Exam

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

1) Which of the following describes a substance in the gaseous physical state?

A) The substance has a variable volume.

B) The substance has a variable shape.

C) The substance compresses significantly.

D) all of the above

E) none of the above

2) What is the term for a direct change of state from a gas to a solid?

A) sublimation

B) vaporization

C) condensation

D) deposition

E) none of the above

3) Air contains nitrogen, oxygen, argon, and other gases. Which of the following describes air?

A) compound

B) element

C) heterogeneous mixture

D) homogeneous mixture

E) none of the above

4) Which of the following is a general characteristic of a metal?

A) malleable

B) solid state

C) conductor of heat

D) high density

E) all of the above

5) Refer to a periodic table and predict which of the following is a liquid metal at 25 °C and one atmosphere pressure.

A) Hg B) As C) Xe D) Br E) Cl

6) Cyanocobalamin, C63H88CoN14O14P, is vitamin B12. What is the total number of atoms in the chemical formula of vitamin B12?

A) 181

B) 179

C) 12

D) 180

E) none of the above

7) Which of the following is an example of a physical property?

A) physical state

B) color

C) crystalline form

D) melting point

E) all of the above

8) Which of the following is an example of a chemical change?

A) baking a pie

B) boiling an egg

C) cooking a steak

D) charring sugar

E) all of the above

9) Which law states that the total mass of reactants before a chemical change is equal to the total mass of products after a chemical change?

A) law of conservation of mass

B) law of conservation of mass and energy

C) law of conservation of energy

D) law of constant composition

E) none of the above

10) Which physical state demonstrates very high kinetic energy?

A) solid state

B) liquid state

C) gaseous state

D) all of the above

E) none of the above

11) Which of the following of Dalton's proposals is still valid?

A) Compounds contain atoms in small whole number ratios.

B) An element is composed of tiny particles called atoms.

C) Atoms of different elements combine to form compounds.

D) all of the above

E) none of the above

12) According to the Thomson model, what is the relative charge on an electron?

A) +2

B) +1

C) -2

D) -1

E) none of the above

13) Which of the following subatomic particles are found inside the nucleus?

A) proton and electron

B) neutron and proton

C) electron and neutron

D) all of the above

E) none of the above

14) Using atomic notation, indicate the isotope having 11 p+, 12 n0, and 11 e-.

A) Mg B) Na C) Mg D) Na E) Na

15) Element Z has two natural isotopes: Z-79 (78.918 amu) and Z-81 (80.916 amu). Calculate the atomic mass of element Z given the abundance of Z-81 is 49.31%.

A) 79.00 amu

B) 79.90 amu

C) 120.92 amu

D) 80.00 amu

E) 119.93 amu

16) Which of the following wavelengths has the lowest energy?

A) 540 nm

B) 440 nm

C) 650 nm

D) 470 nm

E) All wavelengths have the same energy.

17) Which of the following produces the "atomic fingerprint" of an element?

A) electrons jumping to a higher energy level

B) protons jumping to a higher energy level

C) protons dropping to a lower energy level

D) electrons dropping to a lower energy level

E) none of the above

18) What is the maximum number of electrons that can occupy a *d* energy sublevel?

A) 2

B) 6

C) 10

D) 14

E) none of the above

19) What is the electron configuration for an atom of nickel?

A) 1*s*2 2*s*2 2*p*6 3*s*2 3*p*6 4*s*2 4*p*8

B) 1*s*2 2*s*2 2*p*6 3*s*2 3*p*6 4*s*2 4*d*8

C) 1*s*2 2*s*2 2*p*6 3*s*2 3*p*6 4*s*2 3*d*8

D) 1*s*2 2*s*2 2*p*6 3*s*2 3*p*6 3*d*8

E) none of the above

20) What term best describes the shape of a *p* orbital?

A) ellipse B) dumbbell C) sphere D) wave E) clover

21) Which of the following scientists is credited with first arranging the elements into groups according to increasing atomic mass and repeating properties?

A) Dmitri Mendeleev

B) J. A. R. Newlands

C) H. G. J. Moseley

D) Johann Döbereiner

E) none of the above

22) Which of the following is a transition element?

A) Cu

B) Au

C) Ag

D) all of the above

E) none of the above

23) Which of the following elements are fourth period semimetals?

A) Sb and Te

B) Po and At

C) Ge and As

D) Si and Ge

E) none of the above

24) Given the chemical formulas CH4, NH3, and H2O, predict the formula for silane, Si?H?.

A) SiH3 B) SiH2 C) H2Si D) SiH4 E) SiH

25) Which element has the following electron configuration: [Ar] 4*s*2 3*d*5?

A) Cl B) Tc C) Mn D) Br E) Kr

26) Which of the following is a general trend in the periodic table for the atomic radius of the elements?

A) decreases from left to right, decreases from bottom to top

B) decreases from left to right, increases from bottom to top

C) increases from left to right, decreases from bottom to top

D) increases from left to right, increases from bottom to top

E) none of the above

27) Predict the number of valence electrons for a chlorine atom.

A) 35 B) 1 C) 5 D) 17 E) 7

28) Which of the following is the electron dot formula for an atom of nitrogen?





29) Which of the following groups has a predictable ionic charge of two positive?

A) Group VIIIA/18

B) Group IIB/12

C) Group IIA/2

D) Group VIA/16

E) Group VIB/6

30) Which of the following is a general trend for the ionization energy of elements in the periodic table?

A) increases from left to right; decreases from bottom to top

B) decreases from left to right; increases from bottom to top

C) decreases from left to right; decreases from bottom to top

D) increases from left to right; increases from bottom to top

E) none of the above

31) What is the predicted ionic charge for a S ion?

A) 2-

B) 2+

C) 6+

D) 6-

E) none of the above

32) What is the predicted ionic charge for an Al ion?

A) 1-

B) 3+

C) 1+

D) 3-

E) none of the above

33) Which of the following ions is isoelectronic with the noble gas argon?

A) Ca2+

B) Sc+

C) Na+

D) V3+

E) none of the above

1) D

2) D

3) D

4) E

5) A

6) A

7) E

8) E

9) A

10) C

11) D

12) D

13) B

14) D

15) B

16) C

17) D

18) C

19) C

20) B

21) A

22) D

23) C

24) D

25) C

26) A

27) E

28) E

29) C

30) D

31) A

32) B

33) A