

Ch 10 practice test**Matching**

Match each item with the correct statement below.

- a. molar volume
- b. molar mass
- c. atomic mass

- _____ 1. the number of grams of an element that is numerically equal to the atomic mass of the element in amu
- _____ 2. the mass of a mole of any element or compound
- _____ 3. the volume occupied by a mole of any gas at STP

Match each item with the correct statement below.

- a. representative particle
- b. mole
- c. Avogadro's number
- d. percent composition
- e. standard temperature and pressure
- f. empirical formula

- _____ 4. the number of representative particles of a substance present in 1 mole of that substance
- _____ 5. an atom, an ion, or a molecule, depending upon the way a substance commonly exists
- _____ 6. the SI unit used to measure amount of substance
- _____ 7. 0°C and 1 atm
- _____ 8. the percent by mass of each element in a compound
- _____ 9. the smallest whole number ratio of the atoms in a compound

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 10. What SI unit is used to measure the number of representative particles in a substance?
 - a. kilogram
 - b. ampere
 - c. kelvin
 - d. mole
- _____ 11. Which of the following is NOT a representative particle?
 - a. atom
 - b. cation
 - c. anion
 - d. all of the above
- _____ 12. Which of the following elements exists as a diatomic molecule?
 - a. neon
 - b. lithium
 - c. nitrogen
 - d. sulfur
- _____ 13. Avogadro's number of representative particles is equal to one _____.
 - a. kilogram
 - b. gram
 - c. kelvin
 - d. mole
- _____ 14. All of the following are equal to Avogadro's number EXCEPT _____.
 - a. the number of atoms of bromine in 1 mol Br₂
 - b. the number of atoms of gold in 1 mol Au
 - c. the number of molecules of nitrogen in 1 mol N₂
 - d. the number of molecules of carbon monoxide in 1 mol CO

- _____ 15. How many moles of tungsten atoms are in 4.8×10^{25} atoms of tungsten?
- a. 8.0×10^2 moles c. 1.3×10^{-1} moles
 b. 8.0×10^1 moles d. 1.3×10^{-2} moles
- _____ 16. How many moles of silver atoms are in 1.8×10^{20} atoms of silver?
- a. 3.0×10^{-4} c. 3.0×10^2
 b. 3.3×10^{-3} d. 1.1×10^{44}
- _____ 17. How many atoms are in 0.075 mol of titanium?
- a. 1.2×10^{-25} c. 6.4×10^2
 b. 2.2×10^{24} d. 4.5×10^{22}
- _____ 18. How many molecules are in 2.10 mol CO_2 ?
- a. 2.53×10^{24} molecules c. 3.49×10^{-24} molecules
 b. 3.79×10^{24} molecules d. 1.26×10^{24} molecules
- _____ 19. How many atoms are in 3.5 moles of arsenic atoms?
- a. 5.8×10^{-24} atoms c. 2.1×10^{24} atoms
 b. 7.5×10^1 atoms d. 1.7×10^{23} atoms
- _____ 20. The atomic masses of any two elements contain the same number of ____.
- a. atoms c. ions
 b. grams d. milliliters
- _____ 21. What is true about the molar mass of chlorine gas?
- a. The molar mass is 35.5 g.
 b. The molar mass is 71.0 g.
 c. The molar mass is equal to the mass of one mole of chlorine atoms.
 d. none of the above
- _____ 22. The mass of a mole of NaCl is the ____.
- a. molar mass c. molecular mass
 b. atomic mass d. gram atomic mass
- _____ 23. What is the molar mass of Gold (III) chloride?
- a. 96 g c. 232.5 g
 b. 130 g d. 303.6 g
- _____ 24. What is the molar mass of ammonium carbonate?
- a. 144 g c. 96 g
 b. 138 g d. 78 g
- _____ 25. What is the mass in grams of 5.90 mol C_8H_{18} ?
- a. 0.0512 g c. 389 g
 b. 19.4 g d. 673 g
- _____ 26. How many moles of CaBr_2 are in 5.0 grams of CaBr_2 ?
- a. 2.5×10^{-2} mol c. 4.0×10^1 mol
 b. 4.2×10^{-2} mol d. 1.0×10^3 mol

- _____ 27. For which of the following conversions does the value of the conversion factor depend upon the formula of the substance?
- volume of gas (STP) to moles
 - density of gas (STP) to molar mass
 - mass of any substance to moles
 - moles of any substance to number of particles
- _____ 28. What is the mass of silver in 3.4 g AgNO_3 ?
- 0.025 g
 - 0.64 g
 - 2.2 g
 - 3.0 g
- _____ 29. The volume of one mole of a substance is 22.4 L at STP for all _____.
- gases
 - liquids
 - solids
 - compounds
- _____ 30. The molar volume of a gas at STP occupies _____.
- 22.4 L
 - 0°C
 - 1 kilopascal
 - 12 grams
- _____ 31. Which combination of temperature and pressure correctly describes standard temperature and pressure, STP?
- 0°C and 101 kPa
 - 1°C and 0 kPa
 - 0°C and 22.4 kPa
 - 100°C and 100 kPa
- _____ 32. The molar mass of a substance can be calculated from its density alone, if that substance is a(n) _____.
- element
 - gas at STP
 - liquid
 - solid
- _____ 33. The molar mass of a gas can be determined from which of the following?
- the density of the gas at STP
 - the volume of a mole of the gas
 - Avogadro's number
 - none of the above
- _____ 34. What is the volume, in liters, of 0.500 mol of C_3H_8 gas at STP?
- 0.0335 L
 - 11.2 L
 - 16.8 L
 - 22.4 L
- _____ 35. What is the number of moles in 500 L of He gas at STP?
- 0.05 mol
 - 0.2 mol
 - 22 mol
 - 90 mol
- _____ 36. What is the density at STP of the gas sulfur hexafluoride, SF_6 ?
- 0.153 g/L
 - 6.52 g/L
 - 3270 g/L
 - 3.93×10^{24} g/L
- _____ 37. If the density of a noble gas is 1.783 g/L at STP, that gas is _____.
- Kr
 - Xe
 - Ar
 - He
- _____ 38. If 60.2 grams of Hg combines completely with 24.0 grams of Br to form a compound, what is the percent composition of Hg in the compound?
- 28.5%
 - 39.9%
 - 71.5%
 - 60.1%
- _____ 39. What is the percent composition of chromium in BaCrO_4 ?
- 4.87%
 - 9.47%
 - 20.5%
 - 25.2%

Name: _____

ID: A

- _____ 40. What is the percent composition of carbon, in heptane, C₇H₁₆?
- a. 12%
 - b. 19%
 - c. 68%
 - d. 84%
- _____ 41. What is the percent by mass of carbon in acetone, C₃H₆O?
- a. 20.7%
 - b. 62.1%
 - c. 1.61%
 - d. 30.0%
- _____ 42. How many grams are in 215 formula units of Aluminum nitrate?
- a. 1.01 X 10⁰
 - b. 3.57 X 10⁻²²
 - c. 5.89 X 10⁻²⁰
 - d. 7.61 X 10⁻²⁰
- _____ 43. What is the volume, in liters, of 0.500 g of C₃H₈ gas at STP?
- a. 2.54 X 10⁻¹
 - b. 2.55 X 10⁻¹
 - c. 2.5 X 10¹
 - d. 2.55 X 10¹

Short Answer

44. Find the mass in grams of 3.10×10^{23} molecules of F₂.
45. Find the number of moles of argon in 607 g of argon.
46. Find the mass, in grams, of 1.40×10^{23} molecules of N₂.
47. What is the percent by mass of hydrogen in aspirin, C₉H₈O₄?

Ch 10 practice test Answer Section

MATCHING

- | | | | | |
|----|--------------------------------|--------------------------------|------------------------|----------------------|
| 1. | ANS: C
OBJ: 10.1.3 | PTS: 1
STA: Ch.1.a | DIF: L1 | REF: p. 294 |
| 2. | ANS: B
OBJ: 10.1.3 10.1.4 | PTS: 1 | DIF: L1
STA: Ch.3.d | REF: p. 294 p. 295 |
| 3. | ANS: A
OBJ: 10.2.2 | PTS: 1
STA: Ch.4 | DIF: L1 | REF: p. 300 |
| 4. | ANS: C
OBJ: 10.1.2 | PTS: 1
STA: Ch.3.b | DIF: L1 | REF: p. 290 |
| 5. | ANS: A
OBJ: 10.1.2 | PTS: 1
STA: Ch.3.b | DIF: L1 | REF: p. 290 |
| 6. | ANS: B
OBJ: 10.2.1 | PTS: 1
STA: Ch.3.b Ch.3.c | DIF: L1 | REF: p. 290 |
| 7. | ANS: E
OBJ: 10.2.2 | PTS: 1
STA: Ch.4.d | DIF: L1 | REF: p. 300 |
| 8. | ANS: D
OBJ: 10.3.1 | PTS: 1
STA: Ch.5 | DIF: L1 | REF: p. 305 |
| 9. | ANS: F
OBJ: 10.3.2 | PTS: 1
STA: Ch.3 | DIF: L1 | REF: p. 309 |

MULTIPLE CHOICE

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|-----|-----------------------|--------------------------------|---------|----------------------|
| 10. | ANS: D
OBJ: 10.1.2 | PTS: 1
STA: Ch.3.b Ch.3.c | DIF: L1 | REF: p. 290 |
| 11. | ANS: D
OBJ: 10.1.2 | PTS: 1
STA: Ch.1 | DIF: L1 | REF: p. 290 |
| 12. | ANS: C
OBJ: 10.1.2 | PTS: 1
STA: Ch.1 | DIF: L1 | REF: p. 290 |
| 13. | ANS: D
OBJ: 10.1.2 | PTS: 1
STA: Ch.3.b | DIF: L1 | REF: p. 290 |
| 14. | ANS: A
OBJ: 10.1.2 | PTS: 1
STA: Ch.3 | DIF: L1 | REF: p. 290 |
| 15. | ANS: B
OBJ: 10.1.2 | PTS: 1
STA: Ch.3.d | DIF: L2 | REF: p. 290 p. 291 |
| 16. | ANS: A
OBJ: 10.1.2 | PTS: 1
STA: Ch.3.d | DIF: L2 | REF: p. 290 p. 291 |
| 17. | ANS: D
OBJ: 10.1.2 | PTS: 1
STA: Ch.3.d | DIF: L2 | REF: p. 291 p. 292 |
| 18. | ANS: D
OBJ: 10.1.2 | PTS: 1
STA: Ch.3.d | DIF: L2 | REF: p. 291 p. 292 |
| 19. | ANS: C
OBJ: 10.1.2 | PTS: 1
STA: Ch.3.d | DIF: L2 | REF: p. 291 p. 292 |

20.	ANS: A OBJ: 10.1.3	PTS: 1 STA: Ch.3	DIF: L1	REF: p. 294
21.	ANS: B OBJ: 10.1.3	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 294
22.	ANS: A OBJ: 10.1.4	PTS: 1 STA: Ch.3	DIF: L1	REF: p. 295
23.	ANS: D OBJ: 10.1.4	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 295 p. 296
24.	ANS: C OBJ: 10.1.4	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 295 p. 296
25.	ANS: D OBJ: 10.2.1	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 297 p. 298
26.	ANS: A OBJ: 10.2.1	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 299
27.	ANS: C OBJ: 10.2.1	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 297
28.	ANS: C OBJ: 10.2.1	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 298
29.	ANS: A OBJ: 10.2.2	PTS: 1 STA: Ch.4.c	DIF: L1	REF: p. 300
30.	ANS: A OBJ: 10.2.2	PTS: 1 STA: Ch.4.c	DIF: L1	REF: p. 300
31.	ANS: A OBJ: 10.2.2	PTS: 1 STA: Ch.4.d	DIF: L1	REF: p. 300
32.	ANS: B OBJ: 10.2.2	PTS: 1 STA: Ch.4.d	DIF: L1	REF: p. 302
33.	ANS: A OBJ: 10.2.2	PTS: 1 STA: Ch.4	DIF: L1	REF: p. 302
34.	ANS: B OBJ: 10.2.2	PTS: 1 STA: Ch.4.h	DIF: L2	REF: p. 301
35.	ANS: C OBJ: 10.2.2	PTS: 1 STA: Ch.4.h	DIF: L2	REF: p. 301
36.	ANS: B OBJ: 10.2.2	PTS: 1 STA: Ch.4.h	DIF: L2	REF: p. 302
37.	ANS: C OBJ: 10.2.2	PTS: 1 STA: Ch.4.h	DIF: L3	REF: p. 302
38.	ANS: C OBJ: 10.3.1	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 305 p. 306
39.	ANS: C OBJ: 10.3.1	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 307
40.	ANS: D OBJ: 10.3.1	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 307
41.	ANS: B OBJ: 10.3.1	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 307
42.	ANS: D OBJ: 10.2.1	PTS: 1 STA: Ch.3	DIF: L2	REF: p. 297 p. 298

43. ANS: B PTS: 1 DIF: L2 REF: p. 301
 OBJ: 10.2.2 STA: Ch.4.h

SHORT ANSWER

44. ANS:

$$3.10 \times 10^{23} \text{ molecules} \times 1 \text{ mol F}_2 / 6.02 \times 10^{23} \text{ molecules} \times 38.0 \text{ g F}_2 / 1 \text{ mol F}_2 \\ = 19.6 \text{ g F}_2$$

PTS: 1 DIF: L2 REF: p. 297 OBJ: 10.2.1
 STA: Ch.3

45. ANS:

$$607 \text{ g Ar} \times 1 \text{ mol Ar} / 39.9 \text{ g Ar} = 15.2 \text{ mol Ar}$$

PTS: 1 DIF: L2 REF: p. 299 OBJ: 10.2.1
 STA: Ch.3

46. ANS:

$$1.40 \times 10^{23} \text{ molecules N}_2 \times (1.00 \text{ mol N}_2 / 6.02 \times 10^{23} \text{ molecules N}_2) \times (28.0 \text{ g N}_2 / 1 \text{ mol N}_2) \\ = 6.51 \text{ g}$$

PTS: 1 DIF: L3 REF: p. 291 | p. 297
 OBJ: 10.1.2 | 10.2.1 STA: Ch.3

47. ANS:

$$8.00 \text{ g H}_2 / 180 \text{ g C}_9\text{H}_8\text{O}_4 \times 100\% = 4.44\% \text{ H}_2$$

PTS: 1 DIF: L3 REF: p. 307 OBJ: 10.3.1
 STA: Ch.3