

Chemistry Fall Review



- The molar mass of sodium chloride (4 significant figures) is
 - 58.44 g
 - 58.5 g
 - 13.44 g
 - 1.344×10^3 g
 - 11.45 g
- Atoms of silver and gold
 - generally form stable bonds with transition elements.
 - have stable electron configurations.
 - tend to form cations.
 - tend to form anions.
- Precision refers to all of the following EXCEPT
 - reproducibility of measurements
 - agreement among numerical values
 - sameness of measurements
 - closeness of a measurement to an accepted value
- The Greek philosopher who proposed an atomic theory about 2400 years ago:
 - Aristotle
 - Socrates
 - Democritus
 - Plato
 - Alexander
- Identify the covalent compound:
 - NaCl
 - Fe₂O₃
 - KMnO₄
 - HClO₃
 - P₂O₅
- When 72.4 is divided by 2.0, the correct number of significant figures in the result is
 - 36.2
 - 36
 - 1
 - 2
 - 3
- Compounds that are electrically neutral must have equal numbers of
 - anions and cations.
 - positive and negative charges.
 - molecules.
 - ionic bonds.
 - covalent bonds.
- Identify the equation that shows the correct relationship among light, energy, and wavelength:
 - $c = \lambda \nu$
 - $E = \lambda \nu$
 - $E = h\lambda$
 - $c = h\lambda$
 - $E = h\nu$



9. The correct name for the O^{2-} ion is
- oxygen
 - oxide
 - peroxide
 - dioxide
 - oxalate
10. How many 2.0 cm lengths can be cut from a spool that holds 6.0 m of copper wire?
- 30
 - 3×10^2
 - 3×10^3
 - 3×10^4
 - 3×10^5
11. Select the measurement that has been reported to 4 significant figures:
- 0.0050 mm
 - 0.00501 mm
 - 4000 mm
 - 5×10^4 mm
 - 50.00 mm
12. The number 80 in the name Bromine-80 represents
- the sum of protons and neutrons.
 - the atomic number.
 - the number of electrons.
 - the electron configuration.
13. A temperature of 323 K is equivalent to
- 50 °C
 - 596 °C
 - 1.2 °C
 - 50 °C
 - 100 °C
14. 4.0 km =
- 4.0×10^{-3} cm
 - 4.0×10^3 cm
 - 4.0×10^5 cm
 - 4.0×10^{-5} cm
 - 1.0×10^{-3} cm
15. If 50 g of a certain substance reacts completely with 25 g of another substance, what is the total mass of the product that forms?
- 25 g
 - 50 g
 - 75 g
 - 50 mL
 - 75 mL
16. Select the formula for the compound formed by the barium ion (Ba^{+2}) and the hydroxide ion (OH^{-1}):
- BaOH
 - Ba₂OH
 - BaOH₂
 - Ba(OH)₂
 - Ba₂(OH)₂
17. Matter that has a definite shape and a definite volume is
- an acid.
 - a base.
 - a solid.
 - a liquid.
 - a gas.
18. All of the following are physical properties of an element EXCEPT
- color.
 - size.
 - boiling point.
 - reactivity.
 - density.
19. An element with an outer electron configuration of $4s^24p^3$ is in which period (row) of the periodic table?
- 1
 - 2
 - 3
 - 4
 - 5



20. The molar mass of water (4 significant figures) is
- 16.00 g
 - 32.00 g
 - 18.02 g
 - 14.02 g
 - 2.02 g
21. A chemical change occurs when wood
- burns.
 - is painted.
 - is chopped into smaller pieces.
 - falls.
22. Convert 25 °C to Kelvin temperature:
- 125 K
 - 273 K
 - 300 K
 - 248 K
 - 248 K
23. Select the largest measurement:
- 0.200 L
 - 0.020 L
 - 20.0 mL
 - 2.00×10^2 mL
 - 2.0×10^3 mL
24. How many significant figures are there in the quantity 85.0020 g?
- 3
 - 4
 - 5
 - 6
25. Select the correct formula for potassium permanganate
- KMnO
 - KMnO₂
 - KMnO₃
 - KMnO₄
 - PMnO₄
26. Select the correct name for the compound KClO₃:
- potassium chloride
 - potassium trioxchlorite
 - potassium chlorate
 - potassium perchlorate
 - potassium hypochlorite
27. Which of the following elements is most likely to form ions with a +3 charge?
- antimony
 - aluminum
 - argon
 - arsenic
28. Which of the following elements are liquid at room temperature (about 25 °C)?
- bromine
 - neon
 - sulfur
 - antimony
 - germanium
29. Select the correct formula for iron III oxide:
- FeO
 - Fe₂O₂
 - Fe₂O₃
 - Fe₃O₂
 - Fe₃O
30. The elements of this group have a stable outer electron configuration of s²p⁵:
- alkali metals
 - alkaline earth metals
 - transition metals
 - halogens
 - noble gases



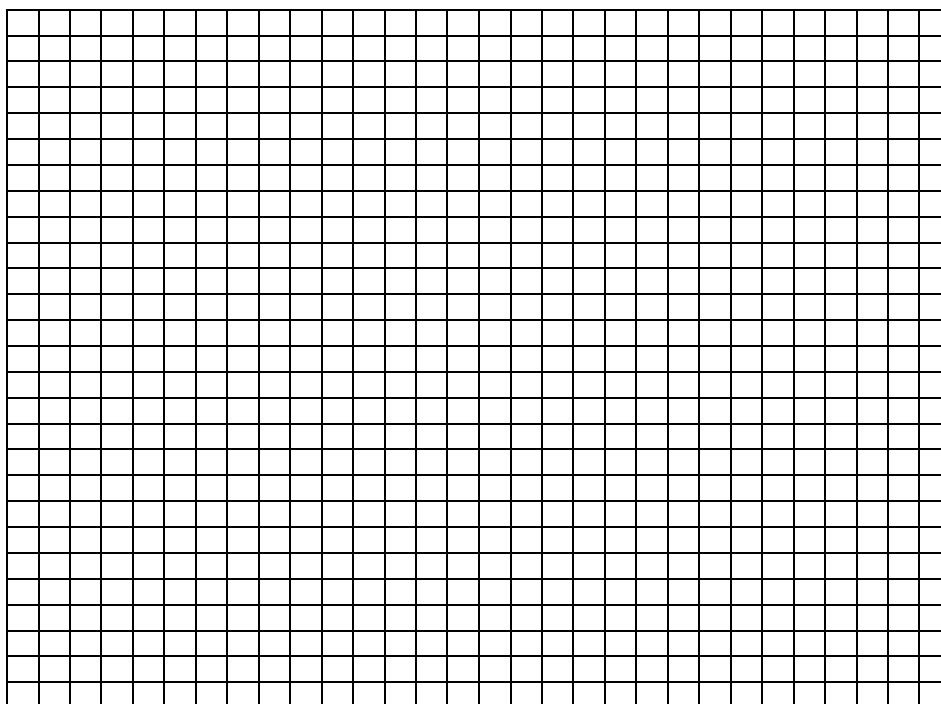
31. An atom of an element with atomic number 48 and mass number 120 contains
- 48 protons, 48 electrons, and 72 neutrons
 - 72 protons, 72 electrons, and 48 neutrons
 - 120 protons, 48 electrons, and 72 neutrons
 - 72 protons, 48 electrons, and 48 neutrons
32. An important result of Rutherford's experiments on the nature of the atom is the concept that
- atoms have mass.
 - electrons have a negative charge.
 - gold is an element.
 - the atom is mostly empty space.
 - the nucleus occupies most of volume of an atom.
33. The equation $e = mc^2$ indicates that
- chemical reactions are either exothermic or endothermic.
 - mass and energy are directly related.
 - mass and energy are inversely related.
34. The maximum number of electrons that can occupy the 3rd energy level is
- 2
 - 8
 - 18
 - 32
 - 64
35. All of the following are parts of Dalton's atomic theory EXCEPT
- all elements are composed of atoms.
 - atoms of the same element are alike.
 - atoms are always in motion.
 - atoms that combine do so in simple whole-number ratios.
36. All of the following are alkaline earth metals EXCEPT
- calcium
 - strontium
 - barium
 - sodium
 - beryllium
37. Select the formula for the COVALENT compound:
- CCl_4
 - HCl
 - CuCl_2
 - KClO_3
 - NaCl
38. Identify the metallic ion in the compound CuSO_4
- Cu^{+2}
 - Cu^{-2}
 - Cu^{+1}
 - Cu^{-1}
 - Cu
39. Select the correct formula for sulfuric acid
- HSO_4
 - HSO_2
 - H_2SO_4
 - H_3SO_4
 - H_2SO_3
40. Select the nonmetal:
- sodium
 - calcium
 - tungsten
 - uranium
 - sulfur



Graphing

- Graph the following data on mass and volume of various solids
- Write the correct formula for the liquids on the line provided
- Graph mass vs volume
- Determine the density from the slope (remember units)

Volume (cm ³)	Mass of Solid (g)				
	Antimony	Aluminum	Arsenic	Selenium	Silver
5	33.00 g	13.00 g	29.00 g	24.00 g	52.00
10	66.00 g	28.00 g	58.00 g	49.00 g	106.00
15	100.00 g	41.00 g	84.00 g	75.00 g	160.00
20	135.00 g	53.00 g	115.00 g	95.00 g	212.00
25	170.00 g	68.00 g	145.00 g	120.00 g	253.00
Density	_____	_____	_____	_____	_____



The Periodic Table

Element	Symbol	Atomic #	Atomic Mass	Mass #	Protons	Electrons	Neutrons
arsenic							
selenium							
copper							
antimony							
lithium							

Chemistry Problem Solving

- Convert 275 mg potassium to g.
- Convert 2.45×10^3 mg potassium acetate to g.
- Convert 125 g potassium nitrate to ng.
- Potassium consists of four naturally occurring isotopes with atomic masses 39.00, 40.00, and 41.00 amu. Their abundances are 93.25%, 0.05%, and 6.70 %, respectively. What is the atomic mass of potassium?
- What is the molar mass of potassium?
- What is the molar mass of potassium chloride?
- Calculate the mass in grams of 2.25 moles of potassium?
- Calculate the number of grams in 1.75 moles of potassium sulfate.
- Calculate the number of moles in 500.0 g potassium permanganate.
- Calculate the number of moles in 85.5 g potassium dichromate.
- Determine the percent composition of potassium chromate.
- Calculate the percent potassium in potassium hydroxide.
- Determine the percent potassium in potassium phosphate.
- Determine the mass of a cube of potassium that measures 2.0 cm on each side. (The density of potassium is 0.86 g/cm^3).
- Determine the volume of a cube of potassium that has a mass of 125 g.
- Write the complete electron configuration for potassium.
- Determine the number of seconds in a week.
- Determine the energy of a photon whose energy is $6.00 \times 10^{-15} \text{ J}$.
- Determine the frequency of a photon whose frequency is $2.22 \times 10^{14} / \text{s}$.
- Determine the wavelength of radiation with a frequency of $5.00 \times 10^{15} / \text{s}$.



Chemistry Comprehension

Mercury Health Hazards

<http://www.nih.gov/od/ors/ds/nomercury/health.htm>

1. Identify 4 physical properties
2. Identify 2 chemical properties
3. Name 4 mercury compounds
4. Name 3 sources of mercury toxicity
5. Describe 2 symptoms of mercury toxicity
6. Identify 3 ways to prevent mercury toxicity

Toxicology: How Mercury Harms Humans

Elemental (metallic) mercury and its compounds are toxic and exposure to excessive levels can permanently damage or fatally injure the brain and kidneys. Elemental mercury can also be absorbed through the skin and cause allergic reactions. Ingestion of inorganic mercury compounds can cause severe renal and gastrointestinal toxicity. Organic compounds of mercury such as methyl mercury are considered the most toxic forms of the element. Exposures to very small amounts of these compounds can result in devastating neurological damage and death. For fetuses, infants and children, the primary health effects of mercury are on neurological development. Even low levels of mercury exposure such as result from mother's consumption methyl mercury in dietary sources can adversely affect the brain and nervous system. Impacts on memory, attention, language, and other skills have been found in children exposed to moderate levels in the womb.

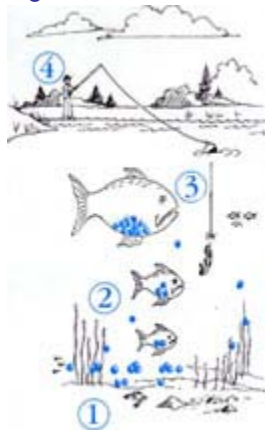
How Do People Get Exposed To Mercury?

Air borne mercury is highly toxic when inhaled. How does it get in the air? Metallic mercury slowly evaporates when exposed to the air. The air in a room can reach contamination levels just from the mercury in a broken thermometer

Mercury may be released into the air when coal, oil, or wood are burned as fuel or when mercury-containing wastes are incinerated. The resulting mercury concentrations in outdoor air are usually low and of little direct concern. However, mercury in the air can fall to the ground with rain and snow, landing on soil or in bodies of water, causing contamination. Lakes and rivers are also contaminated when there is a direct discharge of mercury-laden industrial or municipal waste into the water.

When mercury enters bodies of water, biological processes transform it to methyl mercury, a highly toxic and bioaccumulative form. Fish can absorb methyl mercury from their food and directly from water as it passes over their gills.

The cycle of mercury in nature is complex. This illustration summarizes how methyl mercury accumulates at the higher levels of the food chain and becomes concentrated in fish and animals that eat fish.



1. Methyl mercury in the water and sediment is taken up by tiny animals and plants known as plankton.
2. Minnows and juvenile fish eat large quantities of plankton over time.
3. Larger predatory fish consume many smaller fish, accumulating methyl mercury in their tissues. The older and larger the fish, the greater the potential for high mercury levels in their bodies.
4. Fish are caught and eaten by humans and animals, causing methyl mercury to accumulate in human tissues.



Most people are exposed to mercury by eating fish containing mercury. Since mercury is tightly bound to proteins in all fish tissue, including muscle, there is no method of cooking or cleaning them that will reduce the amount of mercury in a meal.

From the mid-1950s to the 1970s, several mass poisonings took place in Japan and in Canada involving methyl mercury from consumption of fish from contaminated waters. Although instances of poisoning from fish consumption in the U.S. have not been reported, the possibility of such poisoning has been a subject of concern. In the U.S., the number of states that have issued health advisories limiting consumption of fish has risen steadily from 27 states in 1993 to 41 states in 1999. A total of 2,073 advisories were issued.

<http://www.epa.gov/waterscience/fish/>

Currently, concern is focused on the health impacts of chronic exposures to low levels of mercury from dietary sources. Preliminary estimates of mercury levels in hair and blood samples from the 1999 National Health and Nutrition Examination Survey suggest that approximately 10% of women have mercury levels within one tenth of potentially hazardous levels indicating a narrow margin of safety for some women.

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5008a2.htm>. The National Research Council (NRC) issued a report estimating that as many as 60,000 newborns a year in the U.S. are now at risk for adverse neurodevelopmental effects from dietary mercury <http://www.nap.edu/books/0309071402/html/>. These studies strongly support efforts to reduce methyl mercury exposure.

Occupational Health Hazards in Biomedical Facilities

The most common potential mode of occupational exposure to mercury in biomedical facilities is probably via inhalation of vapors. If not cleaned up properly, spills of even small amounts of elemental mercury, such as may result from breakage of thermometers, can contaminate indoor air above recommended limits and lead to serious health consequences.

Some organic mercury compounds such as methyl mercury, find limited use in biomedical research procedures such as gel electrophoresis and as a reference in nuclear magnetic spectroscopy. At least two fatal exposures have occurred in laboratories. The most recently reported incident involved a chemistry professor with an interest in the toxicology of heavy metals. During an experiment performed in a fume hood, she accidentally spilled several drops of methyl mercury onto a gloved hand. The spill was considered inconsequential and cleaned up without special measures. Approximately two months later, the professor began to develop symptoms of neurotoxicity. She died despite receiving aggressive chelation therapy and medical support.



Answer Key

Testname: CHEMFALL0405MCQREVIEW.TST

1. Answer: a
2. Answer: c
3. Answer: d
4. Answer: c
5. Answer: e
6. Answer: d
7. Answer: b
8. Answer: a
9. Answer: b
10. Answer: c
11. Answer: e
12. Answer: a
13. Answer: a
14. Answer: c
15. Answer: c
16. Answer: d
17. Answer: c
18. Answer: d
19. Answer: d
20. Answer: c
21. Answer: a
22. Answer: c
23. Answer: e
24. Answer: d
25. Answer: d
26. Answer: c
27. Answer: b
28. Answer: a
29. Answer: c
30. Answer: d
31. Answer: a
32. Answer: d
33. Answer: b
34. Answer: c
35. Answer: c
36. Answer: d
37. Answer: a
38. Answer: a
39. Answer: c
40. Answer: e

