

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

- 1) Which of the following is an example of matter? 1) _____
A) clothing
B) light
C) jealousy
D) wisdom
E) forgiveness
- 2) Malic acid, a compound used to increase the acidity of fruit-flavored products, freezes at 128°C and boils at 150°C. What is its phase at 100°C, a temperature used in food processing applications? 2) _____
A) gas
B) liquid
C) solid
D) a mixture of solid and liquid
E) a mixture of liquid and gas
- 3) Which factor determines the state of matter in which a substance exists? 3) _____
A) amount
B) temperature
C) odor
D) color
E) density
- 4) What element is represented by the chemical symbol K? 4) _____
A) silver
B) sodium
C) phosphorus
D) kaolin
E) potassium
- 5) When the prefix *centi* is used in the metric system, a fundamental unit of measurement is multiplied by what factor? 5) _____
A) 10^{-3} B) 10^6 C) 10^3 D) 10^{-2} E) 10^{-6}
- 6) The amount of matter in an object is its 6) _____
A) mass.
B) weight.
C) volume.
D) specific gravity.
E) density.

- 7) Which measurement represents the **largest** quantity? 7) _____
- A) 4.73×10^{-6} kg
 - B) 4730 ng
 - C) 47.3 mg
 - D) 4.73×10^{-4} g
 - E) 4.73×10^3 μ g
- 8) In an introductory laboratory exercise, a student was asked to measure the volume of soda in a partially filled can in metric units. Which value below is most likely to be correct? 8) _____
- A) 2.5 L
 - B) 550 μ L
 - C) 1.0 kL
 - D) 6.0×10^6 nL
 - E) 325 mL
- 9) 125 cL is the same as all of these **except** 9) _____
- A) 125 centiliter.
 - B) 12.5 deciliter.
 - C) 1.25 liter.
 - D) 1250 milliliter.
 - E) 125 cubic liter.
- 10) In scientific notation, the number 185,000,000 is 10) _____
- A) 1.85×10^6 .
 - B) 1.85×10^8 .
 - C) 185×10^{-8} .
 - D) 185×10^6 .
 - E) 1.85×10^{-8} .
- 11) What is the numerical value of $\frac{(3.00 \times 10^6)(2.0 \times 10^{-3})}{5.0 \times 10^{-2}}$? 11) _____
- A) 1.2×10^3
 - B) 1.2×10^7
 - C) 1.2×10^{11}
 - D) 1.2×10^5
 - E) 1.2
- 12) How many centimeters are there in one kilometer? 12) _____
- A) 10^2 cm
 - B) 10^5 cm
 - C) 10^1 cm
 - D) 10^{-5} cm
 - E) 10^{-2} cm
- 13) An extra-strength aspirin contains 0.500 g of aspirin. How many grains is this? (1 grain = 64.8 mg) 13) _____
- A) 32.4 grains
 - B) 3.24×10^4 grains
 - C) 13.0 grains
 - D) 7.72 grains
 - E) 65.3 grains
- 14) If gasoline sells for 95.4 cents per liter, what is its cost on a per gallon basis? 14) _____
- 1 L = 1.06 q
- A) \$404.50
 - B) \$3.60
 - C) \$4.04
 - D) \$3.82

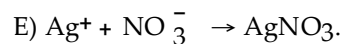
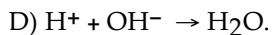
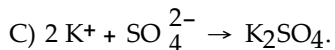
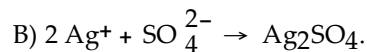
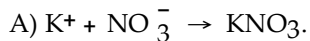
- 15) How many calories are released when 500 g of water cools from 95.0 °C to 25.0°C? 15) _____
A) 3.50×10^4 cal
B) 1.25×10^4 cal
C) 4.75×10^4 cal
D) 70.0 cal
E) 35.0 cal
- 16) A 35.0 mL sample of a liquid weighs 27.2 g. What is the density of the liquid? 16) _____
A) 62.2 g/mL
B) 0.777 g/mL
C) 0.952 g/mL
D) 7.80 g/mL
E) 1.29 g/mL
- 17) The smallest amount of an element that retains that element's characteristics is the 17) _____
A) atom. B) electron. C) neutron. D) proton. E) molecule.
- 18) Which characteristics correctly describe a proton? 18) _____
A) approximate mass 5×10^{-4} amu; charge -1; outside nucleus
B) approximate mass 5×10^{-4} amu; charge +1; inside nucleus
C) approximate mass 1 amu; charge 0; inside nucleus
D) approximate mass 1 amu; charge +1; outside nucleus
E) approximate mass 1 amu; charge +1; inside nucleus
- 19) An atom containing 29 protons, 29 electrons, and 34 neutrons has a mass number of 19) _____
A) 5. B) 63. C) 58. D) 29. E) 34.
- 20) An atom with a mass number of 58 and with 32 neutrons will have _____ protons. 20) _____
A) 90 B) 26 C) 58 D) 16 E) 32
- 21) Adding one proton to the nucleus of an atom: 21) _____
A) does not change either its atomic number or its atomic mass
B) converts it to an isotope of the same element
C) converts it to an atom of a different element
D) increases its atomic mass by one unit, but does not change its atomic number
E) increases its atomic number by one unit but does not change its atomic mass
- 22) Elements in the Periodic Table are arranged according to 22) _____
A) atomic weight.
B) alphabetical order.
C) number of neutrons.
D) atomic number.
E) date of discovery.
- 23) How many electrons are there in the valence shell of a nitrogen atom? 23) _____
A) 5 B) 2 C) 7 D) 0 E) 3

- 32) In a Lewis dot structure the electrons which complete an octet but are not located between two atoms are referred to as _____ 32) _____
- A) lone pairs.
 B) bonding pairs.
 C) excess electrons.
 D) filled shells.
 E) delta minus electrons.
- 33) A molecule in which the central atom has no lone pairs and forms four single bonds is said to have a _____ shape. 33) _____
- A) linear
 B) bent
 C) planar
 D) pyramidal
 E) tetrahedral
- 34) A molecule in which the central atom forms three single bonds and has one lone pair is said to have a _____ shape. 34) _____
- A) tetrahedral
 B) linear
 C) planar
 D) pyramidal
 E) bent
- 35) The water molecule has a _____ geometry because its central atom has _____ bonds and _____ lone pairs of electrons. 35) _____
- A) planar triangular; three; one
 B) bent; two; two
 C) tetrahedral; four; zero
 D) pyramidal; three; one
 E) linear; two; two
- 36) The formula for phosphorus pentafluoride is _____. 36) _____
- A) P₅F B) PF₅ C) PhF₅ D) P₅F₅ E) (PF)₅
- 37) Which of the following equations is **not** balanced? 37) _____
- A) $C_3H_8 + 5 O_2 \rightarrow 3 CO_2 + 4 H_2O$
 B) $2 Al + 6 HCl \rightarrow 2 AlCl_3 + 3 H_2$
 C) $SO_2 + O_2 \rightarrow SO_3$
 D) $2 Na + 2 H_2O \rightarrow 2 NaOH + H_2$
 E) $2 H_2 + O_2 \rightarrow 2 H_2O$
- 38) The balanced equation for the reaction occurring when calcium nitrate solution is mixed with sodium phosphate solution is _____ 38) _____
- A) $3 Ca(NO_3)_2 (aq) + 2 Na_3PO_4 (aq) \rightarrow Ca_3(PO_4)_2 (aq) + 6 NaNO_3 (aq)$.
 B) $2 Ca(NO_3)_2 (aq) + 3 Na_3PO_4 (aq) \rightarrow 2 Ca_3(PO_4)_2 (s) + 6 NaNO_3 (aq)$.
 C) $Ca(NO_3)_2 (aq) + 2 NaPO_4 (aq) \rightarrow Ca(PO_4)_2 (s) + 2 NaNO_3 (aq)$.
 D) $3 Ca(NO_3)_2 (aq) + 2 Na_3PO_4 (aq) \rightarrow Ca_3(PO_4)_2 (s) + 6 NaNO_3 (aq)$.
 E) $3 CaNO_3 (aq) + Na_3PO_4 (aq) \rightarrow Ca_3PO_4 (aq) + 3 NaNO_3 (s)$.

- 39) The formula weight of copper(II) chloride is _____ g. 39) _____
A) 134.45 B) 98.90 C) 162.53 D) 197.80 E) 133.00
- 40) How many moles of NaHCO₃ are present in a 2.00 g sample? 40) _____
A) 168 mol
B) 85.0 mol
C) 1.27×10^{-2} mol
D) 2.00 mol
E) 2.38×10^{-2} mol
- 41) Determine the number of moles of water produced when one mole of NH₃ reacts according to the 41) _____
balanced reaction shown.
- $4 \text{ NH}_3 + 5 \text{ O}_2 \rightarrow 4 \text{ NO} + 6 \text{ H}_2\text{O}$
- A) 0.67 B) 1.00 C) 1.25 D) 1.50 E) 1.33
- 42) In the reaction $2 \text{ C} + \text{ O}_2 \rightarrow 2 \text{ CO}$, how many moles of carbon are needed to produce 66.0 g of 42) _____
carbon monoxide?
A) 28.3 B) 1.18 C) 0.424 D) 4.71 E) 2.36
- 43) How many grams of C will be consumed when 5.00 grams of Na₂SO₄ react according to the 43) _____
balanced reaction shown?
- $\text{Na}_2\text{SO}_4 + 2 \text{ C} \rightarrow \text{Na}_2\text{S} + 2 \text{ CO}_2$
- A) 0.211 g B) 17.1 g C) 0.844 g D) 1.69 g E) 0.038 g
- 44) Which reaction is an example of a precipitation reaction? 44) _____
A) $\text{H}_2\text{CO}_3 (\text{aq}) \rightarrow \text{H}_2\text{O} (\text{l}) + \text{CO}_2 (\text{g})$
B) $\text{H}_2\text{SO}_4 (\text{aq}) + \text{Ca}(\text{OH})_2 (\text{aq}) \rightarrow \text{CaSO}_4 (\text{aq}) + 2 \text{ H}_2\text{O} (\text{l})$
C) $2 \text{ Hg} (\text{l}) + \text{O}_2 (\text{g}) \rightarrow 2 \text{ HgO} (\text{s})$
D) $6 \text{ HCl} (\text{aq}) + 2 \text{ Al} (\text{s}) \rightarrow 2 \text{ AlCl}_3 (\text{aq}) + 3 \text{ H}_2 (\text{g})$
E) $\text{FeCl}_3 (\text{aq}) + \text{KOH} (\text{aq}) \rightarrow \text{Fe}(\text{OH})_3 (\text{s}) + 3 \text{ KCl} (\text{aq})$
- 45) The combination of ions least likely to produce a precipitate is 45) _____
A) Ca²⁺ and PO₄³⁻.
B) Ba²⁺ and SO₄²⁻.
C) Mg²⁺ and C₂H₃O₂⁻.
D) Fe³⁺ and OH⁻.
E) Pb⁺ and Cl⁻.

46) $2 \text{AgNO}_3(\text{aq}) + \text{K}_2\text{SO}_4(\text{aq}) \rightarrow 2 \text{KNO}_3(\text{aq}) + \text{Ag}_2\text{SO}_4(\text{s})$ 46) _____

The net ionic reaction for the balanced equation shown above is



47) The oxidation number of sulfur in calcium sulfate, CaSO_4 , is _____. 47) _____

A) +6

B) -2

C) +2

D) 0

E) +4

48) $\text{Fe}(\text{s}) + \text{CuCl}_2(\text{aq}) \rightarrow \text{Cu}(\text{s}) + \text{FeCl}_2(\text{aq})$ In the redox reaction shown, _____ is oxidized and becomes _____. 48) _____

A) Cu; Cu^{2+}

B) Cu^{2+} ; Cu

C) Fe; Fe^{2+}

D) Fe; Fe^+

E) none of the above

49) The element chlorine is very reactive as a(an) _____ agent because it readily _____ electrons to form the chloride ion. 49) _____

A) reducing; gains

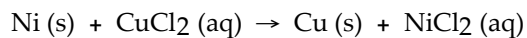
B) oxidizing; gains

C) oxidizing; loses

D) reducing; loses

E) none of the above

50) In the reaction shown, _____ is the oxidizing agent because it _____. 50) _____



A) Ni; gets reduced

B) CuCl_2 ; gets reduced

C) CuCl_2 ; causes reduction

D) Ni; causes reduction

E) NiCl_2 ; gets reduced

Answer Key

Testname: 104_F09_E1A

- 1) A
- 2) C
- 3) B
- 4) E
- 5) D
- 6) A
- 7) C
- 8) E
- 9) E
- 10) B
- 11) D
- 12) B
- 13) D
- 14) B
- 15) A
- 16) B
- 17) A
- 18) E
- 19) B
- 20) B
- 21) C
- 22) D
- 23) A
- 24) A
- 25) B
- 26) C
- 27) A
- 28) D
- 29) B
- 30) E
- 31) A
- 32) A
- 33) E
- 34) D
- 35) B
- 36) B
- 37) C
- 38) D
- 39) A
- 40) E
- 41) D
- 42) E
- 43) C
- 44) E
- 45) C
- 46) B
- 47) A
- 48) C
- 49) B
- 50) B