Evaporation: This method is used to separate (dye) from blue black ink.

Q. How will you separate dye from ink?
Ans.- Fill half a beaker with water put a watch glass on the mouth of the beaker. Put few drops of ink on the watch glass. Now start heating the mixture. The evaporation of water takes place. Continue heating till there is no further change on the watch glass water has evaporated and left behind in the watch glass is dye.

2) Centrifugation: Sometimes the solid particles in a liquid are very small and pass through filter. Such mixture are separated by centrifugation. The principle is that the denser particles are forced to the bottom and the lighter particles stay at the top when spun rapidly.

Applications:
(i) Used in diagnostic laboratories for blood and urine tests.
(ii) Used in dairies and home to separate butter from cream.
(iii) Used in washing machine to squeeze out water from wet clothes.

Q. How can we separate cream from milk?
Ans. Take some full cream milk in a container centrifuge it by using centrifuging machine or milk churner for two minutes. When rotated rapidly cream particles being lighter than milk, rise up and milk settle down cream particles float on the top and is removed off.

Separation using separating funnel

Gravity Method: This method is used to separate a mixture of two immiscible liquids. The principle is that immiscible liquids separate out in layers depending on their densities.

Applications:
(i) To Separate mixture of oil and water.
(ii) To extract iron from its ore (The slag impurities being lighter floats on the surface of molten iron and is removed off.

Q. How can we separate the mixture of kerosene oil and water?
Ans. Pour the mixture of kerosene oil and water in separating funnel. Let it stand undisturbed for some time so that separate layers or oil and water are formed. Open the stopcock of the separating funnel and pour out the lower layer of water carefully close the stopcock of the separating funnel as the oil reaches the stopcock. Thus we get the oil and water separated.

4. Sublimation: This process is used to separate those mixture which contain a sublimate volatile component (Solid which directly changes in to vapours and vice-versa) from a non-sublimable impurities some sublimable solids are ammonium chloride, camphor, naphthalene and anthracene.

Q. How can we separate a mixture of salt and ammonium chloride?
Ans:- Take in china dish. Cover the dish with an inverted glass funnel. Plug the opening of the funnel with a piece of cotton. Heat the mixture on a Bunsen burner. The vapours of ammonium chloride rise and condense on the cooler walls of the funnel. Common salt is left behind in the china dish as residue.
5) Chromatography: This technique is used for the separation of those solutes that dissolve in the same solvent. The principle is that the coloured component that is more solute in water rises faster on the filter paper along with water and in this way different components get separated.

**Application**
(i) To separate colours in a dye
(ii) To separate pigments from natural colours
(iii) To separate drugs from blood

Q. How can we separate different colours of a dye in black ink?

Ans. Take a thin strip of filter paper. Draw a line on it using a pencil, 3 cm above the lower edge. Put a small drop of ink at the centre of the line. Let it dry. Lower the filter paper into a glass containing water so that the drop of ink on the paper is just above the water level and leave it undisturbed as the water rises on the filter paper it takes along with it the dye particles. The coloured component that is more soluble in water rises faster and in this way the colours get separated.

6) Distillation: This method is used for the separation of components of a mixture containing two miscible liquids that boil without decomposition and have sufficient difference in their boiling point. On heating one component vaporises and gets condensed in separate container.

Q. How can we separate a mixture of acetone and water?

Ans. Take a mixture of acetone and water in a distillation flask. Fit it with a thermometer. Arrange the apparatus as shown in the figure. Heat the mixture slowly keeping a close watch at the thermometer. The acetone vaporizes and condenses in the condenser and can be collected from the condenser outlet. Water is left behind in the distillation flask.

**Fractional Distillation**:
This process is used to separate a mixture of two or more miscible liquids for which the difference in boiling points is less than 25k.

**Applications of fractional distillation**
(i) To separate different gasses from air
(ii) To obtain different fractions from petroleum product
(iii) To separate mixtures of miscible liquids like alcohol and water.
Q. How can we separate different gasses from air?
Ans. Air is a homogenous mixture and can be separated into its components by fractional distillation. The air is first filtered to remove dust, then water vapours and co2 are removed. Now air is compressed to a high pressure and cooled to obtain liquid air. The liquid air is then introduced into a tall fractional distillation column and warmed up slowly, where gases get separated at different heights depending upon their boiling points.

Crystallisation :- It is the process to obtain a pure solid in the form of crystal from its concentrated solution. For ex. The salt we get from sea water can have many impurities in it. To remove these impurities, the process of crystallization is used.

Q. How can we obtain pure copper sulphate from impure sample?
Ans. Take about 5g of impure sample of copper sulphate in a china dish. Dissolve it in minimum olnount of water. Filter the impurities out. Evaporate water from the copper sulphate solution so as to get a saturated solution. Cover the solution with a filter paper and leave it undisturbed at room temperature to cool slowly for a day. The crystals of copper sulphate are obtained in the china dish.

Application :- (i) Purification of salt that we get from sea water (ii) Separation of crystals of alum from impure sample

Q. Crystallisation is better than evaporation. Give reason.
Ans. (i) Some solids decompose and some, like sugar, may get charred on heating to dryness. (ii) Some soluble impurities do not get removed by the process of evaporation.

Q. What the various steps involved in the supply of drinking water from water works?
Ans. The water from reservoir is pumped into a sedimentation tank. The water is allowed to stand for some time in the tank so that the insoluble impurities settle down at the bottom of the tank. (ii) From sedimentation tank, water is sent to loading tank and some alum is added to water. The suspended particles get loaded with alum particles and settle down at the bottom of tank. (iii) The tank is then passed through filtration tank which has three different layers of fine sand, gravel and coarse gravel. These layers act as filters and remove all the suspended impurities. (iv) The clear water is then passed into chlorination tank where chlorine gas is added to kill the germs present in water. (v) The clean and disinfected water is then supplied to homes and factories from water works.