

Round 4 Elementary

Round 4 Tossups

(1) This range's northern end is home to the Mountain Tapir, and this mountain range is the natural habitat of chinchillas and guinea pigs. Wild camelids found in this mountain range include the vicuña [[vih-KOO-nyah]] and guanaco [[gwah-NAH-koh]]. For the point, name this South American mountain range home to alpacas and llamas.

ANSWER: **Andes** Mountains (or Cordillera de los **Andes**; accept **Andean** Mountains; prompt on "Altiplano")

(2) Some of these objects that orbit in the L4 and L6 points of Jupiter and Neptune are known as "Trojans." The largest and first-discovered example of these objects was predicted to exist by the debunked Bode's [[BOADS]] Law and is named Ceres [[SEE-rees]]. For the point, name these large, rocky masses that orbit the sun in a namesake "belt."

ANSWER: **Asteroids** (accept **Asteroid** belt; prompt on "minor planet" or "planetoid")

(3) This compound form, which is divided into driving and driven varieties, is the most abundant and potent greenhouse gas in Earth's atmosphere. Suddenly exceeding the saturation point of this compound form in the atmosphere can lead to cloudburst precipitation. Concentration of this compound form is measured as humidity. For the point, name this greenhouse gas which condensates to form clouds.

ANSWER: **Water Vapor** (accept **Aqueous vapor**; prompt on "water"; prompt on "H2O"; do not accept or prompt on "Steam")

(4) The "Ecdy" is a plant derived form of this hormone recently discovered. Examples of these hormones include the androgen and estrogen sex hormones. Cholesterol is in a class of precursors for these hormones, which include stress hormones like cortisol. For the point, name these hormones, whose anabolic variety are illegally used to grow muscle mass.

ANSWER: **Steroids** (accept Anabolic **steroids**; prompt on "Corticoids")

(5) A coil with a spark gap was used to observe this effect by Heinrich Hertz. Robert Millikan verified that this effect's output is related to frequency but not intensity. Albert Einstein's 1921 Nobel Prize in Physics was for his work on, for the point, what effect in which electrons are emitted under light?

ANSWER: **Photoelectric** Effect

(6) There are this many Frenet-Serret [[freh-NEH-seh-REH]] formulas, which in total concern this many vectors. Apéry's [[ah-PEH-rees]] constant is the value of the Riemann zeta function with this integer as an input. The area of a polygon with this many sides can be calculated using Heron's formula. For the point, what number is the degree of a cubic polynomial?

ANSWER: **Three**

(7) These animals, which carry the *Babesiosis* [[bah-bee-see-OH-sis]] disease, carry an infection diagnosed by a bullseye rash. These animals are the primary vector for human infections of *Rickettsia rickettsii* [[rih-KET-see-uh rih-KET-see-"eye"]], the causative agent of Rocky Mountain Spotted Fever. For the point, name these parasitic arachnids, the primary carriers of Lyme disease.

ANSWER: **Ticks** (or **Ixodida**; accept American dog **ticks**; accept Rocky Mountain Wood **Ticks**; accept Brown dog **ticks**; accept Black-legged **ticks**; accept Bear **ticks**; accept Deer **ticks**; prompt on "arachnids" before mentioned)

(8) The citrate of this element can be used to prevent kidney stones and is used as a laxative to prepare for colonoscopies. Calcined dolomite can be used to purify this element. This element's sulfate is often used for anti-inflammatory soaks and is called epsom salt. In a flame test, bright white light is emitted by, for the point, what alkali earth metal with number 12.

ANSWER: **Magnesium** (accept **Mg**; accept **Magnesium** citrate)

(9) This man died along with Colonel Vladimir Seryogin [[seh-ree-OH-gin]] while piloting an experimental MiG-15 aircraft near the town of Novosyolovo [[no-vo-syo-LO-vo]]. During his most significant mission, this man allegedly said, "I don't see any God up here." The Vostok I was piloted by, for the point, what Soviet cosmonaut, the first human to reach space?

ANSWER: Yuri **Gagarin**

(10) These organisms were the first to have their entire genome sequenced. These organisms include *Candida albicans* and members of the genus *Saccharomyces* [[sah-kah-roh-"MY"-sees]], which can release carbon dioxide and ethanol during fermentation. For the point, name these single-celled fungi used during beer and bread making.

ANSWER: **Yeasts** (accept **Saccharomyces** before mentioned; accept **Saccharomyces cerevisiae**; prompt on "fungi")

(11) These substances are confined with magnetic fields in a *tokamak* [[TOH-kah-mak]]. As in electrolyte solutions, the range of a particle's electrostatic effect in this state is given as the Debye [[deh-"BYE"]] length. Nuclear fusion is only possible if matter is in this state. For the point, name this fourth state of matter, a collection of highly energized gas atoms found in stars.

ANSWER: **Plasma**

(12) These objects begin to form when supercooled water comes into contact with dust nucleation sites. These objects form after repeated passing through updrafts in cumulonimbus [[kyoo-mew-loh-NIM-bes]] clouds during severe storms. For the point, name these icy objects that fall as precipitation.

ANSWER: **Hail** stones

(13) This inventor of the modern Celsius scale wrote a work which popularized a scientific racist theory of classifying humans into four groups based on skin tone and alleged personality. This scientist's *Systema Naturae* [[NAH-tyoo-ray]] is credited with standardizing binomial nomenclature and modern taxonomy. For the point, name this taxonomist who invented the modern Latin naming convention for organisms.

ANSWER: Carl **Linnaeus** (or Carl von **Linné**; or Carolus **Linnaeus**; prompt on “Linnaean taxonomy” or “Linnaean system”)

(14) Particles that can hypothetically exceed this quantity in a vacuum are known as tachyons [[TAK-ee-ons]]. Mass energy equivalence is established by a formula that sets energy equal to mass times this quantity squared. Represented as "c" in Einstein's formula "e equals mc squared," for the point, what is this rate at which photons move?

ANSWER: **Speed of Light** (or **Lightspeed**; prompt on "c")

(15) One of these phenomena caused by lateral neural inhibition is named for Ernst Mach [[MOCK]]. Many of these phenomena originate from a confused figure-ground distinction. The autokinetic effect is one of these phenomena that suggests movement. For the point, name these phenomena, which trick the brain into processing visual data incorrectly.

ANSWER: Optical **illusions** (accept Visual **illusions**)

(16) This substance is composed of equal parts dichlorophenoxyacetic [[die"-klo-ro-feh-NAHK-see-ah-SEH-tik]] acid and trichlorophenoxyacetic [[try"-klo-ro-feh-NAHK-see-ah-SET-tik]] acid. The first use of this substance occurred during the Malaysian Emergency. A part of the larger class of “Rainbow Herbicides,” for the point, what is this defoliant used to clear out forests during the Vietnam War?

ANSWER: **Agent Orange** (Prompt on “Rainbow Herbicides” before mentioned)

(17) This region is home to formations such as black and white smokers. Cold seeps along this region can result in the formation of brine pools. Organisms that live near this region are collectively known as benthos, which often cluster around hydrothermal vents. For the point, name this rocky region at the bottom of the ocean.

ANSWER: **Sea floor** (or **Ocean floor**; accept **Bed** in place of **Floor**; accept **Bottom** in place of **Floor** before mentioned)

(18) This molecule's receptors are activated by a class of hallucinogenic drugs that includes psilocin [["SIGH"-loh-sin]] and LSD. When prepared for gastrointestinal use, this molecule is synthesized and secreted by enterochromaffin [[en-teh-roh-KROH-mah-fin]] cells, which synthesize it from tryptophan [[TRIP-toh-fan]]. Lexapro, Zoloft, and Prozac are name brand examples, for the point, what appetite and mood-regulating neurotransmitter?

ANSWER: **Serotonin** [[seh-roh-TOH-nin]] (accept **5-hydroxytryptamine**; or **5-HT**)

(19) The transpose of a matrix with this property always equals its inverse. A triangle's circumcenter lies at the intersection of lines named for this property, which is also possessed by two vectors whose dot product equals zero. Two lines with opposite reciprocal slopes have this relative property. For the point, name this property of lines that meet at 90 degree angles.

ANSWER: **Perpendicularity** (accept **Orthogonality**; accept **Normal**; accept **Orthonormal**; accept **Right angles** or **90 degree angles** before mentioned; prompt on "bisector" or "bisecting")

(20) Members of this phylum known as the deuterostomes [[doo-TEH-roh-stohms]] are known for their separate mouths and anuses. Members of this phylum possess either pharyngeal [["fair"-en-JEE-ahl]] pouches or pharyngeal slits while in their embryonic state. For the point, name this animal phylum named for possessing a namesake cartilage tube or backbone.

ANSWER: **Chordata** (or **Chordates**)

(21) The Faber-Jackson equation relates the stellar velocity dispersion of these entities to their luminosity, and Hubble's tuning fork diagram is used to classify these entities. In approximately four billion years, two of these will collide, creating an entity named "Milkomeda" [["milk"-AH-meh-dah]]. Coming in irregular, spiral, and elliptical varieties, for the point, what are these large collections of dust, dark matter, and stars?

ANSWER: **Galaxy** (accept **Galaxies**; accept Milkomeda **galaxy** or Milkdromeda **galaxy**; accept Andromeda **galaxy**; accept Irregular, Spiral, or Elliptical **galaxy**)

(22) Studies of these systems introduced Strahler [[STRAY-ler]] numbers for describing branch order. Riparian [{"rye"}-"PAIR"-ee-an]] zones form buffer areas around these systems. Cutting off sections of these bodies of water forms oxbow lakes. For the point, name these bodies of water that flow into the sea at deltas.

ANSWER: **Rivers** (accept more narrow synonyms such as **Stream**, **Brook**, **Creek**, or **Rivulet**)

(23) The transom supports of these devices connect to the sterndrive. These devices are divided into inboard and outboard motor varieties based on the placement of their propeller. These devices can be steered by redirecting fluid with a rudder. For the point, name these vehicles, examples of which include canoes and kayaks.

ANSWER: **Boat** (or **Ship**; accept Motor **Boat** before "canoe" is mentioned)

(24) These entities can be described using only mass, angular momentum, and charge, rendering them "hairless." An object approaching one of these entities will become increasingly redshifted and eventually stop moving, and the boundary of that occurrence with these objects is known as the event horizon. For the point, name these gravitational singularities from which even light cannot escape.

ANSWER: **Black holes**

(25) Extended use of this technology without rest can lead to a repetitive motion injury commonly known as "gorilla arm." Mobile devices often employ haptics to improve user experience with this technology. Pinches and multi-finger swipes are common gestures used with this technology. For the point, name this technology used to give inputs when using smartphones.

ANSWER: **Touch screen** (accept descriptive answers involving **screens** which are operated by **touch**)

Extra Question

(1) A grip-assisting extension of this animal's sesamoid [[SEH-sah-moyd]] bone was used as an example of a spandrel in a Stephen Jay Gould essay titled for this animal's "thumb." Due to their lack of interest in mating in captivity, a method of artificial insemination using liquid nitrogen was developed. For the point, name these black and white bamboo-eating bears from China.

ANSWER: Giant **Pandas** (or *Ailuropoda melanoleuca*; accept **Panda** bears)