

IESO – Environmental Science Bee – Round 2

Regulation Tossups

(1) Microsoft is set to refurbish the site where this incident took place to power its data centers. This incident was the only one of its type with an INES rating of more than five to take place in North America, and it was caused by a loss-of-coolant accident, which led to minimal health impacts in the area around the Susquehanna River. For the point, name this accident, which took place in 1979 at a namesake nuclear power plant in Pennsylvania.

ANSWER: **Three Mile Island** accident

(2) This state's Isle Royale has been studied for the interaction between its wolves and moose. This state was the site of a 2010 oil spill on the Kalamazoo River, and the Enbridge Line 5 has attracted controversy for traveling via its Straits of Mackinac [[MAH-kih-NAW]]. *Legionella* bacteria infected the water of one city in this U.S. state, as part of a scandal for which governor Rick Snyder was charged. The Flint Water Crisis occurred in, for the point, what U.S. state known for its auto industry within Detroit?

ANSWER: **Michigan**

(3) Examples of these events caused by dinoflagellates are called red tides. These harmful events may result from eutrophication, a process that causes oxygen depletion in a body of water. Excess fertilizer runoff can cause these events, which can involve cyanobacteria and subsequently cause the deaths of fish. For the point, name these harmful events in which certain aquatic organisms explode in population within lakes, causing water color to change.

ANSWER: **algal bloom** (or **algae bloom**; prompt on "algae" alone)

(4) This event destroyed most of the habitat of the long-footed potoroo and all of the habitat of the Kate's leaf-tailed gecko. Dry lightning induced much of this event, the costliest natural disaster in the history of greater Oceania, which lasted between June 2019 to May 2020 and was termed the "Black Summer." For the point, name this natural disaster which burned millions of trees, causing major smoke pollution in states such as New South Wales and Victoria.

ANSWER: 2019-2020 **Australian bushfires** (accept **Black Summer** until mentioned)

(5) These particles create "global dimming" by increasing cloud albedo, temporarily masking warming effects. These substances form brown clouds over South Asia which disrupt monsoon patterns, and they provide nucleation sites for cloud formation. These substances, whose sulfate varieties caused acid rain before clean air regulations, are injected by volcanic eruptions into the stratosphere, leading to temporary cooling. For the point, name these suspended particles which include soot, dust, and sea spray.

ANSWER: **aerosols**

(6) Events quantified by this system create "butterfly" patterns of fallen trees and can temporarily depress local water tables. Buildings designed to withstand forces measured by this system can create wind tunnels which intensify the phenomena it measures. Phenomena measured by this scale create unique succession patterns by clearing central forest areas while leaving edges intact. For the point, name this scale used to rate tornado intensity based on damage patterns.

ANSWER: **Fujita** scale (or **Fujita**-Pearson scale; accept **F-Scale**; accept **FFP**)

(7) These devices are being installed in streets to eliminate mercury emitted from some lamps. This semiconductor device releases a "blue" type of radiation, which poses health risks as it suppresses the sleep hormone melatonin. According to the U.S. Department of Energy, this device uses up to 90 percent less energy than incandescent bulbs. For the point, name this device which emits light when an electric current passes through it, and whose white light is used to improve concentration.

ANSWER: **LED** light (or **light emitting diode**; prompt on "artificial light")

(8) One candidate for controlling the spread of this organism is the highly toxic fungus *Myrothecium verrucaria*. In 2010, Chattanooga began a program using llamas and goats to restrict this plant, and this plant was once advertised to farmers as a way of preventing soil erosion during the Dust Bowl. Due to its rapid regrowth, this plant must be mowed down once a month. For the point, name this climbing plant which is called the "vine that ate the South."

ANSWER: **kudzu** (or **Chinese arrowroot**; or **Japanese arrowroot**; prompt on "arrowroot"; prompt on "vine")

(9) This person's day is on November 15, which was the birthday of his favorite tortoise on the Galápagos Islands. In one program, this man and his wife, Terri, used an eagle and a sea snake as an example to explain the food chain on Fraser Island. For the point, name this Australian conservationist who became a household name due to his television series *The Crocodile Hunter*.

ANSWER: Steve **Irwin** (or Stephen Robert **Irwin**; prompt on "Crocodile Hunter" before read)

(10) This proposal includes a vision for a "ten-year national mobilization" and Dianne Feinstein voiced her opposition to it when confronted by protestors from the Sunrise Movement. This proposal was authored in the Senate by Massachusetts senator Ed Markey, and it includes aspects such as upgrading high-speed rail systems. Alexandria Ocasio-Cortez is a supporter of, for the point, what progressive proposal, which combines responding to climate change with larger social reforms?

ANSWER: **Green New Deal** (accept **GND**; do not accept or prompt on "New Deal" alone)

(11) In rural areas, this process is often executed with vermifilters, which use earthworms to reduce oxygen demand and remove pathogens. This process creates effluent which can be safely released into the environment, and its proliferation has greatly reduced cholera outbreaks. This process cannot be carried out via septic tanks in densely-populated areas due to the need for large drainfields. For the point, name this process whereby contaminants are removed from wastewater.

ANSWER: **sewage treatment** (accept clear-knowledge equivalents)

(12) The Indian Point Energy Center along this river was shut down in 2021 due to concerns about nuclear pollution, and it was marked as a "Superfund" site due to PCB pollution, partly caused by a GE factory in North Tarrytown. This river, which runs above the Lincoln Tunnel, contains a sediment layer of metal-rich ash from the 9/11 attacks. For the point, name this river which serves as a drinking source for some cities in New York.

ANSWER: **Hudson** River

(13) One animal from this island is called the sifaka for its distinctive call. The world's smallest reptile, the nano-chameleon, was recently discovered on this island, where the extinct elephant bird was found. Six species of Baobab tree are endemic to this island, as well as a type of primate known for its black and white tail consisting of ring patterns. For the point, name this island off the coast of Africa which is notably the home of lemurs.

ANSWER: **Madagascar**

(14) This genus's "pygmy" species lived on the Channel Islands and primarily ate leaves and twigs. The Columbian species of this animal was likely a disperser of the Kentucky coffeetree, whose fruit cannot be consumed by current North American fauna. Though these furry animals could use their large front teeth to forage for food, overhunting by the Clovis culture likely caused their extinction. For the point, name this genus of mammals which disappeared after the Ice Age.

ANSWER: **mammoth** (accept **mammuthus** or woolly **mammoth**)

(15) Using the Superfund law, this organization can clean up environmentally contaminated sites. This organization sponsors a program that creates low-flow fixtures as part of its voluntary WaterSense initiative. In December 2024, this organization awarded grants worth \$135 million to California to discontinue the use of diesel trucks. For the point, name this governmental agency which helps preserve the quality of water and air by implementing the Clean Air and Water Acts.

ANSWER: **EPA** [[E-P-A]] (or United States **Environmental Protection Agency**)

(16) The largest recurring hypoxic zone in the U.S. occurs in this body of water due to runoff from agribusiness, and also extends to the Brazos River mouth. This body of water was the site of a collision of a boat with a bridge to Pelican Island in 2024, causing an oil spill into Galveston Bay. This body of water is connected to Lake Pontchartrain, where the failure of levees caused flooding in 2005. For the point, name this body of water, into which runoff is fed by the Mississippi River.

ANSWER: Gulf of **Mexico**

(17) Robert Whittaker proposed three metrics for this quantity denoted alpha, beta, and gamma, which differ between local and regional scales. This quantity is maximized when ecological disturbances like forest fires are at an intermediate frequency. The Simpson index for this quantity accounts for both species richness and species evenness. Rainforests are often namesake "hotspots" for, for the point, what measure of the variability of life within an ecosystem?

ANSWER: bio**diversity** (accept species **diversity**; accept biological **diversity**)

(18) This cycle has been altered by humans due to the extensive harvesting of legumes, as well as the Haber–Bosch process used during the creation of fertilizers. Human impact on this cycle has also increased the frequency of acid rain. This cycle includes processes such as ammonification and fixation, which is carried out by bacteria present in plant roots. For the point, name this biogeochemical cycle which depicts the circulation of the most common element in the atmosphere.

ANSWER: **nitrogen** cycle

(19) Climate change causes disruptions to networks of this process due to changes in angiosperm reproductive timing. Some angiosperms use patterns visible in UV light to create a “bullseye” for this process. The most economically important performer of this process is currently under threat due to colony collapse disorder. Bees can be rented by farmers to perform, for the point, what step of plant reproduction, which involves the transfer of a dust-like substance from one flower to another?

ANSWER: **pollination** (prompt on “feeding” or similar answers; prompt on answers indicating “visiting flowers”)

(20) The use of the NSAID [[en-“SAID”]] diclofenac has caused a massive collapse of birds who exhibit this behavior in India. In food chains, animals engaging in this behavior precede decomposers and detritivores and succeed primary predators. Common examples of animals who engage in this behavior include jackals, raccoons, and carrion flies. For the point, identify this feeding strategy used by vultures and hyenas, the act of consuming prey that has already been killed.

ANSWER: **scavenging** (accept word forms such as **scavenger**; accept **carrion eating** or equivalents; do not accept “decomposer” or “detritivores”)

(21) This company faced controversy for sourcing its nickel from the Goro Mine, which has caused pollution in New Caledonia. Martin Tripp leaked that this company scrapped 40 percent of raw materials in its Nevada Gigafactory. This company was sued for an alleged failure of its Fremont factory to comply with the Clean Air Act, and it has also been criticized for using diesel generators to power its Supercharger network. For the point, name this largest producer of electric cars in the world.

ANSWER: **Tesla** Motors

(22) The silver fox was successfully subjected to this process in a Russian experiment under laboratory conditions. This process has caused the western honeybee to become easier to calm with the use of smoke. Ostriches underwent this process in South Africa during the mid-1800s in response to high demand of their feathers. *Canis lupus familiaris* is another species that underwent, for the point, what process, whereby a species is made more adaptable to human use?

ANSWER: **domestication** (accept clear-knowledge equivalents)

(23) These biomes often occur in endorheic settings such as those surrounding Lop Nur, but they are prone to flash floods, which carve *wadis* into them. Windstorms in these biomes create ergs and haboobs, which some animals have adapted to with multiple layers of eyelids. The world's largest "hot" example of these biomes is home to the white antelope, whose stomach lining allows it to store the dew it consumes. For the point, name these dry biomes, whose indigenous species include dromedary camels.

ANSWER: **deserts** (accept hot **desert** or cold **desert**)

(24) This industry was the primary cause of the extinction of Costa Rica's pass stubfoot toad. The CITES treaty, also known as the Washington Convention, has attempted to prevent the illegal form of this industry. Along with deforestation, this industry is the primary cause of declining slow loris populations. For the point, name this industry which often sources its products by capturing and breeding endangered wild animals for human companionship.

ANSWER: exotic **pet** trade (accept **wildlife** trade before "wild" is read)

(25) This phenomenon often leads to desertification, and a demand for cashmere goat wool is intensifying this phenomenon in Mongolia. Sea urchins cause this phenomenon within kelp forests. This phenomenon has been partly responsible for the expansion of the Sahel, causing conflicts between herders and farmers in Nigeria. This phenomenon is partly caused by rabbits in Australia, resulting in the loss of native plant species. For the point, name this situation which occurs when animals feed on vegetation without ample recovery time.

ANSWER: **overgrazing** (accept clear-knowledge equivalents)

(26) One of these structures named for Wallis Annenberg is being partly built to prevent the Ventura Freeway from causing the genetic isolation of mountain lions in the Santa Monica Mountains. Christmas Island contains these structures called "crab bridges," and students at Cornell University built these structures known as "amphibian tunnels." These structures, typified by overpasses, are built to prevent roadkill. For the point, name these pathways which allow animals to pass across roadways.

ANSWER: **wildlife crossings** (accept clear-knowledge equivalents; prompt on "bridge" and "overpass" alone)

(27) To defend itself from pests, plants of this species possess the poison *solanine*, making its fruits inedible. Though it is not the tomato, this species is affected by the *phytophthora infestans* mold. A "lumper" version of this plant was noted for its ability to grow in soggy, nutrient-poor soil, though it was susceptible to mold which caused dark spots to grow on the round parts of its roots. For the point, name this plant whose "blight" once caused a human famine in Ireland.

ANSWER: **potato** (accept *Solanum* **tuberosum**)

(28) Climate change has increased the frequency of these events by degrading soil crusts and expanding deserts. These meteorological events can strand migrating birds and damage their respiratory systems, while also reducing solar panel efficiency in arid regions. For the point, name these windstorms which transport particles from dry regions such as deserts.

ANSWER: **sandstorms** (accept **dust storm**)

(29) A tea made from the dung of this animal is produced in Ya'an and is one of most expensive teas, as it is believed that this animal's waste contains 70 percent of the nutrients it consumes. One variety of this animal is known as the Qinling [[CHIN-ling]] and has brown fur. This endangered species is primarily vegetarian, though they may eat smaller rodents and carrion. Residing in the Sichuan and San provinces, these are, for the point, what black-and-white bear species native to China?

ANSWER: giant **panda** (or **panda** bear; prompt on "bear")

(30) One facility holding these vessels called HMNB Clyde was the site of protests by Trident Ploughshares. Sealant was applied to one of these vessels, called the *Komsomolets*, to prevent the leakage of plutonium, and another called the USS *Thresher* leaked diesel after sinking off the coast of Cape Cod. The use of sonar to detect these vehicles can result in stranding of some whale species. For the point, name these vehicles which operate independently underwater.

ANSWER: **submarines** (do not accept "submersible")

Extra Questions

(1) Horizontal gene transfer can complicate the construction of these diagrams, which often use outgroups for rooting. Synapomorphies are shared derived traits used to determine relationships in these diagrams. Branch lengths in these diagrams can represent genetic distance or time since divergence. For the point, name these branching diagrams that show evolutionary relationships between species, often called evolutionary trees.

ANSWER: **phylogenetic** tree (or **phylogeny**)