2015 International History OLYMPIAD

Science and Technology Bee
Round 1 - Prelims

1. These organisms can be infected with Israeli acute paralysis virus. Warwick Estevam Kerr hybridized the *scutellata* and *ligustica* subspecies of these animals, which were accidentally released in 1957 near Rio Claro. Their namesake "space" allows removable frames in a device patented by L.L. Langstroth, which largely replaced the earlier upside-down baskets. Karl von Frisch first studied a behavior in these animals known as the waggle dance. A worldwide decline in them may be due to colony collapse disorder. For the point, name these stinging yellow and black insects that pollinate flowers.
ANSWER: **bee**s (accept ***Apis***; accept **Apidae**; accept **Apinae**; accept **Anthophila**; prompt on "hymenopterans;" do not accept "hornets" or "wasps")

2. This substance was originally discovered when Charles Smullen tested an unusually inviscid, turbid liquid crystalline solution. The process for manufacturing this substance had originally been developed by Akzo for the creation of Twaron. This substance was developed by the only female winner of the Lavoisier Medal, named Stephanie Kwolek. This compound, which is similar to Technora and Novex, is a para-aramid fiber developed by DuPont that has five times the tensile strength of steel. For the point, name this polymer commonly used in bulletproof vests.
ANSWER: **Kevlar**

3. New Zealand's *SS Talune* caused this event to be especially devastating in Western Samoa. Due to her description of it in *Pale Horse, Pale Rider*, Katherine Porter is the dedicatee of a book on this event by Alfred Crosby, who posited it originated in Haskell County, Kansas. Cytokine storms produced by strong immune systems contributed to healthy people being the primary victims of this 20th century event, which may have killed up to six percent of the world's population. For the point, name this deadly pandemic caused by a strain of the avian H1N1 virus at the end of World War I.
ANSWER: 1918 **Spanish flu** (accept **Spanish influenza**; accept **1918 flu** pandemic; prompt on **H1N1 pandemic** until it is read)

4. One device developed by this man's company the XT3, uses the "Red Storm" architecture. One company founded by this man developed the first device to make major use of GaAs circuits, but went bankrupt when only one of those was sold. While working for Control Data Corporation, this man decided to create his own company in Chippewa Falls, Wisconsin. One of his first devices was sold to the National Center for Atmospheric Research; that device was an improvement on the STAR-100, by adding registers to speed up vector processing. For the point, name this American engineer and businessman who is called the "father of supercomputing".
ANSWER: Seymour **Cray**

5. This text was initially going to be co-written with *Newsweek* journalist Edwin Diamond. This text used expert testimonies from a case brought by Marjorie Spock. This work was preceded by the last volume of its author's trilogy, *The Edge of the Sea*. This text prompted the "flagrant propaganda" film *Fire Ants on Trial*. The Keats poem "La Belle Dame sans Merci" provided the name of its chapter "And No Birds Sing". This book spurred the U.S. campaign to ban the pesticide DDT. For the point, name this nonfiction book by marine biologist and environmentalist Rachel Carson.
ANSWER: ***Silent Spring***

6. A water-cooled early version of these devices can still be found on the *NS Savannah*. An early version of this device was developed by I. F. Mourosteff for Westinghouse and was demonstrated at the 1933 Chicago Worlds' Fair. The Amana Radarange was an early example of them. While working for Raytheon, Percy Spencer discovered the process used in these devices while standing next to a radar antenna and discovering a candy bar had melted in his pocket. For the point, name this cooking device which uses part of the electromagnetic spectrum with longer wavelength than infrared.
ANSWER: **microwave** oven

7. This man participated in an expedition led by Ludvig Mylius-Erichsen, after which he wrote *Thermodynamics of the Atmosphere*. Scientists who supported his ideas include Emile Argand and Alexander Du Toit. This scientist died in Greenland during the 1930s after returning from a rescue expedition. This scientist noticed that tropical plants had fossils in the polar regions, similar rock strata in the mountains of South Africa and Brazil, and how coastlines of South America and Africa seemed to fit together. For the point, name this German scientist who first proposed the supercontinent Pangea and the concept of continental drift.
ANSWER: Alfred **Wegener**

8. The BepiColombo is a planned joint Japanese/European mission to this astronomical body, and will include an orbiter to study its magnetosphere. One space probe to visit this astronomical body discovered a faint helium atmosphere. That probe, Mariner 10, was only able to map 45% of this planet's surface, including its large Caloris Basin. This planet was only recently completely mapped in 2011 by the space probe MESSENGER. After the demotion of Pluto, this planet became the smallest in the Solar System. For the point, name this first planet from the sun.
ANSWER: **Mercury**

9. This man jostled with a bunch of people in an elevator wearing minus-sign caps in the "Storms" episode of the show he stars in. Darrell Suto reprised his role as Billy Quan on a show with this man, whose persona was invented by Pat Cashman on *Almost Live!* "Not That Bad Records" produced the soundtrack of the show in which this man appears, including the parody songs by "Sure Floats-a-Lot" and "Alice in Genes". This engineer's Big Think video "Creationism is Not Appropriate for Children" led to a debate with Ken Ham. For the point, name this bow-tied educator who hosted a namesake children's show as "the Science Guy".
ANSWER: William “Bill” **Nye** (prompt on "the **Science Guy**" until it is read)

10. A plant devoted to the electrolysis of this substance owned by the Dryden Chemical Company is responsible for poisoning two First Nations groups in an outbreak of Ontario Minamata disease. That process for electrolysing this substance is named for Castner and Kellner and uses a mercury-containing cell. This compound is molten in a Downs cell. Halite is a nearly pure form of this substance which can be mined, and brine contains a high concentration of it. For the point, name this molecule with chemical formula NaCl.
ANSWER: **salt** (accept **sodium chloride**,or **NaCl** until mention)

11. Nuclear examples of these devices were envisioned as part of the British "Blue Peacock" protocol. The Giant Viper were methods used to remove these objects, whose use are banned by the Ottawa Treaty. Norman MacLeod invented one of these devices that he named after the claymore. They can be detected by a breed of rats trained by the APOPO organization and by trained honeybees. Many of these objects are still active in Cambodia and the Korean Demilitarized Zone. For the point, name these weapons, which are explosive devices triggered when a person walks over them.
ANSWER: land**mine**s (prompt on "bombs" or "explosives" or the like)

12. One of these structures is named for Albert Wojciech Adamkiewicz. The largest one of these structures contains the sinuses of Valsalva and bifurcates into the common iliac ones. Low-density lipoproteins in the endothelium of these structures is thought to be responsible for the accumulation of fatty plaque in atherosclerosis. The pulmonary one of these vessels is the only one not to carry oxygenated blood. The aorta is the largest human one of, for the point, what blood vessels that carry blood away from the heart, in contrast to veins?
ANSWER: **artery** (accept **arteries**; anti-prompt "aorta")

13. A member of this place measured a nearby bridge to be 364.4 smoots plus or minus one ear. On Drop Day, attendees at this place drop a piano off the roof of Baker House. The acronym for this place's motto, IHTFP, is sometimes put on class rings; Tony Stark wears one of those Brass Rats, implying he went to this place. Another notable "hack" at this place involved placing stop signs in its Infinite Corridor. A graph theory problem left on a blackboard at this place is solved by savant janitor Will Hunting. For the point, name this greater science and tech school that has resisted being absorbed by its neighbor Harvard.
ANSWER: **Massachusetts Institute of Technology** (accept **MIT**)

14. This man's namesake effect describes the decrease in fermentation rate that results when yeast is exposed to oxygen. By comparing tartaric acid isolated from wine lees to that synthesized artificially, this man first demonstrated chirality and explained isomerism. This man attenuated cultures with potassium dichromate, a method he took from his rival Toussaint, to create the anthrax vaccine. Nothing grew in the medium in this man's swan-neck flasks, effectively disproving spontaneous generation. For the point, give this Frenchman who names the process for heating up milk to kill bacteria.
ANSWER: Louis **Pasteur**

15. Besides creating the first recorded turbidity currents, the 1929 Grand Banks earthquake destroyed twelve these structures. A company headed by Cyrus Field was given a subsidy from the US government to create one of these things. The SS Great Eastern, designed by Isambard Kingdom Brunel, was responsible for placing the first permanent one of these structures, which ran from Valentina Island to Heart's Content. The first of these was used in an exchange between Queen Victoria and James Buchanan. For the point, name these things which allowed the exchange of Morse code messages between the US and Britain.
ANSWER: transatlantic **telegraph cable** (prompt on "cable"; accept **transatlantic cable**, but do NOT accept anything with the word "telephone")

16. Reg Sprigg discovered a group of fossilized life forms in a region of this country that names a geologic period marked by the Avalon explosion; that period was named after this country's Ediacara Hills. Populations of goanna have declined in this country's Kakadu National Park due to poisoning from bufotoxins secreted by invasive cane toads. This country introduced the myxoma virus to control populations of animals that easily overran its 3,200-kilometer series of rabbit-proof fences. For the point, name this country where machine gun-toting soldiers combatted large flightless birds in its Emu War.
ANSWER: **Australia**

17. At the time of his death, this man owned the company Bofors AB. This scientist's support of the Karolinska Institute over more prestigious schools of the same type suprised many of his contemporaries. This scientist's brother Emil died in an explosion at their father's laboratory. A well-known urban legend claims that a love interest of this man rejected him for Gosta Mittag-Leffler, a mathematician. This scientist left money equal to about $265 million of today's dollars to fund prizes handed out annually in Oslo and Stockholm. For the point, name this inventor of dynamite and namesake of prestigious science awards.
ANSWER: Alfred **Nobel**

18. The lower bound in the Travelling Salesman problem is given by a type of these structures, which can be found using algorithms named for Boruvka, Kruskal and Prim. An average of big O of log n time is required for inserting and deleting elements on the binary type of these structures. The AVL and red-black types of these structures are self-balancing. For the point, name these data structures with parent or root nodes, whose branches terminate with leaves.
ANSWER: **tree**s

19. This mathematician names a theorem with Leonhard Euler that every even perfect number is of the form 2 to the quantity n plus one times the quantity 2 to the n plus 1. One algorithm named for this mathematician takes two numbers, divides the smaller into the larger, replaces the larger number with the remainder, and repeats until the remainder is zero. The remainder of the second-to-last division of his namesake algorithm will be the greatest common divisor. The fact that all right angles are equal to one another is one of his five postulates. For the point, name this mathematician who wrote *Elements* and is known as the father of geometry.
ANSWER: **Euclid**

20. Around 140 of these weapons were pulled from the wreck of the *Mary Rose.* A 1470 statute made training in this weapon compulsory, leading to a 1472 Statute of Westminster in which ships were required to bring material for four of these weapons for every unit of cargo. Skeletons of users of this weapon showed characteristic bone spurs on the left wrist and left shoulder. These weapons were constructed from yew trees and had a range over 200 meters. For the point, name this weapon used to great effect at the Battles of Crecy and Agincourt, a long-range bow with length around 2 meters.
ANSWER: English **longbow** (accept Welsh **longbow**; prompt on "bow" or "bow and arrow")

21. The optimality of these things can be ranked A, C, D, E, or T, which represent invariants of the information matrix. In response surface methodology, a second degree polynomial is used to model the results of one of these things that follows a central composite design. Full factorial ones account for every combination of variables. Ronald A. Fisher's principles for designing them include comparison, randomization, and replicability. For the point, give these procedures that typically have independent and dependent variables, which scientists use to test hypotheses.
ANSWER: **experiment**s

22. One of this company's first product was released after Federico Faggin joined the company; that product was developed in partnership with Busicom using the 10-micrometer process. One of this company's co-founders posited that their products would double in complexity every two years. Founded by Noyce and Moore, this company's 8088 chip featured in the original IBM PC, and they later introduced hyperthreading on their Pentium 4 line of processors. For the point, name this competitor to AMD, a semiconductor company currently producing the Core line of processors.
ANSWER: **Intel** Corporation

23. Dr. Humphrey Osmond treated alcoholics who failed to respond to other treatments with this substance and supposedly achieved a 50% success rate. Bicycle Day commemorates Sandoz pharmacist Albert Hoffman's first experiment with substance. Dr. Frank Olsen died after he was covertly dosed with this drug during the CIA project MKUltra. The Merry Pranksters are refused this substance at the Millbrook mansion run by Timothy Leary. This drug is often distributed on blotter paper due to its potency. For the point, name this psychedelic drug that produces hallucinations sometimes called "trips".
ANSWER: **LSD** (accept lysergic **acid** diethylamide)

24. This color names the IUPAC book that describes the standards of organic chemical nomenclature. This color describes the "cloud" at the bottom of galaxy color-magnitude diagrams, and a type of main-sequence star referred to as "stragglers." The 2014 Nobel prize in physics was awarded to three scientists for their work in producing LEDs that emit light of this color. When a body is travelling towards us, its signals experience a Doppler shift named for this color. Rigel is a star of this color, which are the hottest types of stars. For the point, name this color, that due to Rayleigh scattering, is the color of our sky.
ANSWER: **blue**

25. Swanson's law predicts the price of these devices, which comes out to them halving in price every 10 years or so. Charles Fritts developed one of the first one of these devices using gold and selenium. The Shockley-Queisser limit is the maximum theoretical efficiency of one these devices consisting of a p-n junction. These devices operate in reverse bias and require the absorption of a photon in order to generate an exciton. Jimmy Carter put these things up on the White House, only to have Reagan remove them, and they are often used on space probes. For the point, name these devices that are used to convert sunlight into electrical energy.
ANSWER: **solar cell**s (accept "**solar panel**s" or "**photovoltaic panels**" or "**photovoltaic cell**s")

26. Richard Zigismondy created a colloidal form of this element, which is also synthesized by the Turkevich method. Ions of this element are used by the Relativistic Heavy Ion Collider is used to study the matter created directly after the Big Bang. Fritz Haber attempted to extract it from seawater. Electrum is an alloy of this element and silver, and an experiment that used this element involved bombarding a sheet of it with alpha particles to prove the existence of the atomic nucleus. For the point, name this metal that was used in a namesake foil experiment by Ernest Rutherford.
ANSWER: **gold** (accept **Au**; prompt on atomic number **79**)

27. One history of this company written by Mark Pendergrast contrasted it with "God" and "country". It's CEO J. Paul Austin forced local businesses to support a dinner honoring Martin Luther King Jr. Joseph A. Biedenharn developed packaging for one of this company's products. Asa Griggs Candler bought the formula for this company's flagship product from pharmacist John Pemberton, who claimed it could cure neurasthenia and headaches. That product manufactured by this company originally contained cocaine. For the point, name this company based in Atlanta that manufactures a namesake soft drink.
ANSWER: **Coca-cola** company (accept **Coke**)

28. The San Francisco Examiner offered a 10,000 prize for the first piece of one of these delivered to its offices, which was claimed by Stan Thornton. The 1979 Miss Universe pageant displayed a piece of debris from one of these things, which had landed a few days earlier. A proposed one of these things called *Freedom* later involved into one containing *Unity*, *Harmony*, and *Tranquility* modules. The existence of coronal holes was confirmed by observations from one of these places, which rained debris over Western Australia when it was deorbited. For the point, name these craft that include Mir, Skylab, and the ISS.
ANSWER: **space station**s

29. Richard Altmann was the first person to observe the ubiquitous nature of these organelles, and called them "bioblasts". A chemiosmotic process discovered in this organelle won Peter Mitchell a Nobel prize. The genome of protist *Rickettsia* is fairly similar to that of this organelle, and supports Lynn Margulis' endosymbiotic theory of this organelle's development. An "Eve" character named for this organelle is the oldest shared mother of all current humans. The Krebs cycle occurs in this organelle. For the point, name this organelle that produces ATP, the powerhouse of the cell.
ANSWER: **mitochondria**

30. This plant was made commercially viable after the discovery of a "u" phenotype which made it ripen uniformly. Robert Gibbon Johnson supposedly ate some of them in front of a crowd in Salem, New Jersey to prove they aren't poisonous. This plant was made to decrease its expression of polygalacturonase to stop rotting in the first example of a commercially-available GMO, the Flavr Savr. The case *Nix v. Hedden* established that it is botanically a fruit but culinarily a vegetable. For the point, name this crop, a sauce from which is commonly used to make pizza.
ANSWER: **tomato**

Extra Tossup – ONLY READ IF A QUESTION IS BOTCHED!

REPLACEMENT. During the Israeli-Lebanon War of 2006, one of these events occurred after the bombing of the Jiyeh station. In the aftermath of one of these, the Cullen Inquiry was assembled to determine why safety systems on Piper Alpha failed. The Sedco 135F tower was destroyed during another one of these events. Nalco's Corexit formula is often used in the aftermath of these events. Joseph Hazelwood was partly responsible for one of these events occurring in Prince William Sound, which resulted in the death of over one hundred thousand seabirds. For the point, name these events including the destruction of the Exxon Valdez.
ANSWER: **oil spill**s (accept reasonable equivalents; accept things like "oil tanker crashes" and so on)