NUNAVUT CHEMISTRY 20 · UNIT D

# Quantitative Relationships in Chemical Changes — Practice Test

**Nunavut Chemistry 20 • 25 questions**

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

**1** **Use the atomic masses Ca = 40.08, O = 16.00, H = 1.01 g/mol. The molar mass of $Ca(OH)_2$ is**

- A 57.09 g/mol
- B 74.10 g/mol
- C 97.15 g/mol
- D 114.18 g/mol

Understand It with Pulse | Flag a mistake

**2** **The mass of 0.250 mol of sodium chloride, NaCl (molar mass 58.44 g/mol), is**

- **A** 14.6 g
- **B** 7.31 g
- **C** 29.2 g
- **D** 234 g

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**3** **The number of molecules in 2.00 mol of $NH_3$ is (use $6.02 \times 10^{23}$ molecules/mol)**

- **A** $3.01 \times 10^{23}$
- **B** $6.02 \times 10^{23}$
- **C** $1.20 \times 10^{24}$
- **D** $2.41 \times 10^{24}$

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**4** **At STP, one mole of any ideal gas occupies 22.4 L. The volume occupied by 0.500 mol of $O_2(g)$ at STP is**

- **A** 5.60 L
- **B** 11.2 L
- **C** 22.4 L
- **D** 44.8 L

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**5** **A solution contains 0.200 mol of solute dissolved in 500 mL of solution. The concentration of the solution is**

- **A** 0.100 mol/L
- **B** 0.200 mol/L
- **C** 0.400 mol/L
- **D** 1.00 mol/L

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6 **Use the atomic masses N = 14.01, H = 1.01, O = 16.00 g/mol. The percent by mass of nitrogen in $NH_4NO_3$ is**

A 17.5%

B 35.0%

C 52.5%

D 70.0%

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7 **A compound consists of 40.0% C, 6.7% H, and 53.3% O by mass. Use C = 12.01, H = 1.01, O = 16.00 g/mol. The empirical formula of the compound is**

A $CH_2O$

B CHO

C $C_2H_4O_2$

D $CH_4O$

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8 **The volume of a 6.00 mol/L stock solution required to prepare 250 mL of a 0.500 mol/L solution is**

- A 3.00 L
- B 125 mL
- C 41.7 mL
- D 20.8 mL

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9 **$2\ H_2(g) + O_2(g) \rightarrow 2\ H_2O(l)$**
**The number of moles of $O_2(g)$ required to react completely with 6.0 mol of $H_2(g)$ is**

- A 1.5 mol
- B 3.0 mol
- C 6.0 mol
- D 12 mol

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10 $N_2(g) + 3\ H_2(g) \rightarrow 2\ NH_3(g)$

**The mass of $NH_3$ (molar mass 17.04 g/mol) produced when 0.500 mol of $N_2(g)$ reacts completely is**

A 34.1 g

B 8.52 g

C 25.6 g

D 17.0 g

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11 **At STP the molar volume of a gas is 22.4 L/mol. A sample of $CO_2(g)$ has a volume of 5.60 L at STP and a molar mass of 44.01 g/mol. The mass of the sample, to the nearest tenth of a gram, is ____ g**

ANSWER _____

Understand It with Pulse | Flag a mistake

12 **$2\ Al(s) + 3\ Cl_2(g) \rightarrow 2\ AlCl_3(s)$**
**If 4.00 mol of Al(s) and 4.00 mol of $Cl_2(g)$ are mixed and allowed to react as completely as possible, then**

A $Cl_2(g)$ is the limiting reactant and 2.67 mol of $AlCl_3(s)$ forms

B Al(s) is the limiting reactant and 4.00 mol of $AlCl_3(s)$ forms

C $Cl_2(g)$ is the limiting reactant and 4.00 mol of $AlCl_3(s)$ forms

D Al(s) is the limiting reactant and 2.67 mol of $AlCl_3(s)$ forms

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13 **A reaction has a theoretical yield of 25.0 g of product, but a student actually collects 21.5 g of product. The percent yield of the reaction is**

A 116%

B 79.6%

C 86.0%

D 92.5%

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14 $H_2SO_4(aq) + 2\ NaOH(aq) \rightarrow Na_2SO_4(aq) + 2\ H_2O(l)$

**The volume, in millilitres, of 0.150 mol/L NaOH(aq) required to neutralize 20.0 mL of 0.300 mol/L $H_2SO_4(aq)$, to the nearest tenth of a millilitre, is ____ mL**

ANSWER _____

Understand It with Pulse | Flag a mistake

15 $CH_4(g) + 2\ O_2(g) \rightarrow CO_2(g) + 2\ H_2O(g)$

**The volume of $O_2(g)$ at STP required to completely burn 11.2 L of $CH_4(g)$ at STP is**

A 5.60 L

B 11.2 L

C 22.4 L

D 44.8 L

Understand It with Pulse | Flag a mistake

16 **A 0.500 mol sample of an unknown gas has a mass of 32.0 g. The molar mass of the gas, in g/mol, to the nearest whole number, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

17 $CaCO_3(s) + 2\ HCl(aq) \rightarrow CaCl_2(aq) + H_2O(l) + CO_2(g)$

The mass of $CO_2(g)$ (44.01 g/mol) produced when 10.0 g of $CaCO_3(s)$ (100.09 g/mol) reacts completely, to the nearest tenth of a gram, is _____ g

ANSWER

Understand It with Pulse | Flag a mistake

18 $AgNO_3(aq) + NaCl(aq) \rightarrow AgCl(s) + NaNO_3(aq)$

50.0 mL of 0.200 mol/L $AgNO_3(aq)$ is mixed with excess NaCl(aq). The mass of AgCl(s) (molar mass 143.32 g/mol) that precipitates is

A 0.717 g

B 2.87 g

C 14.3 g

D 1.43 g

Understand It with Pulse | Flag a mistake

**19** **A compound has an empirical formula of $CH_2O$ (empirical formula mass 30.03 g/mol) and a molar mass of 180.16 g/mol. Its molecular formula is**

A $C_2H_4O_2$

B $C_3H_6O_3$

C $C_6H_{12}O_6$

D $C_{12}H_{24}O_{12}$

Understand It with Pulse | Flag a mistake

**20** **$2\ H_2(g) + O_2(g) \rightarrow 2\ H_2O(l)$**
**If 4.00 g of $H_2$ (2.02 g/mol) and 32.0 g of $O_2$ (32.00 g/mol) react, the mass of $H_2O$ (18.02 g/mol) formed, to the nearest tenth of a gram, is ____ g**

ANSWER _____

Understand It with Pulse | Flag a mistake

21 **$HCl(aq) + NaOH(aq) \rightarrow NaCl(aq) + H_2O(l)$**
**A 20.0 mL sample of HCl(aq) requires 18.5 mL of 0.100 mol/L NaOH(aq) for complete neutralization. The concentration of the HCl(aq) is**

A 0.0925 mol/L

B 0.108 mol/L

C 0.185 mol/L

D 0.0500 mol/L

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22 **$Zn(s) + 2\ HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$**
**A student reacts 13.0 g of Zn(s) (65.38 g/mol) with excess HCl(aq) and collects 0.175 mol of $H_2(g)$. The percent yield, to the nearest whole percent, is ____ %**

ANSWER _____

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**23** **The total number of moles of ions present in 500 mL of a 0.200 mol/L $CaCl_2(aq)$ solution, assuming complete dissociation, is**

- A 0.300 mol
- B 0.100 mol
- C 0.200 mol
- D 0.600 mol

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**24** **The mass of NaOH(s) (molar mass 40.00 g/mol) needed to prepare 250 mL of a 0.500 mol/L solution, to the nearest tenth of a gram, is _____ g**

ANSWER _____

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**25** **Use $6.02 \times 10^{23}$ particles/mol. The number of oxygen atoms in 0.500 mol of $Ca(OH)_2$ is**

- **A** $3.01 \times 10^{23}$
- **B** $1.20 \times 10^{24}$
- **C** $1.81 \times 10^{24}$
- **D** $6.02 \times 10^{23}$

Understand It with Pulse | Flag a mistake

# ANSWER KEY

| | | | | | |
|---|---|---|---|---|---|
| **1.** | B | **10.** | D | **19.** | C |
| **2.** | A | **11.** | 11.0 | **20.** | 35.7 |
| **3.** | C | **12.** | A | **21.** | A |
| **4.** | B | **13.** | C | **22.** | 88 |
| **5.** | C | **14.** | 80.0 | **23.** | A |
| **6.** | B | **15.** | C | **24.** | 5.0 |
| **7.** | A | **16.** | 64 | **25.** | D |
| **8.** | D | **17.** | 4.40 | | |
| **9.** | B | **18.** | D | | |

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