

(MS) Science Bee Round 3

Regulation Tossups

(1) A stream of electrons in a magnetic field is used to generate this kind of radiation in a cavity magnetron. Unlike lower frequency kinds, this type of radiation requires a line of sight to transmit information. Radiation of this type is used to transmit cell phone signals to and from towers. For the point, name this type of radiation with wavelengths shorter than radio, commonly used to heat food.

ANSWER: **Microwave** Radiation

(2) These organisms are coated in a layer of flat, skin-like cells called pinacocytes. Like comb jellies, these organisms completely lack hox genes and, like placozoa, these organisms lack true tissues. These organisms are simple, filter-feeding animals, and their skeletons are used by humans for dermabrasion. For the point, identify these absorbent organisms often used to soak up spills and apply soap.

ANSWER: **Sponges** (or **Porifera**)

(3) This quantity over the vacuum permittivity is equal to electric flux through a closed surface by Gauss's law. For a capacitor, this quantity is equal to the capacitance times the voltage. This quantity is equal to the current multiplied by time duration, and this quantity is symbolized Q. For the point, identify this property of matter in an electrical field that can be either positive or negative.

ANSWER: **Charge** (accept **Q** before mentioned)

(4) The role of these organelles in plant cells is performed by vacuoles. These organelles contain HEXA, an enzyme that breaks down gangliosides, although that mechanism fails in Tay-Sachs disease. These organelles are the final destination in endocytosis and drive the process of autophagy. For the point, name these organelles that break down cellular waste.

ANSWER: **Lysosomes**

(5) A rule for this effect was first quantified by Arrhenius, and this effect was later measured by the Keeling Curve. Water vapor is the largest contributor to this effect, and a runaway type of this effect is responsible for Venus having the hottest surface temperature in the solar system. For the point, name this effect in which gases like CO₂ trap heat inside of a planet's atmosphere.

ANSWER: **Greenhouse** Effect (prompt on "Global Warming;" prompt on "Climate Change")

(6) The Rodrigues Solitaire was a close relative of this animal, while the still-extant Nicobar pigeon is genetically similar to this animal. Confusion over an ibis species once caused scientists to believe that this animal lived on Réunion. This bird was driven to extinction in the 17th century by invasive species and Dutch sailors. For the point, name this flightless bird that once lived in Mauritius.

ANSWER: **Dodo** (or **Dodos**; or **Raphus cucullatus**)

(7) A silver-plated sheet of this metal was used to make daguerreotypes in an early form of photography. Due to its biostatic properties, the Royal Navy used this metal to sheath the underwater hulls of their ships. This metal can be combined with zinc to make brass. Gold and silver are grouped with, for the point, what ductile and conductive metal with atomic symbol Cu?

ANSWER: **Copper** (accept **Cu** before mentioned)

(8) The two most superior of these structures are called the atlas and axis, which articulate with the occipital bone. Herniation of the cartilage between these structures is called a "slipped disc." Humans possess 33 of these bones, which come in cervical, thoracic, and lumbar varieties. For the point, name these bones that make up the spinal column.

ANSWER: **Vertebrae** (prompt on "Spine" or "Spinal Column;" prompt on "Backbone")

(9) An inner layer of this body is composed of a material called ice-VI [[SIX]]. The majority of this moon's atmosphere is composed of nitrogen, which makes this moon the only satellite with a thick atmosphere in the solar system. This moon is the largest satellite of its planet, and its size exceeds that of nearby Rhea and Enceladus. The Cassini-Huygens probe visited, for the point, what largest moon of Saturn?

ANSWER: **Titan**

(10) This element combines with carbon to form the polymer used in Teflon. This group seventeen element, which is the most electronegative, creates an extremely caustic acid when combined with hydrogen. For the point, name this element and halogen, an anion of which is often added to water due to its importance in dental health.

ANSWER: **Fluorine** (prompt on "Fluoride")

(11) This company's African and Asian subsidiary is called Careem. An internal tool used by this company is colloquially known as God View. This company hired the former CEO of Expedia, Dara Khosrowshahi [[coze-ruh-SHAW-hee]], to replace co-founder Travis Kalanick. This company's arrival to the UK was protested by black-cab drivers. For the point, identify this ride-sharing app and competitor of Lyft.

ANSWER: **Uber** Technologies, Inc.

(12) The dye carmine is made from insects that live on these organisms. The largest one of these organisms is the *Pachycereus pringlei* [[PACK-uh-sare-ee-us PRIN-gull-eye]] of northwest Mexico. A large example of these plants is the saguaro [[suh-WAHR-oh]] species of Arizona, which can absorb over 100 gallons of water. An edible one of these plants is the prickly pear. For the point, name these desert-dwelling plants with sharp spines.

ANSWER: **Cactus** (or **Cacti**; prompt on "Plants" or "Succulents")

(13) The presence of furocoumarins [[FYOOR-oh-koo-muh-rens]] in this genus can cause intense namesake sunburns if handled outdoors. An oddly "fingered" member of this genus is known as Buddha's hand. Fruits from this genus possess a spongy white mesocarp called pith. Ancestral species of this genus include the pomelo, kumquat, and mandarin. For the point, name these types of fruits that include lemons, limes, and oranges.

ANSWER: **Citrus**

(14) This man's magnum opus explained to Europe the *modus Indorum*, or the place-value system for Hindu or Arabic numeral calculation. This man included an example about the growth of a population of rabbits in the *Liber Abaci*, which was published in 1202. For the point, name this Italian mathematician who names a numerical sequence beginning 1, 1, 2, 3.

ANSWER: **Fibonacci** (or **Fibonacci** Sequence; or Leonardo **Bonacci**; or **Leonardo of Pisa**; or **Leonardo Bigollo Pisano**; do not accept or prompt on "Leonardo" alone)

(15) The time elapsed between this event and the present day can be given by the comoving coordinate. The Planck epoch immediately followed this event that took place following the initial singularity. Cosmic microwave background radiation is a remnant of, for the point, what violent event theorized to have formed the known universe?

ANSWER: **Big Bang** (prompt on answers such as "The Formation of the Universe")

(16) Components of this bone include the linea aspera, as well as a projection known as the lateral condyle. The front of this bone is covered by a muscle group called the quadriceps, and this bone meets with the cotyloid cavity to form the hip joint. For the point, name this bone of the thigh and upper leg, the longest bone in the human body.

ANSWER: **Femur**

(17) The largest of these landforms was named for Bruce P. Lambert, and that landform was studied further in Operation Highjump. Accumulation zones form on these landforms where precipitation often flows through crevasses and seracs. Constantly moving due to gravity or basal sliding, these are, for the point, what large, slow-moving bodies of dense ice?

ANSWER: **Glaciers**

(18) GTOs are proprioceptors in these structures that can sense changes in tension. One type of these structures can be identified by the presence of sarcomeres, and the longest one of these structures in the human body is called the sartorius. For the point, identify these anatomical structures that are attached to bones by tendons, examples of which include the gluteus and the biceps.

ANSWER: **Muscles** (accept Striated **Muscles**; accept Skeletal **Muscles**)

(19) Ernst Ruka won the 1986 Nobel Prize in Physics for inventing one type of these instruments that uses a beam of accelerated electrons. One variety of these devices that come in optical and fluorescent types uses lenses to refract visible light in order to produce an observable image. For the point, name these laboratory devices used to magnify and examine objects that are too small to be seen by the naked eye.

ANSWER: **Microscopes** (accept specific types such as Electron **Microscopes**)

(20) In 2015, the instrument SAM took samples from this planet and discovered fixed nitrogen in its nitrates. The largest mountain in the solar system can be found on this planet, and that mountain's name is Olympus Mons. This planet has two moons named Deimos and Phobos. For the point, name this Red Planet located between Earth and Jupiter.

ANSWER: **Mars**

(21) The Elk Cloner was the first widespread example of these things. A mythic tale of Homer inspired the name of one of these entities known as a "Trojan Horse," which is often shared via e-mail attachments masquerading as legitimate files or software. Computers can be infected by, for the point, what type of malware that affects performance?

ANSWER: Computer **Viruses** (accept **Malware** before mentioned)

(22) This complex organelle is made up of flattened, stacked pouches called cisternae [[SIS-ter-nay]]. This membrane-bound organelle of eukaryotic cells carries the surname of its discoverer, an Italian pathologist with the first name Camillo [[kah-MEE-loh]]. For the point, name this two-faced organelle responsible for the transportation, modification, and packaging of proteins and lipids into vesicles.

ANSWER: **Golgi Body** (or **Golgi Bodies**; accept **Golgi Apparatus**)

(23) One protein in this substance is made up of four globular subunits, each of which contains a porphyrin ring. The fluid component of this substance is known as serum, and that substance can become plasma when its clotting factors are re-introduced. Hemoglobin is a protein in, for the point, what liquid substance carried by veins and arteries?

ANSWER: **Blood** (prompt on "Hemoglobin" before "Fluid Component")

(24) An ideal process for these devices is the common Otto cycle. A theoretical type of these devices with optimal efficiency is described by the Carnot [[car-NO]] cycle. Intake and compression are the first two stages in the four-stroke type of these devices. Heat and other forms of energy are converted into mechanical work in, for the point, what type of device found under the hood of a car?

ANSWER: **Engines** (accept **Motor**; accept Carnot **Engine**; accept Four-Stroke **Engine**)

(25) This molecule winds itself around histones to create nucleosomes. Unlike its less-evolved precursor, the pyrimidine base uracil is replaced by thymine in this molecule. Genetic recombination is used to repair this molecule that contains long segments called chromosomes. For the point, name this molecule with a double-helix structure that contains an organism's genome.

ANSWER: **DNA** (accept **Deoxyribonucleic Acid**)

Extra Questions

(1) The release of aldosterone causes the renal tubes to absorb this nutrient in the RAAS system. Excessive levels of this nutrient is the leading cause of preventable hypertension-related deaths. In nerve cells, this nutrient is exchanged across ion channels with potassium. For the point, name this element that makes up table salt with chloride, symbolized Na.

ANSWER: **Sodium** (accept **Na** before mentioned; accept **Natrium**)

(2) Affluents and distributaries, such as the Atchafalaya in Louisiana, can extend from these features. Low turbidity and oxygen levels can result in a blackwater type of this feature, which can be found in bayous. For the point, name this type of body of water that flows in different directions at continental divides and often ends in deltas.

ANSWER: **Rivers**