

Review Chapters 18-25

Test Notes

- Test should be available starting tomorrow (Tuesday)
- A periodic table will be provided on the test
- Vocabulary quiz is due midnight on Thursday
- Late fee starts Friday at 11:00am
- Absolute deadline is next Monday
- Contact me if you want to take the foreign language test. You can sign up directly if you have taken a previous one.
- If you want to review further:
 - Monday 3-4:30 HBLL 3714 Melissa
 - Tuesday 7-8:30 MARB 446 Chad
 - Wednesday 4-5 MARB 456 Colby & Alex
 - Wednesday 7-8:30 ESC C215 Alex
 - Thursday 5-6:30 ESC C215 Amber
 - Thursday 6-7:30 JFSB B002 Adrian

Chapter 18 – Law of Increasing Disorder

- Review
 - Types of Processes
 - Reversible
 - Irreversible
 - How do each of these affect disorder (entropy)?
 - Energy Forms
 - How much disorder is in each?
 - Conversion of Energy Forms
 - How does disorder play a part in this?
 - Implications for Society

Table 18.1 – Forms of Energy and Their Ranking in Terms of Organization

Gravitational Potential Energy and Macroscopic Kinetic Energy	↑ ordered ↓ disordered
Nuclear Potential Energy	
Electrical (Household)	
Chemical Potential Energy	
Thermal Energy (also known as Heat or Microscopic Kinetic Energy)	

In an irreversible process, the amount of disorder in the universe

- a) Is zero
- b) Becomes infinite
- c) Stays the same
- d) Decreases
- e) Increases

A car burns gasoline and travels down the road.

- Explain
 - What forms of energy are present?
 - How are the energy forms changing?
 - What is happening to the total amount of energy?
 - What is happening to the total amount of entropy?



Chapter 19 – Elements & Compounds

- Review
 - Difference between:
 - Element
 - Compound
 - Alloy
 - Mixture
 - Solution
 - Know the types of matter
 - Atomic
 - Molecular
 - Network
 - Structure of Molecules
 - Formulas
 - Shapes
 - Structure of Network Matter
 - Analytical Techniques
 - Spectroscopy

Which of the following is a type of network matter?

- A. Hydrogen gas
- B. Water
- C. Carbon dioxide
- D. Salt
- E. Methane

Which of the following elements is most likely to form an alloy with gold (Au)?

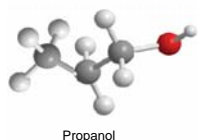
- A. Ag (Silver)
- B. Si (Silicon)
- C. O (Oxygen)
- D. F (Fluorine)
- E. B (Boron)



What would the formula be for propanol, the next member of this molecular family?



- A. CH_3OH
- B. $\text{C}_2\text{H}_5\text{OH}$
- C. $\text{C}_3\text{H}_7\text{OH}$
- D. $\text{C}_7\text{H}_9\text{OH}$



Chapter 20 – Chemical Reactivity

- Review
 - Chemical Bonding
 - New orbitals
 - Importance of valence electrons
 - Balancing Equations
 - Conservation of Matter & Charge
 - Rates of Chemical Reactions
 - Activation Energy
 - Entropy
 - Catalysts
 - Chemical Equilibrium

A combination of Ca and Cl would result in which type of matter?

- a) Molecular
- b) Atomic
- c) Alloy
- d) Network Solid

Which of the following equations is balanced?

- A. $\text{CH}_4 + \text{O}_2 = \text{CO}_2 + \text{H}_2\text{O}$
- B. $\text{CH}_4 + 2\text{O}_2 = \text{CO}_2 + 2\text{H}_2\text{O}$
- C. $2\text{CH}_4 + \text{O}_2 = 2\text{CO}_2 + \text{H}_2\text{O}$
- D. $\text{CH}_4 + \text{O}_2 = \text{CO}_2 + \text{H}_2$
- E. $\text{CH}_4 + \text{O}_2 = \text{C}_2\text{H}_6 + \text{H}_2\text{O}$

Chapter 21 – Bonding of Metals

- Review
 - Properties of Metals
 - What are the electron orbitals like?
 - Include entire piece of metal
 - Lots of energy levels (band)
 - Electrons free to move
 - How does this explain the properties of metals?
 - Opaque
 - Conductors of heat & electricity
 - Shiny, reflective
 - Chemically reactive
 - Malleable and Ductile
 - High Melting Temperature
 - Alloys
 - Semi-conductors
 - How are they different from metals

An LED made with a semi-conductor emits red light. If the LED is heated, however, the electron band gap decreases. How will this affect the color of the light emitted?

- A. Shift it to longer wavelength light
- B. Shift to shorter wavelength light
- C. No effect will be observed on the light emitted

Chapter 22 – Ionic Bonding

- Review
 - Properties of Ionic Materials
 - Why does the bond form
 - Valence electrons
 - Electromagnetic attraction
 - Characteristics of Bond
 - Electrons localized near atoms
 - Not free to move
 - Few electron energy levels
 - How does this explain...
 - High melting and boiling T
 - Transparency
 - Brittleness
 - Electrical properties

How many electrons does nitrogen (N) have in its outermost s and p orbitals?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

Which of the equations below for the ionic compound potassium oxide is balanced?

- A. $K + O_2 = KO_2$
- B. $K + O_2 = K_2O$
- C. $4K + O_2 = 2K_2O$
- D. $2K + O_2 = KO_2$

Compare and Contrast:
Ionic Compounds vs Metals



- Network Solids
 - High melting T's
 - Brittle solids
 - Don't conduct heat and electricity in solid
 - Often colorless and usually transparent in big chunks (White when powdered)
- Network Solids
 - High melting T's
 - Malleable
 - Good conductors of heat and electricity in solid
 - Opaque

Which of the following will **not** be a property of potassium oxide?

- A. High melting and boiling T
- B. White when powdered
- C. Conduct electricity when solid
- D. Dissolve in water
- E. Brittle

Chapter 23 – Covalent Bonding

- Review
 - Properties?
 - Melting and Boiling T's
 - Electrical conductivity?
 - How does a covalent bond form?
 - Sharing of valence electrons
 - Polar Bonds/Non-polar Bonds
 - Electronegativity
 - Polar & Non-polar Molecules
 - Types of Intermolecular forces
 - Dispersion
 - Dipole-dipole interactions
 - Hydrogen Bond
 - Covalent materials properties

Which of the following atoms would likely be the most electronegative?

- A. C
- B. N
- C. O
- D. F

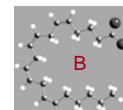
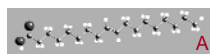
Which covalent materials dissolve most readily in water?

- A. Those with strongly polar molecules
- B. Those with weakly polar molecules
- C. Those without polar molecules
- D. This property has nothing to do with the polar nature of the molecules

Chapter 24 – It's All Chemistry

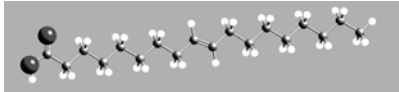
- Review
 - Fatty Acids
 - Saturated Fats
 - Unsaturated Fats
 - Trans Fats
 - How do the molecule's shapes affect properties?
 - Silicate Minerals
 - What is the basic unit that forms these minerals?
 - How can it be put together?
 - How does the internal structure affect the external properties?

Which of the fatty acids shown would have the lowest melting temperature?



The fatty acid shown below has one double bond between carbon atoms, but is not kinked. This would be classified as...?

- A. A saturated fatty acid
- B. A poly-unsaturated fatty acid
- C. A trans-fatty acid



Chapter 25 – Nuclear Processes

- Review
 - Properties of the strong force
 - Nuclear Potential Energy
 - How does it relate to mass per nucleon?
 - How does an atom gain it or lose it?
 - Fusion
 - Which atoms are likely to fuse?
 - Fission
 - Which atoms are likely to fission?
 - Why?
 - Radioactive Decay
 - Why does it happen?

Fission and Fusion

Is it Fission or Fusion:

- Which is a splitting apart?
- Which is a welding together?
- Which requires enormous temperatures (100,000,000 degrees Celsius)?
- Which uses isotopes of hydrogen?
- Which uses isotopes of uranium?
- Which can release energy explosively (bombs)?
- Which is presently used as a commercial source of energy?
- Which powers the sun?
- Which produces very long-lived (250,000 years) radioactive by-products?
- Electron-positron annihilation is classified as which?
- Which is the more easily controlled?
- Which promises the more plentiful, more easily obtained ingredients for fuel?

A sample of radioactive material with a half-life of 6 hours sits for a day (24 hrs). How much of the original material remains?

- a) A half
- b) A quarter
- c) An eighth
- d) A sixteenth