



1. The D1 and D2 proteins bind to this compound, which can be synthesized from succinyl-CoA and glycine. This compound includes a phytol chain composed of twenty carbons, and it consists of a porphyrin (POR-fu-rin) ring coordinated with a magnesium atom. This compound, which comes in P680 and P700 types, is found in the thylakoid membrane and is used by plants to absorb light. For 10 points, identify this green pigment found in plants.

ANSWER: chlorophyll

189-12-73-03101

2. In one of this author's poems, the speaker describes the items his sister Isabel has woven. That poem, "my sweet old etcetera," appears in his collection *is 5*. This author was arrested and sent to a French prison camp during World War I, an experience described in his novel *The Enormous Room*. He described "how children are apt to forget to remember" in "anyone lived in a pretty how town." For 10 points, name this American poet, who may be best known for his unusual capitalization.

ANSWER: E. E. Cummings [or Edward Estlin Cummings]

140-12-73-03102

3. This man found more time to write after colony-taxer Charles Townshend hired him as a tutor. He argued that the "impartial spectator" inside each person judges actions in his *Theory of Moral Sentiments*. In another book, he explained that a factory produced forty-eight thousand pins per day due to the division of labor and that economic self-interest guides society through the "invisible hand." For 10 points, name this philosopher who wrote the anti-mercantilist *The Wealth of Nations*.

ANSWER: Adam Smith

019-12-73-03103

4. The protagonist of one of this author's plays refuses to recant when brought to court for telling a friend to burn a horrible sonnet he recited about "Phyllis." This author died onstage playing Argan, a hypochondriac. Alceste leaves civilization for the wilderness at the end of one of this man's plays, and in another, the title impostor poses as a religious advisor to seduce Orgon's wife. For 10 points, name this French playwright of the comedies *The Misanthrope* and *Tartuffe*.

ANSWER: Moliere [or Jean-Baptiste Poquelin]

080-12-73-03104

5. Longterm sufferers of this disease can develop CMV esophagitis and mycobacterium avium complex. Classes of drugs used to treat it include integrase inhibitors and fusion inhibitors. People who suffer from it can display Kaposi (kuh-PO-see) sarcoma tumors in their mouths. This disease is caused due to a destruction of CD4 T-helper lymphocytes by a retrovirus. Sixty-eight percent of its cases occur in Sub-Saharan Africa. For 10 points, name this disease caused by the human immunodeficiency virus.

ANSWER: AIDS [or acquired immunodeficiency syndrome; prompt on human immunodeficiency virus infection until it is read; prompt on HIV until it is read]

052-12-73-03105

6. This novel features the death by drowning of Cheswick and a fishing trip with the prostitute Candy Starr. Characters in this book vote twice on whether to watch the World Series on television. This book about "Acutes" and "Chronics" is narrated by the half-Indian Chief Bromden, who tells of Randle McMurphy's lobotomy after weeks of resistance to the evil Nurse Ratched. For 10 points, name this novel about life in a mental hospital, a work by Ken Kesey.

ANSWER: **One Flew Over the Cuckoo's Nest**

104-12-73-03106

7. This theory uses mathematical light cones as explanatory tools on Minkowski diagrams. The reciprocal of the square root of one minus beta squared, where beta is a speed ratio, is the namesake "factor" in this theory's Lorentz transformations. It predicts length contraction and time dilation as objects come near the unattainable speed of light. For 10 points, name this theory which assumes that there is no privileged frame of reference and was proposed by Einstein before its general variant.

ANSWER: Einstein's theory of **special relativity** [prompt on **relativity**]

104-12-73-03107

8. This character is found in the Cotton Nero manuscript. Created by the Pearl Poet, his real name is Bertilak de Hautdesert. He is given the task of upsetting Queen Guinevere, for which purpose he is transformed by Morgan le Fay, Arthur's half-sister and nemesis. He ominously grinds an axe unseen while preparing to complete the beheading contest he initiates. For 10 points, name this chivalric character who tests Sir Gawain in the fourteenth-century poem bearing his colorful name.

ANSWER: the **Green Knight**

045-12-73-03108

9. This actress recorded a version of "Baby It's Cold Outside" for the movie *Elf*, in which she played Jovie. In a different movie, Tom Hansen, played by Joseph Gordon Levitt, falls in love with a character played by this woman. In one television series, this woman plays a character who lives in an apartment with three guys and is named Jess. For 10 points, name this "adorkable" female lead in *New Girl* and *500 Days of Summer*.

ANSWER: **Zooey Deschanel** [prompt on **Deschanel**]

149-12-73-03109

10. This President was nominated at Chicago's Blackstone Hotel in the so-called "smoke-filled room." Thomas Walsh investigated this President's Interior Secretary Albert Fall for leasing Navy land. The first President to carry the new female vote, he promised a "return to normalcy," though his approval soured due to the Teapot Dome scandal. For 10 points, name this Republican President whose death from emphysema in 1923 led to Calvin Coolidge's presidency.

ANSWER: Warren Gamaliel **Harding**

104-12-73-03110

11. This man wrote about a sixty-nine-year-old who eats bananas to ease digestive pain and listens to recordings of his life in *Krapp's Last Tape*. He wrote two windows into the stage directions of a play in which two legless characters live in trash bins. He originally used French for a play in which Lucky is kept on a leash by Pozzo while two tramps sit by a tree. For 10 points, name this absurdist who wrote about Vladimir and Estragon in *Waiting for Godot*.

ANSWER: Samuel **Beckett** [or Samuel Barclay **Beckett**]

104-12-73-03111

12. This country had a secret police force called the DINA, which ran Operation Colombo. One leader of this country employed a number of American-educated economists called the Chicago Boys. Another president of this country came to power with the Popular Unity party before being killed in a military coup in 1973. For 10 points, name this South American country once under the socialist rule of Salvador Allende (eye-END-ey) and the dictatorship of Augusto Pinochet (pee-no-SHAY).

ANSWER: Republic of **Chile** [or Republica de **Chile**]

153-12-73-03112

13. In a speech in August 2012, this man said that "we choose respect over love," and "we are taking our country back." This politician said that he didn't care about "Presidential politics" on Fox News when Steve Doocy asked him about possibly meeting with Mitt Romney to survey damages. This keynote speaker at the 2012 Republican National Convention was photographed arm in arm with Barack Obama after Hurricane Sandy. For 10 points, name this governor of New Jersey.

ANSWER: Christopher James **Christie**

023-12-73-03113

14. In one work set in this city, Agricola Fusilier and Joseph Frowenfeld disagree about slavery in talks with Honore (ah-NOR). In another work set in this city, Paradise hot dogs are sold by the lazy Ignatius J. Reilly. This city is the setting for George Washington Cable's *The Grandissimes* (GRON-diss-eemz) as well as a novel by John Kennedy Toole. For 10 points, name this southern setting of *A Confederacy of Dunces*, which depicts the vibrant life of this city's French Quarter.

ANSWER: **New Orleans**

023-12-73-03114

15. One way to traverse this boundary is through the Blackpool Crossing. It is also crossed by the Blue Water Bridge and the Ogdensburg-Prescott Bridge. This boundary includes a northward prominence at the Northwest Angle within Lake of the Woods, then runs concurrent with the 49th parallel westward to the Pacific. For 10 points, identify this longest unmilitarized border in the world, which separates two North American countries.

ANSWER: **U.S.-Canada** border [or obvious equivalents]

019-12-73-03115



1A. Which Major League Baseball team, which plays at a stadium nicknamed the "Friendly Confines," has been managed in the past by Dusty Baker and Lou Piniella?

ANSWER: Chicago **Cubs** [prompt on **Chicago**]

1B. What term, which parodies the title of a Thomas More work about an ideal society, refers to a fictional world that is undesirable or terrifying, like the societies in *Nineteen Eighty-Four* or *Brave New World*?

ANSWER: **dystopia**

2A. What man founded the Union for a Popular Movement and was succeeded by Nicolas Sarkozy as president of France?

ANSWER: Jacques Rene **Chirac**

2B. Which Genoese explorer, the namesake of an important "exchange" of goods from the Old and New Worlds, established a settlement called La Navidad?

ANSWER: Christopher **Columbus** [or Cristoforo **Colombo**; or Cristobal **Colon**]

3A. What chemist discovered the covalent bond and names dot structures used to model the bonding between atoms and electron pairs?

ANSWER: Gilbert Newton **Lewis**

3B. Which invertebrate phylum, whose members exhibit radial symmetry, includes sea cucumbers and starfish?

ANSWER: **echinodermata** [or **echinoderms**]

4A. Newton's method is an iterative method for finding what points that, when input to a given function, result in an output of zero?

ANSWER: **roots** of a function [prompt on **zeroes** of a function]

4B. What is the term for the portion of the Earth that contains the crust and the upper mantle, thus lying directly above the asthenosphere?

ANSWER: **lithosphere**

5A. This is a 20-second calculation question. What number or numbers are excluded from the domain of the function defined by y equals the quantity x squared plus four x plus three, all over the quantity x squared minus four x minus five?

ANSWER: **-1 and 5** [do not accept or prompt on partial answer]

5B. This is a 20-second calculation question. If the supplementary angle of $6x$ degrees is 48 degrees, what is the value of x ?

ANSWER: **22**

6A. What doctrine, introduced in 1823, asserted that no foreign power could colonize North or South America without a response from the United States?

ANSWER: **Monroe** Doctrine

6B. Which American school of painting, named for a waterway, was headed by such artists as Asher Durand and Thomas Cole?

ANSWER: **Hudson River** School

7A. Wenceslas Square is located in what European city on the Vltava (vol-TAH-vuh) River, the capital of the Czech Republic?

ANSWER: **Prague**

7B. A heap is a special type of what data structure, which has nodes called leaves?

ANSWER: **trees**

8A. This is a 30-second calculation question. Find the cosine of the inverse tangent of the square root of 3.

ANSWER: **1/2** [or **0.5**]

8B. This is a 30-second calculation question. If two six-sided dice are thrown, what is the probability the sum of their faces will be an even number less than 7?

ANSWER: **1/4** [or **9/36**]

9A. Which American psychologist studied self-actualization in developing his namesake "hierarchy of needs"?

ANSWER: Abraham **Maslow**

9B. What comic operetta by Gilbert and Sullivan is about Frederic and Mabel but is best known for containing the song "I am the very model of a modern Major-General"?

ANSWER: *The **Pirates of Penzance***

10A. What law of physics states that for every action, there is an equal and opposite reaction?

ANSWER: Isaac **Newton's Third** Law of Motion [prompt on partial answer]

10B. What language is spoken in parts of northeastern Spain and is the official language of an autonomous community in Spain and in some parts of Navarre?

ANSWER: **Basque** [or **Euskara**]



1. One scene depicted by this man was also painted by Cabanel and Bouguereau (bah-guh-ROH). In that painting of his, Aura is held by the floating Zephyrus in the upper-left, who blows air from his mouth. This artist depicted a forest scene in which the Three Graces dance on the left, an allegory of spring. This artist of *Primavera* also depicted a red-haired nude goddess covering herself while standing on a seashell. For 10 points, name this Florentine artist of *The Birth of Venus*.

ANSWER: Alessandro **Botticelli** [or Sandro **Botticelli**; or Alessandro di Mariano di Vanni **Filipepi**]

104-12-73-03117

2. This island chain's namesake company used its southern Lafonia region for extensive sheep farming. An isthmus in this chain is home to Goose Green. The wreck of the ship *General Belgrano* lies just outside the 320-kilometer "Exclusion Zone" of this archipelago, whose two namesake islands are separated by a sound. Its major city of Port Stanley was once home to a British air base. For 10 points, name this contested archipelago east of Argentina.

ANSWER: **Falkland** Islands [or **Falklands**; or Las Islas **Malvinas**]

104-12-73-03118

3. A gradient in this quantity results in a form of convection named for Marangoni. It is related to radius of curvature by the Young-Laplace equation. Alveoli reduce this property by secreting surfactants. This property is responsible for the condensation of dew into droplets, and it is also responsible for capillary action. For 10 points, identify this attraction between the molecules on the surface of a liquid and other nearby molecules, which allows some animals to seemingly walk on water.

ANSWER: **surface tension**

189-12-73-03119

4. This man was replaced as governor by Alfred Cumming in part because John Doyle Lee led a slaughter of the Baker-Fancher wagon train in the Mountain Meadows Massacre. This man was the third to join the Quorum of the Twelve Apostles, and he led a group out of Nauvoo, Illinois, to a new state called Deseret. For 10 points, name this man who served as the first governor of Utah, and who also succeeded Joseph Smith as leader of the Mormons.

ANSWER: Brigham **Young**

023-12-73-03120

5. This creature killed residents of a city as punishment for the murder of Androgeus (an-dro-JAY-us). On his way home after killing this creature, one man forgot to change the color of his sails, leading to the death of his father. That hero slew this creature with assistance from Ariadne, who provided him with string. This beast was finally killed when Theseus entered the center of the Cretan labyrinth. For 10 points, name this half-man, half-bull monster from Greek mythology.

ANSWER: **Minotaur**

052-12-73-03121

6. One character in this game makes the protagonist agree to marry her after he saves her from the belly of Lord Jabu-Jabu. That character, Ruto, ends up being one of the Seven Sages. Near this game's beginning, the Great Deku Tree dies. Accompanied by the fairy Navi, this game's protagonist sleeps for seven years in order to be able to wield the Master Sword and defeat Ganondorf. For 10 points, identify this game in the *Legend of Zelda* franchise, named for an instrument.

ANSWER: *The Legend of Zelda: Ocarina of Time*

192-12-73-03122

7. In this novel, two characters discuss a dream in which a peasant carrying a sack describes pounding iron. The title character's husband is discovered to be under the influence of the French psychic Landau in this novel, which leads him to refuse divorce. This novel ends with Levin finding fulfillment in life through faith. Due to her fading relationship with Count Vronsky, the title character commits suicide by throwing herself under a train. For 10 points, name this novel by Leo Tolstoy.

ANSWER: *Anna Karenina*

140-12-73-03123

8. The acceleration caused by this kind of force can be determined by creating two similar triangles out of the velocity vectors for an object in motion at two points. The acceleration for an object under this force is equal to the velocity squared over the length of the radius of the object's travel. This type of force is used on cars in roller coaster loops. For 10 points, name this type of force that is center-seeking and opposed by the fictitious centrifugal force.

ANSWER: centripetal force [do not accept or prompt on "centrifugal"]

023-12-73-03124

9. One song in this book's first chapter has a tune in between that of "La Cucaracha" and "Oh My Darling Clementine." The mythical Sugarcandy Mountain is a paradise described by Moses in this novel, in which Molly is obsessed with ribbons. Alcohol is banned by a set of seven commandments in this novel, in which a glue factory kills Boxer and Snowball is purged by Napoleon, his fellow pig. For 10 points, name this allegory for Soviet Russia in which George Orwell uses barnyard creatures.

ANSWER: *Animal Farm*

104-12-73-03125

10. Fugacity is often substituted for this quantity when doing calculations with non-ideal gases. For an incompressible fluid, this quantity is equal in all parts of the fluid according to Pascal's Principle. The solubility of a gas in a liquid is proportional to this quantity for the gas according to Henry's Law. Charles's Law keeps this quantity constant, and it is multiplied by volume in the ideal gas law. For 10 points, name this quantity measured in pascals, often by a barometer.

ANSWER: pressure [or vapor pressure]

190-12-73-03126

11. This person killed a fig tree when he cursed it for not bearing figs out of season. He claimed that "no prophet is accepted in his own country." In another incident, he prays to God to "let this cup pass from me" before asking, "What, could you not watch with me one hour?" in admonishment of his sleeping followers. At the marriage at Cana, he turned water into wine. For 10 points, name this religious figure whose life is recounted in the Gospels.

ANSWER: Jesus of Nazareth [or Jesus Christ]

014-12-73-03127

12. One of this man's campaign slogans was "Public Office is a Public Trust." This politician became known as "the Good" for his anticorruption policies as governor of New York. As President, he faced the Panic of 1893 and controversially sent federal troops to put down the Pullman strike. Despite being derided by the slogan "Ma, Ma, where's my Pa?," this man won the 1884 presidential election, beating James G. Blaine. For 10 points, name this man, who served two non-consecutive terms as President of the U.S.
ANSWER: Stephen Grover **Cleveland**

140-12-73-03128

13. Alan Strang blinds six of these animals, which he worships, in a Peter Shaffer play. In *Gulliver's Travels*, Gulliver begins talking to these animals because they resemble the Houyhnhnms (WIN-ims). Babieca is one that appears in *El Cid*, and Rocinante (roh-sin-ON-tay) is another who is a character in *Don Quixote*. Richard III offers to trade his kingdom for one of these animals. For 10 points, name this kind of animal, about which Anna Sewell wrote *Black Beauty*.

ANSWER: **horses**

080-12-73-03129

14. The Juba talks were an attempt to broker peace with this man's organization. In 1987, this man declared that he was a prophet of the Acholi people. He used holy water to convince child soldiers that they are bulletproof, and he has attempted to overthrow the government of Yoweri Museveni. Invisible Children created a widely watched viral video entitled "This Man" 2012. For 10 points, name this indicted war criminal and leader of Uganda's Lord's Resistance Army.

ANSWER: Joseph **Kony**

030-12-73-03130

15. This composer wrote a despairing letter to his brothers called the Heiligenstadt (HI-luh-gunsh-tot) Testament. This man directed pianists to hold the pedal down for the entirety of the first movement of a sonata that Ludwig Rellstab nicknamed. That sonata by this man reminded Rellstab of night at Lake Lucerne. Another work for piano by this composer was titled "For Elise." For 10 points, name this German composer who wrote the *Moonlight Sonata* and continued to conduct after going deaf.

ANSWER: Ludwig van **Beethoven**

023-12-73-03131



2013 VHSL Districts
Round 3
Tiebreaker Questions

1. This letter denotes a value that can be approximated as $1/137$, the fine structure constant. In statistics, the p-value is compared to a quantity denoted by this letter, the statistical significance. In biology, it describes a secondary structural motif in which every four amino acids are bound by a hydrogen bond, a type of helix. A helium nucleus is known as this type of particle. This letter also designates the highest-ranking individual in a social group. For 10 points, name the first letter of the Greek alphabet.

ANSWER: alpha

140-12-73-03132

2. A speech given in this city claimed that "the weak do what they must" before it subjugated Melos. One commander in this city had a vision of a "wall of wood" that was interpreted as a call to build a navy. This city was connected by the Long Walls to Piraeus, a harbor where it kept its triremes. This city's rank of *strategos* was held by Themistocles, the victor at Salamis. A plague killed its leader Pericles. For 10 points, name this ancient Greek city-state known for its democracy.

ANSWER: Athens [or Athenai]

104-12-73-03133

3. The first people to supply instructions to this machine were women such as Kay McNulty. It was built at the Moore School of the University of Pennsylvania. Due to John von Neumann's involvement with this machine, its first run actually involved computations for the hydrogen bomb. This machine was designed by John W. Mauchly and J. Presper Eckert, Jr. to calculate artillery firing tables for the US Ballistics Research Laboratory. For 10 points, identify this first general-purpose computer.

ANSWER: ENIAC [or Electronic Numerical Integrator and Computer]

066-12-73-03134

4. One structure within this organ includes slit-diaphragms between podocytes, and a U-shaped structure within this organ is called the loop of Henle. Another structure in this organ is surrounded by Bowman's Capsule, and this organ secretes enzymes like calcitriol and renin. The adrenal glands are found above this organ, and its functional unit is the nephron. For 10 points, identify this organ responsible for urine production and blood filtration.

ANSWER: kidneys

189-12-73-03135

5. The historical incident that became the inspiration for this novel was also used as the basis for *Margaret Garner*, a play by the same author. Howard and Buglar run away at the beginning of this novel, with the dog Here Boy following suit soon after. Paul D's arrival forces out a ghost in 124 Bluestone Road, but he leaves after realizing the main character decapitated her own baby to save her from slavery. For 10 points, name this novel about Sethe written by Toni Morrison.

ANSWER: Beloved

140-12-73-03136

This is a calculation question. What is the sine of a first-quadrant angle whose cosine is one-third?

ANSWER: two times the square root of two, over three [or square root eight, over three; or 2/3 times root 2]

What city contains the Wainwright Building and the Gateway Arch?

ANSWER: St. Louis, Missouri