# Atoms and Molecules

## Assertion & Reason Type Questions

**Directions : Each of the following questions consists of two statements, one is Assertion (A) and the other is Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:**

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

c. Assertion (A) is true but Reason (R) is false.

d. Assertion (A) is false but Reason (R) is true.

**Q1. Assertion (A):** In a chemical substance, the elements are always present in definite proportions by mass.

**Reason (R):** Atoms of different elements have different masses as well as chemical properties.

**Answer :** (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

**Q2. Assertion (A):** Law of conservation of mass holds good for nuclear reactions.

**Reason (R):** It states that mass can neither be created nor destroyed in a chemical reaction.

**Answer :** (d) Assertion (A) is false because law of conservation of mass does not hold good for nuclear reactions due to mass defect.

Law of conservation of mass states that matter can neither be created nor destroyed.

**Q3. Assertion (A):** Pure water obtained from different sources such as, river, well, spring, sea, etc. always contains hydrogen and oxygen combined in the ratio 1: 8 by mass.

**Reason (R):** A chemical compound always contains elements combined together in the same proportion by mass.

**Answer :** (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Pure water always contains hydrogen and oxygen in the ratio 1: 8 by mass. This is in accordance with the law of constant proportions.

**Q4. Assertion (A):** In most of the elements, atoms are not able to exist independently.

**Reason (R):** Atoms combine to form molecules or ions that aggregate in large numbers.

**Answer :** (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

**Q5. Assertion (A):** Atomic mass of aluminium is 27.

**Reason (R):** An atom of aluminium is 27 times heavier than 1/12th of the mass of carbon-12 atom.

**Answer :** (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

**Q6. Assertion (A):** A molecule is the smallest particle of an element or a compound which is capable of free existence.

**Reason (R):** The number of atoms present in one molecule of the substance is called its atomicity.

**Answer :** (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

**Q7. Assertion (A):** One atomic mass unit (amu) is mass of an atom equal to exactly one-twelfth the mass of a carbon-12 atom.

**Reason (R):** Carbon-12 isotope was selected as standard.

**Answer :** (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

For universally accepted atomic mass unit in 1961, C-12 was selected as standard. However, the new symbol used is 'u' (unified mass) in place of amu.

**Q8. Assertion (A):** The molecular mass and formula unit mass of a substance is the sum of atomic masses of all the atoms in the molecular formula or formula unit of a compound.

**Reason (R):** The only difference between the molecular mass and formula unit mass is that, former is for molecular compounds (covalent compounds) and latter is for ionic compounds. However, their numerical value is the same.

**Answer :** (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).