

**QUICK DRILL · CBSE CLASS 11**

# Some Basic Concepts of Chemistry

Chemistry · Chapter 1 · 15 MCQs · 20 minutes · PYQ-tagged with time budgets

DATE	TOTAL MARKS	DURATION	MARKING	TARGET
_____	<b>15</b>	<b>20 min</b>	<b>+1 / 0</b>	<b>≥ 12/15</b>

**OBJECTIVES**

Reinforce the four core topics of Some Basic Concepts of Chemistry via 15 PYQ-derived MCQs. Identify weak sub-topics via concept-node IDs (see answer key). Build per-question time budget habit.

**INSTRUCTIONS**

Attempt all 15. Time budget shown per Q (use it as pacing guide). Mark answers (A/B/C/D) in the margin. Answer key + explanations on the last page. **Don't peek — score yourself honestly.**

**SECTION · QUICK DRILL**
**Q 1-15 · 20 MIN**
**Q1.** The number of moles in 36 g of water (H<sub>2</sub>O) is:

**(A)** 1 mol

**(C)** 0.5 mol

PYQ 2021 · CBSE SQP · 1m · 45s

**(B)** 2 mol

**(D)** 18 mol

**Q2.** Avogadro's number is closest to:

**(A)**  $6.022 \times 10^{22}$ 
**(C)**  $6.022 \times 10^{24}$ 

PYQ 2020 · School Annual · 1m · 20s

**(B)**  $6.022 \times 10^{23}$ 
**(D)**  $1.66 \times 10^{-24}$ 
**Q3.** Which law states that equal volumes of all gases at the same temperature and pressure contain equal numbers of molecules?

**(A)** Gay-Lussac's law

**(C)** Law of multiple proportions

PYQ 2019 · School Annual · 1m · 30s

**(B)** Avogadro's law

**(D)** Law of constant proportions

**Q4.** The molar mass of H<sub>2</sub>SO<sub>4</sub> is:

**(A)** 98 g/mol

**(C)** 82 g/mol

PYQ 2022 · School Annual · 1m · 45s

**(B)** 100 g/mol

**(D)** 66 g/mol

**Q5.** The empirical formula of a compound with 1:2:1 atom ratio of C:H:O is:

**(A)** C<sub>2</sub>H<sub>4</sub>O<sub>2</sub>
**(C)** CH<sub>2</sub>O

PYQ 2020 · CBSE SQP · 1m · 30s

**(B)** CHO

**(D)** C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>
**Q6.** In the reaction  $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$ , if 1 mol N<sub>2</sub> reacts with 5 mol H<sub>2</sub>, the limiting reagent is:

**(A)** H<sub>2</sub>
**(C)** NH<sub>3</sub>

PYQ 2021 · School Annual · 1m · 60s

**(B)** N<sub>2</sub>
**(D)** Neither — both fully consumed

**Q7.** Molarity of a solution is defined as moles of solute per:

**(A)** kilogram of solvent

**(C)** litre of solvent

PYQ 2022 · School Annual · 1m · 30s

**(B)** litre of solution

**(D)** 100 g of solution

**Q8.** Which concentration term is INDEPENDENT of temperature?

**(A)** Molarity

**(C)** Normality

PYQ 2023 · CBSE SQP · 1m · 30s

**(B)** Molality

**(D)** All of these

**Q9.** The average atomic mass of chlorine (75.77% Cl-35, 24.23% Cl-37) is approximately:

**(A)** 35.00 u

**(C)** 35.45 u

PYQ 2021 · CBSE SQP · 1m · 60s

**(B)** 36.00 u

**(D)** 37.00 u

**Q10.** The number of molecules in 8 g of O<sub>2</sub> (molar mass 32 g/mol) is:

**(A)**  $6.022 \times 10^{23}$ 
**(C)**  $3.011 \times 10^{23}$ 

PYQ 2020 · School Annual · 1m · 60s

**(B)**  $1.5055 \times 10^{23}$ 
**(D)**  $1.2044 \times 10^{24}$

**Q11.** The law of conservation of mass was proposed by:

- (A) Proust (B) Dalton  
(C) Lavoisier (D) Avogadro

PYQ 2019 · School Annual · 1m · 20s

**Q12.** The mole fraction of solute in a solution of 2 mol solute and 8 mol solvent is:

- (A) 0.25 (B) 0.20  
(C) 0.80 (D) 0.10

PYQ 2022 · CBSE SQP · 1m · 45s

**Q13.** Molarity of a solution made by dissolving 4 g NaOH (M=40) in 250 mL of solution is:

- (A) 0.1 M (B) 0.4 M  
(C) 1.0 M (D) 0.04 M

PYQ 2023 · School Annual · 1m · 60s

**Q14.** Which statement about empirical and molecular formula is CORRECT?

- (A) They always describe different substances (B) Molecular = (empirical) x n, where n = molar mass / empirical mass  
(C) Empirical formula needs the molar mass to be found (D) For water they are different

PYQ 2020 · School Annual · 1m · 45s

**Q15.** When two elements form more than one compound, the masses of one element that combine with a fixed mass of the other are in a simple whole-number ratio. This is the law of:

- (A) Constant proportions (B) Multiple proportions  
(C) Conservation of mass (D) Gaseous volumes

PYQ 2021 · School Annual · 1m · 45s

## ANSWER KEY & EXPLANATIONS

Q 1-15 · MARK YOUR SCORE

**Q1. Answer: B**

Molar mass H<sub>2</sub>O = 18 g/mol.  $n = 36/18 = 2$  mol.

**Q2. Answer: B**

$N_A = 6.022 \times 10^{23}$  particles per mole. The last value is the mass of 1 u in grams.

**Q3. Answer: B**

This is Avogadro's law (1811). Gay-Lussac's law is about whole-number volume ratios of reacting gases.

**Q4. Answer: A**

$2(1) + 32 + 4(16) = 2 + 32 + 64 = 98$  g/mol.

**Q5. Answer: C**

Empirical formula = simplest whole-number ratio = CH<sub>2</sub>O. C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> is the molecular formula.

**Q6. Answer: B**

N<sub>2</sub> needs 3 mol H<sub>2</sub> per mol; 1 mol N<sub>2</sub> needs 3 mol H<sub>2</sub>, but 5 mol H<sub>2</sub> is available. H<sub>2</sub> is in excess, so N<sub>2</sub> is limiting.

**Q7. Answer: B**

Molarity (M) = moles of solute / litre of SOLUTION. Per kg of solvent is molality.

**Q8. Answer: B**

Molality uses mass of solvent (temperature-independent). Molarity uses volume, which expands on heating.

**Q9. Answer: C**

$35 \times 0.7577 + 37 \times 0.2423 = 26.52 + 8.97 = 35.49$  u. It is a weighted average, not an integer.

**Q10. Answer: B**

$n = 8/32 = 0.25$  mol. Molecules =  $0.25 \times 6.022 \times 10^{23} = 1.5055 \times 10^{23}$ .

**Q11. Answer: C**

Antoine Lavoisier established the law of conservation of mass. Proust gave constant proportions; Dalton, multiple proportions.

**Q12. Answer: B**

$x_{\text{solute}} = 2 / (2 + 8) = 2/10 = 0.20$ . Mole fractions sum to 1 (solvent = 0.80).

**Q13. Answer: B**

$n = 4/40 = 0.1$  mol;  $V = 0.250$  L;  $M = 0.1/0.250 = 0.4$  M.

**Q14. Answer: B**

Molecular formula is a whole-number multiple n of the empirical formula. For water both are H<sub>2</sub>O (n=1).

**Q15. Answer: B**

This is Dalton's law of multiple proportions (e.g. CO and CO<sub>2</sub>: O masses per fixed C are in 1:2 ratio).