

IB Diploma

CHEMISTRY

HL

Paper 1

2017 — 2023

Chapter 1	Stoichiometric Relationship	Page 1
Chapter 2	Atomic Structure	Page 19
Chapter 3	Periodicity	Page 23
Chapter 4	Chemical Bonding & Structure	Page 28
Chapter 5	Energetics / Thermochemistry	Page 39
Chapter 6	Chemical Kinetics	Page 47
Chapter 7	Equilibrium	Page 54
Chapter 8	Acids & Bases	Page 61
Chapter 9	Redox Processes	Page 70
Chapter 10	Organic Chemistry	Page 79
Chapter 11	Measurement & Data Processing	Page 94
Chapter 12	Atomic Structure (HL)	Page 100
Chapter 13	The Periodic Table (HL)	Page 111
Chapter 14	Chemical Bonding & Structure (HL)	Page 122
Chapter 15	Energetics / Thermochemistry (HL)	Page 141
Chapter 16	Chemical Kinetics (HL)	Page 166
Chapter 17	Equilibrium (HL)	Page 191
Chapter 18	Acids & Bases (HL)	Page 205
Chapter 19	Redox Processes (HL)	Page 223
Chapter 20	Organic Chemistry (HL)	Page 244
Chapter 21	Measurement & Analysis (HL)	Page 269
	Answers	Page 288

1 - (CHEMI/11_HL_Summer_2017_Q1) - *Stoichiometric Relationship*

Which compound has the greatest percentage by mass of nitrogen atoms?

- A. N_2H_4
- B. NH_3
- C. N_2O_4
- D. NaNO_3

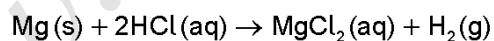
2 - (CHEMI/11_HL_Summer_2017_Q2) - *Stoichiometric Relationship*

Which statements about mixtures are correct?

- I. The components may be elements or compounds.
 - II. All components must be in the same phase.
 - III. The components retain their individual properties.
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

3 - (CHEMI/11_HL_Summer_2017_Q3) - *Stoichiometric Relationship*

What is the expression for the volume of hydrogen gas, in dm^3 , produced at STP when 0.30 g of magnesium reacts with excess hydrochloric acid solution?

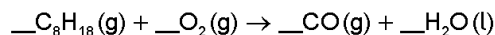


Molar volume of an ideal gas at STP = $22.7 \text{ dm}^3 \text{ mol}^{-1}$

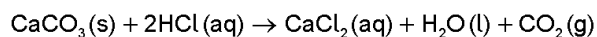
- A. $\frac{0.30 \times 2 \times 22.7}{24.31}$
- B. $\frac{0.30 \times 22.7}{24.31}$
- C. $\frac{0.30 \times 24.31}{22.7}$
- D. $\frac{0.30 \times 22.7}{24.31 \times 2}$

4 - (CHEMI/12_HL_Summer_2017_Q1) - *Stoichiometric Relationship*

What is the sum of the coefficients when the equation is balanced with whole numbers?



- A. 26.5
- B. 30
- C. 53
- D. 61

5 - (CHEMI/12_HL_Summer_2017_Q2) - *Stoichiometric Relationship*What is the maximum volume, in dm^3 , of $\text{CO}_2(\text{g})$ produced when 1.00 g of $\text{CaCO}_3(\text{s})$ reacts with 20.0 cm^3 of 2.00 mol dm^{-3} $\text{HCl}(\text{aq})$?Molar volume of gas = $22.7 \text{ dm}^3 \text{ mol}^{-1}$; $M_r(\text{CaCO}_3) = 100.00$

- A. $\frac{1}{2} \times \frac{20.0 \times 2.00}{1000} \times 22.7$
- B. $\frac{20.0 \times 2.00}{1000} \times 22.7$
- C. $\frac{1.00}{100.00} \times 22.7$
- D. $\frac{1.00}{100.00} \times 2 \times 22.7$

6 - (CHEMI/12_HL_Summer_2017_Q3) - *Stoichiometric Relationship*

Which factors affect the molar volume of an ideal gas?

- I. Pressure
 - II. Temperature
 - III. Empirical formula
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

7 - (CHEMI/10_HL_Winter_2017_Q1) - *Stoichiometric Relationship*

How many atoms of nitrogen are there in 0.50 mol of $(\text{NH}_4)_2\text{CO}_3$?

- A. 1
- B. 2
- C. 3.01×10^{23}
- D. 6.02×10^{23}

8 - (CHEMI/10_HL_Winter_2017_Q4) - *Stoichiometric Relationship*

A compound with $M_r = 102$ contains 58.8% carbon, 9.80% hydrogen and 31% oxygen by mass.

What is its molecular formula?

A_r : C = 12.0; H = 1.0; O = 16.0

- A. $\text{C}_2\text{H}_{14}\text{O}_4$
- B. $\text{C}_3\text{H}_4\text{O}_4$
- C. $\text{C}_5\text{H}_{10}\text{O}_2$
- D. $\text{C}_6\text{H}_{14}\text{O}$

9 - (CHEMI/11_HL_Summer_2018_Q1) - *Stoichiometric Relationship*

What is the molecular formula of a hydrocarbon containing 84.6% carbon by mass with a molar mass of 142.3 g mol^{-1} ?

- A. $\text{C}_{20}\text{H}_{44}$
- B. $\text{C}_{11}\text{H}_{10}$
- C. $\text{C}_{10}\text{H}_{22}$
- D. C_5H_{11}

ANSWERS

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1 - (CHEMI/11_HL_Summer_2017_Q1) - *Stoichiometric Relationship*

A

2 - (CHEMI/11_HL_Summer_2017_Q2) - *Stoichiometric Relationship*

B

3 - (CHEMI/11_HL_Summer_2017_Q3) - *Stoichiometric Relationship*

B

4 - (CHEMI/12_HL_Summer_2017_Q1) - *Stoichiometric Relationship*

C

5 - (CHEMI/12_HL_Summer_2017_Q2) - *Stoichiometric Relationship*

C

6 - (CHEMI/12_HL_Summer_2017_Q3) - *Stoichiometric Relationship*

A

7 - (CHEMI/10_HL_Winter_2017_Q1) - *Stoichiometric Relationship*

D

8 - (CHEMI/10_HL_Winter_2017_Q4) - *Stoichiometric Relationship*

C

9 - (CHEMI/11_HL_Summer_2018_Q1) - *Stoichiometric Relationship*

C

10 - (CHEMI/11_HL_Summer_2018_Q2) - *Stoichiometric Relationship*

A