Round 1

Regulation

(Tossup 1) Basement rocks, shields and platform varieties of cratons make up the core of these structures. In 1912, Alfred Wegener proposed these structures have "drifted" across ocean beds. The "super" variety of these structures include Pangaea, which split into the modern variety of these land masses. For the point, name these giant land masses, examples of which include Asia and North America.

ANSWER: **continent**s (accept **continetnal drift**; accept **continental crust**; prompt on "crust"; prompt on tectonic "plate"s; prompt on "lithosphere"; prompt on "craton" before mentioned)

(Tossup 2) This author of *The Assayer* legendarily said "and yet it moves" at the end of his trial for heresy. This scientist was put under house arrest by the Inquisition for backing Copernicus's belief of heliocentrism. For the point, name this Italian scientist who noted two objects with different densities would fall at the same speed and collectively names the four largest moons of Jupiter.

ANSWER: **Galileo Gallilei** (accept either underlined name)

(Tossup 3) In 1755, the Marquis of Pombal helped establish the study of these events with a survey asking about damages following the one in Lisbon. In 1906, another one of these events with a Mercalli intensity of XI ["eleven"] caused the death of over 3,000 people living in San Francisco. P and S waves occur as a result of these events that are measured on the Richter scale. For the point, name these seismic events caused by the shaking of the Earth's surface.

ANSWER: **earthquake**s

(Tossup 4) These cells are supported by glial cells, and use messenger molecules like GABA and serotonin. These cells can be surrounded by a myelin sheath and their dendrites connect to other cells through synapses. These cells send electrical signals down their axons. For the point, name these cells that make up the nervous system and relay messages in the brain.

ANSWER: **neuron**s

(Tossup 5) These macromolecules are aided by chaperones which fold them into proper formation. They are made up of monomers like arginine and methionine that are linked together by peptide bonds. These macro-molecules are made from RNA in translation. For the point, name these biological molecules made up of amino acids, which are a key nutrient along with fats and carbohydrates.

ANSWER: **protein**s (prompt on peptides; prompt on polypeptides; prompt on amino acids)

(Tossup 6) An increase in this quantity equals the product of ebullioscopic constant and molality. The Leidenfrost effect occurs when a liquid encounters a region with a value above this quantity, which is the temperature at which vapor pressure equals atmospheric pressure. For the point, name this temperature at which liquid transitions into a vapor.

ANSWER: **Boiling point**

(Tossup 7) Arthur Eddington used one of these events to prove Einstein's prediction of gravitational lensing. These events, which can be annular or partial, are a special form of occultation involving a body orbiting the Earth and the body the Earth orbits. Staring at one can still damage the eye. For the point, name these events whose solar variety sees the moon block out the sun.

ANSWER: **eclipse**s (accept solar **eclipse**;prompt on answers describing occultation or occult before mentioned; do not accept lunar eclipse)

(Tossup 8) Tuyas are volcanoes that erupt through these objects. Erosion of bedrock by these objects occurs through plucking. Lands affected by these objects go through cycles of isostatic depression and rebound. These objects shrink in zones of ablation and create landscape features like cirques, drumlins, and moraines. For the point, name these giant, slow moving bodies of ice.

ANSWER: **glacier**s

(Tossup 9) A type of these materials called "shape-memory" returns to their original shape after being deformed and heated. One of these materials is created in the Bessemer process, which combines pig iron with carbon. For the point, what materials are a mixture of two or more metals and include brass, bronze and steel?

ANSWER: **alloys** (accept **solid solutions**; prompt on metals)

(Tossup 10) This property can be reduced by the addition of common ions, and miscibility is a special case of this property involving two liquids. Henry's Law relates this property to the partial pressure above a liquid. When this property is exceeded, precipitation occurs. Oil does *not* possess this property in water. For the point, name this ability of a substance to dissolve in a solvent.

ANSWER: **solubility** (accept word forms like **soluble**; accept descriptions of **dissolving in water**; accept **miscibility** before mentioned; accept **mixable** or **mixability**)

(Tossup 11) The guard cells in this structure are used to control carbon dioxide uptake. A cutical layer over this structure prevents excess water loss through transpiration, and this structure is the site of concentrated chloroplasts that perform photosynthesis. For the point, name this green part of a plant that will change colors and fall off of trees in colder seasons.

ANSWER: **leaf** (accept **leaves**)

(Tossup 12) The largest "farm" that captures this form of energy is the Gansu Powerbase in China. This energy is captured through a tower connected to a rotor which transforms the energy into rotational shaft energy. The power of this form of energy is equal to 1/2 A times the density of air times the velocity cubed. For the point, name this form of energy captured by turbines that spin due to air particles picking up velocity.

ANSWER: **wind** energy (accept **wind** power)

(Tossup 13) One protein that regulates the cell cycle called Cdk1 was first studied in *S. pombe*, or the "fission" species of these microorganisms. One species of these organisms exchanges "a" and "alpha" factors while mating, though most of them reproduce asexually through budding. The genus *Saccharomyces* [sah-CAR-oh-MY-sees] includes these organisms that may release ethanol and carbon dioxide during fermentation. For the point, name these unicellular fungi used to make bread.

ANSWER: **yeast**s (prompt on fungi)

(Tossup 14) These events measure a 12 or more on the Beaufort scale. These events occur after tropical depressions and tropical storms, and are classified on the Saffir-Simpson scale. They form from numerous thunderstorms swirling around an "eye" which, unlike a tornado, is typically quiet. For the point, name these strong rotating storms that include Wilma, Maria, and Katrina.

ANSWER: **hurricane**s (accept **typhoon**s; prompt on tropical cyclones; prompt on tropical storms; prompt on cyclonic storms; prompt on storms)

(Tossup 15) One supplement of this vitamin is produced by irradiation of ergosterol [er-go-stare-all] in yeast, but a more common supplement is cholecalciferol [cole–lee–cal–suh–FAIR-all]. This vitamin is active as calcitriol [CAL-suh-TRY-all] and a deficiency in it can cause rickets. This vitamin is needed to digest calcium and is primarily obtained through skin cells reacting with ultraviolet light. For the point, name this fat-soluble vitamin essential for strong bones.

ANSWER: Vitamin **D**3

(Tossup 16) This planet's axial tilt of over 177 degrees is the most of any planet. Ishtar Terra is the smaller of this planet's two highland areas, and this planet include Maxwell Montes, this planet's highest point. With the least eccentric orbit of any planet, one day on this planet is roughly 20 Earth days longer than one year on this planet. For the point, identify this planet known for the runaway greenhouse effect in its atmosphere which makes this planet the brightest planet as seen from earth.

ANSWER: **Venus**

(Tossup 17) On a graph of this organ's activity, a sawtooth shape can indicate ST elevation, and a widened QRS complex can signify a bundle branch block. In this organ, the Bundle of His transmits signals from the AV node towards Purkinje fibers, which can be recorded using an EKG. This organ's mitral and tricuspid valves prevent backflow of fluid from the right and left ventricles. For the point, name this cardiac organ that pumps blood.

ANSWER: **heart**

(Tossup 18) If one of these constructs is drawn through the largest angle of a right triangle, its length equals half of the hypotenuse. These constructs are divided in a 2:1 ratio by a concurrence point called the centroid. For the point, name this line connecting the vertex of a triangle to the midpoint of the opposite side.

ANSWER: **median**

(Tossup 19) This organ contains a fine loosely arranged layer of connective tissue called the papillary layer. This organ of the integumentary system has a stratum basale layer which contains melanocytes [muh-lah–no-sights]. This largest organ of the human body is divided into the epidermis, dermis, and hypodermis tissue layers. For the point, name this fleshy organ that surrounds your body to protect it from foreign invaders.

ANSWER: **skin** (prompt on dermis; prompt on epidermis)

(Tossup 20) The atomic force variety of this device was an improvement on the scanning tunneling type of this device. The phase contrast type of these devices converts subtle phase shifts of light into more visible brightness contrasts. Robert Hooke coined the word "cell" based on his work with this device. Antoine van Leeuwenhoek [lay-vehn-hook] became the first person to observe bacteria by using, for the point, what type of device which allows scientists to see extremely small objects?

ANSWER: **microscope**s

(Tossup 21) A famous photograph of x-ray diffraction on this molecule came out of the lab of Rosalind Franklin. Watson and Crick discovered this molecule's structure which is composed of bases like adenine, guanine, thymine, and cytosine that form base pairs. For the point, name this molecule with a double helix structure that contains the genetic code for life.

ANSWER: **DNA** (accept **deoxyribonucleic acid**)

(Tossup 22) This is the only number to have infinite factors. This number may or may not be a natural number, depending on one's definition. Along with 1, this number's factorial is also equal to one. This number cannot be divided by itself. For the point, name this number that is neither positive nor negative.

ANSWER: **zero**

(Tossup 23) Low amounts of this element in the blood can cause hypokalemia. This element's isotope 40 decays to argon which can be used to date rocks. The most common form of permanganate is in a salt with this element, and this element is below sodium on the periodic table. For the point, name this alkali metal with atomic number 19 and atomic symbol K that is commonly associated with bananas.

ANSWER: **potassium** (accept **K** before it is read)

(Tossup 24) Two opposite points on this shape are called antipodal points, and its graph is given by "x-squared plus y-squared plus z-squared equals r." The surface area of this shape is equal to "4 pi r squared." Made up of all points that are the same distance from a given center, for the point, name this 3D analogue of a circle and the shape of a globe.

ANSWER: **sphere**

(Tossup 25) This element is the densest naturally occurring liquid on earth, and 760 millimeters of this element is equal to one atmospheric pressure unit. A barometer with this element was invented by Evangelista Torricelli. This element has the symbol Hg. For the point, name this element known as quicksilver, which is commonly used in thermometers.

ANSWER: **mercury** (accept **quicksilver** until it is read; accept **Hg** until it is read)

(Tossup 26) A dipole event in this ocean sees the the eastern portion alternate between warming and cooling. In 2009, the Maldives government held an underwater cabinet meeting in this ocean to discuss the impact of climate change. Warm air from this ocean in the summer generates southwest monsoon rains over the Bay of Bengal through Sri Lanka, Myanmar and Bangladesh. For the point, name this ocean named for a subcontinent of Asia.

ANSWER: **Indian** Ocean

(Tossup 27) This molecule reacts with Nickel in the Mond process. This molecule is mixed with hydrogen gas to form synthetic gas. Concentrations of this molecule in the body can severely limit oxygen transport by binding tightly to hemoglobin. This diatomic molecule contains a triple bond between elements with atomic number 6 and 8 on the periodic table. For the point, name this toxic molecule with chemical formula CO.

ANSWER: **carbon monoxide** (accept **CO** before it is read)

(Tossup 28) The conductivity of these materials can be increased by the addition of an impurity in a process called doping. When doping increases the number of free electrons in these materials, they are classified as "n-type". For the point, name these materials that include gallium, arsenide, and doped-silicon which behave like conductors in the right conditions.

ANSWER: **semiconductor**s

(Tossup 29) This word describes a subset of T-cells that have encountered an antigen before and can mount a fast immune response. Retrograde and anterograde are used to describe a physiological effect where this faculty is damaged. This faculty deteriorates in Alzheimer's disease and can be erased partially or completely by amnesia. For the point, name this ability to recall information.

ANSWER: **memory** (accept descriptions of either recalling or forming **memories**; prompt on amnesia before it is read by asking "What mental ability is damaged?")

(Tossup 30) This quantity is generated for quarks and leptons by the Higgs-Boson. Gravity is an interaction between objects which possess this quantity. The gravitational potential energy stored for an object can be calculated by multiplying the object's height, the gravitational field constant, and this quantity. For the point, identify this quantity, equal to the amount of matter in an object, which is often measured in units of grams or kilograms.

ANSWER: **mass**

Replacements

(Tossup 31) One type of this group is located just before the branch in the Bowen's reaction series. A potassium form of this group of minerals is microcline, and labradorite is an iridicent, calcic member of this group. Orthoclase and plagioclase classes make up this group of minerals that is defined as a six on the Mohs hardness scale. For the point, name this group of tetrosilicate minerals that make up a majority of the Earth's crust.

ANSWER: **feldspar**s (accept **orhoclase**; accept **pagioclase** before it is read prompt afterwards)

(Tossup 32) Preserved footprints found on a namesake "beach" in France first showed these organisms could walk on land. On average, their fourth finger was ten times longer than the other digits. *Quetzalcoatlus*, the largest of these organisms, had a wingspan over forty feet, and they were the first vertebrates to evolve flight. For the point, name this group of flying reptiles that lived alongside the dinosaurs.

ANSWER: **pterosaur**s (accept **pterodactyl**s)