1 **A weather balloon with a 2-meter diameter at ambient temperature holds 525 grams of helium. What type of electronic probe could be used to determine the pressure inside the balloon?**

A barometric

B thermometric

C calorimetric

D spectrophotometric

CSC10177

2 **Which would be *most* appropriate for collecting data during a neutralization reaction?**

A a pH probe

B a statistics program

C a thermometer

D a graphing program

CSC20124

3 **A scientist observed changes in the gas pressure of one mole of a gas in a sealed chamber with a fixed volume. To identify the source of the changes, the scientist should check for variations in the**

A air pressure outside the chamber.

B molecular formula of the gas.

C temperature of the chamber.

D isotopes of the gas.

CSC10120

4 **Electrical fires cannot be safely put out by dousing them with water. However, fire extinguishers that spray solid carbon dioxide on the fire work very effectively. This method works because carbon dioxide**

A displaces the oxygen.

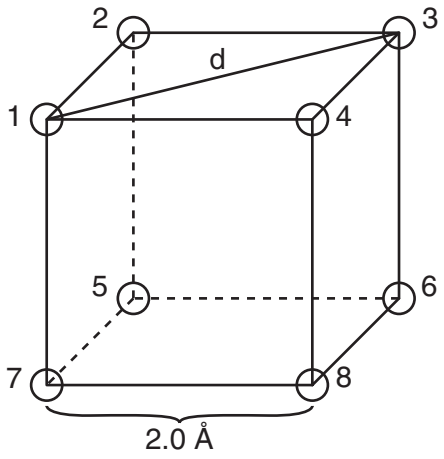
B renders the fire's fuel non-flammable.

C forms water vapor.

D blows the fire out with strong wind currents.

CSC00005

5



In the cubic crystal shown, if each edge is 2.0 angstroms in length, what is the diagonal distance, d, between atoms 1 and 3? (Assume that the Pythagorean theorem can be used to solve this problem.)

A 2.5 Å

B $2\sqrt{2.0}$ Å

C $2\sqrt{3.0}$ Å

D $3\sqrt{2.0}$ Å

CSC00127

6 **In order to advance to the level of a theory, a hypothesis should be**

A obviously accepted by most people.

B a fully functional experiment.

C in alignment with past theories.

D repeatedly confirmed by experimentation.

CSC00144

7 **Matter is made of atoms that have positive centers of neutrons and protons surrounded by a cloud of negatively charged electrons. This statement is**

A a theory.

B a hypothesis.

C an inference.

D an observation.

CSC20129

8

Model of an Ideal Gas	
No.	**Corollary**
1	Molecules have insignificant volume (point particles).
2	Molecules are very far apart from each other.
3	Molecules are not attracted to each other.
4	Molecules are in continuous, completely random motion in all directions with varying speeds.
5	Molecules bounce off walls and each other perfectly elastically.

The model of ideal gases shown above is useful because it

A accurately approximates the properties of most gas molecules.

B predicts the behavior of other phases of matter.

C gives precise explanations for nonideal gas behavior.

D shows a linear relation between gas pressure and volume.

CSC20474

9 **When a metal is heated in a flame, the flame has a distinctive color. This information was eventually extended to the study of stars because**

A the color spectra of stars indicate which elements are present.

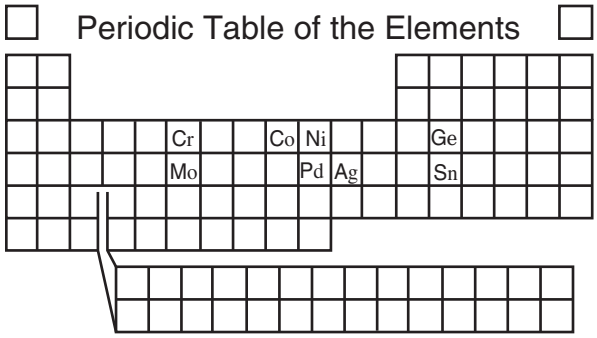
B a red shift in star color indicates stars are moving away.

C star color indicates absolute distance.

D it allows the observer to determine the size of stars.

CSC00006

10



Which of the following ordered pairs of elements shows an increase in atomic number but a decrease in average atomic mass?

A Ag to Pd

B Co to Ni

C Ge to Sn

D Cr to Mo

CSC00149

11 **Why is cobalt (Co) placed before nickel (Ni) on the periodic table of the elements even though it has a higher average atomic mass than nickel?**

A Nickel has one more proton.

B Cobalt was discovered first.

C Nickel has fewer electrons.

D Cobalt has a lower density.

CSC20049

12 **Generally, how do atomic masses vary throughout the periodic table of the elements?**

A They increase from left to right and top to bottom.

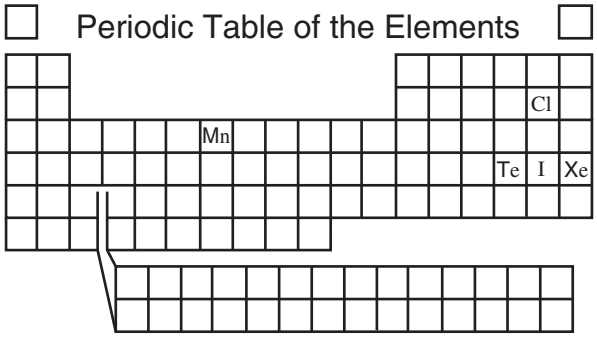
B They increase from left to right and bottom to top.

C They increase from right to left and top to bottom.

D They increase from right to left and bottom to top.

CSC20136

13



Iodine would have chemical properties *most* like

A manganese (Mn).

B tellurium (Te).

C chlorine (Cl).

D xenon (Xe).

CSC00028

14 **Which of the following elements is classified as a metal?**

A bromine

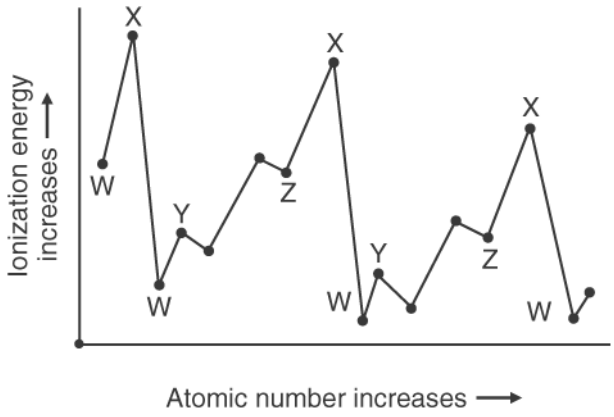
B helium

C sulfur

D lithium

CSC20170

15



The chart above shows the relationship between the first ionization energy and the increase in atomic number. The letter on the chart for the alkali family of elements is

A W.

B X.

C Y.

D Z.

CSC00206

16 **Which of the following atoms has the largest atomic radius?**

A barium (Ba)

B chlorine (Cl)

C iodine (I)

D magnesium (Mg)

CSC10393

17 **Which of the following atoms has six valence electrons?**

A magnesium (Mg)

B silicon (Si)

C sulfur (S)

D argon (Ar)

CSC00185

18 **Which statement *best* describes the density of an atom's nucleus?**

A The nucleus occupies most of the atom's volume but contains little of its mass.

B The nucleus occupies very little of the atom's volume and contains little of its mass.

C The nucleus occupies most of the atom's volume and contains most of its mass.

D The nucleus occupies very little of the atom's volume but contains most of its mass.

CSC10304

19

Results of Firing Alpha Particles at Gold Foil

Observation:	Proportion:
Alpha particles went straight through gold foil.	> 98%
Alpha particles went through gold foil but were deflected at large angles.	≈ 2%
Alpha particles bounced off gold foil.	≈ 0.01%

What information do the experimental results above reveal about the nucleus of the gold atom?

A The nucleus contains less than half the mass of the atom.

B The nucleus is small and is the densest part of the atom.

C The nucleus contains small positive and negative particles.

D The nucleus is large and occupies most of the atom's space.

CSC20056

20 **Why are enormous amounts of energy required to separate a nucleus into its component protons and neutrons even though the protons in the nucleus repel each other?**

A The force of the protons repelling each other is small compared to the attraction of the neutrons to each other.

B The electrostatic forces acting between other atoms lowers the force of repulsion of the protons.

C The interactions between neutrons and electrons neutralize the repulsive forces between the protons.

D The forces holding the nucleus together are much stronger than the repulsion between the protons.

CSC00136

21 **The most abundant isotope of lead contains 82 protons and 124 neutrons packed closely together in the nucleus. Why do the protons stay together in the nucleus rather than fly apart?**

A Electrons in neighboring atoms neutralize repulsive forces between protons.

B Neutrons effectively block the protons and keep them far apart to prevent repulsion.

C Electrostatic forces between neutrons and protons hold the nucleus together.

D Nuclear forces overcome repulsive forces between protons in the nucleus.

CSC20451

22 **Which equation correctly represents the alpha decay of polonium-214?**

A

$$^{214}_{84}\text{Po} \rightarrow {}^{214}_{85}\text{Po} + {}^{0}_{-1}\text{e}$$

B

$$^{214}_{84}\text{Po} + {}^{2}_{4}\text{He} \rightarrow {}^{216}_{90}\text{Th}$$

C

$$^{214}_{84}\text{Po} \rightarrow {}^{210}_{82}\text{Pb} + {}^{4}_{2}\text{He}$$

D

$$^{214}_{84}\text{Po} \rightarrow {}^{214}_{82}\text{Pb} + {}^{0}_{2}\text{He}$$

CSC10110

23 **A 2-cm-thick piece of cardboard placed over a radiation source would be *most* effective in protecting against which type of radiation?**

A alpha

B beta

C gamma

D x-ray

CSC00299

24 **Which of the following is a monatomic gas at STP?**

A chlorine

B fluorine

C helium

D nitrogen

CSC10387

25 **When cations and anions join, they form what kind of chemical bond?**

A ionic

B hydrogen

C metallic

D covalent

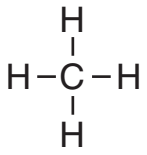
CSC20314

26 **Which of the following correctly shows how carbon and hydrogen bond to form a compound?**

A $[4H]^{+4}[C]^{-4}$

B $[H]^{+}[C]^{-}$

C



D C – H

CSC00237

27 **Some of the molecules found in the human body are NH_2CH_2COOH (glycine), $C_6H_{12}O_6$ (glucose), and $CH_3(CH_2)_{16}COOH$ (stearic acid). The bonds they form are**

A nuclear.

B metallic.

C ionic.

D covalent.

CSC10230

28

Table of Common Molecules				
Name	**Hydrogen**	**Chlorine**	**Ammonia**	**Methane**
Molecular Formula	H_2	Cl_2	NH_3	CH_4

What type of bond do all of the molecules in the table above have in common?

A covalent

B ionic

C metallic

D polar

CSC10331

29 **The reason salt crystals, such as KCl, hold together so well is because the cations are strongly attracted to**

A neighboring cations.

B the protons in the neighboring nucleus.

C free electrons in the crystals.

D neighboring anions.

CSC00150

30 **What type of force holds ions together in salts such as CaF_2 ?**

A electrostatic

B magnetic

C gravitational

D nuclear

CSC20144

31 **Under the same conditions of pressure and temperature, a liquid differs from a gas because the molecules of the liquid**

A have no regular arrangement.

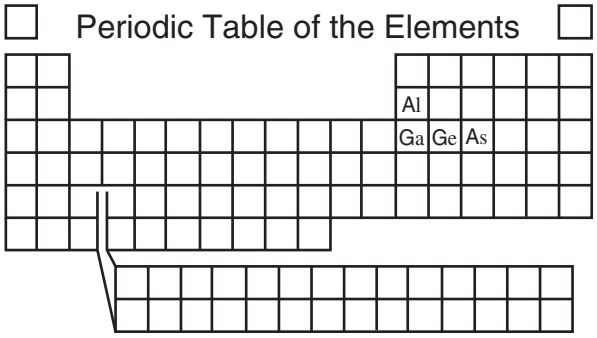
B are in constant motion.

C have stronger forces of attraction between them.

D take the shape of the container they are in.

CSC10388

32



Which of the following elements has the same Lewis dot structure as silicon?

A germanium (Ge)

B aluminum (Al)

C arsenic (As)

D gallium (Ga)

CSC00142

33 **Which substance is made up of many monomers joined together in long chains?**

A salt

B protein

C ethanol

D propane

CSC00323

34 **For the polymer, polyvinyl chloride (PVC), ~ $CH_2CH(Cl)CH_2CH(Cl)CH_2CH(Cl)$ ~ the repeating subunit is**

A CH(Cl).

B $CH(Cl)CHCH_2$.

C CH_2CH.

D $CH_2CH(Cl)$.

CSC10086

35 **Which element is capable of forming stable, extended chains of atoms through single, double, or triple bonds with itself?**

A carbon

B oxygen

C nitrogen

D hydrogen

CSC20155

36 **Proteins are large macromolecules composed of thousands of subunits. The structure of the protein depends on the sequence of**

A lipids.

B monosaccharides.

C amino acids.

D nucleosides.

CSC00062

37 **When a cold tire is inflated to a certain pressure and then is warmed up due to friction with the road, the pressure increases. This happens because the**

A air molecules hit the walls of the tire less frequently.

B rubber in the tire reacts with oxygen in the atmosphere.

C air molecules speed up and collide with the tire walls more often.

D air molecules diffuse rapidly through the walls of the tire.

CSC00183

38 **When someone standing at one end of a large room opens a bottle of vinegar, it may take several minutes for a person at the other end to smell it. Gas molecules at room temperature move at very high velocities, so what is responsible for the delay in detection of the vinegar?**

A the increase in the airspace occupied by vinegar molecules

B the chemical reaction with nerves, which is slower than other sensory processes

C attractive forces between the air and vinegar molecules

D random collisions between the air and vinegar molecules

CSC00125

39 **Methane (CH_4) gas diffuses through air because the molecules are**

A moving randomly.

B dissolving quickly.

C traveling slowly.

D expanding steadily.

CSC20840

40 **The volume of 400 mL of chlorine gas at 400 mm Hg is decreased to 200 mL at constant temperature. What is the new gas pressure?**

A 400 mm Hg

B 300 mm Hg

C 800 mm Hg

D 650 mm Hg

CSC00239

41 **Under what circumstance might a gas decrease in volume when heated?**

A The gas is held constant at STP.

B The gas remains under uniform temperature.

C The gas is placed under increasing pressure.

D The gas undergoes a decrease in pressure.

CSC20333

42 **A sample of carbon dioxide gas occupies a volume of 20 L at standard temperature and pressure (STP). What will be the volume of a sample of argon gas that has the same number of moles and pressure but twice the absolute temperature?**

A 10 L

B 20 L

C 40 L

D 80 L

CSC10250

43 **Standard temperature and pressure (STP) are defined as**

A 0 ºC and 1.0 atm pressure.

B 0 ºC and 273 mm Hg pressure.

C 0 K and 1.0 atm pressure.

D 0 K and 760 mm Hg pressure.

CSC00285

44 **Under which of the following sets of conditions will a 0.50 mole sample of helium occupy a volume of 11.2 liters?**

A 298 K and 0.90 atm

B 273 K and 1.10 atm

C 373 K and 0.50 atm

D 273 K and 1.00 atm

CSC10234

45 **What is the equivalent of 423 kelvin in degrees Celsius?**

A −223 ºC

B −23 ºC

C 150 ºC

D 696 ºC

CSC00089

46 **Theoretically, when an ideal gas in a closed container cools, the pressure will drop steadily until the pressure inside is essentially that of a vacuum. At what temperature should this occur?**

A 0 ºC

B −460 ºC

C −273 K

D 0 K

CSC10216

47 **The temperature at which all molecular motion stops is**

A −460 ºC.

B −273 K.

C 0 K.

D 0 ºC.

CSC20088

48

SOLUBILITY OF SUBSTANCES IN WATER @ 20 °C		
Substance	**Formula/State**	**Solubility (g/100g H_2O)**
Magnesium chloride	$MgCl_2$ / solid	54.6
Ammonia	NH_3 / gas	34.0
Ethanol	CH_3CH_2OH / liquid	infinite
Benzoic Acid	C_6H_5COOH / solid	0.29

Which of the substances in the table can act as either the solute or the solvent when mixed with 100 grams of water at 20 °C?

A NH_3

B C_6H_5COOH

C $MgCl_2$

D CH_3CH_2OH

CSC10055

49 **A teaspoon of dry coffee crystals dissolves when mixed in a cup of hot water. This process produces a coffee solution. The original crystals are classified as a**

A solute.

B solvent.

C reactant.

D product.

CSC20256

50 **If the attractive forces among solid particles are less than the attractive forces between the solid and a liquid, the solid will**

A probably form a new precipitate as its crystal lattice is broken and re-formed.

B be unaffected because attractive forces within the crystal lattice are too strong for the dissolution to occur.

C begin the process of melting to form a liquid.

D dissolve as particles are pulled away from the crystal lattice by the liquid molecules.

CSC00088

51 **Water is a polar solvent, while hexane is a nonpolar solvent.**

Solute	Water	Hexane
NH_4Cl, ammonium chloride	Soluble	Insoluble
$C_{10}H_8$, naphthalene	Insoluble	Soluble
C_2H_5OH, ethanol	Soluble	Soluble
$CO(NH_2)_2$, urea	Soluble	Insoluble

Which of the examples above illustrates a nonpolar solute in a polar solvent?

A NH_4Cl in water

B $C_{10}H_8$ in water

C C_2H_5OH in hexane

D $CO(NH_2)_2$ in hexane

CSC20958

52 **A technician prepared a solution by heating 100 milliliters of distilled water while adding KCl crystals until no more KCl would dissolve. She then capped the clear solution and set it aside on the lab bench. After several hours she noticed the solution had become cloudy and some solid had settled to the bottom of the flask. Which statement *best* describes what happened?**

A As the solution cooled, evaporation of water increased the KCl concentration beyond its solubility.

B Water molecules, trapped with the KCl crystals, were released after heating.

C At lower temperatures the solubility of the KCl decreased and recrystallization occurred.

D At increased temperatures the solubility of KCl increased and remained too high after cooling.

CSC00012

53 **If the solubility of NaCl at 25 ºC is 36.2 g/100 g H_2O, what mass of NaCl can be dissolved in 50.0 g of H_2O?**

A 18.1 g

B 36.2 g

C 72.4 g

D 86.2 g

CSC00275

54 **How many moles of HNO_3 are needed to prepare 5.0 liters of a 2.0 M solution of HNO_3?**

A 2.5

B 5

C 10

D 20

CSC10375

55 **The Dead Sea is the saltiest sea in the world. It contains 332 grams of salt per 1000 grams of water. What is the concentration in parts per million (ppm)?**

A 0.332 ppm

B 332 ppm

C 33,200 ppm

D 332,000 ppm

CSC20046

56 **The random molecular motion of a substance is greatest when the substance is**

A condensed.

B a liquid.

C frozen.

D a gas.

CSC00258

57 **Which of these is an example of an exothermic chemical process?**

A evaporation of water

B melting ice

C photosynthesis of glucose

D combustion of gasoline

CSC00153

58 **The boiling point of liquid nitrogen is 77 kelvin. It is observed that ice forms at the opening of a container of liquid nitrogen. The *best* explanation for this observation is**

A water at zero degrees Celsius is colder than liquid nitrogen and freezes.

B the nitrogen boils and then cools to form a solid at the opening of the container.

C water trapped in the liquid nitrogen escapes and freezes.

D the water vapor in the air over the opening of the liquid nitrogen freezes out.

CSC00171

59 **The specific heat of copper is about 0.4 joules/gram ºC. How much heat is needed to change the temperature of a 30-gram sample of copper from 20.0 ºC to 60.0 ºC?**

A 1000 J

B 720 J

C 480 J

D 240 J

CSC00045

60 **Equal volumes of 1 molar hydrochloric acid (HCl) and 1 molar sodium hydroxide base (NaOH) are mixed. After mixing, the solution will be**

A strongly acidic.

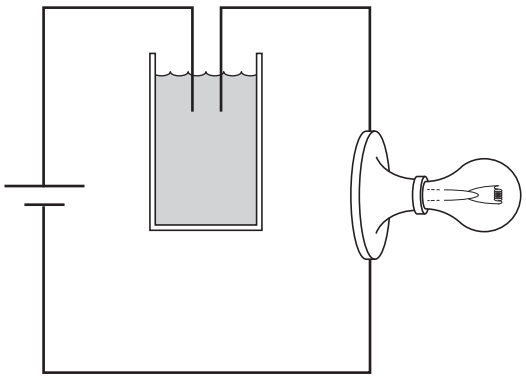
B weakly acidic.

C nearly neutral.

D weakly basic.

CSC00188

61



The above picture shows a light bulb connected to a battery with the circuit interrupted by a solution. When dissolved in the water to form a 1.0 molar solution, all of the following substances will complete a circuit allowing the bulb to light *except*

A hydrochloric acid.

B sodium nitrate.

C sucrose.

D ammonium sulfate.

CSC00146

62 **Which of the following is an observable property of many acids?**

A They become slippery when reacting with water.

B They react with metals to release hydrogen gas.

C They produce salts when mixed with other acids.

D They become more acidic when mixed with a base.

CSC20338

63 **Copper (II) nitrate and sodium hydroxide solutions react in a test tube as shown below.**

$$Cu(NO_3)_{2(aq)} + 2NaOH_{(aq)} \rightarrow Cu(OH)_{2(s)} + 2NaNO_{3(aq)}$$

If nitric acid is added to the test tube, the amount of solid precipitate decreases. The *best* explanation for this is that the acid

A dilutes the solution making the precipitate dissolve.

B reacts with the copper (II) nitrate, pulling the equilibrium to the left.

C will dissolve most solids, including sodium nitrate.

D will react with the copper (II) hydroxide to form water and soluble copper (II) nitrate.

CSC00160

64 **Potassium hydroxide (KOH) is a strong base because it**

A easily releases hydroxide ions.

B does not dissolve in water.

C reacts to form salt crystals in water.

D does not conduct an electric current.

CSC20341

65 **Of four different laboratory solutions, the solution with the *highest* acidity has a pH of**

A 11.

B 7.

C 5.

D 3.

CSC00173

66

$$H_2 + Cl_2 \longrightarrow 2HCl$$

Which of these describes the rate of this chemical reaction?

A an increase in the concentration of HCl and H_2 with time

B an increase in the concentration of HCl with time

C an increase in H_2 and Cl_2 with time

D a decrease in HCl and Cl_2 with time

CSC10369

67

$$C_6H_6 + Br_2 \xrightarrow{\text{catalyst}} C_6H_5Br + HBr$$

Which of the following changes will cause an increase in the rate of the above reaction?

A increasing the concentration of Br_2

B decreasing the concentration of C_6H_6

C increasing the concentration of HBr

D decreasing the temperature

CSC00027

68

$$2CO + O_2 \longrightarrow 2CO_2$$

If the above reaction takes place inside a sealed reaction chamber, then which of these procedures will cause a decrease in the rate of reaction?

A raising the temperature of the reaction chamber

B increasing the volume inside the reaction chamber

C removing the CO_2 as it is formed

D adding more CO to the reaction chamber

CSC00106

69 **A catalyst can speed up the rate of a given chemical reaction by**

A increasing the equilibrium constant in favor of products.

B lowering the activation energy required for the reaction to occur.

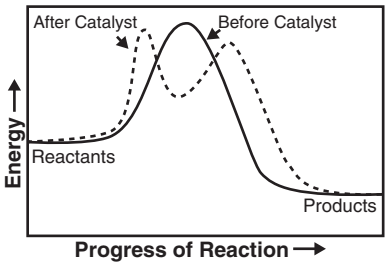
C raising the temperature at which the reaction occurs.

D increasing the pressure of reactants, thus favoring products.

CSC00184

70 **Which reaction diagram shows the effect of using the appropriate catalyst in a chemical reaction?**

A



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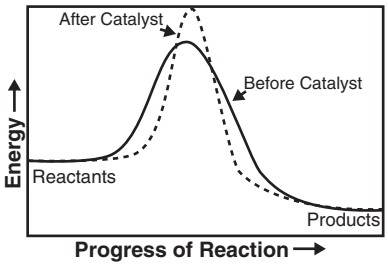

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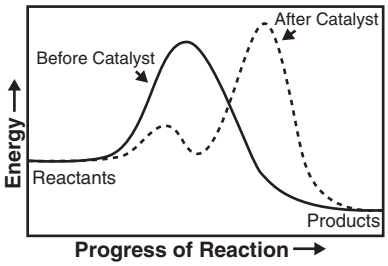
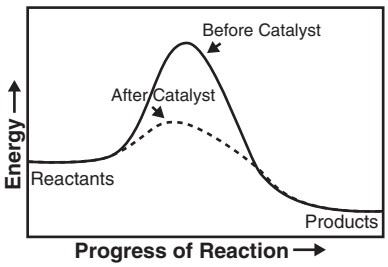


D



CSC20412

71 **H_2O_2, hydrogen peroxide, naturally breaks down into H_2O and O_2 over time. MnO_2, manganese dioxide, can be used to lower the energy of activation needed for this reaction to take place and, thus, increase the rate of reaction. What type of substance is MnO_2?**

A a catalyst

B an enhancer

C an inhibitor

D a reactant

CSC10368

72 **When a reaction is at equilibrium and more reactant is added, which of the following changes is the immediate result?**

A The reverse reaction rate remains the same.

B The forward reaction rate increases.

C The reverse reaction rate decreases.

D The forward reaction rate remains the same.

CSC00248

73 **In which of the following reactions involving gases would the forward reaction be favored by an increase in pressure?**

A $A + B \rightleftharpoons AB$

B $A + B \rightleftharpoons C + D$

C $2A + B \rightleftharpoons C + 2D$

D $AC \rightleftharpoons A + C$

CSC00129

74

$$4HCl_{(g)} + O_{2(g)} \rightleftarrows 2H_2O_{(l)} + 2Cl_{2(g)} + 113\ kJ$$

Which action will drive the reaction to the right?

A heating the equilibrium mixture

B adding water to the system

C decreasing the oxygen concentration

D increasing the system's pressure

CSC10082

75

$$NO_2(g) + CO(g) \rightleftharpoons NO(g) + CO_2(g)$$

The reaction shown above occurs inside a closed flask. What action will shift the reaction to the left?

A pumping CO gas into the closed flask

B raising the total pressure inside the flask

C increasing the NO concentration in the flask

D venting some CO_2 gas from the flask

CSC20419

76

$$NH_4Cl(s) + heat \rightleftharpoons NH_3(g) + HCl(g)$$

What kind of change will shift the reaction above to the right to form more products?

A a decrease in total pressure

B an increase in the concentration of HCl

C an increase in the pressure of NH_3

D a decrease in temperature

CSC20103

77 **In a sealed bottle that is half full of water, equilibrium will be attained when water molecules**

A cease to evaporate.

B begin to condense.

C are equal in number for both the liquid and the gas phase.

D evaporate and condense at equal rates.

CSC00152

78

$$C_3H_8 + O_2 \longrightarrow CO_2 + H_2O$$

This chemical equation represents the combustion of propane. When correctly balanced, the coefficient for water is

A 2.

B 4.

C 8.

D 16.

CSC00311

79 **Which of the following is a balanced equation for the combustion of ethanol (CH_3CH_2OH)?**

A $CH_3CH_2OH + 3O_2 \longrightarrow CO_2 + 2H_2O$

B $CH_3CH_2OH + 3O_2 \longrightarrow 2CO_2 + 3H_2O$

C $CH_3CH_2OH + O_2 \longrightarrow 2CO_2 + 3HO$

D $CH_3CH_2OH + 2O_2 \longrightarrow 3CO_2 + 2H_2O$

CSC10401

80 **Hydrazine, N_2H_4, and dinitrogen tetroxide, N_2O_4, react to form gaseous nitrogen and water. Which of these represents a properly balanced equation for this reaction?**

A $N_2H_4 + N_2O_4 \rightarrow N_2 + H_2O$

B $2N_2H_4 + N_2O_4 \rightarrow 2N_2 + 4H_2O$

C $2N_2H_4 + N_2O_4 \rightarrow 3N_2 + 4H_2O$

D $2N_2H_4 + 3N_2O_4 \rightarrow 5N_2 + 6H_2O$

CSC00092

81

$$\_\_\ NH_3(g) + \_\_\ O_2(g) \longrightarrow \_\_\ N_2(g) + \_\_\ H_2O(g)$$

When the reaction above is completely balanced, the coefficient for NH_3 will be

A 2.

B 3.

C 4.

D 6.

CSC20068

82 **How many moles of carbon-12 are contained in exactly 6 grams of carbon-12?**

A 0.5 mole

B 2.0 moles

C 3.01×10^{23} moles

D 6.02×10^{23} moles

CSC00068

83 **How many atoms are contained in 97.6 g of platinum (Pt)?**

A 5.16×10^{30}

B 3.01×10^{23}

C 1.20×10^{24}

D 1.10×10^{28}

CSC00255

84 **When methane (CH_4) gas is burned in the presence of oxygen, the following chemical reaction occurs.**

$$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$$

If 1 mole of methane reacts with 2 moles of oxygen, then

A 6.02×10^{23} molecules of CO_2 an 6.02×10^{23} molecules of H_2O are produced.

B 1.2×10^{24} molecules of CO_2 and 1.2×10^{24} molecules of H_2O are produced.

C 6.02×10^{23} molecules of CO_2 and 1.2×10^{24} molecules of H_2O are produced.

D 1.2×10^{24} molecules of CO_2 and 6.02×10^{23} molecules of H_2O are produced.

CSC20428

85 **How many moles of CH_4 are contained in 96.0 grams of CH_4?**

A 3.00 moles

B 6.00 moles

C 12.0 moles

D 16.0 moles

CSC00162

86 **How many atoms are in a chromium sample with a mass of 13 grams?**

A 1.5×10^{23}

B 3.3×10^{23}

C 1.9×10^{26}

D 2.4×10^{24}

CSC10251

87 **How many moles of chlorine gas are contained in 9.02×10^{23} molecules?**

A 1.5 moles

B 2.0 moles

C 6.02 moles

D 9.03 moles

CSC10373

88

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

In this reaction, how many grams of Fe_2O_3 are required to completely react with 84 grams of CO?

A 64 g

B 80 g

C 160 g

D 1400 g

CSC00159

89

$$Mg_3N_{2(s)} + 6H_2O_{(l)} \longrightarrow 2NH_{3(aq)} + 3Mg(OH)_{2(s)}$$

If 54.0 grams of water are mixed with excess magnesium nitride, then how many grams of ammonia are produced?

A 1.00

B 17.0

C 51.0

D 153

CSC20076

90 **A mass of 5.4 grams of aluminum (Al) reacts with an excess of copper (II) chloride ($CuCl_2$) in solution, as shown below.**

$$3CuCl_2 + 2Al \longrightarrow 2AlCl_3 + 3Cu$$

What mass of solid copper (Cu) is produced?

A 0.65 g

B 8.5 g

C 13 g

D 19 g

CSC10406

Question Number	Correct Answer	Standard	Year of Release
1	*A*	CHIE1.A	2005
2	*A*	CHIE1.A	2007
3	*C*	CHIE1.C	2006
4	*A*	CHIE1.D	2004
5	*B*	CHIE1.E	2008
6	*D*	CHIE1.F	2004
7	*A*	CHIE1.F	2006
8	*A*	CHIE1.G	2008
9	*A*	CHIE1.K	2003
10	*B*	CH1.A	2004
11	*A*	CH1.A	2007
12	*A*	CH1.A	2007
13	*C*	CH1.B	2004
14	*D*	CH1.B	2008
15	*A*	CH1.C	2003
16	*A*	CH1.C	2008
17	*C*	CH1.D	2003
18	*D*	CH1.E	2004
19	*B*	CH1.E	2006
20	*D*	CH11.A	2005
21	*D*	CH11.A	2008
22	*C*	CH11.D	2007
23	*A*	CH11.E	2003
24	*C*	CH2.A	2005
25	*A*	CH2.A	2006
26	*C*	CH2.A	2008
27	*D*	CH2.B	2005
28	*A*	CH2.B	2007
29	*D*	CH2.C	2004
30	*A*	CH2.C	2008
31	*C*	CH2.D	2005
32	*A*	CH2.E	2003
33	*B*	CH10.A	2003
34	*D*	CH10.A	2006
35	*A*	CH10.B	2007

Question Number	Correct Answer	Standard	Year of Release
36	*C*	CH10.C	2004
37	*C*	CH4.A	2008
38	*D*	CH4.B	2004
39	*A*	CH4.B	2006
40	*C*	CH4.C	2003
41	*C*	CH4.C	2007
42	*C*	CH4.C	2008
43	*A*	CH4.D	2004
44	*D*	CH4.D	2006
45	*C*	CH4.E	2003
46	*D*	CH4.F	2007
47	*C*	CH4.F	2008
48	*D*	CH6.A	2005
49	*A*	CH6.A	2008
50	*D*	CH6.B	2004
51	*B*	CH6.B	2006
52	*C*	CH6.C	2008
53	*A*	CH6.D	2003
54	*C*	CH6.D	2004
55	*D*	CH6.D	2006
56	*D*	CH7.A	2003
57	*D*	CH7.B	2007
58	*D*	CH7.C	2004
59	*C*	CH7.D	2003
60	*C*	CH5.A	2003
61	*C*	CH5.A	2005
62	*B*	CH5.A	2006
63	*D*	CH5.B	2007
64	*A*	CH5.C	2005
65	*D*	CH5.D	2005
66	*B*	CH8.A	2008
67	*A*	CH8.B	2007
68	*B*	CH8.B	2007
69	*B*	CH8.C	2003
70	*D*	CH8.C	2005

Question Number	Correct Answer	Standard	Year of Release
71	*A*	CH8.C	2006
72	*B*	CH9.A	2003
73	*A*	CH9.A	2004
74	*D*	CH9.A	2005
75	*C*	CH9.A	2006
76	*A*	CH9.A	2007
77	*D*	CH9.B	2005
78	*B*	CH3.A	2004
79	*B*	CH3.A	2005
80	*C*	CH3.A	2008
81	*C*	CH3.A	2008
82	*A*	CH3.B	2004
83	*B*	CH3.C	2005
84	*C*	CH3.C	2006
85	*B*	CH3.D	2003
86	*A*	CH3.D	2006
87	*A*	CH3.D	2007
88	*C*	CH3.E	2005
89	*B*	CH3.E	2006
90	*D*	CH3.E	2007

Periodic Table of the Elements

Chemistry Reference Sheet

California Standards Test

	1 1A												13 3A	14 4A	15 5A	16 6A	17 7A	18 8A
1	1 **H** Hydrogen 1.01	2 2A																2 **He** Helium 4.00
2	3 **Li** Lithium 6.94	4 **Be** Beryllium 9.01											5 **B** Boron 10.81	6 **C** Carbon 12.01	7 **N** Nitrogen 14.01	8 **O** Oxygen 16.00	9 **F** Fluorine 19.00	10 **Ne** Neon 20.18
3	11 **Na** Sodium 22.99	12 **Mg** Magnesium 24.31	3 3B	4 4B	5 5B	6 6B	7 7B	8	9 8B	10	11 1B	12 2B	13 **Al** Aluminum 26.98	14 **Si** Silicon 28.09	15 **P** Phosphorus 30.97	16 **S** Sulfur 32.07	17 **Cl** Chlorine 35.45	18 **Ar** Argon 39.95
4	19 **K** Potassium 39.10	20 **Ca** Calcium 40.08	21 **Sc** Scandium 44.96	22 **Ti** Titanium 47.87	23 **V** Vanadium 50.94	24 **Cr** Chromium 52.00	25 **Mn** Manganese 54.94	26 **Fe** Iron 55.85	27 **Co** Cobalt 58.93	28 **Ni** Nickel 58.69	29 **Cu** Copper 63.55	30 **Zn** Zinc 65.39	31 **Ga** Gallium 69.72	32 **Ge** Germanium 72.61	33 **As** Arsenic 74.92	34 **Se** Selenium 78.96	35 **Br** Bromine 79.90	36 **Kr** Krypton 83.80
5	37 **Rb** Rubidium 85.47	38 **Sr** Strontium 87.62	39 **Y** Yttrium 88.91	40 **Zr** Zirconium 91.22	41 **Nb** Niobium 92.91	42 **Mo** Molybdenum 95.94	43 **Tc** Technetium (98)	44 **Ru** Ruthenium 101.07	45 **Rh** Rhodium 102.91	46 **Pd** Palladium 106.42	47 **Ag** Silver 107.87	48 **Cd** Cadmium 112.41	49 **In** Indium 114.82	50 **Sn** Tin 118.71	51 **Sb** Antimony 121.76	52 **Te** Tellurium 127.60	53 **I** Iodine 126.90	54 **Xe** Xenon 131.29
6	55 **Cs** Cesium 132.91	56 **Ba** Barium 137.33	57 **La** Lanthanum 138.91	72 **Hf** Hafnium 178.49	73 **Ta** Tantalum 180.95	74 **W** Tungsten 183.84	75 **Re** Rhenium 186.21	76 **Os** Osmium 190.23	77 **Ir** Iridium 192.22	78 **Pt** Platinum 195.08	79 **Au** Gold 196.97	80 **Hg** Mercury 200.59	81 **Tl** Thallium 204.38	82 **Pb** Lead 207.2	83 **Bi** Bismuth 208.98	84 **Po** Polonium (209)	85 **At** Astatine (210)	86 **Rn** Radon (222)
7	87 **Fr** Francium (223)	88 **Ra** Radium (226)	89 **Ac** Actinium (227)	104 **Rf** Rutherfordium (261)	105 **Db** Dubnium (262)	106 **Sg** Seaborgium (266)	107 **Bh** Bohrium (264)	108 **Hs** Hassium (269)	109 **Mt** Meitnerium (268)									

58 **Ce** Cerium 140.12	59 **Pr** Praseodymium 140.91	60 **Nd** Neodymium 144.24	61 **Pm** Promethium (145)	62 **Sm** Samarium 150.36	63 **Eu** Europium 151.96	64 **Gd** Gadolinium 157.25	65 **Tb** Terbium 158.93	66 **Dy** Dysprosium 162.50	67 **Ho** Holmium 164.93	68 **Er** Erbium 167.26	69 **Tm** Thulium 168.93	70 **Yb** Ytterbium 173.04	71 **Lu** Lutetium 174.97
90 **Th** Thorium 232.04	91 **Pa** Protactinium 231.04	92 **U** Uranium 238.03	93 **Np** Neptunium (237)	94 **Pu** Plutonium (244)	95 **Am** Americium (243)	96 **Cm** Curium (247)	97 **Bk** Berkelium (247)	98 **Cf** Californium (251)	99 **Es** Einsteinium (252)	100 **Fm** Fermium (257)	101 **Md** Mendelevium (258)	102 **No** Nobelium (259)	103 **Lr** Lawrencium (262)

Key

11 — Atomic number
Na — Element symbol
Sodium — Element name
22.99 — Average atomic mass*

* If this number is in parentheses, then it refers to the atomic mass of the most stable isotope.