Exam 1

Duration: 50 minutes

(1) The fundamental SI unit of distance is
A) centimeter.
B) meter.
C) kilometer.
D) millimeter.
E) nanometer.

(2) If the melting point of tungsten metal is 3450°C, what is its melting point in Fahrenheit (°F) temperature?
A) 6200 °F
B) 6542 °F
C) 6345 °F
D) 6242 °F
E) 6713 °F

(3) A piece of metal weighs 9.00 g. When a student places it into a graduated cylinder containing water, the liquid level rises from 21.25 mL to 26.47 mL. What is the density of the metal?
A) 0.340 g/mL
B) 0.580 g/mL
C) 1.72 g/mL
D) 2.94 g/mL
E) 1.83 g/mL

(4) The average distance between nitrogen and oxygen atoms is 115 pm in a compound called nitric oxide. What is this distance in centimeters?
A) 1.15×10^{-9} cm
B) 1.15×10^{-8} cm
C) 1.15×10^{12} cm
D) 1.15×10^{16} cm
E) 1.15×10^{-11} cm

(5) What is the chemical symbol for Sodium?
A) Sc
B) Sr
C) S
D) Na
E) Se

(6) Which property refers to the ability to shape a metal?
A) Thickness
B) Density
C) Malleability
D) Hardness
E) Crystallinity

(7) Carry out the indicated arithmetic operation and give the answer with the correct number of significant figures.

4.033 + 88.1

A) 93.83
B) 93.13
C) 92.1
D) 92.133
E) 92.13

(8) The average mass of an atom is determined by:
A) adding the number of protons and electrons and dividing it by the number of neutrons.
B) averaging the masses of each isotope.
C) calculating the weighted average of all stable isotopic masses.
D) adding the number of protons and neutrons and dividing it by the number of electrons.
E) calculating the mass of protons and electrons

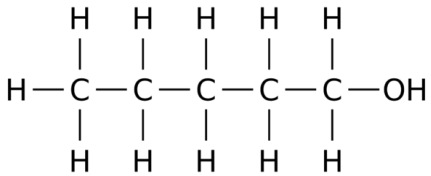
(9) According to the modern periodic table, _____ are examples of transition metals.
A) Fe and Zn
B) Sb and I
C) Pm and Gd
D) Al and Ga
E) K and Ca

(10) The molecular formula for iron(II) bromide is _____.
A) $FeBr_3$
B) $FeBr_2$
C) I_2Br_2
D) IBr_3
E) Fe_2Br_3

(11) What is the name of Cl_2O_7?
A) Chloride oxide
B) Dichloride oxide
C) Dichlorine oxide
D) Dichlorine heptoxide
E) Chlorine(VII) oxide

(12) How many protons (p) and neutrons (n) are in an atom of ^{90}Sr?
A) 38 p, 52 n
B) 38 p, 90 n
C) 52 p, 38 n
D) 90 p, 38 n
E) 38 p, 38 n

(13) What is the functional group present in this molecule?



A) Ketone
B) Aldehyde
C) Alcohol
D) Amine
E) Carboxylic acid

(14) What is the sum of the coefficients "**A** + **B** + **C**", where **A**, **B**, and **C** represent the coefficients of the balanced equation?

A P_4 + **B** O_2 ⟶ **C** P_2O_5

A) 3
B) 4
C) 7
D) 8
E) 14

(15) What is the molar mass of sodium carbonate?
A) 133 g/mol
B) 197 g/mol
C) 106 g/mol
D) 116 g/mol
E) 142 g/mol

(16) What is the empirical formula for ethyl fluoride if the compound contains 49.97% carbon, 10.51% hydrogen, and 39.52% fluorine by mass?
A) C_2H_5F
B) $C_4H_{10}F_2$
C) $C_4H_{10}F_4$
D) $C_{25}F_2$

(17) Which compound listed below is not soluble in water?
A) KCl
B) $(NH_4)_2CO_3$
C) $NaNO_3$
D) $PbSO_4$
E) none of these

(18) In the reaction $AgNO_3(aq) + HI(aq) \rightarrow AgI(s) + HNO_3(aq)$ the spectator ions are,

A) Ag^+ and NO_3^-
B) Ag^+ and I^-
C) H^+ and I^-
D) H^+ and NO_3^-

(19) 87.2 g of $IrCl_3$ contains _____ moles of the compound.
A) 7.65
B) 3.41
C) 0.0819
D) 0.292
E) 0.395

(20) If 92.8 g of $NaNO_2$ is dissolved in sufficient water to prepare 2.3 L of solution, the resulting solution has a molarity of _____.
A) 1.34 M
B) 0.890 M
C) 0.59 M
D) 1.92 M
E) 1.44 M

(21) What volume of a 1.00 M HCl solution must be diluted to obtain 200 mL of a 0.250 M HCl solution?
A) 30.0 mL
B) 50.0 mL
C) 60.0 mL
D) 75.0 mL
E) 40.0 mL

(22) Calculate the mass of Carbon required to react with 7.83 g of Fe_2O_3 according to the following equation. (Molar mass of Fe_2O_3 159.687 g/mol)

$$2\ Fe_2O_3 + 3\ C \longrightarrow 3\ CO_2 + 4\ Fe$$

A) 8.83 g
B) 8.00 g
C) 88.3 g
D) 0.883 g
E) 84.5 g

(23) How many grams of H_2 can be prepared from 25.0 mL of 6.00 M H_2SO_4 and excess zinc?

$$Zn(s) + H_2SO_4(aq) \longrightarrow ZnSO_4(aq) + H_2(g)$$

A) 0.405 g
B) 0.502 g
C) 0.302 g

D) 0.348 g
E) 0.403 g

(24) In an acid-base neutralization, 23.74 mL of 0.500 M KOH reacts with 25.00 mL of H_2SO_4. What is the concentration of the acid?

$$2\ KOH(aq) + H_2SO_4(aq) \longrightarrow K_2SO_4(aq) + 2\ H_2O(l)$$

A) 0.950 M
B) 0.475 M
C) 0.526 M
D) 0.237 M
E) 0.285 M

(25) Suppose a student performs a reaction and obtains 0.855 g of $CuCO_3$ and the theoretical yield is 0.988 g. What is the percent yield?

$$Cu(NO_3)_2(aq) + Na_2CO_3(aq) \rightarrow CuCO_3(s) + 2\ NaNO_3(aq)$$

A) 56.5%
B) 65.3%
C) 88.6%
D) 86.5%
E) 90.8%