Some Basic Concepts of Chemistry

1. Assertion (A): The percentage of nitrogen in urea is 46.6%.

Reason (R): Urea is Ionic compound.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **2. Assertion (A):** One molal aqueous solution of glucose contains 180 g of glucose in 1 kg water.

Reason (R): Solution containing one mole of solute in 1000 g of solvent is called one molal solution.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **3. Assertion (A):** The weight percentage of a compound A in a solution is given by

% of A =
$$\frac{\text{Mass A}}{\text{Total mass of solution}} \times 100$$

Reason (R): The mole fraction of a component A is given by,

Mole fraction of A =

No. of moles of A

Total no. of moles of all components

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- (4) Both (A) and (R) are false

4. Assertion (A): A one molal solution prepared at 20°C will retain the same molality at 100°C, provided there is no loss of solute or solvent on heating.

Reason (R): Molality is independent of temperature.

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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **5. Assertion (A):** Laboratory reagents are usually made up to a specific molarity rather than a given molality.

Reason (R): The volume of a liquid is more easily measured than its mass.

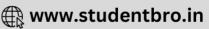
- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **6. Assertion (A):** Molality and mole fraction concentration units do not change with temperature.

Reason (R): These units are not defined in terms of any volume.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
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- (4) Both (A) and (R) are false







7. Assertion (A): The molality and molarity of very dilute aqueous solutions differ very little.

Reason (R): The density of water is about 1.0 g cm⁻³ at room temperature.

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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- 8. Assertion (A): For calculating the molality or the mole fraction of solute, if the molarity is known, it is necessary to know the density of the solution.

Reason (R): Molality, molarity and the mole fraction of solute can be calculated from the weight percentage and the density of the solution

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- 9. Assertion (A): The ratio of the mass of 100 billion atoms of magnesium to the mass of 100 billion atoms of lead can be expressed as $\frac{24}{207}$.

Reason (R): Atomic weights are relative masses.

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- (4) Both (A) and (R) are false

10. Assertion (A): The average mass of one Mg atom is 24.305 amu, which is not the actual mass of one Mg atom.

Reason (R): Three isotopes, ²⁴Mg, ²⁵Mg and ²⁶Mg, of Mg are found in nature.

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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- 11. Assertion (A): A molecule of butane, C_4 H_{10} has a mass of 58.12 amu.

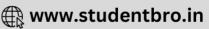
Reason (R): One mole of butane contains 6.022×10^{23} molecules and has a mass of 58.12 g.

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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **12. Assertion (A):** Both 12 g of carbon and 27 g. of aluminium will have 6.02×10^{23} atoms.

Reason (R): Gram atomic mass of an element contains Avogadro's number of atoms.

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13. Assertion (A): The empirical mass of ethene is half of its molecular mass.

Reason (R): The empirical formula represents the simplest whole number ratio of various atoms present in a compound.

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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **14. Assertion (A):** One atomic mass unit is defined as one twelfth of the mass of one carbon-12 atom.

Reason (R): Carbon-12 isotope is the most abundant isotope of carbon and has been chosen as standard.

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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **15. Assertion (A):** Combustion of 16 g of methane gives 18 g of water.

Reason (R): In the combustion of methane, water is one of the products.

- (1) Both A and R are true but R is not the correct explanation of A.
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

16. Assertion (A): Simple distillation can help in separating a mixture of propan-1-ol (boiling point 97°C) and propanone (boiling point 56°C).

Reason (R): Liquids with a difference of more than 20°C in their boiling points can be separated by simple distillation.

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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **17. Assertion (A):** The percentage of nitrogen in urea is 46.6%.

Reason (R): Urea is a covalent compound.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

	ANSWER KEY																
Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Ans.	3	1	2	1	1	1	1	2	1	1	1	1	1	2	3	1	2



