

Questions and Problems

Q.1: Four answers are given for each question. Select the correct answer.

i) The branch of Chemistry which describes the relationship between the amounts of reactants and products in a balanced chemical equation is called:

- (a) Physical chemistry (b) Biochemistry
(c) Stoichiometry (d) Organic chemistry

ii) What are the number of covalent bonds in 68g of H_2S gas?

- (a) 3.01×10^{23} (b) 6.02×10^{23}
(c) 2.41×10^{24} (d) 24.1×10^{24}

iii) The mass of O_2 required to burn 0.1 mole of $\text{C}_2\text{H}_5\text{OH}$ is:

- (a) 32g (b) 3.2g
(c) 5.6g (d) 9.6g

Equation: $\text{C}_2\text{H}_5\text{OH} + 3\text{O}_2 \longrightarrow 2\text{CO}_2 + 3\text{H}_2\text{O}$

iv) The volume occupied by 1.4g of N_2 at STP is:

- (a) 2.24 dm^3 (b) 22.4 dm^3
(c) 1.12 dm^3 (d) 112 dm^3

v) A beaker contains 9 g of water. The number of hydrogen atoms is:

- (a) 6.02×10^{23} (b) 3.01×10^{23}
(c) 6.02×10^{24} (d) 3.01×10^{24}

vi) One mole of diamond chain and one mole of gold ring have same number of:

- (a) neutrons (b) protons
(c) electrons (d) atoms

MDCAT BY FUTURE DOCTORS (TOUSEEF AHMAD)

- vii) The largest number of molecules are present in:
- (a) 4.8g of C_2H_5OH
 - (b) 3.6g of H_2O
 - (c) 2.8g of CO
 - (d) 5.4g of N_2O_5
- viii) Limiting reactant is that:
- (a) Which remains unreacted
 - (b) Which gives maximum amount of product
 - (c) Which gives minimum amount of product
 - (d) Which has low-price
- ix) The amount of product obtained practically is called:
- (a) Expected yield
 - (b) Theoretical yield
 - (c) Actual yield
 - (d) fractional yield
- x) The reactant which is in larger amount and remains unreacted is called:
- (a) Limiting reactant
 - (b) Excess reactant
 - (c) Expensive reactant
 - (d) Restricting reactant

- Q.2: Fill in the blanks with suitable words given in the brackets:
- i) A balanced chemical equation has the _____ number of atoms of each element on both sides of the equation. (same / different)
 - ii) There are _____ molecules in two moles of CH_3OH . (6.02×10^{23} / 12.04×10^{23})
 - iii) The number of atoms in one mole of neon is _____. (6.02×10^{23} / 12.04×10^{23})
 - iv) The mass of _____ moles of N_2 is 56g. (one / two)
 - v) The space occupied by 0.50 moles of Cl_2 at STP is _____. ($11.207 dm^3$ / $22.414 dm^3$)
 - vi) The equal volume of all gases at STP has _____ number of molecules but they have _____ masses. (equal / different)
 - vii) The percentage of nitrogen in N_2O_4 is _____. (30.43% / 69.57%)
 - viii) 1 mole of Cu_2O has _____ atoms of copper and _____ atoms of oxygen. (6.02×10^{23} / 12.04×10^{23})
 - ix) Limiting reactant gives _____ amount of product. (Minimum / Maximum)
 - x) Actual yield is always _____ than theoretical yield. (less / more)

TEST BY FUTURE DOCTORS (TOUSEEF AHMAD)

3: Label the following statements as True or False.

- i) Stoichiometry tells you that how to calculate the quantities of substances involved in a reaction. **true**
- ii) The stoichiometric calculations can be performed only when Avogadro's law is obeyed. **true**
- iii) One atom of Mg is twice in mass as compared to one carbon atom. **true**
- iv) The reactants are on the right side of arrow in a chemical equation. **true**
- v) Avogadro's number is represented by N_A . **true**
- vi) The number of hydrogen atoms in 1.5 moles of H_2S is equal to the number of hydrogen atoms in 1.5 moles of HI. **false**
- vii) The molar mass of PO_4^{3-} ion is 95 g mol^{-1} . **true**
- viii) Ionic compounds consist of molecules. **false**
- ix) The amount of product calculated from balanced chemical equations is called actual yield. **false**
- x) Greater is the percentage yield; higher will be the efficiency of reaction. **true**

4: What is stoichiometry? Why is stoichiometry important? Give some examples.

5: Give the principles and relationships of stoichiometric calculations.

6: How can you solve a Stoichiometry Problem?

7: a) Define and explain mole and Avogadro's number with examples.
b) Define molar mass and molar volume with examples.