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20/9/23 Separation Techniques for components of mixture

Dictation words.

1. Heterogeneous.
2. Solubility
3. Distillation
4. Fractional
5. Immiscible
6. Acetone
7. Sublimation
8. Ammonium chloride
9. Adsorbent.
10. Chromatography
11. Thermometer
12. Benzene
13. Essences.
14. Carbon tetrachloride.
15. Turpentine
16. Varnishes
17. Lacquer
18. Gasoline
19. perfumes
20. Preferentially.

II Answer the following questions.

① Define the following terms.

(a) Evaporation : When a liquid changes into gaseous state on gentle heating, such that liquid does not boil, the process is called evaporation.

(b) Sublimation: this method is employed when a mixture consists of two or more solids, such that one of the solid sublimes on heating.

(c) Fractional Distillation: The process of separation of two miscible liquids by the process of distillation, making use of their difference in boiling points.

(d) Separating funnel: The separation of two immiscible liquids is based on the difference in their densities, the apparatus used for separation is a separating funnel.

② What do you understand by the following terms.

(a) Paper Chromatography:

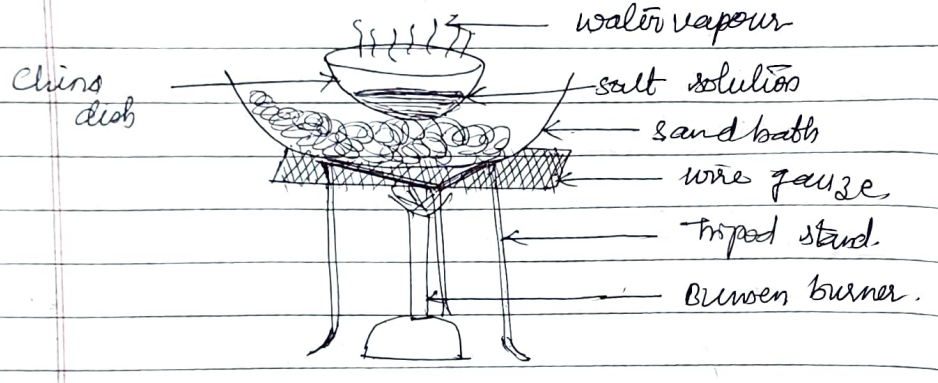
Ans: The process of separation of different dissolved components of a mixture by absorbing them over an appropriate adsorbent material.
If filter paper is used as an adsorbent material for the separation of various components of a mixture, then this method of separation of mixture is called paper chromatography

(b) Distillation:
The process of separation of a liquid from a soluble salt solution by the evaporation of liquid and recondensation of its vapours in another vessel.

(c) Distillate:
The pure liquid so collected from its salt solution by the combined process of evaporation and condensation

(3) Describe an experiment for separation of common salt from a mixture of common salt and water.

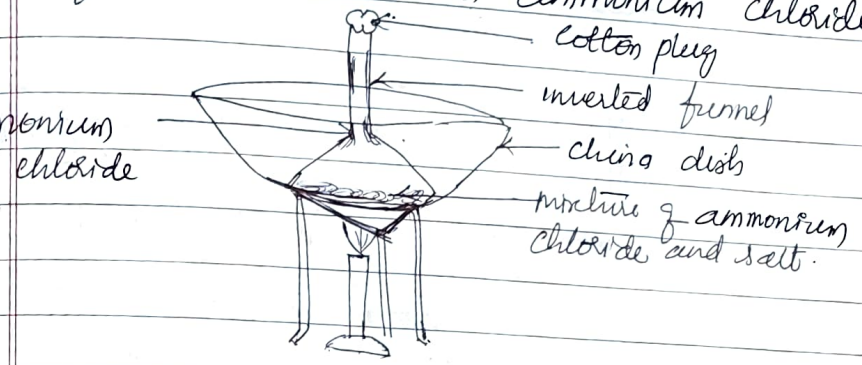
Ans:



Prepare common salt solution by dissolving 2-3 tea spoons of common salt in 50cm³ of water. Pour this soln in a China dish. Take an iron pan containing sand and place it over a Tripod stand. place wire gauze under the sand pan Heat the sand strongly by a bunsen burner. place the China dish containing common salt soln on the sand bath. Stir the soln with a glass rod. Slowly the water evaporates leaving behind Common salt.

(4) Describe an experiment for separation of pure ammonium chloride from a mixture of common salt and ammonium chloride.

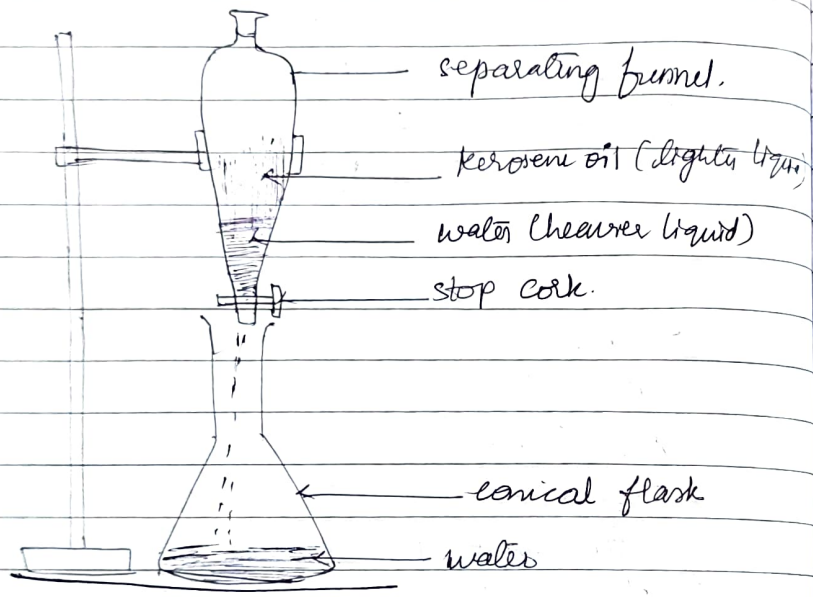
Ans:



Take a China dish and put in it a mixture of common salt & ammonium chloride. An inverted dry funnel is placed over China dish and its stem is closed with cotton wool. Heat the mixture over a low Bunsen flame. In few moments, white fumes are seen to rise in the funnel. ~~and~~ these fumes are of ammonium chloride. They gradually settle on the sides of funnel, Scrap and remove ammonium chloride repeat the process till ammonium chloride completely separates.

(5) Describe an experiment for separation of kerosene oil from a mixture of kerosene oil and water.

Ans:



The apparatus used for such type of separation of two immiscible liquids is a separating funnel.

Close the tap of the separating funnel and clamp it in a vertical position in a iron stand.

Pour the kerosene oil and water mixture in the separating funnel. Allow the mixture to stand for half an hour or more. The immiscible components of the mixture, i.e., kerosene oil and water separate out into distinct layers. kerosene oil from the lighter layer on the top and water forms the heavier layer at the bottom. Place a conical flask under the nozzle of the separating funnel. Turn the stop cock gently.. so that the water trickles in the flask of the beaker drop by drop. Once the water is drained out, close the stop cock. Now place another conical flask under the nozzle of the separating funnel. Open the stop cock to drain out kerosene oil.

(6) (a) How is paper chromatography used to separate various components of coloured solutes present in a mixture like ink, dyes etc?

Ans: Paper chromatography is used to separate two soluble solids which are present in solution in very small quantities. This method is based on the differences in solubility. Some solids may be more

soluble than the other in the same solvent. Black ink contains a number of different coloured dyes in it. By paper chromatography different fractions of black ink can be separated. Take a strip of chromatographic paper. Draw a line with pencil 3cm above from one end. Apply a small point by a black sketch pen at the centre of the pencil line. Lower the strip in a test jar containing some water below the pencil line. Paste the other end in a vertical position to a glass rod with a cellotape. After sometime you will find water rising up taking the colours with it. The colour which is more soluble in water dissolves first and rises up first. The lesser soluble colour dissolves later and rises later. like this, after sometimes one will find different coloured spot at different distances.

(b) List some solvents other than water and state their uses:

(i) Ethanol (C_2H_5OH): It is less toxic as compared to other alcohols and used as a solvent in medical drugs, perfumes and vegetable essences such as vanilla.

(ii) Benzene (C_6H_6): It is used as an industrial solvent in paints, varnish, lacquer thinner, gasoline etc.

(iii) Carbon tetrachloride [CCl_4]: it is used to dissolve fats, oils and rodenes also.

(iv) Turpentine: It is a solvent for oil paints and varnishes.
it can be used to remove tar and grease spots. it is a good solvent for sulphur and phosphorous.

(v) Acetone (CH_3COCH_3): it is used as a solvent to clean paint ink spots. it is a solvent of plastic also.

(7) State differences between a mixture and a compound by giving three points.

Ans:

Compounds	Mixtures
★ Compounds are pure substance	★ Mixtures are impure substances

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Compounds	Mixtures
☆ They are made up of two or more elements combined chemically	☆ They are made up of two or more substances mixed physically.
☆ The constituents of a compound are present in a fixed ratio	☆ The constituents of a mixture are present in varying ratios.