Cheatography

GRADE 12 CHEMISTRY Cheat Sheet

by katiemc8 via cheatography.com/174181/cs/36594/

Chapter 1

Chemistry- study of physical properties of matter

matter - anything that has mass or takes up space

Areas of chemistry - organic, inorganic, biochemistry, analytical, and physical

organic chemistry - study of chemicals containing carbon

inorganic chemistry - study of chemicals not containing carbon

biochemistry - study of processes taking place in organisms

analytical chemistry - study of composition of matter

physical chemistry - study of the mechanism, rate, and energy transfer that occurs when matter changes

Chapter 1

pure - pursuit of knowledge for itself

applied - research directed to a specific goal

macroscopic - visible to human eye

microscopic - only visible with microscope

Antoine Lavoisier - made chemistry become a measurable, observable science

scientific method - observe, test hypothesis, and develop theories

hypothesis - proposed explanation

experiment - test a hypothesis

Chapter 1

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scientific method - observe, test hypothesis, and develop theories

hypothesis - proposed explanation

experiment - test a hypothesis

manipulated variable - variable changed intentionally during experiment

responding variable - variable observed

theory - well tested explanation for a broad set of observations

scientific law - concise statement that summarises results of of observations and experiments

Chapter 2

extensive property - property depending on amount of matter in sample

intensive property - property depending on type of matter in sample

mass - a measure of amount matter (SI unit = kg)

volume - a measure of space occupied by matter

Chapter 2 (cont)

physical property - a substance that a person can measure without changing the material

physical change - properties of a material change, but not composition

vapour - a gas state of substance that is liquid or solid at room temp

Solids - fixed volume, fixed shape, close particles

Liquids - free shape, fixed volume, medium particle space

Gas - free shape, easy to compress, far particles

Chapter 3

Addition and Subtraction of Sig Figs - round to the same number of decimal places as the measurement with the least number of decimal places

Multiplication and Division - round answer to the same number of sig figs as the measurement with the least amount of sig figs

12.345 + 6.1 = 18.4

(1.502)(3.8) = 5.7076 = 5.7

Chapter 3

measurement - a quantity that has both a number and a unit

scientific notation - a number written as product of 2 numbers: a coefficient and 10/E to raised to a power, coefficient must be b/w 1 and 10 --- 6.789×10^{25}

Chapter 3 (cont)

accuracy a measurement of how close a measurement comes to the actual/true

precision - a measure of how close a series of measurement are to each other

sig figs - in measurement includes all digits that are known plus an estimated digit

Error = Experimental Value - Accepted Value

% = | error | / accepted value x 100%

Chapter 3

density -intensive property b/c it has to do with type of substance, not amount and density decreases with increasing temperatures

density = mas/ volume in g/cm^3

Chapter 2

reactant - substance present at start of chemical reaction

product - substance present at end of chemical reaction

participate - a solid that forms and settles out of liquid mixture

Conservation of Mass - in any physical/chemical reaction, the mass of reactants must = the mass of the products ---- (10g H^2 + 8g O^2 = 18 H^2O)

Clues that a chemical change has ocurred:
- transfer energy
- color change
- production of gas
- participate forms

Chapter 3

temperature - kelvin (0C = 273 K)

units of energy - is measured in calories or joules (joules is SI)

conversion factor - ratio of equivalent measurement

dimensional analysis - way to solve problems using units, dimensions, or measurements

5 Base of SI
meter = length
kilograms = mass
kelvin = temperature
second = time
mole = number of molecules
litre = volume
1 J = 0.2390 cal
1 cal = 4.184 Joules
mole = number of molecules
litre = volume

Converting - 8.351 g to mg
smaller = multiply
bigger = divide

Chapter 4

Atom - smallest particle of element that retains it identity in a chemical reaction

Subatomic particles - protons, neutrons, electrons

Electrons - negatively charged, located outside the nucleus, tiny (9.11 x10^{-24}g), discovered by J.J. Thompson

Protons - positively charged, located in the nucleus, large in comparison to electrons (1.67x10^{-24}), discovered by Eugen Goldstein

Neutrons - no charge, in nucleus, same mass as protons, discovered by James Chadwick

Chapter 4 (cont)

Cathode Rays -the high-speed electrons emitted in a stream from the heated cathode of a vacuum tube

J.J. Thompson's Plum Pudding Model - atoms were positively charged masses with negatively charged electrons distributed throughout the mass.

Rutherford's Atomic Model/Theory - The atom is mostly empty space, there is small negatively charged nucleus, electrons are located outside of and around nucleus

Democritus believed atoms were indivisible and indestructible.

Chapter 2

substance - uniform and definite composition of matter

mixture - a physical blend of 2+ components (can be homogeneous or heterogeneous)

heterogeneous - mixture not uniform throughout

homogeneous - mixture uniform throughout

phase - any part of a solution that is uniform throughout

filtration - process separates a solid from liquid in hetero mix

distillation - separates dissolved solids from liquid, which is boiled to produce vapour that has condensed into liquid

Sig Fig Rules

1. every non zero digit is significant	**4.** zeros at end of number and right of a decimal are significant
2. zeros b/w non zero digits are significant	**5.** zeros on right end of measurement that lie left of a decimal are not significant
3. zeros appearing in front of non zeros (place holders) are not significant	**6.** there are unlimited sig figs if: you are counting or situations involving exactly defined quantities

Chapter 4

Daltons' Atomic Theory

1. all elements are composed of tiny indivisible particles called atoms

2. atoms of same element are identical, atoms of any one element are different from those of another element

3.atoms of different elements can mix together or chemically combine in simple whole number ratios

Chapter 4 (cont)

4. chemical reactions occur when atoms are separated, joined, or arranged. atoms of one element are never changed into atoms of another element.

Summary of Principle Energy Levels, and, Orbitals

Principle Energy Level	Number of Sublevels	Type of Sublevels
n = 1	1	1s (1 orbital)
n = 2	2	2s (1 orbital), 2p (3 orbital)
n = 3	3	3s (1 orbital), 3p (3 orbital), 3d (5 orbital)
n = 4	4	4s (1 orbital), 4p (3 orbital), 4d (5 orbital), 4f (7 orbital)

Chapter 4

Atomic Number - number of protons in nucleus in atom

Mass Number - protons + neutrons = total mass #

 # neutrons = atomic # - mass#

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Maximum Numbers of Electrons

Energy Level N	Maximum Number of Electrons
1	2
2	8
3	18
4	32

Chapter 2

element - simplest form of matter that has unique properties

compound - substance containing 2+ elements in fixed proportion

Compounds can be broken down, but elements cannot. Scientists use chemical symbols to represent elements. Chemical symbols are always 1 or 2 letters with first letter capitalized

Chapter 5

Quantum of Energy - is amount of energy required to move an electron from one energy level to another

Orbit - each is associated with an energy level. The orbit an electron is in, determines energy of electron. Electrons can change orbits by gaining or losing energy

Aufbau Principle - electrons occupy orbitals of lowest energy first

**Electron Configuration* - ways electron are arranged in various orbitals

Chapter 5 (cont)

Pauli Exclusion Principle - atomic orbital can hold at most 2 electrons with opposite spin direction ↑↓

Hunds Rule - electrons occupy orbitals of same energy in way that makes # of electrons w/ same spin direction as large as possible

Chapter 4

Atomic Number - number of protons in nucleus in atom

Mass Number - protons + neutrons = total mass # (total # of of protons in nucleus of an element)

 # neutrons = atomic # - mass#

isotopes - atoms same element that have same atomic number, but different atomic masses due to difference of neutrons

atomic mass - a unit of mass to = $^{1/12}$ the mass of a carbon 12 atom

period - horizontal row of elements in periodic table

group - vertical column of elements in periodic table