

# Backup

## Regulation

(Tossup 1) This process shares its name with a class of reactions also called dehydration synthesis. Reflux is a chemical technique that repeatedly performs this process. When this process involves dust, snow can form, while the opposite of this process is vaporization. This process occurs below the dew point and is responsible for foggy windshields. For the point, name this process in which a gas turns into a liquid.

ANSWER: condensation

(Tossup 2) This is the principal ion to aid in exocytosis of neurotransmitter vesicles. By activating vitamin D, parathyroid hormone increases the supply of this ion in the bloodstream. This ion is released by the sarcoplasmic reticulum. When it binds to troponin, this ion activates muscle contraction. Osteoporosis can occur when this ion is deficient. For the point, name this ion, which is mainly stored by humans in their teeth and bones.

ANSWER: calcium ion (prompt on “Ca”; prompt on “Ca<sup>2+</sup>”)

(Tossup 3) It’s not communication, but in the book A Mathematical Theory Of Communication, Claude Shannon outlined ideas for a theory related to this other word. The space this concept takes up can be measured using its namesake entropy. For the point, name this 10-letter word related to knowledge, such as possessing facts, an important concept in communication and data science, commonly abbreviated to just “info.”

ANSWER: information (prompt on “info”)

(Tossup 4) All elements heavier than iron come from these events, types of which include Type I and Type II. One of the largest of these events in recorded history that occurred in 1054 was responsible for the creation of the Crab Nebula. These events leave behind a black hole or neutron star after they occur. For the point, name these large stellar explosions that occur at the end of a star’s life.

ANSWER: supernovae (prompt on novae)

(Tossup 5) A substance known as “purified protein derivative” is used to test for this disease by injecting it under the skin and waiting two to three days for swelling. The BCG vaccine was developed for this disease which the Mantoux [mahn-TOH] test was developed for. This disease is caused by a member of the mycobacterium genus. For the point, name this disease commonly abbreviated TB.

ANSWER: tuberculosis (prompt on “TB” until mentioned)

(Tossup 6) This structure can be described using Miller indices. X-ray diffraction is a method to analyze the atomic layout of these structures. Body centered cubic and face centered cubic are among the ways these structures can organize themselves. These structures can be described mathematically with lattices. For the point, give this term for solids that have a repeating structure.

ANSWER: crystals (accept crystallography)

(Tossup 7) This industry received a boost from John Kay's invention of the flying shuttle. The main device used in this industry works by intersecting warp and weft lines. Automatic looms are more common today in this industry where synthetic fibres like polyester, acrylic, and nylon are used. For the point, name this industry that weaves together fibers into fabrics and wearable items.

ANSWER: textiles (accept clothing or clothes; prompt on "weaving" )

(Tossup 8) This number is the first of the so-called "safe primes." A regular polygon with this many sides has interior angles of 108 degrees each. There are this many Platonic solids. The divisibility test for this integer passes if the units digit is either this number or 0. The only prime factors of one million are two and this number. For the point, give this number of sides in a pentagon.

ANSWER: five

(Tossup 9) A "little" one of these periods started in the sixteenth century. Interglacial periods occur during these events, one of which was caused by the Great Oxygenation Event. Saber-toothed cats and woolly mammoths lived during one of these events, which can lead to a "Snowball Earth" effect. For the point, name these extended periods of time of low Earth temperature.

ANSWER: ice ages

(Tossup 10) This phylum has a cartilaginous odontophore which supports their characteristic "ribbon of teeth." Members of this phylum eat using a chitinous structure called a radula and move using their foot muscle. The mantle of members of this phylum secretes their characteristic shell. Bivalves and gastropods are members of, for the point, what marine phylum of invertebrates that includes snails and clams?

ANSWER: mollusca (or molluscs)

(Tossup 11) These objects were the subject of a "War" to find them between Othniel Marsh and Edward Drinker Cope. Coprolite is a type of these objects. "Living" examples of these objects greatly resemble extinct species, while "index" examples are used for dating purposes. These objects also name a type of fuel that is nonrenewable. For the point, name these preserved remains of prehistoric organisms.

ANSWER: fossils

(Tossup 12) The strength of this force is proportional to the applied load according to Amontons's first law. Corresponding coefficients accompany the static and kinetic forms of this force. Newton's first law that an object in motion tends to stay in motion is acted against by this force. For the point, name this force that resists the movement of an object which is low on slippery surfaces like ice.

ANSWER: friction

(Tossup 13) This element was central to the work done by the winners of the 2019 Nobel Prize in Chemistry. This element's salt is commonly used as a treatment for bipolar disorder. This is the lightest element that has core electrons. Ions of this element name a class of rechargeable batteries used in electronics. For the point, name this lightest alkali metal with atomic number three and chemical symbol Li.

ANSWER: **lithium** (prompt on Li before mentioned)

(Tossup 14) This fundamental value for this quantity was measured in the Millikan oil drop experiment. Capacitors are devices used to store this quantity. The rate of change of this quantity over time is equal to current. Coulomb's law states that force is inversely proportional to distance squared. For the point, name this quantity measuring the presence or absence of electrons.

ANSWER: electric **charge**

(Tossup 15) Ada Lovelace is credited with the first one of these instructions for calculating Bernoulli numbers. The Halting problem proves it is impossible for one to determine whether one of these sets of instructions will always halt. They typically use for loops and if statements. For the point, give this term for instructions used to execute computer computations.

ANSWER: computer **algorithm** (accept computer **program**; accept computer **code**)

(Tossup 16) A NASA space telescope for observing this portion of the spectrum is called WISE. Night-vision goggles can detect the near-form of this radiation from heat imaging, which is why this type of radiation is popularly known as "heat radiation." For the point, name this portion of the spectrum with wavelength shorter than radio waves and longer than visible light.

ANSWER: **infrared**

(Tossup 17) TrkA's absence and L-N-G-F-R's presence can induce this process. In this process, the death-inducing signalling complex is formed. A cascade of caspases is triggered in this process by the release of Cytochrome C into the cytosol, which is characterized by blebbing and fragmentation of the cell. This cellular process is contrasted with necrosis, which is unprogrammed. For the point, name this process of programmed cell death.

ANSWER: **apoptosis**

(Tossup 18) The main resource of this technology is moved around in a circle in the center pivot application. Wheel line systems are a manual method in this technological discipline. Historically, this technology made use of aqueducts, but in the modern age, drippers and sprinklers are employed. For the point, name this method of controlling water and applying it to crops for agriculture.

ANSWER: **irrigation** (prompt on answers describing "water," "water movement," or "water control")

(Tossup 19) The main competitor to this event was known as steady state theory. Fred Hoyle coined the name for this event. Observations of the cosmic microwave background provide evidence for this event, shortly after which occurred a period of rapid inflation. Marking time zero of the universe, for the point, name this event, a large explosion of matter that expanded out into the rest of the universe.

ANSWER: **Big Bang**

(Tossup 20) This is the number of carbon atoms in an unaromatic tub shaped cyclic molecule with four double bonds whose dianion [dai-ANN-i-on] COT has this many carbon atoms. The speed of light is commonly approximated as three times this power of ten. Boron is the first element on the periodic table to violate a rule that elements tend to fill this many electrons. For the point, name this number of carbon atoms in octane.

ANSWER: **eight**

(Tossup 21) This element was originally produced in the Deacon process. This is the element with the highest electron affinity. Mercury bonds with this element in a two to two ratio, rather than a one to one ratio as expected. This element's ion is used to disinfect swimming pools and with sodium it forms common table salt. For the point, name this element with chemical symbol Cl.

ANSWER: **chlorine** (accept **chloride**; prompt on Cl before mention)

(Tossup 22) This organ produces an important hormone that regulates blood pressure with angiotensin and aldosterone. The functional unit of this organ includes notable features such as Bowman's capsule and the glomerulus; that functional unit is the nephron. The adrenal glands sit above this organ which most people have two copies of. For the point, name these bean-shaped renal organs that filter blood and produce urine.

ANSWER: **kidneys**

(Tossup 23) In addition to forest fires, El Niño increases the likelihood of these events on island countries like Australia. California suffered a recent one of these events occurring from 2011 to 2017. Plants like Cacti are said to have tolerance to this condition, allowing them to grow in arid climates with little rainfall. For the point, name this condition characterized by prolonged shortage of water supply.

ANSWER: **droughts** (prompt on "water depletion" or similar answers)

(Tossup 24) A variable star in this constellation names a class of young variable "T stars" that are pre-main-sequence stars about to join the Hayashi track on H-R diagrams. The red giant star Aldebaran forms the red eye of this constellation which also contains the Pleiades [PLY-uh-DEES] cluster, the Hyades [HI-uh-DEES] cluster, and the Crab Nebula. For the point, name this constellation that resembles a bull.

ANSWER: **Taurus**

(Tossup 25) A paradox formulated by this scientist, Podolsky, and Rosen showcased quantum entanglement. This man field equations led to the prediction of gravitational waves. This scientist names a low-temperature condensate with Satyendra Bose. The special and general relativity were theories of, for the point, what physicist who stated mass-energy equivalence as  $E$  equals  $m c$  squared?

ANSWER: Albert Einstein

(Tossup 26) An effect named for these species causes a decrease in the solubility of a solid. The energy needed to remove an electron is named for these species. When salt is added to water, it dissociates into two examples of this type of species. For the point, name these atoms and molecules with a positive or negative charge due to loss or gain of electrons.

ANSWER: ions

(Tossup 27) This animal suborder contains the most niche-partitioned amniotic genus at over 400 species, *Anolis*. This animal suborder taxonomically shares an order with amphisbaenians and serpents. The largest member of this subgroup of squamate reptiles is the Komodo Dragon. For the point, name these reptiles which include chameleons, geckos, and iguanas.

ANSWER: lizards (anti-prompt on specific lizards with which are apart of what larger suborder?"; accept Lacertilia; prompt on "squamate"s or squamata before "squamate" mentioned; prompt on "reptile" before mentioned)

(Tossup 28) According to legend, this scientist once dropped two balls off the leaning tower of Pisa to show that falling time was independent of mass. This man improved upon Hans Lippershey's design for a telescope used to discover four moons of Jupiter that are named after him. For the point, identify this Italian astronomer and physicist who was placed under house arrest for refusing to recant his heliocentric views.

ANSWER: Galileo Galilei (accept either underlined part)

(Tossup 29) Due to this phenomenon, ocean levels have risen 0.3 centimeters per year over the last twenty years. Though this phenomenon has recently accelerated, it has been occurring for the last 25,000 years. The greenhouse effect causes this phenomenon by trapping carbon dioxide in the atmosphere. For the point, name this phenomenon in which the Earth's temperature is rising over time.

ANSWER: climate change (or global warming)

(Tossup 30) These organic compounds are examined in Ramachandran plots. Crucial motifs for these compounds include leucine zippers. This class of compounds has secondary structures mostly made up of alpha helices and beta-plate sheets. The fundamental units of these compounds are encoded on the codons of mRNA. For the point, name these biological compounds whose primary structure is made up of peptide bonds between amino acids.

ANSWER: proteins (prompt on poly"peptide"s; prompt on "amino acid"s before mentioned)

## Extra

(Tossup 31) A compound containing six atoms of this element attached to uranium is created during nuclear power generation. This is the only stable element in its group that does not form a strong acid when bonded to hydrogen. This element sits to the left of Neon on the periodic table. For the point, name this lightest halogen with atomic number nine and chemical symbol F.

ANSWER: fluorine (prompt on F before mentioned)

(Tossup 32) In 1991, Al Gore helped popularize calling this service a “superhighway” and promoted National Information Infrastructure for this service. In 2017, FCC chairman Ajit Pai proposed ending the “neutrality” of this service. For the point, name this critical invention to the information age, a global system of computer networks with features like the World Wide Web.

ANSWER: Internet (accept interconnected network; prompt on World Wide “Web”; prompt on “the net”; prompt on “Information Superhighway”)