**TOSS-UP**

1) CHEMISTRY *Short Answer* How is the rate of a reaction affected when the temperature is increased?

ANSWER: INCREASES

**BONUS**

1) CHEMISTRY *Multiple Choice* When solute is added to a pure solvent, the vapor pressure of the solution:

1. Increases
2. Decreases
3. Stays the same
4. Is unable to be calculated without a constant.

ANSWER: X) DECREASES

**TOSS-UP**

2) CHEMISTRY *Multiple Choice* A reaction is spontaneous only if the Gibb’s Free Energy is:

1. Positive
2. Negative
3. 0
4. Greater than 1

ANSWER: X) NEGATIVE

**BONUS**

2) CHEMISTRY *Short Answer* What type of electrochemical cell has a negative Gibbs Free Energy?

ANSWER: VOLTAIC (ACCEPT: GALVANIC)

**TOSS-UP**

3) CHEMISTRY *Short Answer* What is the name of the phase change by which a gas directly becomes a solid?

ANSWER: DEPOSITION

**BONUS**

3) CHEMISTRY *Multiple Choice* Which factor is the best determinant of whether or not two liquids are miscible?

1. Density
2. Molecular Size
3. Polarity
4. Specific Heat

ANSWER: Y) POLARITY

**TOSS-UP**

4) CHEMISTRY *Multiple Choice* Radioactive Decay is an example of what order of reaction?

1. Zero Order
2. First Order
3. Second Order
4. Third Order

ANSWER: X) FIRST ORDER

**BONUS**

4) CHEMISTRY *Short Answer* “The total enthalpy change of a reaction is the sum of the enthalpy changes of each step” is a statement of what law?

ANSWER: HESS’S LAW

**TOSS-UP**

5) CHEMISTRY *Short Answer* If the pOH of an aqueous solution is 12, then what is the pH?

ANSWER: 2

**BONUS**

5) CHEMISTRY *Short Answer* In the equation NH3 + H2O 🡪 NH4+ + OH-, identify the conjugate acid and base.

ANSWER: Y) CONJUGATE ACID= NH4+, CONJUGATE BASE= OH-

**TOSS-UP**

6) CHEMISTRY *Multiple Choice* If an element undergoes radioactive decay, and increases its atomic number by one, but kept its mass number the same, what type of decay has it undergone?

1. Gamma Decay
2. Alpha Decay
3. Positron Emission
4. Beta Decay

ANSWER: Z) BETA DECAY

**BONUS**

6) CHEMISTRY *Short Answer* What is the name given to the difference between the mass of the nucleus of an atom and the mass of its constituent protons and neutrons?

ANSWER: MASS DEFECT

**TOSS-UP**

7) CHEMISTRY *Short Answer* What is the name given to the type of covalent bond where the shared electron pair comes from the lone pair of one atom?

ANSWER: COORDINATE COVALENT BOND (ACCEPT: DIPOLAR BOND)

**BONUS**

7) CHEMISTRY *Short Answer* What is the molecular geometry of AsH3 (Arsine)?

ANSWER: TRIGONAL PYRAMIDAL

**TOSS-UP**

8) CHEMISTRY *Multiple Choice* If a Carbon atom forms a double bond and two single bonds, what type of hybridization is it?

1. *sp*
2. *sp*2
3. *sp*3
4. It has not undergone hybridization.

ANSWER: X) SP2

**BONUS**

8) CHEMISTRY *Short Answer* What is the molecular geometry of an *sp* hybridized Carbon atom?

ANSWER: LINEAR

**TOSS-UP**

9) CHEMISTRY *Short Answer* Robert Millikan is credited with the measurement of what value?

ANSWER: CHARGE OF AN ELECTRON

**BONUS**

9) CHEMISTRY *Short Answer* What is the name given to the antiparticle of the electron?

ANSWER: POSITRON

**TOSS-UP**

10) CHEMISTRY *Multiple Choice* Which of the following can be classified as a strong electrolyte?

1. Br2
2. NO3
3. CaCl2
4. C6H12O6

ANSWER: Y) CaCl2

**BONUS**

10) CHEMISTRY *Short Answer* The amount of charge contained in one mole of electrons is equivalent to what unit?

ANSWER: FARADAY

**TOSS-UP**

11) CHEMISTRY *Short Answer* Which principle states that no two electrons in the same atom can have identical quantum numbers?

ANSWER: PAULI EXCLUSION PRINCIPLE

**BONUS**

11) CHEMISTRY *Short Answer* Which subatomic particle is not subject to the Pauli Exclusion Principle, and can have identical particles occupying the same quantum state?

ANSWER: BOSON

**TOSS-UP**

12) CHEMISTRY *Multiple Choice* Which of the following elements has the highest first ionization energy?

1. Sodium
2. Phosphorus
3. Chlorine
4. Argon

ANSWER: Z) ARGON

**BONUS**

12) CHEMISTRY *Short Answer* The change in energy when a gaseous atom in its ground state gains an electron is known as what chemical property?

ANSWER: ELECTRON AFFINITY

**TOSS-UP**

13) CHEMISTRY *Short Answer* If temperature is held constant, and pressure is increased, what happens to the volume of an ideal gas?

ANSWER: DECREASES

**BONUS**

13) CHEMISTRY *Short Answer* What is the effect of lowering the temperature on the solubility of a gas?

ANSWER: IT BECOMES MORE SOLUBLE.

**TOSS-UP**

14) CHEMISTRY *Multiple Choice* What happens to a buffer system if both the acid and salt concentrations are halved?

1. pH increases
2. pH decreases
3. Nothing
4. A precipitate is formed.

ANSWER: Y) NOTHING

**BONUS**

14) CHEMISTRY *Short Answer* What color does litmus paper become in an acidic solution?

ANSWER: RED

**TOSS-UP**

15) CHEMISTRY *Short Answer* What is the name given to the organic reaction in which a Carbon-Carbon double bond is converted into a single bond?

ANSWER: ADDITION

**BONUS**

15) CHEMISTRY *Short Answer* What is the name given to the reaction where a bond is broken as a molecule absorbs a photon of light energy?

ANSWER: PHOTODISSOCIATION

**TOSS-UP**

16) CHEMISTRY *Multiple Choice* An exothermic reaction has an enthalpy change that is:

1. Greater than 1
2. Zero
3. Positive
4. Negative

ANSWER: Z) NEGATIVE

**BONUS**

16) CHEMISTRY *Short Answer* What is the heat of formation of N2 gas?

ANSWER: ZERO

**TOSS-UP**

17) CHEMISTRY *Short Answer* The idea that electrons orbit the nucleus in a true orbit was a part of which model of the atom?

ANSWER: BOHR MODEL

**BONUS**

17) CHEMISTRY *Short Answer* Which family of the periodic table contains elements that occur in all 3 states of matter?

ANSWER: HALOGENS

**TOSS-UP**

18) CHEMISTRY *Multiple Choice* Of the following, which is the only factor that affects both the frequency of collisions and also the energy of collisions between atoms?

1. Temperature
2. Nature of Reactants
3. Surface Area of Reactants
4. Catalysts

ANSWER: W) TEMPERATURE

**BONUS**

18) CHEMISTRY *Short Answer* What method of separation can be used due to the different boiling points of substances?

ANSWER: DISTILLATION

**TOSS-UP**

19) CHEMISTRY *Short Answer* Order “Colloids”, “Solutions”, and “Suspensions” in order of greatest particle size to smallest particle size in a solution.

ANSWER: SUSPENSIONS, COLLOIDS, SOLUTIONS

**BONUS**

19) CHEMISTRY *Short Answer* What is the name given to the temperature above which the liquid phase of a substance cannot exist?

ANSWER: CRITICAL TEMPERATURE

**TOSS-UP**

20) CHEMISTRY *Multiple Choice* The Azimuthal or Secondary Quantum Number refers to:

1. Average Distance of the orbital form the nucleus
2. Number of Orbitals
3. Shape of the orbital
4. Spin

ANSWER: Y) SHAPE OF THE ORBITAL

**BONUS**

20) CHEMISTRY *Short Answer* How many times as fast does one mole of H2 diffuse than one mole of O2?

ANSWER: 4 TIMES AS FAST

**TOSS-UP**

21) CHEMISTRY *Short Answer* What is the name given to the random movement of particles suspended in a fluid?

ANSWER: BROWNIAN MOTION

**BONUS**

21) CHEMISTRY *Short Answer* What are the two unsaturated series’ of hydrocarbons?

ANSWER: ALKENES AND ALKYNES

**TOSS-UP**

22) CHEMISTRY *Multiple Choice* What is the color of a solution of KMnO4?

1. Purple
2. Red
3. Green
4. Blue

ANSWER: W) PURPLE

**BONUS**

22) CHEMISTRY *Short Answer* In a flame test, what is the color that pure copper burns?

ANSWER: BLUE

**TOSS-UP**

23) CHEMISTRY *Short Answer* In a galvanic cell, which type of ion is reduced?

ANSWER: CATION

**BONUS**

23) CHEMISTRY *Short Answer* What is the device used to connect the oxidation and reduction half reactions of a galvanic cell?

ANSWER: SALT BRIDGE

**TOSS-UP**

24) CHEMISTRY *Multiple Choice* The addition of a salt to water does what to the entropy of the salt?

1. Increases
2. Decreases
3. No change
4. It is impossible to tell.

ANSWER: W) INCREASES

**BONUS**

24) CHEMISTRY *Short Answer* What is the name given to the temperature at which normal Helium transitions into its super fluid state?

ANSWER: LAMBDA POINT

**TOSS-UP**

25) CHEMISTRY *Multiple Choice* What does the “S” in the formula for Gibb’s Free Energy stand for?

1. Enthalpy
2. Entropy
3. Temperature
4. Time

ANSWER: X) ENTROPY

**BONUS**

25) CHEMISTRY *Short Answer* What is the name given to the organic compound used as an automotive antifreeze?

ANSWER: ETHYLENE GLYCOL