

CHEMISTRY

- Equilibrium state established when concentration of SO_3 was 4 mol/L in a reaction $\text{SO}_2 + \text{O}_2 \rightleftharpoons \text{SO}_3$ ($K_E = 1$). Determine the equilibrium concentration of oxygen (mol/L) if initial concentration of SO_2 is 6 mol/L.
A) 4 B) 2 C) 6 D) 8
- Identify the row of water good soluble substances.
A) AgCl ; CH_3COONa
B) CaCl_2 ; AgNO_3
C) $\text{Al}(\text{OH})_3$; Ag_3PO_4
D) BaSO_4 ; K_3PO_4
- Dissociation of what salt gives anions which number are 3 times greater than number of cations? (Do not take into account the dissociation of water).
A) Na_3PO_4
B) $\text{Al}_2(\text{SO}_4)_3$
C) KNO_3
D) CaCl_2
- Choose elementary compounds. 1) dry ice; 2) rhombic sulfur; 3) baking soda; 4) red phosphorus; 5) ozone; 6) liquid glass
A) 2,4,5 B) 1,3,5 C) 2,4,6 D) 1,2,6
- The 30 L mixture of ethylene, methylcyclopropane and oxygen was fully reacted and 32 L of mixture of water vapor and CO_2 was formed. Find the volume of ethylene (L) in the initial mixture. (All volumes are taken in the same conditions).
A) 12 B) 18 C) 5 D) 2
- 1,4 g nitrogen was formed at burning of a 5,9 g of tertiary amine. Find an amine.
A) trimethylamine B) propylamine
C) isobutylamine D) triethylamine
- Find the oxidation process(es).
1) $\text{MnO}_4^- \rightarrow \text{Mn}^{2+}$ 2) $\text{S}^{2-} \rightarrow \text{SO}_3^{2-}$
3) $\text{MnO}_2 \rightarrow \text{MnO}$ 4) $\text{CH}_3\text{OH} \rightarrow \text{HCOOH}$
A) 2,3,4 B) 1,2,3 C) 1 D) 1,4
- Determine monobasic saturated organic acid if ratio of two different hybridized orbitals are 2:1
A) $\text{C}_2\text{H}_5\text{COOH}$
B) CH_3COOH
C) HCOOH
D) $\text{C}_3\text{H}_7\text{COOH}$
- A monoatomic saturated alcohol was oxidized to a carboxylic acid. Number of sp^3 -hybrid orbitals decreased 1,25 times. Identify the alcohol.
A) $\text{C}_4\text{H}_9\text{OH}$
B) $\text{C}_2\text{H}_5\text{OH}$
C) $\text{C}_3\text{H}_7\text{OH}$
D) CH_3OH
- The 1,5 mol product is formed during 5 minutes at reaction which proceeds in 0,5 L volume. Determine the average reaction rate (mol/l sec).
A) 0,01 B) 0,02 C) 0,1 D) 0,05
- Determine the values of x and y in the following nuclear reaction: ${}^{223}_{87}\text{Fr} \rightarrow {}^{203}_{81}\text{Tl} + x\alpha + y\beta$. A) 7,4 B) 8,3 C) 6,3 D) 5,4
- By adding water equal to the mass of water that was present in the solution, the concentration became 20%. Determine the initial concentration of the solution.
A) 50 B) 37,5 C) 25 D) 75
- Determine the oxide if 16 g of an oxide E_2O_3 is fully reacted with 0,6 mol HCl.
A) Fe_2O_3
B) B_2O_3
C) Al_2O_3
D) Cr_2O_3
- Solutions of 400 mL of 0.2 M copper(II) nitrate and 200 mL of 0.2 M silver nitrate were mixed, and subjected to electrolysis for 3860 seconds with a current of 5 A. Determine the mass (g) of substance which remained in solution when electrolysis was finished.
A) 6,3 B) 12,6 C) 2,52 D) 18,9
- 3,9 mol of water was obtained when 0,6 mol mixture of $\text{CaCl}_2 \cdot 4\text{H}_2\text{O}$ and $\text{CaCl}_2 \cdot 7\text{H}_2\text{O}$ was dehydrated. Find molar ratio of crystal hydrates.
A) 1:5 B) 2:7 C) 1:1 D) 1:2
- The 20,4 g mixture of metals K, Na and Ca was dissolved in water. 8,96 L gas (normal condition) was isolated and 0,2 mol of KOH was formed. Find the mass (g) of Ca in the initial mixture.
A) 6 B) 12 C) 8 D) 4
- Determine the volume fraction ($\phi\%$) of ozone in the gas mixture formed when oxygen passed through ozonizer and its density increased for 10%.
A) 10 B) 20 C) 15 D) 30
- By which formula can be calculated number of sp^3 -hybridized orbitals in alkanes ($\text{C}_n\text{H}_{2n+2}$) molecule?
A) $4n$ B) $2n-1$ C) $2n+2$ D) $3n+1$
- Determine polymerization degree of polyethylene with molecular weight of 140000 a.m.u.
A) 100 B) 500 C) 1000 D) 5000
- The butyric acid fermentation of glucose forms 8,96 L gas mixture (n.c.) with 50% yield. Determine the mass (g) of fermented glucose.
A) 108 B) 72 C) 36 D) 54