**TASK 10**  NAME:\_\_\_ANSWERS\_\_\_\_\_

**ATAR CHEMISTRY UNITS 1 & 2 SCIENCE INQUIRY 2 QUIZ**

TOTAL 20 marks

1. Name the techniques that are suitable for separating the following mixture: (5 marks)

|  |  |  |
| --- | --- | --- |
|  | Situation | Separation Technique(s) |
| a. | To obtain drinking water from muddy water | Distillation, Evaporation, Filtration |
| b. | To separate petrol from crude oil | Distillation |
| c. | To remove leaves from a swimming pool | Filtration, Mechanical Separation |
| d. | To obtain pure sugar from a solution | Evaporation, Crystallization |
| e. | To determine whether the colouring in a fruit juice is a single substance or a mixture of coloured substances | Chromatography |

2. When packing up after a Year 9 Chemistry class, the teacher needed to find a way

to separate the mixture left by the students. The mixture contained vinegar,

vegetable oil, calcium phosphate and sodium nitrate.

Vinegar is a solution that contains approximately 3% Ethanoic acid.

(Boiling Point of Ethanoic Acid is 118.1° C)

**ALL substances need to be recovered.**

1. Draw a flow diagram to show the steps you would use if you were required to separate the mixture described above. (5 marks)

Mixture containing vinegar, vegetable oil, calcium phosphate and sodium nitrate

1. Decantation

Vegetable oil

Vinegar, calcium phosphate and sodium nitrate

2. Filtration

Vinegar and sodium nitrate

Calcium phosphate

3. Fractional Distillation

Water and sodium nitrate

Ethanoic acid

4. Distillation

Sodium nitrate

water

1. (i) Describe the separation technique used to separate each substance.

Start from the first step and clearly number each step to match your flow chart.

(5 marks)

1. **Decantation** – allow mixture to settle and the vegetable oil will be on top of the aqueous layer. Then carefully pour the vegetable oil into another container leaving the aqueous layer behind.
2. **Filtration** – when solution has re-settled pour through a funnel containing filter paper. Wash any of the mixture remaining in the container into the funnel with distilled water. The calcium phosphate solid will remain in to filter paper.
3. **Fractional Distillation** – requires a fractionating column connected to distillation flask, condenser and conical flask to collect the substance being separated. The mixture is placed in the distillation flask, the fractionating column placed onto the distillation flask, which is then connected to the condenser (which has water flowing through its jacket). The distillation flask is then heated until the all the higher temperature vapour has moved into the condenser, cooled and all the ethanoic acid collected in the conical flask.
4. **Distillation** – With the distillation flask connected to condenser, heat the flask until there is only solid remaining. The water will have turned to vapour, cooled in the condenser and been collected in a conical flask.
5. **Remaining** - Solid remaining in the distillation flask is the sodium nitrate.

(ii) Explain how the physical property makes it possible to use the separation

technique chosen. (5 marks)

1. **Decantation** – requires a difference in density so that one substance floats on top of the other substances.
2. **Filtration** – requires one substance to be insoluble while the others are either soluble solutes or solvents.
3. **Fractional Distillation** – requires substance to be able to turn to vapour.

This method is used when substances have close boiling points.

1. **Distillation** – requires one substance to be able to turn to vapour (reach its boiling point) while the other remains as a solid.
2. **Remaining** – substance must be soluble in water and have a high boiling point.