

SUPeR Chemistry

CH 221 Practice Exam

This exam has been designed to help you practice working multiple choice problems over the topics presented in the first three chapters of the Silberberg text. The actual exams for each section of CH 221 will be different and you should not assume that this practice exam is representative of those exams.

Multiple Choice: Select the *one* best answer.

- If 4.00 g of element **A** react completely with 8.00 g of element **B**, which of the following statements must be true?
 - The reaction requires 4 moles of **A** to react with 8 moles of **B**.
 - The maximum mass of product that can be formed is 12.00 g.
 - The maximum amount of product that can be formed is 12 moles.
 - The atomic weight of **B** is double the atomic weight of **A**.
 - The density of **B** is greater than the density of **A**.
- How many neutrons are in ${}_{34}^{79}\text{Se}$?
 - 34
 - 45
 - 79
 - 113
 - 117
- Identify the set that contains isotopes of the same element.
 - ${}_{8}^{17}\text{A}$ and ${}_{9}^{17}\text{A}$
 - ${}_{7}^{12}\text{A}$ and ${}_{12}^{7}\text{A}$
 - ${}_{7}^{11}\text{A}$ and ${}_{7}^{12}\text{A}$
 - ${}_{5}^{11}\text{A}$ and ${}_{6}^{11}\text{A}^{+}$
 - ${}_{24}^{11}\text{A}$ and ${}_{11}^{24}\text{A}$
- Consider a hypothetical, newly discovered element that has two stable isotopic forms. Use the data in the table below to determine the atomic mass of this element.

Isotope	Mass (amu)	% natural abundance
A	84.91171	72.15
B	86.90918	27.85

- 84.91 amu
- 85.00 amu
- 85.47 amu
- 85.91
- 87.00

5. Which of the following describes the formula and bonding for barium fluoride?
- A. BaF_2 , ionic compound
 - B. BaF_2 , covalent compound
 - C. Ba(II)F_2 , ionic compound
 - D. BaF , ionic compound
 - E. BaF , covalent compound
6. The density of gasoline is 0.7025 g/cm^3 at 20°C . What is the mass of one gallon of gasoline?

Possibly useful information:

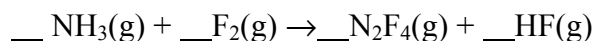
$$1 \text{ qt} = 0.9463 \text{ L}$$

$$4 \text{ qt} = 1 \text{ gal (exactly)}$$

- A. 0.6650 kg
 - B. $2.659 \times 10^3 \text{ g}$
 - C. $1.661 \times 10^2 \text{ g}$
 - D. $6.646 \times 10^3 \text{ g}$
 - E. $1.505 \times 10^{-3} \text{ g}$
7. The density of tin is 7.26 g/cm^3 . How many atoms would be found in 1 cm^3 of tin?
- A. 1.09×10^{-23}
 - B. 2.72×10^{-23}
 - C. 6.99×10^{20}
 - D. 3.68×10^{22}
 - E. 9.13×10^{22}
8. A flask contains 40 g of neon and 40 g of argon. Which of the following statement(s) is (are) true?
- 1. There are more moles of Ar than moles of Ne present.
 - 2. There are more atoms of Ne than atoms of Ar present.
 - 3. There are equal numbers of atoms of each element present.
- A. 1 only
 - B. 2 only
 - C. 3 only
 - D. 1 and 2 only
 - E. 1 and 3 only

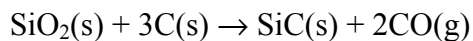
9. Which of the following is not named correctly?
- A. H_2CO_3 carbonic acid
 - B. CaCl_2 calcium chlorite
 - C. NH_4NO_3 ammonium nitrate
 - D. Pb_2O_3 lead(III) oxide
 - E. KMnO_4 potassium permanganate
10. What is the mass percentage of copper in copper(I) sulfide?
- A. 20.1 %
 - B. 33.5 %
 - C. 46.5 %
 - D. 79.9 %
 - E. 84.3 %
11. A compound contains 15.94% boron by mass with the remainder being fluorine. What is its empirical formula?
- A. BF
 - B. BF_2
 - C. B_2F_3
 - D. BF_3
 - E. B_2F_5
12. How many moles of aluminum are present in 47.51 g of aluminum oxide?
- A. 0.2330
 - B. 0.4660
 - C. 0.9319
 - D. 1.864
 - E. 95.02

13. The calcium ion, Ca^{2+} , has
- A. two more electrons than the calcium atom.
 - B. two fewer electrons than the calcium atom.
 - C. two more protons than the calcium atom.
 - D. two fewer protons than the calcium atom.
 - E. two more electrons and two more protons than the calcium atom.
14. Ammonia will react with fluorine to produce dinitrogen tetrafluoride and hydrogen fluoride.



When the equation above is properly balanced, the respective coefficients are:

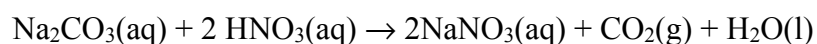
- A. 2, 1, 1, 6
 - B. 2, 3, 1, 6
 - C. 2, 5, 1, 6
 - D. 2, 10, 1, 6
 - E. 2, 6, 1, 6
15. How many grams of carbon are needed to react completely with 75.2 grams of silicon dioxide according to the equation below?



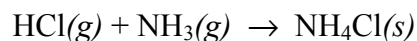
- A. 15.0 g
- B. 20.5 g
- C. 32.8 g
- D. 45.1 g
- E. 61.5 g

16. When 2.61 g of solid sodium carbonate (Na_2CO_3 , molar mass = 106.0 g/mol) is dissolved in sufficient water to make 250.0 mL of solution, the concentration of Na_2CO_3 is
- A. 0.0246 M
 - B. 10.4 M
 - C. 0.205 M
 - D. 0.0985 M
 - E. 0.141 M

17. How many grams of Na_2CO_3 (molar mass = 106.0 g/mol) are required for complete reaction with 25.0 mL of 0.155 M HNO_3 ?



- A. 205 g
 - B. 20.5 g
 - C. 0.410 g
 - D. 0.205 g
 - E. 0.122 g
18. If 7.30 g of HCl and 4.00 g of NH_3 are mixed, how many grams of NH_4Cl can be formed?



- A. 10.7
- B. 11.3
- C. 12.6
- D. 13.3