Mrs. Progar
Honors Chemistry Fall 2018 Common Assessment 1 Review

CHAPTERS IN TEXT: Prentice Hall CHEMISTRY, Wilbraham, Staley, Matta, Waterman

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Hon Common assessment 1 Test Results:

Atomic 10/50
Nuclear 11/50
Fission/Fusion 5/50
Light 6/50
Electrons & Config 10/20
Periodic Trends 8/50

OLD 52%
48%

CP

Atomic 10/50
Nuclear 13/50
Fission/Fusion 4/50
Light 6/50
Electrons 11/50
& Config
Periodic Trends 7/50

TOPICS

Measurement

Significant Figures

The International System of Units

Conversions

Atomic Structure

Protons, Neutrons, Electrons

Ions

Isotopes

Periodic Table

Atomic Number

Average Atomic Mass

Families

Oxidation States of typical ions

Nuclear

Alpha/Beta/Gamma

Fission/Fusion

$E=mc^2$

Radioisotope Uses

Half Life

Decay Equations

Quantum/Orbitals

Light/Electromagnetic Spectrum

Frequency, wavelength, Speed of Light, Energy relationships

Absorption and Emission Spectra

Bohr Model and process by which e^- s give off light

Sublevels/orbitals

Electron Configurations: long hand, short hand (noble) and orbital diagrams

Periodic Table (eg. Ions, valence electrons/families), dot diagrams

Periodic Trends

Atomic Radius

Ionization Energy

Electron Affinity

Electronegativity

Know the trends from the periodic table

Know why they change across the table and from bottom up

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Calculations Using Significant Figures

1. 1.35 m x 2.467m = 3.33 m^2
2. 1.035 m^2 / 42 m = 0.025 m
3. 12.01 mL + 35.2 mL + 6 mL = 53 mL
4. 55.46 g. -28.9 g = 26.6 g
5. .012 cm x 3.2 cm x 100.1 cm = 3.8 cm^3
6. 0.15 cm + 1.15 cm + 2.051 cm = 3.35 cm
7. 150 L^3 / 4 L = 40 L^2
8. 505 kg – 450.25 kg = 55 kg
9. 1.252 mm x 0.115 mm x 0.012 mm = 0.0017 mm^3
10. 1.278 x 10^3 m^2 / 1.4267 x 10^2 m = 8.958 m

Rules:

1) multiplication and Division: Answer in least # sig figs

2) addition and Subtraction:
   a) look at the decimal portion of the numbers only (to the right of decimal points)
   b) count # of significant figures in the decimal portion for each number. ie) the numbers to the left of the decimal are not used to determine how many decimal places in the final answer.

Convert into Scientific Notation

a) 12994 = 1.2994×10^4 b. .0004405 = 4.405×10^{-4} c. 3388.55 = 3.38855×10^3 d. .0033 = 3.3×10^{-3}

Convert to regular form

a. 6.033×10^5 = 603,300 b. 2.202×10^2 = 220.2 c. 5.07×10^{-3} = 0.00507

Determine correct number of significant figures:

305 3

305.0 4

3050 3

0.0305 3

0.03050 4

a. 356.56 5 b. 0.00201 3 c. 23000 2 d. 34.000 5

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ATOMIC

Match each description in Column B with the correct term in Column A

Column A	Column B
1. Proton j	a. The total number of protons and neutrons in the nucleus of an atom
2. Atom g	b. The weighted average mass of the atoms in a naturally occurring sample of an element
3. Mass number a	c. 1/12 the mass of a carbon 12 atom
4. Atomic mass unit c	d. The number of protons in the nucleus of an element
5. Electron f	e. Atoms with the same number of protons but different numbers of neutrons
6. Isotopes e	f. Negatively charged subatomic particle
7. Atomic Number d	g. The smallest particle of an element that maintains its identity in a chemical reaction
8. Atomic Mass b	h. A horizontal tow of the periodic table
9. Period h	i. Subatomic particle with no charge
10 Neutron i	~~11~~ Positively charged subatomic particle

Choose the best answer:

The nucleus of an atom is

a. Negatively charged and has a low density
b. Negatively charged and has a high density
c. Positively charged and has a low density
d. Positively charged and has a high density

The number of neutrons in the nucleus of an atom can be calculated by

a. Adding together the numbers of electrons and protons
b. Subtracting the number of protons from the number of electrons
c. Subtracting the number of protons from the mass number
d. Adding the mass number to the number of protons

The sum of the protons and neutrons in an atom equals the

a. Atomic number
b. Number of electrons

c. Atomic mass
d. Mass number

Which of these statements is false

a. Electrons have a negative charge

b. Electrons have a mass of 1 atomic mass unit

c. The nucleus of an atom is positively charged

d. The neutron is found in the nucleus of an atom

An atom of an element with atomic number 48 and mass number 120 contains

a. 48 p, 48 e and 72 n
b. 72 p, 48 e, and 48 n
c. 120 p, 48 e, and 72 n
d. 72 p, 72 e, and 48 n

How do the isotopes hydrogen – 2 and hydrogen – 3 differ?

a. Hydrogen-3 has one more electron than Hydrogen-2
b. Hydrogen-3 has 2 neutrons
c. Hydrogen-2 has 3 protons
d. Hydrogen-2 has no protons

The number 80 in Bromine-80 represents

a. The atomic number
b. The mass number
c. The sum of protons and neutrons
d. None of the above

Which of these statements is **not** true

a. Atoms of the same element can have different masses
b. The nucleus of an atom has a positive charge
c. Atoms of isotopes of an element have different numbers of protons
d. Atoms are mostly empty space

If E is the symbol for an element, which two of the following symbols represent isotopes of the same element?

1. $^{24}_{12}E$ 2. $^{24}_{13}E$ 3. $^{25}_{11}E$ 4. $^{35}_{12}E$

The release of tremendous energy in fission and fusion is due to a loss of mass according to $E = mc^2$.

List 3 differences between fission and fusion.

1. fission - split larger atom into 2 smaller
   fusion - joining of 2 atoms to become 1 larger atom.
2. fission - occurs in nuclear power plants
   fusion - occurs in the sun and hydrogen bombs
3. fission releases less energy per equivalent mass & leaves radioactive waste
   fusion releases more energy per mass; little to waste

In Nuclear Fission

(a.) Certain Atoms break into fragments when struck by neutrons
b. A chain reaction cannot occur
c. Energy is absorbed
d. All of the above

Nuclear fusion

a. Occurs when large nuclei fuse together
(b.) Takes place in the sun
c. Generally produces hydrogen nuclei
d. All of the above

What particle is needed to complete this equation?

$^{14}_{7}N + \_\_\_\_?\_\_\_\_ \rightarrow {}^{14}_{6}C = {}^{1}_{1}H$

(a.) $_0{}^1n$

b. $_{-1}{}^0e$

c. $_2{}^4He$

d. $_{-1}{}^0e$

A device that is used primarily for the detection of beta radiation is

a. The film badge

b. The Geiger counter
c. The scintillation counter
d. All of the above

Complete the following reactions by filling in the blanks with the correct numbers:

$^{42}K \rightarrow {}_{0}e^{-} + {}_{1}Ca$

_?_ -1 20

$^{42}_{19}K \rightarrow {}^{0}_{-1}e + {}^{42}_{20}Ca$

After 252 Days, a 24 g sample of scandium-42 contains only 3.0 g of the isotope

24 g → 12 g → 6 g → 3 g

How many half-lives have occurred? 3

How many days is one half life? 84 days

	Name	Symbol	Atomic #	Mass #	# Protons	# Neutrons	3 Electrons
1	Boron	B	5	11	5	6	5
2	Zinc	Zn	30	61	30	31	30
3	Potassium	K	19	42	19	23	19
4	Titanium	Ti	22 (error)	49	22	27	20
5	Antimony	Sb	51	122	51	71	51
6	Uranium (II)	U^{+2}	92	238	92	146	90
7	Silver (I)	Ag^{+1}	47	107	47	60	46
9	Cesium, (I)	Cs^{+1}	55	134	55	79	54
10	molybdenum	Mo^{+3}	42	97	42	55	39
12	Krypton	Kr	36	83	36	47	36
14	Nitride	N^{3-}	7	15	7	8	10
15	Chloride	Cl^{-1}	17	37	17	20	18

Nuclear Chemistry

Beta particles are

a. X-rays

b. Neutrons

c. Helium nuclei

d. Protons

e. Electrons when a neutron decays to a proton

An unstable nucleus_____.

a. Increases its half-life
b. Emits energy when it decays
c. Expels all of its protons
d. Increases its nuclear mass by fission

The WEAKEST form of radiation is _____.

a. Beta radiation
b. Cannot determine
c. Gamma radiation
d. Alpha radiation

Which symbol is used for an alpha particle?

a. $_{1}^{4}He$
b. $_{1}^{2}He$
c. $_{2}^{4}He$
d. $_{2}^{2}He$

What symbol is used for beta radiation?

a. $_{0}^{-1}e$
b. $_{-1}^{-1}e$
c. $_{-1}^{0}e$
d. $_{0}^{0}e$

Complete this reaction: $_{86}^{222}Rn \rightarrow _{84}^{218}Po +$ _____

a. $_{1}^{1}H$
b. $_{0}^{1}n$
c. $_{2}^{4}He$
d. $_{-1}^{0}e$

To what Element does polonium-208 (atomic number 84) decay when it emits an alpha particle?

a. $_{86}^{214}Rn$
b. $_{82}^{210}Pb$
c. $_{82}^{204}Pb$
d. $_{82}^{210}Po$

Nuclear fusion _____.

a. Is used in medicine
b. Occurs at low temperatures
c. Takes place in the sun

d. Is used in power plants

When small nuclei combine to form a large nucleus, the reaction is

a. Chemical
b. Fusion
c. Fission
d. Ionization

Smoke detectors commonly use _____ decay from $_{95}Am$

a. Neutron
b. Gamma
c. Alpha
d. Beta

Radioisotopes are often used for ____.

a. Food additives
b. Time travel
c. Medical testing
d. Fireworks

A beta particle has a mass number of ____, a charge of ____, and a mass equal to that of a(n)_____.

a. 1, 0, neutron
b. 4, 2^+, helium nucleus
c. 0, 1-, electron
d. 0, 1+, electron
e. 1, 1+, proton

It is FALSE to say that gamma rays...

a. Are stopped by 1mm of paper
b. Have no mass
c. Are a common type of radiation emitted in decay processes
d. Have a great penetrating power and severely damage both skin and internal organs
e. Travel at the speed of light

Joining light nuclei to form heavier nuclei is ___?___; Splitting of heavy nuclei into lighter nuclei is __?__

a. Nuclear fusion; nuclear fission
b. Combination; decomposition
c. Induced radioactivity; natural radioactivity
d. Nucleons; radioisotopes

Which one of the following represents fusion?

a. $_1{}^3H + _1{}^2H \rightarrow _2{}^4H3 + _0{}^1n$

b. $_{84}^{211}Po \rightarrow {}_{84}^{211}Po + {}_{0}^{0}\gamma$

c. $_{90}^{233}Th \rightarrow {}_{91}^{233}Pa + {}_{-1}^{0}e$

d. $_{92}^{235}U \rightarrow {}_{57}^{146}La + {}_{35}^{87}Ba + 2\ {}_{0}^{1}n$

Cesium-131 has a half-life of 30 years. What percentage of the original sample would remain after 90 years?

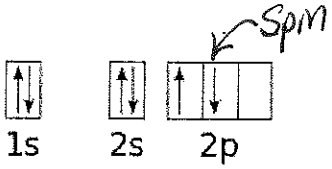
a. 0
b. 50
c. 100
d. 12.5
e. 25

If E is the symbol for an element, which two of the following symbols represent isotopes of the SAME element?

1. $_{12}^{24}E$ 2. $_{13}^{24}E$ 3. $_{11}^{25}E$ 4. $_{12}^{25}E$

a. 1 and 2
b. 3 and 4
c. 1 and 4
d. 2 and 3

What rule is broken in the following orbital diagrams?



Hund's rule

Which Element is represented by this orbital diagram?

n=16 Sulfur

Electrons

Choose the correct term.

Quantum	Hund's Rule
Photons	atomic emission spectrum
Hertz	Aufbau principle

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Pauli Exclusion Principle

Wavelength

LIGHT

The speed of light is related to wavelength and frequency by the following equation:
c = frequency x wavelength

where c is the speed of light a constant $c = 3.00 \times 10^8$ m/s

The energy of light is related to frequency and Planck's constant by E = hf

where h is Planck's constant 6.625×10^{-34} /s.

1. The lowest energy arrangement of electrons in a subshell is obtained by putting electrons into separate orbitals of the subshell before pairing electrons.
   Hund's rule (empty seat)
2. Packets/quanta of electromagnetic energy
   Photons
3. The SI unit of frequency
   Hz
4. An atomic orbital can hold no more than 2 electrons
   Pauli Exclusion
5. The amount of energy required to move an electron from its present energy level to the next higher one; or, the amount released when an electron drops to a lower level
   quantum
6. The modern description of the location and energy of electrons in an atom
   quantum mechanical model or Schrodinger model,
7. This principle states that electrons enter orbitals of lowest energy first
   Aufbau principle
8. The distance between two adjacent crests of an electromagnetic wave
   Wavelength
9. This is produced by passing the light emitted by an element through a prism
   Atomic emission Spectra