Chem "Separation Techniques" Summary

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1. **In case of solid - liquid heterogeneous mixture:**

i. **Decantation:**

→ It is a separation technique used to separate solid- liquid heterogeneous mixture based on the difference of the air densities.

→ **Properties of decantation:**

- ✓ This technique is slow (not quick) since it takes long time.
- ✓ This technique is not efficient (not good) because while decanting part of the liquid remains mixed with the solid and some of the solid fall down with the liquid.

→ Decantation is also called settling down.

ii. **Centrifugation or centrifuging:**

→ It is a separation technique that speeds up the settling down of the solid-liquid heterogeneous mixture.

→ **Centrifugation is 2 types:**

- ✓ Electrical centrifugation
- ✓ Manual centrifugation.

→ **Properties of centrifugation:**

- ✓ It is a quick technique since it takes short time for the solid to settle down.
- ✓ It is not different since decantation takes place.

→ **How are centrifuge tubes place in case of centrifuge:**

The two centrifuge tubes must be placed diametrically opposite to each other to attain equilibrium (balance) between the 2 sides.

iii. **Filtration:**

It is a separation technique that is used to separate solid completely from liquid in a solid- liquid heterogeneous mixture by using either filter paper or filter column.

→ **Indicate whether filtration** is an efficient method. Justify

Filtration is the most efficient technique since it separates the solid particles completely from the liquid in a solid- liquid heterogeneous mixture.

→ **Filtration is done by either:**

✓ Filter paper

✓ Vacuum filtration filter column.

→ **Explain whether filtration using filter paper is a quick or short technique**

Filtration using filter paper is a slow technique, since filter paper has small pores so it will take some time for all the liquid to pass through it.

→ **How can filtration using filter column be accelerated?**

To accelerate filtration using filter paper must be replaced by vacuum filtration.

Conclusion!!!

There are 3 separation techniques used to separate solid- liquid heterogeneous mixture:

1. Decantation → slow technique
   ↓ not efficient technique

2. Centrifugation → quick technique
   ↓ not efficient technique

3. Filtration → most accurate and efficient technique

2. **Homogeneous mixture:**

   It is a technique that involves the separation of s liquid from a solution.

3. **There are 2 processes involved in distillation :**

✓ Boiling (evaporation) of the liquid into gas

✓ Condensation of the vapor formed (change from gas to liquid)

4. **There are 2 types of distillation:**

✓ Simple distillation

✓ Fractional distillation

→ **Simple distillation:**

It is a separation technique used to separate solid- liquid homogeneous mixture based on the difference of boiling point.

→ **Explain what happens in simple distillation:**

In simple distillation, the mixture is heated until it reaches the boiling point of the ~~volatile~~ substance in the mixture.

↓

Easily evaporated

5. **Define filtrate:**

Filtrate is the liquid that passes through the filter paper

6. **Define residue:**

Residue is the solid that is left on the filter paper

7. **Define filter paper:**

Filter paper is a porous material that doesn't allow the passage of solid particles through and used to separate solid from liquid.

8. **Indicate the role of condense:**

The condense used to the vapor into liquid.

9. **Indicate whether simple distillation is an efficient technique. Justify**

Simple distillation is an efficient technique since complete separation of the solid from liquid takes place.

10. **Indicate whether simple distillation is a quick technique**

Simple distillation is not a quick technique since evaporation and condensation take place.

11. **Give the name of the liquid collected in the Erlenmeyer at the end of the distillation.**

The liquid obtained at the end of the distillation id called distillate.

12. **Define distillate**

Distillate is the liquid obtained at the end of the distillation.

→ **Fractional distillation**

It is a technique used to separate liquid-liquid homogeneous mixture (miscible liquid) based on the difference of boiling point of the different components forming the mixture.

→ **Explain what happens in the fractional distillation:**

1st. In the fractional distillation the mixture is heated until it reaches the boiling point of the liquid so it will evaporate.

2nd. The evaporated liquid will undergo condensation process to be collected as distillation at the end of the fractional distillation.