QUIZ: PHYSICAL AND CHEMICAL CHANGES; ELEMENTS AND COMPOUNDS

1. Which of the following are chemical changes?
(i) Condensation of vapours to liquid
(ii) Conversion of water to steam
(iii) Cutting of iron rod
(iv) Burning of candle wax.
(v) Combustion of LPG in the burner.

(a) (i), (ii) & (v)
(b) (i), (ii) & (iii)
(c) (iv) & (v)
(d) (iii) and (iv)

2. In the conversion of X $\longrightarrow$ Y $\longrightarrow$ Z, following processes were carried out.
(i) Crystallization of X
(ii) Hydrogenation of X
(iii) Hydrolysis of Y
(iv) Use of separating funnel to get pure Z
Which of these involve physical changes?
(a) (i) & (iv)
(b) (ii) & (iii)
(c) (i) & (iii)
(d) (ii) & (iv)

3. Which of the following is an element?
(a) Carbon disulphide
(b) Carbon monoxide
(c) Carbon dioxide
(d) Carbon

4. Which one of the following sets of general properties is exhibited by non-metals?
(a) Good conductor, non-lustrous, malleable

(b) Poor conductor, lustrous, non-ductile
(c) Poor conductor, brittle, non-sonorous
(d) Malleable, ductile, good conductor

5. Given below is a hypothetical reaction;

$$X \longrightarrow Z$$

X could be separated into two substances X_1 & X_2 by magnetic separation. The product Z comprising of both X_1 & X_2 does not show the properties of X_1 & X_2 but shows entirely a new set of properties. The species X_1 & X_2 cannot be converted, further into simpler species by simple procedures.

Which of the following is/are correct about X_1, X_2, X & Z?

(i) X is a compound consisting of X_1 & X_2.
(ii) X is a mixture consisting of two elements X_1 & X_2.
(iii) Z is a mixture of two compounds X_1 & X_2.
(iv) Z is a compound consisting of two elements X_1 & X_2.

(a) (i)& (iv)
(b) (ii) & (iii)
(c) (ii) & (iv)
(d) (i) &(iii)

Answers:

1. (c)

Explanation:

(a) The changes at (i) & (ii) do not involve the formation of any new chemical substance. These are physical changes. In (v): on combustion, LPG produces carbon dioxide and water. Thus it is a chemical change.
(b) (i), (ii), and (iii) are all physical changes as no new substance is formed in these changes.
(c) Correct. The changes (iv) & (v) involve the formation of carbon dioxide and water. These are therefore, chemical changes.
(d) In (iii), no new substance is formed. It is therefore a physical change. The changes (iv) & (v) involve the formation of new substances and are therefore chemical changes.
Hence answer (c) is correct.

2. (a)

Options:

(a) Correct. The process (i) & (iv) are purification techniques and no new substance is formed. Thus both these are physical changes.

(b) Both (ii) & (iii) are chemical changes due to the formation of new substances.

(c) (i) is a physical change and (iii) is a chemical change.

(d) (ii) is a chemical change leading to the formation of new substance.(iv) is a separation technique in which the original identity of the components is retained.

Explanation: (ii) & (iii) involve the formation of new substances. Therefore these are chemical changes. (i) & (iv) do not involve the formation of any new substance and therefore these are physical changes.

3. (d)

Options:

(a) The compound consists of two elements, carbon and sulphur. Therefore, it is a compound & not an element.

(b) Carbon monoxide consists of two elements, carbon and oxygen. Therefore, it is a compound and not an element.

(c) Carbon dioxide consists of carbon and oxygen and is a compound and not an element.

(d) Correct. Carbon consists of only one type of atoms i.e. carbon atom. Thus, it is an element.

Explanation: Of the four substances, those at a, b and c can be broken into simpler species. But carbon at d, cannot be broken into simpler species.

4. (c)

Options:

(a) Non-metals in general are poor conductors and non-malleable

(b) Non-metals in general are non-lustrous

(c) Correct.

(d) Nonmetals are non-malleable, non-ductile and poor conductors.

Note for the teacher: Similar questions may be framed for metals & non-metals by listing their different properties.

5. (c)

Options:

(a) X is mixture consisting of X_1 and X_2. As X_1 and X_2 cannot be converted into simpler substances, therefore X_1 & X_2 are elements. Z is a compound as it shows a new set of properties.

(b) X is a mixture of elements X_1 and X_2 as it can be easily separated by magnetic separation. Z is a compound formed from X_1 and X_2 as it shows new set of properties and not the properties of X_1 and X_2.

(c) Correct (as given in questions)

(d) (i) X is a mixture of elements X_1 and X_2 as it can be separated into X_1 and X_2 by magnetic separation.

(iii) Z is not a mixture but a compound constituted of X_1 and X_2 as it does not show the properties of X_1 and X_2 but shows entirely a new set of properties.

Explanation: The fact that X_1 & X_2 cannot be converted further into simpler substances shows that both of these are elements. As X could be separated by a simple method of magnetic separation into its constituents, it is therefore a mixture. The product Z consists of X_1 & X_2 & has entirely new set of properties. Hence it is a compound of X_1 & X_2.