**Solutions**

|  |  |  |
| --- | --- | --- |
| 1. | Define Solution with example. | 2 |
| 2. | What do you know by the term‘Solute’ and ‘Solvent’? | 2 |
| 3. | Write some properties of solvents change in solutions. | 3 |
| 4. | What is solute concentration? Writes its Degree. | 4 |
| 5. | What is an azeotrope or azeotropic mixture? | 2 |
| 6. | Explain why a mixture of water and benzene cannot be separated by distillation. | 3 |
| 7. | **If 22 g of benzene is dissolved in 122 g of carbon tetrachloride, determine the mass percentage of carbon tetrachloride (CCl4) and benzene (C6H6)** | 3 |
| 8. | **Define the terms:**   1. **Molarity** 2. **Molality** 3. **Normality** | **6** |
| 9. | **State*Henry’s law* with limitations.** | 4 |
| 10. | Calculate the concentration of CO2 in a soft drink that is bottled with a partial pressure of CO2 of 4.0 atm over the liquid at 25°C. The Henry’s law constant for CO2 in water at this temperature is 3.1 × 10–2mol/L-atm | 3 |
| 11. | What are colligative properties? | 2 |
| 12. | How is the molecular weight of a solute determined from Vapour pressure lowering | 3 |
| 13. | What is *Rault’s law* and also write its’s limitations. | 4 |
| 14. | What is meant by the term “Osmosis” and Osmotic Pressure”? | 3 |

**Thermochemistry**

|  |  |  |
| --- | --- | --- |
| **1.** | **What do you understand by Exothermic and Endothermic reactions/process?** | 3 |
| **2.** | **Define the following terms:**   1. **Heat of solution;** 2. **Heat of neutralization;** 3. **Heat of vaporization;** 4. **Heat of formation;** 5. **Heat of combustion.** | 5 |
| **3.** | **State and explain Hess’s law of constant heat summation.** | 4 |
| **4.** | **Derive thermodynamically Kirchoff’s equation.**  **Or**  **How does the “heat of reaction” vary with temperature? Mention Kirchoff’s equation in this connection.** | 5 |
| **5.** |  |  |
| **6.** |  |  |
| **7.** |  |  |
| **8.** |  |  |
| 9. |  |  |
| 10. |  |  |
|  |  |  |

**Chemical Kinetics**

|  |  |  |
| --- | --- | --- |
| **1.** | **What do you understand by chemical kinetics?** | 2 |
| **2.** | **Define order of a reaction.** | 2 |
| **3.** | **What is Zero order reaction? Give an example.** | 2 |
| **4.** | **What do you understand by the rate of a reaction?** | 2 |
| **5.** | Discuss the factors that affect the reaction rate constant. | 4 |
| **6.** | **Derive a 2nd order rate equation for the reaction**  **.** | 5 |
| **7.** | **Show that the half-life period of a first order reaction is independent of initial reactant concentration.** | 3 |
| **8.** | **Discuss the collision theory of reaction rate?** | 4 |
| 9. |  |  |
| 10. |  |  |
|  |  |  |
|  |  |  |

**Chemical Equilibrium**

|  |  |  |
| --- | --- | --- |
| **1.** | **What do you understand by reversible reactions?** | 2 |
| **2.** | **What is chemical equilibrium?** | 2 |
| **3.** | **Chemical equilibrium is dynamic equilibrium, Explain why?** | 3 |
| **4.** | **Define and explain Law of Mass Action by molecular collision theory.** | 4 |
| **5.** | **State and explain Le Chatelier’s principle.** | 6 |
| **6.** |  |  |
| **7.** |  |  |
| **8.** |  |  |
| 9. |  |  |
| 10. |  |  |
|  |  |  |