**TOSS-UP**

ENERGY *Multiple Choice* Which of the following is not a part of the Carnot Cycle, when it is acting as part of a heat engine?

W) Isentropic expansion of gas, leading to the gas’s temperature decreasing

X) Reversible isothermal expansion of the gas

Y) Reversible adiabatic compression of the gas

Z) Reversible adiabatic expansion of the gas

ANSWER: Y) Reversible adiabatic compression of the gas

**TOSS-UP**

ENERGY *Short Answer* The volatility of gasoline is most often controlled with this organic molecule, which has a boiling point of -0.5 degrees Celsius.

ANSWER: Butane

**TOSS-UP**

ENERGY *Short Answer* In order to prevent engine knocking, most vehicles today have engines that are designed to burn gasoline through this process.

ANSWER: Deflagration

**TOSS-UP**

ENERGY *Multiple Choice* Which of the following is not a major advantage of algae based fuels over fossil fuels?

W) It is relatively harmless to the environment if spilled

X) It is a relatively cost efficient fuel source

Y) The growth rate is extremely short

Z) It can produce much more fuel per area of crop than other competing crops

ANSWER: X) It is a relatively cost efficient fuel source

**TOSS-UP**

ENERGY *Multiple Choice* Which of the following would be the requirements for a non-spontaneous reaction?

W) Positive delta G, negative delta H

X) Negative delta G, negative delta S

Y) Positive delta G, positive delta S

Z) Positive delta G, negative delta H

ANSWER: Z) Positive delta G, negative delta H

**TOSS-UP**

ENERGY *Short Answer* After a molecule undergoes ionizing radiation, what is the name of the new molecule that lacks an electron from a bond or a lone pair?

ANSWER: Free-Radical

**TOSS-UP**

ENERGY *Short Answer* This type of reactor is being used in fusion energy research. It incorporates a container in which a helical magnetic field is used to confine super-heated plasma.

ANSWER: Tokamak

**TOSS-UP**

ENERGY *Short Answer* In human carbohydrate metabolism, this is the name of the molecule that results in the first stage, when glucose is broken down.

ANSWER: Pyruvic Acid

**TOSS-UP**

ENERGY *Short Answer* This is the process, primarily used in manufacturing in which nitrogen is fixed, mainly as ammonia in order to make a variety of materials, such as fertilizers and explosives.

ANSWER: Haber-Bosche Process

**TOSS-UP**

ENERGY *Short Answer* Calculate the electrostatic potential energy of a particle with charge positive 2, another particle with charge positive 3, and a distance separating the objects of 2 meters.

ANSWER: 2.5k

**TOSS-UP**

ENERGY *Multiple Choice* Which of the following explanations best explains why superconductors act the way they do?

W) Atom movement is decreased to the point where the energy gap between the bands increases

X) The space between the valence band and the conduction band disappears

Y) The energy lost due to the vibrations of the atoms becomes zero due to supercooling

Z) The chemical structure of the supercooled atoms changes.

ANSWER: Y) The energy lost due to the vibrations of the atoms becomes zero due to supercooling

**TOSS-UP**

ENERGY *Short Answer* In order to regenerate waste lactic acid into pyruvate, which can be used by the body as energy, what cycle must the lactic acid undergo?

ANSWER: Cori’s Cycle

**TOSS-UP**

ENERGY *Multiple Choice* In petroleum, what percentage of its mass is composed of carbon?

W) 30-40%

X) 50-60%

Y) 70-80%

Z) 80-90%

ANSWER: Z) 80-90%

**TOSS-UP**

ENERGY *Short Answer* When a magnet is spun around in a turbine to produce electricity, which law is being put into effect?

ANSWER: Farraday’s Law

**TOSS-UP**

ENERGY *Short Answer* What is the process of calculating the lattice energy of a crystal called?

ANSWER: BORN-HABER CYCLE