

Exam

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) A small amount of salt dissolved in water is an example of a _____. 1) _____
A) pure substance
B) solid
C) homogeneous mixture
D) compound
E) heterogeneous mixture
- 2) Which one of the following is a pure substance? 2) _____
A) salt water
B) elemental copper
C) milk
D) wood
E) concrete
- 3) In the following list, only _____ is not an example of a chemical reaction. 3) _____
A) dissolution of a penny in nitric acid
B) the condensation of water vapor
C) the formation of polyethylene from ethylene
D) the rusting of iron
E) a burning candle
- 4) If matter is uniform throughout and cannot be separated into other substances by physical means, it is _____. 4) _____
A) a compound
B) an element
C) a heterogeneous mixture
D) either an element or a compound
E) a homogeneous mixture
- 5) Of the following, only _____ is a chemical reaction. 5) _____
A) dissolving sugar in water
B) tarnishing of silver
C) crushing of stone
D) dropping a penny into a glass of water
E) melting of lead
- 6) Which one of the following is an intensive property? 6) _____
A) mass
B) amount
C) volume
D) temperature
E) heat content

7) Osmium has a density of 22.6 g/cm^3 . What volume (in cm^3) would be occupied by a 21.8 g sample of osmium? 7) _____

A) 2.03×10^{-3}
 B) 0.965
 C) 2.03×10^3
 D) 1.04
 E) 493

8) Which of the following liquids has the greatest density? 8) _____

A) 210 cm^3 with a mass of 12 g
 B) 3.5 cm^3 with a mass of 10 g
 C) 54 cm^3 with a mass of 45 g
 D) 13 cm^3 with a mass of 23 g
 E) 0.022 cm^3 with a mass of 0.10 g

9) A cube of an unknown metal measures 1.61 mm on one side. The mass of the cube is 36 mg. Which of the following is most likely the unknown metal? 9) _____

| Metal | Density (g/cm^3) |
|-----------|-----------------------------|
| rhodium | 12.4 |
| copper | 8.96 |
| niobium | 8.57 |
| vanadium | 6.11 |
| zirconium | 6.51 |

- A) niobium B) copper C) zirconium D) rhodium E) vanadium

10) How many significant figures are in the number 0.0034050? 10) _____

A) 6 B) 3 C) 7 D) 4 E) 5

11) The width, length, and height of a large, custom-made shipping crate are 1.20 m, 2.12 m, and 0.54 m, respectively. The volume of the box using the correct number of significant figures is _____ m^3 . 11) _____

A) 1.374 B) 1.4 C) 1.3738 D) 1.37376 E) 1.37

12) The gold foil experiment performed in Rutherford's lab _____. 12) _____

A) was the basis for Thomson's model of the atom
 B) proved the law of multiple proportions
 C) led to the discovery of the atomic nucleus
 D) confirmed the plum-pudding model of the atom
 E) utilized the deflection of beta particles by gold foil

13) Which atom has the largest number of neutrons? 13) _____

A) chlorine-37
 B) argon-40
 C) calcium-40
 D) phosphorus-30
 E) potassium-39

14) The element X has three naturally occurring isotopes. The masses (amu) and % abundances of the isotopes are given in the table below. The average atomic mass of the element is _____ amu. 14) _____

| Isotope | Abundance | Mass |
|------------------|-----------|-------|
| ^{221}X | 74.22 | 220.9 |
| ^{220}X | 12.78 | 220.0 |
| ^{218}X | 13.00 | 218.1 |

- A) 219.7 B) 220.4 C) 218.5 D) 221.0 E) 220.42

15) Which pair of elements would you expect to exhibit the greatest similarity in their physical and chemical properties? 15) _____

- A) K, Ca B) Si, P C) C, N D) H, He E) O, S

16) Which one of the following molecular formulas is also an empirical formula? 16) _____

- A) $\text{C}_2\text{H}_6\text{SO}$ B) $\text{C}_6\text{H}_6\text{O}_2$ C) H_2O_2 D) $\text{H}_2\text{P}_4\text{O}_6$ E) C_6H_6

17) Which type of formula provides the most information about a compound? 17) _____

- A) molecular B) empirical C) chemical D) structural E) simplest

18) There are _____ protons, _____ neutrons, and _____ electrons in $^{131}\text{I}^-$. 18) _____

- A) 131, 53, and 54
B) 53, 78, and 54
C) 131, 53, and 52
D) 78, 53, and 72
E) 53, 131, and 52

19) Barium reacts with a polyatomic ion to form a compound with the general formula $\text{Ba}_3(\text{X})_2$. What would be the most likely formula for the compound formed between sodium and the polyatomic ion X? 19) _____

- A) NaX B) Na_3X C) Na_2X D) Na_3X_2 E) Na_2X_2

20) Which one of the following compounds is chromium(III) oxide? 20) _____

- A) Cr_3O_2 B) Cr_3O C) Cr_2O_4 D) Cr_2O_3 E) CrO_3

21) Which one of the following polyatomic ions has the same charge as the hydroxide ion? 21) _____

- A) phosphate
B) ammonium
C) nitrate
D) sulfate
E) carbonate

22) The correct name for $\text{Ni}(\text{CN})_2$ is _____. 22) _____

- A) nickel cyanate
B) nickel (I) cyanide
C) nickel carbonate
D) nickel (II) cyanide
E) nickel (I) nitride