

CBSE SOLVED TEST PAPER-3

CLASS - IX Science (Is matter around us pure)

Q. Briefly describe how to separate, i) Sulphur from a mixture of sulphur and sand. ii) Black CuO from a mixture of CuO and ZnO.

Answer: i) Add a solvent to the mixture of sulphur and sand. Sulphur dissolves in carbon disulphide while sand does not. When filtered, the residue is sand. The filtrate is kept open, carbon disulphide evaporates and the sulphur crystals form.

ii) Add a solvent to the mixture of CuO and ZnO that dissolves only one component e.g. sodium hydroxide. When sodium hydroxide is added to the mixture, ZnO dissolves. Filter to obtain the residue of CuO.

Q. Action of heat on blue vitriol is a physical as well as chemical change. Justify.

Answer: When blue vitriol is gradually heated to about 800°C, it undergoes a physical change to form a white powder. On adding a drop of water to the white powder, it changes back to blue. Thus the change is a physical change. On strongly heating, copper sulphate (blue vitriol) decomposes to give new substances like copper oxide and sulphur dioxide. On cooling these, copper sulphate cannot be re-obtained. Thus it is a chemical change.

Q. How would you separate a mixture of NH₄Cl and I₂?

Answer: Heating cannot separate the mixture, as both substances sublime on heating. However, when water is added to the mixture, NH₄Cl dissolves but I₂ does not. The mixture is filtered. The filtrate is a solution of NH₄Cl, while the residue is iodine. The filtrate is heated to obtain NH₄Cl crystals.

Q. How can you prove that air is a mixture?

Answer:

- The composition of air is variable. The composition varies from place to place and with altitude. For instance, at higher altitudes, there is less oxygen in the air. In industrial areas, due to the waste gases coming out of industrial chimneys in the form of smoke more impurities are added in the air.
- Air has no definite set of properties. Its properties are an average of its constituents. For e.g., vapour density of oxygen is 16, vapour density of nitrogen is 14 and vapour density of air is 14.4
- The components of air can be separated by physical means. Fractional distillation of liquid air can separate N₂ and O₂. Boiling point of a liquid N₂ = -196°C, Boiling point of a liquid O₂ = -183°C
- The formation of air does not involve any energy change. No energy is released or absorbed when the constituents of air are mixed in the right proportion. e) Air cannot be assigned a fixed chemical formula.

Q. Describe a method for separation of the constituents of gunpowder.

Answer: Gunpowder is a mixture of sulphur, charcoal and potassium nitrate (nitre). When water is added to the mixture potassium nitrate dissolves. The mixture is then filtered. The filtrate is potassium nitrate solution while the residue is a mixture of sulphur and charcoal. The filtrate is evaporated on a sand bath to obtain nitre back. When carbon disulphide is added to the residue, sulphur dissolves. When this mixture is filtered the filtrate is sulphur solution while the residue is charcoal. Leaving it open evaporates the sulphur solution. Carbon disulphide evaporates and sulphur crystals are left behind.

Q. Write down the technique used to separate.

- i) The constituents of the colouring matter in ink.
- ii) Hydrated copper (II) sulphate from its aqueous solution.
- iii) Unused zinc, after reacting the excess with dilute sulphuric acid.
- iv) Benzene (boiling point 80°C) and aniline (boiling point 184°C).

Answer: i) Chromatography

ii) Evaporation

iii) Filtration

iv) Fractional distillation

Q.A pupil decides to separate powdered calcium carbonate from powdered sodium chloride by shaking the mixture with water and filtering. Would this procedure succeed? Explain.

Answer: This procedure will succeed, as CaCO_3 is insoluble in water while NaCl is soluble in water. On filtering the residue will be CaCO_3 .

Q. If salt is added to water, is the mixture homogeneous or heterogeneous. Give reasons for your

Answer: The mixture is homogeneous because

- a) The salt particles do not form a separate layer.
- b) The salt particles cannot be separated from the water by filtration.
- c) Also every portion of the solution is equally salty, as the solution has salt uniformly dispersed in it.