

CHM 100 PRACTICE TEST 1: Units 1, 2, 3

MULTIPLE CHOICE 100 POINTS

UNIT 1

- Anything that has mass and occupies space is known as _____.
A) energy B) matter C) weight D) temperature E) volume
- A solution is an example of a(n).
A) homogeneous mixture B) heterogeneous mixture C) element
D) compound E) pure substance
- Classify vinegar (vinegar contains 5% acetic acid (CH_3COOH) and 95% water.
A) compound B) element C) solution D) heterogeneous mixture
E) pure substance
- Which of the following substances is not an element?
A) steel B) magnesium C) aluminum D) lead E) tin
- Which of the following is a physical combination of two or more pure substances?
A) salt B) air C) sand D) water E) natural gas
- Density is _____.
A) A term that is synonymous with "heavy".
B) A physical property of a pure substance.
C) A term that refers to the thickness of a fog bank.
D) The ratio of the volume of a substance to the mass.
E) The temperature of water.
- Mass and volume are _____ properties
A) intensive B) extensive C) chemical D) energy E) the same
- A glass on the kitchen counter contains ice and water. Which statement is **not true** with regards to this system.
A) The system is homogeneous. B) The system possesses two phases.
C) The system can help quench a thirst. D) The system is heterogeneous.
- Which one of the following is a chemical change?
A) A broken shoestring. B) Dissolving salt in water. C) Iron rusting.
D) Cutting the grass. E) Tearing paper.
- Melting a piece of metal requires heat. What type of reaction is this?
A) endothermic B) exothermic C) condensing D) boiling E) freezing
- What are the energy of position and the energy of motion respectively called?
A) light and nuclear energy B) potential and kinetic energy
C) potential and mechanical energy D) chemical and electrical
- Which of the following is a compound?
A) water B) carbon C) soil D) sugar water E) a milkshake
- Which of the following is not a naturally existing diatomic diatomic molecule?
A) N_2 B) Br_2 C) H_2 D) O_2 E) C_2
- When white, crystalline sugar is heated, it decomposes into a colorless liquid and a black solid. This evidence suggests that sugar is a(n) _____.
A) element B) heterogeneous mixture C) compound D) solution
- How many atoms of oxygen are present in one formula unit of lead (IV) phosphate, $\text{Pb}_3(\text{PO}_4)_4$.
A) 1 B) 3 C) 4 D) 8 E) 16

16. Which of the following is an example of a chemical change?
 A) water boiling B) ice melting C) natural gas burning
 D) iodine vaporizing E) water evaporating

UNIT 2

17. In the SI system of measurement, the base unit for temperature is _____.
 A) °C B) °F C) thermometer D) Kelvin E) absolute zero
18. Calculate the density of silver. A sample has a mass of 118.307 grams and occupies a volume of 11.3 mL.
 A) 0.0956 g/mL B) 10.5 g/mL C) 107 g/mL D) 10500 g/mL E) 11.3 g/mL
19. Calculate the volume of a cube with the following measurements:
 length = 4.5 cm, width = 2.5 cm, height = 5.5 cm $V = l \times w \times h$
 A) 12.5 cm B) 12.5 cm² C) 12.5 cm³ D) 61.9 cm
 E) 61.9 cm³
20. Calculate the density of a metal cylinder with a mass of 45.6 grams and the following measurements:
 radius = 6.5 cm, height = 1.2 cm $V = \pi r^2 H$
 A) 159 g/cm³ B) 0.286 g/cm³ C) 24.5 g/cm³ D) 1.86 g/cm³ E) 0.979 g/cm³
21. The metric system is based on multiples of what number?
 A) 3 B) 5 C) 10 D) 2 E) 0
22. Express the following number in scientific notation: 4,230,000,000
 A) 4230000000 B) 4.23×10^7 C) 4.23×10^{-7} D) 4.23×10^9 E) 4.23×10^{-9}
23. Express the following number in scientific notation: 0.00000320
 A) 3.20×10^5 B) 3.20×10^{-5} C) 3.20×10^6 D) 3.20×10^{-6} E) 3.20×10^7
24. Express the following number in ordinary decimal notation: 4.320×10^{-9}
 A) 432,000,000,000 B) 0.000000000432 C) 4,320,000,000 D) 0.000000004320
25. Express the following number in ordinary decimal notation: 4.5680×10^3
 A) 45,680,000 B) 0.00045680 C) 4568.0 D) 0.0045680 E) 456.80
26. What is the boiling point of water?
 A) 32°C B) 100°C C) 180°C D) 212°C E) 273°C
27. How many significant figures will the answer to the following calculation have?
 $12.362 / 0.64$
 A) 5 B) 3 C) 2 D) 6
28. 1000 meters is equal to _____.
 A) 1 kilometer B) 1 decimeter C) 1 centimeter D) 1 milliliter
29. Mass is measured with a _____.
 A) scale B) balance C) thermometer D) graduated cylinder
30. How many significant figures are in the following number: 4,300.0
 A) 2 B) 4 C) 1 D) 5
31. How many significant figures are in the following number: 0.030020
 A) 7 B) 5 C) 3 D) 2
32. Calculate the following: $10. + (16.6 + 38.606)$. Answer using the correct significant figures.
 A) 65 B) 65.2 C) 65.21 D) 65.206

33. Which unit is used to express the volume of water contained in a swimming pool?
 A) meters B) Kelvins C) grams D) liters E) yards
34. The cubic centimeter (cm^3) is the unit of what?
 A) volume B) mass C) length D) weight E) density
35. Perform the following conversion: $34 \text{ mL} = ? \text{ L}$
 A) 0.0034 L B) 0.034 L C) 0.34 L D) 340 L E) 34000 L
36. Perform the following conversion: $6.22 \text{ nm} = ? \text{ km}$
 A) $6.22 \times 10^9 \text{ km}$ B) $6.22 \times 10^{-9} \text{ km}$ C) $6.22 \times 10^{12} \text{ km}$
 D) $6.22 \times 10^{-12} \text{ km}$ E) 6.22 km
37. Perform the following conversion: $5,300 \text{ decigram} = ? \text{ centigram}$
 A) 530 cg B) 53,000 cg C) 53 cg D) 530,000 cg E) 5.3 cg
38. A healthy adult possesses a body temperature of 98.6°F . Determine the body temperature in units of $^\circ\text{C}$ and Kelvin.
 A) $72.6^\circ\text{C} / 346 \text{ K}$ B) $72.6^\circ\text{C} / -200 \text{ K}$ C) $120^\circ\text{C} / 393 \text{ K}$ D) $37.0^\circ\text{C} / 310 \text{ K}$
39. How many significant figures are in 2,400
 A) 1 B) 2 C) 3 D) 4
40. How many significant figures are in 3.0080
 A) 1 B) 2 C) 3 D) 4 E) 5
41. If your heart beats 75 times per minute, how many times will your heart beat in one day?
 A) 1.1×10^5 B) 3.0×10^7 C) 4.5×10^3 D) 9.9×10^4

UNIT 3

42. Who is responsible for first developing the "atomic theory"?
 A) Dalton B) Thomson C) Millikin D) Rutherford E) Chadwick
43. In 1897, JJ Thomson discovered a subatomic particle that possessed an electrical charge of -1 , traveled in straight lines, and produced very sharp shadows. Based on these observations and other information, Thomson is credited with discovering the _____.
 A) neutron B) gamma rays C) electron D) proton
44. The electrical charges assigned to the electron, neutron, and proton, respectively, are _____.
 A) $-1, +1, 0$ B) $-1, 0, +1$ C) $1, 0, 1$ D) $+1, 0, -1$ E) $1, 1, 1$
45. A certain neutral atom contains 8 protons and 8 neutrons. How many electrons does the atom possess?
 A) 16 B) 0 C) 64 D) 8 E) 2
46. The nucleus of an atom consists of _____.
 A) neutrons and protons B) neutrons and electrons C) protons and electrons
 D) neutrons, electrons, and protons E) just protons
47. Given the following isotope: ^{19}F , fill in the blanks with the correct answer.
 ____atomic number ____mass number ____electrons
 A) 9, 10, 9 B) 19, 9, 19 C) 9, 19, 9 D) 9, 19, 9 E) 10, 9, 10
48. Given the following isotope: $^{32}\text{S}^{3-}$, fill in the blanks with the correct answer.
 ____protons ____electrons
 A) 32, 3 B) 32, 35 C) 32, 29 D) 29, 32 E) 35, 32

49. Given the following isotope: $^{38}\text{Cl}^-$, fill in the blanks with the correct answer.

____protons ____neutrons ____electrons
A) 38, 17, 39 B) 17, 38, 18 C) 17, 21, 16 D) 17, 21, 18

50. Given the following information about the isotopes of carbon:

Calculate the average atomic mass of carbon.

ISOTOPE	ABUNDANCE IN NATURE	ATOMIC MASS
carbon-12	98.89%	12.01115 amu
carbon-13	1.1110%	13.00335 amu

A) 12.50725 amu B) 1200.78597 amu C) 12.00115 amu D) 12.02216 amu