

## VALUE BASED QUESTIONS

Q:-1 A number of industries make use of the phenomenon of adsorption, e.g., Instrumentation industry, dyeing Industry, paint industry, coal mines etc.

Now answer the following questions:

(i) You might have seen that a small packet containing some material packed in a piece of cloth or tissue paper is placed in delicate instruments, e.g., along with the strips used for testing blood sugar. What does it contain and why?

(ii) When a worker goes deep into a coal mine, how does he protect himself from the poisonous gases present there?

(iii) What do the paint manufacturers add in the paints so that it has a good covering power on the furniture doors, windows or the wall? Further, in spirit polish of wooden surfaces, it is first cleaned with spirit. Why?

(iv) When you give your clothes for dyeing, the dyer adds a substance called mordant before dye. Why?

Ans:-(i) Some delicate instruments are sensitive to moisture. The packet placed inside contains a dehumidizer (usually silica gel) which adsorbs the moisture of the air present around it.

(ii) The worker wears a gas mask which contains suitable adsorbents so that poisonous gases present in the mine are preferentially adsorbed and the air for breathing is purified.

(iii) Manufacturers add adsorbents to the paints so that all dissolved gases in the paint are adsorbed as otherwise, they will form gas bubbles which will later burst. All

wooden surfaces are cleaned with spirit to remove adsorbed layers of gas, liquid or solid film.

(iv) Mordant adsorbs the dye uniformly as otherwise uneven dyeing would take place.

Q:-2 The phenomenon of adsorption finds a number of useful applications in a chemical laboratory, e.g. in the separation of a mixture of compounds, use of dyes as indicators in certain titrations, in the preparation of water similar to distilled water required for the preparation of solutions, e.g. that of silver nitrate which otherwise gives a white precipitate with ordinary water. It has also helped in the conservation of water in countries where there is a scarcity of water.

Now, answer the following questions:

- (i) How does adsorption help in the separation of components of a mixture of compounds?
- (ii) How does adsorption help in the titration of KBr with  $\text{AgNO}_3$  solution?
- (iii) How does adsorption help in the preparation of water of the same standard as that of distilled water?
- (iv) How does adsorption help in the conservation of water in countries like Australia where there is a scarcity of water during summer?

Ans:-(i) The selective adsorption by a selective adsorbent has helped to develop a technique for the separation of components of a mixture.

(ii) It is a precipitation titration. The dye eosin is added as an indicator. The colour of the dye is adsorbed on the particles of AgBr, and desorbed at the end point. That is why such dyes are said to act as 'adsorption indicators'.

(iii) Ordinary water is repeatedly passed through ion exchanges which adsorb all the cations and anions of the salts present in water.

(iv) A layer of stearic acid is sprayed over the lakes and other water reservoirs. It is adsorbed on the surface and protects the water from evaporation.

Q:-3 In a number of cases, particles of substances are found to exist in a size which is neither too small nor too large. They are too small to settle down but large enough to scatter light, e.g., dust particles in a room. These particles are called colloidal particles. Further, they are found to carry charge. These characteristics of colloidal particles make them useful in our everyday life.

Now, answer the following questions:

(i) Why a number of medicines available in the market are in the colloidal form?

(ii) If there are clouds in the sky but they are not showering rain, how can we bring about artificial rain?

(iii) When there is a cut and it is bleeding, we apply alum to stop bleeding. How does it work?

(iv) How the property of colloidal particles not to settle down is made use of in warfare ?

Ans:-(i) Medicines in colloidal form are more easily assimilated and hence, are more effective. This is because in the colloidal form, they have large surface area.

(ii) Clouds are colloidal particles of water suspended in the air. As colloidal particles carry charge, they can be coagulated to form bigger drops by spraying oppositely charged colloidal dust or sand particles over them or by

throwing common salt as it is an electrolyte and brings about coagulation of water particles.

(iii) Alum is an electrolyte which brings about the coagulation of the colloidal particles of blood (albuminoids), thereby forming a clot. As a result, bleeding stops.

(iv) In warfare, smoke screens are used which are nothing but colloidal dispersion of certain substances (e.g.,  $\text{SiCl}_4$  or titanium oxide) in the air.

Q:-4 When two immiscible liquids are shaken to form a nearly homogeneous mixture, it is called an emulsion. We use a number of emulsion in everyday life. Digestion of fats in our intestines also takes place through emulsification. Emulsions have sometimes harmful effects too. Now, answer the following questions:

- (i) Give one example of an emulsion which we use in our everyday life for our health. What are its constituents?
- (ii) How are fats digested in the intestines?
- (iii) How is it that water alone does not remove oily or greasy spots from our clothes but soap solution does it?
- (iv) Give one example where formation of emulsion is harmful.

Ans:-(i) Milk. It is an emulsion of liquid fats in water.

(ii) the digestion of fats in the intestine takes place by the process of emulsification.

A small amount of fat reacts with alkaline solution present in intestine to form a sodium soap. This soap causes the emulsification of the fat thereby making metabolic processes easy.

(iii) soap acts as an emulsifying agent and helps in the formation of oil-in-water emulsion which is washed away with water .

(iv) Petroleum forms emulsion with water which is harmful when we need only petroleum likewise in the areas where small amount of petroleum is present the well water becomes unfit for drinking.

**Q.(5)** Milk and Cold cream are the examples of colloidal system. Which

type of colloid are they? Can we dilute them by adding water? Mrs.Nainy being student of chemistry brought the samples of Milk and Cold cream and tried to dilute them and performed experiment before writing answer. Why did she do so is there any value do you find here.

Ans---Milk and cold cream are liquid in liquid colloids i.e. ; emulsion.

She wants to identify the types of emulsions i.e. oil in water or water in oil by dilution.

Milk is diluted on addition of water.So it is oil in water emulsion

But cold cream does not dilute by addition of water. So it is water in oil emulsion

**Value:** Persons who are stiff or rigid do not mix up well with others but those who are friendly and flexible can easily mix up with others like milk. So we should be flexible.

