Round 3

Regulation Tossups

(Tossup 1) Panama disease is characterized by the borders of leaves turning this color. This is the color of the pigments lead iodide and cadmium sulfide. The Aedes aegypti mosquito spreads fever named for this color. Instability or reactivity is denoted by this color on an NFPA diagram. In a flame test, sodium burns this color and Urania is also called [this color]-cake. For the point, name this color of ripe bananas.

ANSWER: **yellow**

(Tossup 2) Subsurface oceans of this molecule exist on Ganymede, Enceladus, and Europa. In 2015, NASA confirmed evidence of this molecule in Martian perchlorate salts. It is found under the carbon dioxide ice cap at Mars's south pole. Along with rocks and dust this molecule's frozen form makes up comets. For the point, name this substance thought to be required for alien life since it covers about 70% of the Earth's surface.

ANSWER: **water** (or H-2-O; accept water vapor or water ice)

(Tossup 3) The arrector pili are smooth muscles found in this organ. Langerhans cells and Meissner corpuscles are found in this organ. The stratum spinosum of this organ is composed of keratinocytes. Exocrine glands in this organ produce sebum. Melanin provides this organ with pigmentation. The dermis and epidermis are part of, for the point, what largest organ in the human body that can be affected by eczema and acne?

ANSWER: **skin**

(Tossup 4) Ptolemy's book on an aspect of this phenomenon describes within it seven tonoi. This phenomenon in the West is centered around sets like Dorian, Phrygian and Lydian. This phenomenon is vertically divided into harmony and horizontally divided into melody. For the point, name this art form transmitted via sound.

ANSWER: **music** (accept harmonics before "harmony")

(Tossup 5) This programming language uses "duck typing" to denote objects. The site Reddit is entirely coded in this language, which uses namesake "Num" and "Sci" libraries for computing. This language invented by Guido van Rossum uses whitespace for readability, and has variables called "spam" and "eggs." Web servers often use, for the point, what programming language named for a British comedy troupe with a "serpentine" name?

ANSWER: **Python**

(Tossup 6) The change in this quantity associated with vaporization is around 10.5 R according to Trouton's rule. Boltzmann's definition of this quantity, carved on his gravestone, sets it equal to k times the natural logarithm of microstates. The second law of thermodynamics states that the total amount of this quantity never decreases. For the point, name this measure of disorder in a system, symbolized S.

ANSWER: **entropy**

(Tossup 7) The phi and psi ["sigh"] dihedral angles of this group of molecules are plotted against each other on a Ramachandran plot. Molecules like dopamine and adrenaline are derived from an aromatic one of these compounds called tyrosine. AUG encodes one of these molecules called methionine. Peptide bonds form between two of these molecules. For the point, name these building blocks of protein.

ANSWER: **amino acids**

(Tossup 8) To define a unit for this quantity, scientists measure the hyperfine transition frequency of cesium. The "arrow" of this quantity is its "asymmetry," which is a property of entropy. The derivative of charge with respect to this quantity gives the current. Power can be calculated by dividing work by change in this quantity. Distance equals rate multiplied by this quantity. For the point, name this quantity that can be measured in seconds

ANSWER: **time**

(Tossup 9) This quantity names a maximum reached between the Paleocene and Eocene periods. Snow causes this quantity to fall as albedo increases resulting in more sunlight being reflected instead of absorbed. Density differences between salinity and this quantity drive the thermohaline circulation. For the point, name this quantity on the rise with global warming, measured in Fahrenheit and Celsius.

ANSWER: **temperature**

(Tossup 10) This constant was once measured using a sphere of ultrapure silicon-28. This constant is equal to Faraday's constant divided by the elementary charge. This number can be defined as the gas constant divided by Boltzmann's constant. This constant was once defined as the number of atoms in 12 grams of pure carbon-12. For the point, name this constant that is the number of particles in a mole, approximately 6.022 times 10 to the 23rd.

ANSWER: **Avogadro's number**

(Tossup 11) For the formation of this material, Hans Jenny developed a five-factor state equation memorized with the mnemonic CLORPT. Aeolian processes can form a type of this material called Loess [LOH ess]. Horizons of this material are separated into O, A, B, C, and R classifications. Humus is any organic matter deposited in this material. Sand, silt, and clay make up, for the point, what type of sediment that nourishes plants?

ANSWER: **soil** (accept dirt; accept earth; prompt on "clay")

(Tossup 12) Uneven distribution of a substance in these cells is termed telolecithal [teLOh less uh THuhl], which leads to their meroblastic cleavage. The follicular phase and luteal phase are parts of a process that releases this type of cell. Polar bodies are formed during oogenesis, which produces these cells. These cells are arrested in prophase I in the ovaries. For the point, name these female sex cells fertilized by sperm that may contain yolk.

ANSWER: **egg cells** (or ovum)

(Tossup 13) A measurement device for this quantity uses a rubber bulb and is named for Karl Friedrich Mohr. Titrations can also be referred to as an analysis named for this extensive property, which is measured using a burette. This quantity is determined by reading the point at the bottom of a meniscus. For the point, name this quantity, which can be measured in labs using graduated cylinders in units of milliliters.

ANSWER: **volume**

(Tossup 14) The Heaviside step function of any of these numbers is zero. The norm of a vector can never equal one of these numbers, and defining the constant i extends the square root function to these numbers. These numbers were first described during the Han Dynasty, and the absolute value of any number is never one of these numbers. For the point, identify these numbers, which are found to the left of zero on the number line.

ANSWER: **negative** numbers

(Tossup 15) This element is the cation in an ethylene-containing compound, Zeise's salt. A non-nucleophilic base, the tert-butoxide of this element, is commonly used to favor E2 eliminations. A form of radioactive dating relies on the decay of this element's isotope-40 into argon. This element is found directly above rubidium on the periodic table and this element was first isolated from potash. For the point, name this alkali metal found in bananas and with the symbol K.

ANSWER: **potassium** (prompt on K)

(Tossup 16) The cuckoo bird is known as a "brood" type of these organisms. Apicomplexa is a large phylum of eukaryotes of this type that includes the protist Plasmodium. A tropical fungus that acts as one of these organisms can alter the behavior of ants. It's not a mutation, since organisms in a symbiotic relationship with them are harmed. For the point, name these organisms that target hosts to gain benefits, examples of which include tapeworms and leeches.

ANSWER: **parasite** (accept parasitism)

(Tossup 17) Iridescent PSCs are known as "nacreous" types of these objects. A cellular "mammatus" type of these objects may form with anvil shaped ones. Silver iodide and dry ice are used to "seed" these objects with their namesake "condensation nuclei." Jet engine exhaust can produce artificial types of these objects called contrails. Classifications of these objects include cirrus, stratus, and cumulus. For the point, name these fluffy-looking objects in the sky made of water

ANSWER: **clouds**

(Tossup 18) Deuterium and helium were made in a nucleosynthesis named after this event. he theory underpinning this event relies on the universe being homogenous and isotropic by the cosmological principle. The existence of cosmic microwave background radiation supports this theory. This event was followed by cosmic inflation. For the point, name this theory that the universe exploded out from one infinitely dense singularity

ANSWER: **Big Bang theory**

(Tossup 19) The German firm Badische Aniline & Soda Fabrik outpaced the Allies in phosgene production, critical in creating this weapon. The Italians broke the Geneva Protocol of 1925 by using this weapon in the Second Ethiopian War. The first use of this chemical weapon was at the Battle of Ypres [EEP] during WWI. For the point, name this weapon made of noxious fumes with "Mustard '' and "Chlorine" variants.

ANSWER: **Poison Gas**

(Tossup 20) NMDA and AMPA receptors in these cells help them undergo long-term potentiation. Multiple sclerosis disrupts the ability of these cells to send action potentials. Grey matter is mainly composed of the bodies of these cells, while the color of white matter comes from the myelin sheath that surrounds their axons. Electrical signals cross the synapses of, for the point, what cells that make up the spinal cord and brain?

ANSWER: **neurons** (or nerve cells)

(Tossup 21) This element sits across from a double-bonded oxygen atom in the ring structure of Biotin. Arsenic and this element are found in orpiment and realgar. The Frasch process pumps superheated water underground to extract this element. Thioethers and thiols both contain this element. This element is used in vulcanization to cross-link rubber. For the point, name this solid yellow compound that smells like rotten eggs.

ANSWER: **sulfur** (prompt on S)

(Tossup 22) Theodor Leber names two diseases affecting this organ, one of which is his namesake congenital amaurosis. Drusen in this organ are an early sign of macular degeneration. Aqueous and vitreous humor are found in this organ, which contains rods and cones in the retina. Cataracts can form in the lens of this organ, which uses vitamin A. Irises and pupils are found in, for the point, what paired organs responsible for vision?

ANSWER: **eyes**

(Tossup 23) This element's hyperfine transition produces the 21-centimeter line. Hydrazine contains two nitrogen atoms and two atoms of this element. Bonds named for this element exist between two antiparallel strands of DNA and form between this element and oxygen, fluorine, or nitrogen. The antiparticle of this element consists of a positron and antiproton. For the point, name this lightest element with atomic number 1.

ANSWER: **hydrogen**

(Tossup 24) One queen in this modern-day country died due to an abscess after an early attempt at tooth extraction. The wheel was introduced to this country during its Second Intermediate Period by the Hyksos people. The engineering prowess of civilization in this modern-day country resulted in the Temple of Amun at Karnak and the Colossi of Memnon. For the point, name this country that produced the Great Pyramid of Giza.

ANSWER: **ancient Egypt** (accept Egyptians)

(Tossup 25) To avoid chromatic aberrations, Isaac Newton invented telescopes that work based on this process. At the critical angle, the "total internal" type of this process occurs, which is used in fiber-optic cables. During this process, the incident angle of the light ray before this process occurs equals the angle after this process occurs. For the point, name this process in which light bounces off of shiny surfaces like mirrors.

ANSWER: **reflection** (accept word forms like reflecting; do not accept "refraction")

Extra Question

(Tossup 1) One of these substances named for Robert Grubbs containing ruthenium is used in olefin metathesis. Fuel cell membranes use plastic black as one of these substances. Toxic emissions from cars can be reduced using a "converter" named for these substances. These substances do not affect chemical equilibrium and are not consumed during a reaction, but they do lower the activation energy. For the point, name these substances that increase the rate of reactions.

ANSWER: **catalysts**