25356 \text{kJ/mol}$, $\text{F} = 800 \text{kJ/mol}$.

ax. 2

1. $5$
2. $2$
3. $4$
4. $3$

Sulphur

Hence, after removal of 3rd electron from outer shell, $\text{I}_3 < \text{I}_4$.

Here, height change is observed between

(4)
t

Rotation 3

Solution: For Strong Acid & Strong Base

Ans. (1)

Diagram and correct graphical representation for it.

Our O.1 M HCl is titrated against 0.1 M NaOH.
**Solution**

\[ \text{Mg}^2+ (aq) \rightarrow \text{paramagnetic} \]

\[ \text{Mg}^2+ (aq) \rightarrow \text{diamagnetic} \]

\[ \text{Ans.} (3) \]

1. \( \text{Mg}^2+ \) and \( \text{Mg}^2+ \) both have parallel bonds.

2. \( \text{Mg}^2+ \) and \( \text{Mg}^2+ \) both are paramagnetic.

3. \( \text{Mg}^2+ \) and \( \text{Mg}^2+ \) are green colored.

4. \( \text{Mg}^2+ \) is purple and \( \text{Mg}^2+ \) is green colored.

5. Both have tetrahedral shape.

6. Identify incorrect statement.
A gaseous mixture contains 1 mole of each O₂, He and H₂ gases, in which partial pressure of H₂ gas is 2 atm. Find total pressure of gaseous mixture.

1. 2 atm  2. 5 atm  3. 4 atm  4. 6 atm

Ans. (4)

Solution

\[ P_{\text{gas}} = P_{\text{tot}} \times x_{\text{gas}} \]

\[ x_{O_2} = \frac{n_{O_2}}{n_{O_2} + n_{He} + n_{H_2}} \]

\[ P_{\text{tot}} = \frac{n_{H_2}}{x_{O_2}} = \frac{2}{(1/3)} = \frac{2}{(1+1+1)} = \frac{2}{3} \]

\[ = 6 \text{ atm}. \]
Solution - Both Be and Al cannot react with N₂ g. d. n. heating.

(a) a, b, c, d (b) a, b, d (c) p, q, r, s (d) p, q, r, s

(b) F₂ and Be

(c) Both metals form covalent compounds

(a) Be atom is smaller than Al

Which statement is correct with respect to Be and Al?
2 A current passed for 5 min. through a solution of $\text{Cr}_2\text{O}_7^{2-}$, resulting into the formation of 0.104 g Cr$^{3+}$ ions. Calculate efficiency of the cell.

**Solution**

$\text{Cr}_2\text{O}_7^{2-} \rightarrow \text{Cr}^{3+}$

**Ans.** $V_{f} = 3$ (Faraday)

$$\frac{I \times (\text{sec}) \times \text{efficiency}}{96500}$$

$$\text{efficiency} = \frac{0.104 \times 3 \times 96500}{52 \times 2 \times (5 \times 60)}$$

$$\text{efficiency} = 0.965 \ (96.5\%)$$

**Ans.**
(a) A = \text{H}_2\text{CO}_3

(b) B = \text{H}_2\text{CO}_4

(c) \text{Boiling point of } (B) > \text{Boiling point of } (A)

(d) \text{(A) is more crystalline than (A)}

(\text{B) is less water soluble than (A)}

(\text{c) all correct})

(\text{A) + (c) only})

(\text{B) only})

(\text{c) only})

(\text{A) only})

Ar.:

\text{Select correct statements for:}
How many groups present in tripeptide Asp-Try-Lys

Solution: ASP = has two -COOH group (it is acidic or quino)

Gly = had one -COOH group

Lys = had one neutral amino acid.
Two isotonic solutions have 16.5 g in 2st solution and 0.93 g solute in 2nd solution.

Calculate ratio of molecules in these solutions.

Solution

\[ T_1 = CPT \]

For isotonic, \[ \frac{W_1}{W_2} = \frac{M_1}{M_2} = \frac{0.93 \times 1000}{1.65 \times 2.50} = 8.39 \]

Ans.
What is the correct order of reactivity towards nucleophilic addition reaction:

1. (a) > (d) > (b) > (c)
2. (a) > (b) > (d) > (c)  
   Ans: (1)
3. (b) > (c) > (d) > (a)
4. (c) > (b) > (a) > (d)

**Solution**

Reactivity for nucleophilic addition:

- α is charge at C
- + is Crowding
Solution: As date is bulky, hence, H will be removed from that β-carbon which has less steric hindrance.
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For the reaction:

\[ 2A + 3B \rightarrow \frac{3}{2} C \rightarrow 3P \]

which of the following relation is correct

1. \[ \frac{d[A]}{dt} = \frac{2}{3} \frac{d[B]}{dt} = \frac{d[C]}{dt} \]

2. \[ \frac{3}{2} \frac{d[A]}{dt} = \frac{d[B]}{dt} = \frac{3}{4} \frac{d[C]}{dt} \]

3. \[ 2 \frac{d[A]}{dt} = \frac{d[B]}{dt} = \frac{3}{2} \frac{d[C]}{dt} \]

4. \[ \frac{d[A]}{dt} = \frac{d[B]}{dt} = \frac{d[C]}{dt} \]

Ans. (1)
Solution

44. $\text{Ru}^{2+}$ = K$^{+}$S$^{5+}$4d$^{6}$ en is SFL, so electrons

will enter in eg before pairing in t$_{2g}$

Fe$^{2+}$ = Ar 4s$^{2}$ 3d$^{6}$ $\rightarrow$ HZO is uorFL, so electron

will enter in eg before pairing in t$_{2g}$

Ans: (1)

(1) t$_{2g}$ eg
(2) t$_{2g}$ eg
(3) t$_{2g}$ eg
(4) t$_{2g}$ eg
(5) t$_{2g}$ eg

The electronic configurations of the complexes

[Fe(en)$_3$]$_2$Cl$_2$ $\rightarrow$ $\text{Fe(En)$_3$}$T$^{+2}$ respectively are:

[en] Cl$^{-}$ Fe(En)$_3$Cl$^{-}$
Let \( l \) is defined as 0, 1, 2, \ldots \((n+1)\) for a given value of principle quantum number \( n \). Then select correct statement for this hypothetical case.

(1) carbon \( \text{ had electrons in } 2p_z \)

(2) Atomic no. of 1st alkali metal will be 9

(3) Element with \( Z = 3^\text{+} \) will have half filled subshell

(4) For 1st noble gas \( Z = 8 \)

\[ \text{Solution} \]

\( n = 1 \implies l = 0, 1, 2 \)

\( n = 2 \implies l = 0, 1, 2, 3 \)

\( \therefore c = 1s^2, 1p^4 \) (no e. in \( 2p_z \))

1st alkali metal \( = 1s^2 1p^6 2s^2 2p^6 3s^1 \implies Z = 19 \)

For \( Z = 18 \) \( = 1s^2 1p^6 2p^6 (\text{half filled}) \)

1st noble gas \( = 1s^2 1p^6 1d^{10} \implies Z = 18 \)
(a) Calculate the molality of a solution containing 5 g solute (X) in 2 L.

\[ \text{6.022 x } 10^{22} \text{ molecules of } X \text{ has mass } = 10 \text{ g} \]

Write the value of P if molality of the solution is \( P \times 10^{-3} \text{ m} \).

\[
\text{Solution} \quad \text{molar mass of } X' = \frac{10}{6.022 \times 10^{22} \times 6.022 \times 10^{22}} = 100 \text{ g}
\]

\[
\text{molality} = \frac{W_o \times \%)}{M_o \times V(\text{ml})} = \frac{5}{100 \times 2} = 2.5 \times 10^{-2} = 2.5 \times 10^{-3}
\]

Answer: 25
Incorrect statement(s) for acid rain is/are:

(a) It corrodes water pipe  
(b) It is not harmful to trees & plants  
(c) It does not cause breathing problem in human being  
(d) It damages building & other structures made up of metal & stones

(1) A & B  (2) B & C  (3) B & D  (4) A & C

Ans. (3)