Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Assignment: Solutions and Solubility

1. Air is mainly made up of nitrogen, with 78% of air being nitrogen, 21% being oxygen, and 0.04% being carbon dioxide. Air is considered to be a \_\_\_i\_\_\_ and a solute of air would be \_\_\_ii\_\_\_.

The statement above is correctly completed by the information in row

|  |  |  |
| --- | --- | --- |
| **Row** | **i** | **ii** |
|  | pure substance | carbon dioxide |
|  | pure substance | nitrogen |
|  | homogenous solution | carbon dioxide |
|  | homogenous solution | nitrogen |

1. When a solute dissolves, intermolecular bonds are \_\_\_i\_\_\_. When bonds break, energy is \_\_\_ii\_\_\_.

The statement above is correctly completed by the information in row

|  |  |  |
| --- | --- | --- |
| **Row** | **i** | **ii** |
|  | only broken | required |
|  | only broken | released |
|  | broken and formed | required |
|  | broken and formed | released |

1. If a reaction is exothermic, the surroundings will \_\_\_i\_\_\_ in temperature because the overall energy for bond breaking is \_\_\_ii\_\_\_ than the overall energy from bond making.

The statement above is correctly completed by the information in row

|  |  |  |
| --- | --- | --- |
| **Row** | **i** | **ii** |
|  | increase | greater |
|  | increase | less |
|  | decrease | greater |
|  | decrease | less |

1. The solubility of potassium chloride, KCl(s), is 34.7g/100mL in water at 20oC. Suppose 40.0g of solute was added to 100mL of water at 20oC. The solution would be considered \_\_\_i\_\_\_ and \_\_\_ii\_\_\_ g of solute would remain undissolved.

The statement above is correctly completed by the information in row

|  |  |  |
| --- | --- | --- |
| **Row** | **i** | **ii** |
|  | saturated | 5.3 g |
|  | saturated | 0.0 g |
|  | unsaturated | 5.3 g |
|  | unsaturated | 0.0 g |

1. The solubility of potassium chloride, KCl(s), is 34.7g/100mL in water at 20oC. Suppose 30.0g of solute was added to 100mL of water at 20oC. The solution would be considered \_\_\_i\_\_\_ and \_\_\_ii\_\_\_ g of solute would remain undissolved.

The statement above is correctly completed by the information in row

|  |  |  |
| --- | --- | --- |
| **Row** | **i** | **ii** |
|  | saturated | 4.7 g |
|  | saturated | 0.0 g |
|  | unsaturated | 4.7 g |
|  | unsaturated | 0.0 g |

1. If the solubility of a gas in a liquid was to be decreased, one could \_\_\_i\_\_\_ the temperature and \_\_\_ii\_\_\_ the pressure.

The statement above is correctly completed by the information in row

|  |  |  |
| --- | --- | --- |
| **Row** | **i** | **ii** |
|  | increase | decrease |
|  | increase | increase |
|  | decrease | decrease |
|  | decrease | increase |

1. Write the equation for the *unsaturated solution* of LiCl(s) in water.
2. Write the equation for the *saturated solution* of LiCl(s) in water.
3. The solubility of sodium nitrate, NaNO3(s), is 87.6g/100mL in water at 20oC and 81.2g/100mL in water at 10oC.
   1. What mass of sodium nitrate is in a 25mL saturated solution at 20oC?
   2. As a 50mL sample of saturated solution of sodium nitrate is cooled from 20oC to 10oC, what mass of sodium nitrate will precipitate out of solution?