

1. Choose The Correct Answers

1. In what situation is fractional distillation applied?

- A) Boiling points differ by $> 25^{\circ}\text{C}$ B) Boiling points differ by $< 25^{\circ}\text{C}$
C) Substances are solids D) Substances are ionic

2. What is meant by the theoretical yield?

- A) The weight of product obtained experimentally B) The limiting reagent weight
C) The maximum possible weight of product D) The excess reagent weight

3. What do dehydration reactions result in?

- A) Loss of water B) Addition of water C) Formation of ions D) Hydrogenation

4. An amphiphile has:

- A) Only hydrophilic groups B) Only hydrophobic groups
C) Both hydrophilic and hydrophobic groups D) No polarity

5. Desiccators are used for:

- A) Heating B) Protecting moisture-sensitive items C) Measuring density D) Filtration

6. Dew point is defined as:

- A) Temperature at 0°C B) Freezing point of air
C) Temperature at which air reaches 100% relative humidity D) Boiling point of water

7. A Büchner flask is used for:

- A) Fractional distillation B) Measuring density C) Boiling azeotropes D) Vacuum filtration

8. Peroxides contain:

- A) O–O bond B) C–C bond C) H–O bond D) N–H bond

9. A zwitterion:

- A) Has net positive charge B) Has net negative charge
C) Has both positive and negative charges D) Is neutral with no charges

10. Homobifunctional crosslinkers:

- A) React with two different functional groups B) React with identical groups at both ends
C) Only activate under UV D) Are acids

2. Indicate whether the statements below are true or false

1. The limiting reagent determines the maximum amount of product in a reaction. ()
2. Esterification produces water as a byproduct. ()
3. Molecular autoionization occurs between different substances. ()
4. Phase transition only occurs between solid and liquid. ()
5. Sedimentation occurs only due to gravity. ()
6. Osmosis is the movement of solute across a semipermeable membrane. ()
7. Electrodialysis requires no electric field to move ions. ()
8. Noble metals resist corrosion and are often found in nature in raw form. ()
9. Electrolytic cells convert chemical energy into electrical energy spontaneously. ()
10. Partition coefficient compares solute concentrations in two immiscible solvents. ()

3. Answer the following questions

- a) Define amphiphile, Molecular autoionization, and hydrolysis reaction. give an example.
- b) What is the principle of fractional distillation?
- c) You have 5.0 g of acetic acid (CH_3COOH) and 3.0 g of ethanol ($\text{C}_2\text{H}_5\text{OH}$). Calculate the theoretical yield of ethyl acetate in the esterification reaction.

