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| Class | IX | Subject | CHEMISTRY |
| PD | 4 | Chapter-2 | IS MATTER AROUND US PURE |
| Recapitulation of the previous taught. | <ul style="list-style-type: none"> ✓ We came to know of the process of separating a mixture of two immiscible liquids using separating funnel. ✓ We came to know about sublimation and the process of crystallisation. ✓ We also came to know of the process of distillation and fractional distillation | | |
| Sub-Concepts | <ul style="list-style-type: none"> ❖ Centrifugation and Chromatography ❖ Separation of different constituents of air | | |
| Teaching Aid To be used | Smart Class, PowerPoint presentation, classroom objects, (advertisements), charts. | | |
| Learning Outcome | <ul style="list-style-type: none"> • Student will be able to know about the method of centrifugation and its applications. • Student will be able to know about the method of separating coloured substances using chromatography. • They would know about the function of water treatment plant | | |
| Sl. No | Step Wise (What to be done) | | |
| 1 Introduction | <p>For Achievers Teacher should initiate the discussion on following topics, which will revolve around the core topic of the chapter like, How can we separate suspended solids from a mixture?</p> <ul style="list-style-type: none"> ➤ Vision to acquire knowledge of the methods of Centrifugation and | <p>For Average</p> <ul style="list-style-type: none"> ➤ They would made familiar of the process of centrifugation. ➤ They would be made to know of the process of chromatography ➤ They would be given some examples of these processes | |

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| | <p>Chromatography.</p> <ul style="list-style-type: none"> ➤ They would be given the concept and principle of centrifugation and chromatography ➤ Vision to acquire knowledge of the treatment plants | |
| <p>2. Centrifugation</p> | <p>Centrifugation:</p> <p>If the solid particles are very small and pass through a filter paper, then centrifugation process is used for the separation of insoluble solid particles from a solid-liquid mixture.</p> <p>Principle involved in centrifugation:</p> <p>The principle is that when the liquid is spun rapidly, the denser particles are forced to the bottom and the lighter particles stay at the top.</p> <p>Example: Centrifugation is used for blood and urine testing in diagnostic laboratories, in dairies to separate butter from cream, and in washing machines to squeeze out water from clothes.</p> | |
| <p>3-Chromatography</p> | <p>Chromatography:</p> <p>Chromatography is a method used to separate mixture that comprises solutes that dissolve in the same solvent. This method gets its name from the Greek word for colour –Kroma, as it was first used for separating colours.</p> <p>Principle:</p> <p>Chromatography is based on differential affinities of compounds towards two phases, i.e stationary and mobile phase.</p> <p>The fraction with greater affinity towards stationary phase travels shorter distance while the fraction with less affinity towards stationary phase travels longer distance.</p> <p>Chromatography is used for separating colours in a dye, pigments from natural colours and drugs from blood.</p> <p>Based on nature of stationary and mobile phases chromatography is classified into following types</p> <ul style="list-style-type: none"> • Paper chromatography | |



- Column chromatography
- Thin layer chromatography
- Gas chromatography

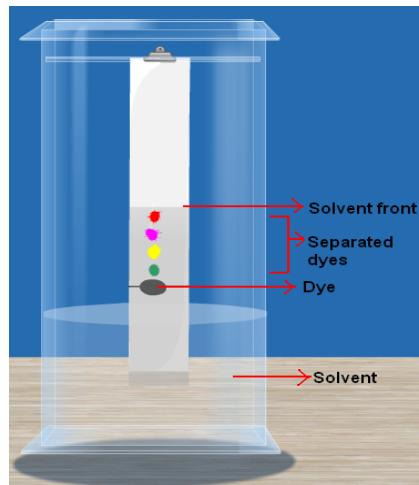
Paper chromatography:

In paper chromatography the stationary phase is paper and the mobile phase is any suitable liquid.

Separation of components of ink:

- First take a thin, long strip of filter paper. Use a pencil to draw a line on it, about 3 cm above the lower edge. Then, put a small drop of black ink.
- On the filter paper in the centre of the line and allow it to dry.
- Finally, lower the filter paper into a jar containing water so that the drop of ink on the paper is just above the water level. Don't disturb the jar.
- After some time you will observe different coloured spots on the paper.

The ink has water as the solvent and the dye is soluble in it. As the water rises, it takes the particles of dye along with it. Since a dye is made of two or more colours, the colour which is the most soluble rises faster and higher. This is why there are differently coloured spots on the paper.



4. Separation of different constituents of air

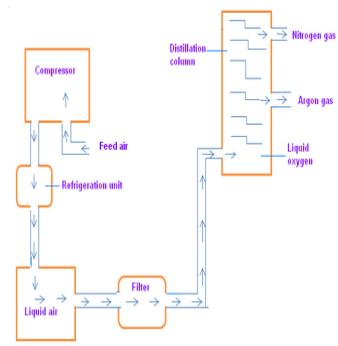
The gases in the air are separated from one another by the fractional distillation of liquid air. Air is made up of different gases like nitrogen, oxygen and carbon dioxide. These gases are separated from one another by the fractional distillation of liquid air.

Steps involved are,



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Air is compressed in the compressor and cooled in the refrigeration unit. Thus, the air gets liquefied. The liquid air is passed through a filter to remove impurities and then fed into a tall fractional distillation column. On warming, liquid nitrogen distils first because it has the lowest boiling point of -196°C . Liquid argon has a slightly higher boiling point of -186°C , so it distils next. Liquid oxygen has the highest boiling point of -183°C , it left behind.



5. Home Assignment

Exercise-II Q13 to Q17

- 1) Mention two applications of centrifugation.
- 2) Show with a neat diagram how to separate different components of air.
- 3) Explain paper Chromatography.



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