



1. These things can be regulated by the binding of molecules to an allosteric site. According to the induced fit hypothesis, the active site of these things changes conformation once bound to a substrate. A common example of these things that is found in the liver greatly increases the speed at which hydrogen peroxide is decomposed to water and oxygen; that example is catalase. For 10 points, identify these proteins that lower the activation energy required for a reaction.

ANSWER: enzymes [or proteins until it is read]

066-13-93-11101

2. This athlete's meteoric rise occurred under the training of Cus D'Amato, who also became his legal guardian. His defeat of James Smith gave him the unified title, just five months after he knocked out Trevor Berbick to become the youngest heavyweight champion ever. After an upset loss to Buster Douglas and three years in prison in Indiana, he returned to boxing and bit the ear of Evander Holyfield. For 10 points, name this notorious boxer who was known as "Iron Mike."

ANSWER: Michael Gerald "Mike" Tyson

019-13-93-11102

3. This author wrote about a purple flashlight that turns a narrator into "The Evil Clergyman." In a story by this author, the "old signal of three-and-two strokes" as a knock alerts Daniel Upton to the fact that the corpse of Asenathe Waite is being animated by the soul of Edward Derby. In another of his stories, a ship in the South Pacific encounters the non-Euclidean city of R'lyeh. For 10 points, name this author of "The Thing on the Doorstep" and "The Call of Cthulhu."

ANSWER: Howard Phillips Lovecraft

019-13-93-11103

4. Officers in this country's army were slaughtered in a forest in the Katyn Massacre. After World War II, this country's western border was moved to the Oder-Neisse line. This country was led for eight years by the Communist General Jaruzelski. An electrician from this country who started a strike at a shipyard in Gdansk. For 10 points, name this European country of the Solidarity Party and Lech Walesa that was invaded at the start of World War II.

ANSWER: Republic of Poland [or Rzeczpospolita Polska]

023-13-93-11104

5. During this war, Captain George Downie was slain in a failed naval maneuver to surround Plattsburgh. William Hull led the first of three invasions of Canada during this war. A last-minute victory at the Battle of New Orleans cheered a combatant in this war, which ended with the Treaty of Ghent. After the Battle of Bladensburg during this war, the British burned Washington. For 10 points, name this war between the United States and England that took place in the early 19th century.

ANSWER: the War of 1812

080-13-93-11105

6. This denomination arose out of a circle that met at Swarthmor Hall in opposition to the mainstream of the Puritan movement. John Woolman led the campaign for this denomination to become strictly abolitionist, and it was the motivation for the "Holy Experiment" authorized by Charles II. For 10 points, identify this Christian denomination founded by George Fox, whose member William Penn founded Pennsylvania in accordance with its ideal of tolerance.

ANSWER: **Quakers** [or **Society of Friends**; or **Friends Church**]

019-13-93-11106

7. Coronene contains six instances of this compound fused together to form a cyclohexane in the center. Michael Faraday was the first to isolate this compound from fish oil residues. Hypothetical structures of this completely planar compound include prismane and one named for Dewar. Napthalene contains two and anthracene contains three molecules of this compound fused together, and phenols consist of an OH group attached to this molecule's aromatic ring. For 10 points, name this simplest aromatic compound, a carcinogen with formula C₆H₆.

ANSWER: **benzene**

239-13-93-11107

8. A long poem titled for one of these structures includes the sections "Quaker Hill" and "Atlantis" and was written by an American poet who committed suicide in 1932. That poem named for one of these was written by Hart Crane. Camila Perichole's valet Uncle Pio appears in a novel named for one of these structures in Lima, Peru, whose destruction kills five people. For 10 points, name these structures, one of which features in a Thornton Wilder novel about one "of San Luis Rey."

ANSWER: **bridges**

014-13-93-11108

9. This molecule is released during a decarboxylation of a carboxylic acid, and is also released during quicklime production from limestone. The Solvay process uses sodium chloride, ammonia, and this molecule to form sodium bicarbonate. Carbonic anhydrase regulates water and this molecule's concentration in the blood stream. This molecule, which is linear according to VSEPR theory, is commercially sold in solid form as dry ice. For 10 points, name this greenhouse gas which is exhaled from our lungs and released with the burning of coal.

ANSWER: **carbon dioxide** [or **CO₂**]

239-13-93-11109

10. The Falcon Reservoir is located on this river near Laredo. The largest dam on this river, Elephant Butte Dam, is located near the town of Truth or Consequences. This river's soil deposits formed Great Sand Dunes National Park in the San Luis Valley. Its major tributaries include the Conchos and Pecos Rivers. Twin cities like Matamoros-Brownsville and Ciudad Juarez-El Paso lie on this river. For 10 points, name this river on the border of Texas and Mexico.

ANSWER: Rio **Grande** [or Rio **Bravo** del Norte]

232-13-93-11110

11. The second law of thermodynamics is one of the few laws violated when this quantity moves in the opposite direction. The Pound-Rebka experiment provided evidence of gravity causing it to dilate. Minkowski space is a coordinate system where this quantity is added as a fourth dimension to the usual three. The derivative of momentum with respect to this quantity is force. For 10 points, name this quantity measured in hours and seconds.

ANSWER: **time**

121-13-93-11111

12. In a novel by this author, Kamala dies after being bitten by a snake near the river. In that novel, the protagonists' friend Govinda becomes a follower of Gotama. In a novel by this author, the saxophonist Pablo brings the protagonist to the Magic Theatre. That protagonist, Harry Haller, then kills Hermine. For 10 points, name this German author of *Siddhartha* and *Steppenwolf*.

ANSWER: Hermann **Hesse**

186-13-93-11112

13. The Euler-Mascheroni constant measures the difference between this function of n and the n th partial sum of the harmonic series. When this function is extended to complex numbers, this function of i returns i times pi over two. The Taylor series of this function of x plus one begins x minus x -squared over two plus x -cubed over three. This function is the anti-derivative of the function one-over- x . For 10 points, identify this function, the inverse of the exponential function, denoted "LN".

ANSWER: **natural logarithm**

233-13-93-11113

14. The Betawi people are descended from residents of this city, which is home to a mosque named after the Arabic word for "independence," Istiqlal. The government of this city also administers the Thousand Islands. The streets of this city are home to a fried rice dish called Nasi Goreng. The Dutch East India company operated out of this city when it was called Batavia. This city is the most populous in Southeast Asia. For 10 points, name this largest city on Java, the capital of Indonesia.

ANSWER: **Jakarta**

080-13-93-11114

15. The first stages of this conflict ended with the Battle of Lade (LA-day), which quelled the Ionian Revolt. This war ended when Pausanias won at Plataea. This conflict was chronicled by Herodotus, whose *Histories* are sometimes named for it. Another battle in this war saw three hundred Spartans hold off an army for three days. For 10 points, name this early fifth century BCE conflict, in which the armies of Darius and Xerxes (ZERK-zeez) attempted to conquer cities such as Athens.

ANSWER: Greco-**Persian Wars** [or equivalent answers such as **Persian invasions of Greece**; or the **Ionian Revolt** before it is read]

019-13-93-11115



1A. What tract by Karl Marx and Friedrich Engels concludes with the exhortation, "Workers of the world unite!"

ANSWER: *The Communist Manifesto*

1B. By what one-word name is rock star Paul Hewson better known?

ANSWER: Bono

2A. What Dutch physicist's namesake transformations show how events in a really fast-moving frame appear to stationary observers?

ANSWER: Hendrik Lorentz

2B. What surname labels a distribution for trials with two possible outcomes and a principle that an increase in a fluid's velocity decreases its pressure?

ANSWER: Bernoulli

3A. What was the name of the undiscovered solar body that would explain observed discrepancies in the orbits of Uranus and Neptune?

ANSWER: Planet X

3B. Which Emperor of Japan delivered the "Jewel Voice Broadcast" to explain Japan's decision to surrender to the Allies and end World War II?

ANSWER: Hirohito [or Showa Emperor]

4A. Kitty Genovese's murder was an example of what psychological phenomenon studied by Darley and Latane, in which multiple onlookers tend to do nothing to help someone in trouble?

ANSWER: bystander effect

4B. The ceiling of the Sistine Chapel is made up of what type of painting, which is produced by mixing pigments with water and placing it on top of lime plaster?

ANSWER: fresco

5A. This is a 20-second calculation question. A square peg fits in a round hole of radius 4 units. What is the maximum area of the base of the peg?

ANSWER: 32 square units

5B. This is a 20-second calculation question. What is the volume of the largest sphere that will fit completely inside a rectangular prism of height 4 units, width 5 units, and depth 8 units?

ANSWER: 32 pi over 3 cubic units [or 32/3 times pi cubic units]

6A. What country that suffered thousands of casualties when it was hit by Typhoon Haiyan in November 2013 is currently led by President Benigno Aquino III?

ANSWER: Republic of the Philippines [or Republika ng Pilipinas]

6B. What English poet described men who are "bent double, like old beggars under sacks" during an attack with poison gas in his "Dulce et Decorum Est?"

ANSWER: Wilfred Owen

7A. What black poet from Colonial America wrote "To His Excellency General Washington" and "On Being Brought from Africa to America?"

ANSWER: Phillis Wheatley

7B. Identify the George Gerswhin opera set in "Catfish Row" of Charleston, South Carolina, which includes the songs "It Ain't Necessarily So" and "Summertime" performed by an exclusively black cast of major characters.

ANSWER: **Porgy and Bess**

8A. What former anchor of SNL's *Weekend Update* plays Leslie Knope on *Parks and Recreation*?

ANSWER: Amy **Poehler**

8B. What names the area surrounding the Pacific plate where many volcanoes are found?

ANSWER: **Ring of Fire**

9A. This is a 30-second calculation question. What is the area of an isosceles triangle with two legs of length 4 and vertex angle 150 degrees?

ANSWER: **4** units

9B. This is a 30-second calculation question. What is the range of possible lengths for the third side of a triangle whose first two sides have length five and eight units?

ANSWER: **between 3 and 13** units [or from **3 to 13** units; or **greater than 3** and **less than 13**; do not accept any answer with the word "inclusive"]

10A. What language had Doric, Aeolic, and Koine dialects in ancient times?

ANSWER: ancient **Greek**

10B. What female Chilean poet of *Desolacion* and *Sonnets of Death* was the first Latin American to win the Nobel Prize in Literature?

ANSWER: Gabriela **Mistral**



1. The *Heliconius* genus of these organisms exhibits convergent evolution of warning signals that is typical of both Batesian and Mullerian mimicry. These Lepidopterans have long antennae that resemble a slender club. The pupal stage of these organisms is spent in a chrysalis. A species of these organism that feeds on milkweeds is famous for migrating from Canada to Mexico and is the monarch. For 10 points, identify these winged creatures that emerge from a caterpillar's cocoon, like moths.

ANSWER: butterfly [or butterflies]

066-13-93-11117

2. A song by this composer starts with the lyric "The sun shines bright on" the title place. This composer managed to achieve considerable popularity in 1847 with one of his songs by setting it to a polka beat. Lyrics for songs by this composer include lines about a racetrack "five miles long" where "somebody bet on the bay" and about a man who came "from Alabama with my banjo on my knee." For 10 points, name this composer of "My Old Kentucky Home," "Camptown Races," and "Oh! Susanna."

ANSWER: Stephen Collins Foster

023-13-93-11118

3. In a play by this author, Simon Stimson leads a chorus that sing "Blessed Be the Tie that Binds," which is later sung at a funeral. In one novel by this author, the Marquesa de Montmayor is among the five who die in an event that is chronicled by Brother Juniper. That novel by this author is *The Bridge of San Luis Rey*. In this author's most famous play, the Stage Manager narrates events such as the marriage of George Gibbs and Emily Webb. For 10 points, name the American author who wrote *Our Town*.

ANSWER: Thornton Wilder

140-13-93-11119

4. Light carries two distinct forms of this property, since it does not travel in an exactly straight line, rotating around that line instead. Precession occurs when this quantity shifts, but its magnitude does not change. This quantity is the same for all points in an orbit, a result that forms the basis of Kepler's Second Law of Motion. For 10 points, name this quantity for a rotating body, the product of rotational inertia and velocity.

ANSWER: angular momentum [prompt on momentum; do not accept linear momentum]

140-13-93-11120

5. During Reconstruction, the Readjuster movement formed in opposition to this state's aristocracy. The term "massive resistance" denoted this state's fight against desegregation, which was spearheaded by its controlling Byrd machine. This state was the location of both the Seven Days' Battles and the Peninsular Campaign, the latter of which was a huge failure for George McClellan. For 10 points, name this state whose capital became the Confederate capital during the Civil War.

ANSWER: Virginia

080-13-93-11121

6. Leonard Glen Francis is accused of bribing senior intelligence officials in this organization. In an attack on Barawe, this organization failed to capture Abdulkadir Mohamed Abdulkadir, an Al-Shabaab leader. That assault was carried out by the same unit that descended on Abbottabad in 2011 to kill Bin Laden. For 10 points, name this branch of the United States military whose special forces are the SEALs.

ANSWER: United States Navy [or USN; prompt on United States military and equivalents]

153-13-93-11122

7. In the prologue to the *Prose Edda*, Snorri Sturulson claimed the Aesir originally came from this city. According to Geoffrey of Monmouth, Britain was founded by Brutus, whose grandfather was from here. Two gods in another myth system built walls for its king Laomedon, who cheated them out of a reward. Laomedon's son was Priam, whose son began a war when he stole Helen. For 10 points, name this city which was destroyed by Greeks after it allowed in a wooden horse.

ANSWER: **Troy** [or **Ilium**]

121-13-93-11123

8. The title of this novel references an unfinished novel by the fictional author "F. Alexander." People in this novel speak a weird slang called Nadsat. The main character undergoes the Ludovico Technique and is a youth who loves Beethoven and commands a gang of "droogs," but is arrested and forced to watch graphically violent films in aversion therapy. For 10 points, name this Anthony Burgess novel about the criminal Alex undergoing a procedure to forcibly "rehabilitate" him.

ANSWER: A ***Clockwork Orange***

052-13-93-11124

9. An attempt to move this country's seat of government from a frontier city provoked the Archives War. Mirabeau Lamar was a president of this country, where James Fannin was slain in the Goliad Massacre. It won independence in an 18-minute battle that resulted in the capture of Santa Anna. This country won its independence with the climactic Battle of San Jacinto. For 10 points, name this independent republic led by Stephen Austin and Sam Houston became the Lone Star State after annexation.

ANSWER: Republic of **Texas**

080-13-93-11125

10. The fortress of Oreshek was built on the shore of this body of water. The north-flowing Volkhov River is a tributary of this body of water. The ancient Valaam Monastery is located on the largest island in this lake. Trucks carried supplies across the frozen "Road of Life" on this lake during World War II. This lake is connected to the Gulf of Finland by the Neva River. It is the largest lake in Europe. For 10 points, name this lake outside of St. Petersburg.

ANSWER: Lake **Ladoga**

080-13-93-11126

11. These structures contain a quiescent center behind which are the zones of cell division, elongation, and maturation. Cell walls in the endodermis of these structures contain Casparian strips. In legumes, nodules in these structures host nitrogen-fixing rhizobia, and mycorrhiza are found in these structures. For 10 points, name these structures which absorb water and nutrients from the soil and anchor plants to the ground.

ANSWER: **roots** [accept **root tips**]

237-13-93-11127

12. This character has a vision of his Aunt Clara lecturing him for causing trouble for his friend. This man was accused of raping a girl in Weed when he patted her dress too hard. He accidentally kills Curley's wife by breaking her neck. This farm hand continually dreams of taking care of the rabbits and is ultimately shot by his friend to save him from a lynch mob. For 10 points, name this character from John Steinbeck's *Of Mice and Men*, a mentally challenged giant and friend of George.

ANSWER: **Lennie** Small [or Lennie **Small**]

052-13-93-11128

13. The alpha chains of this protein are encoded from chromosome 16, while its beta chains are encoded from chromosome 11. This protein is a common sink of carbon dioxide in the body. A mutation in the beta chain of this protein results in sickle-cell anemia. An important component of this protein is a porphyrin ring with a central iron atom. Carbon monoxide poisoning is a result of this protein's affinity for that compound. For 10 points, identify this protein found in red blood cells that carries oxygen .

ANSWER: **hemoglobin**

066-13-93-11129

14. During this war, the Committee on Public Information hired "four-minute men" to propagandize. During this war, American soldiers distinguished themselves at Saint-Mihiel, which was followed by the Meuse-Argonne Offensive. American involvement in this war was provoked by the promise of lost land to Mexico in the Zimmerman Telegram, as well as the sinking of the *Lusitania* by a German U-Boat. For 10 points, name this enormous war that the United States entered during Woodrow Wilson's term.

ANSWER: **World War I** [or the **Great War**]

080-13-93-11130

15. An actress from this country controversially swam naked in the 1932 film *Bird of Paradise*. A painter from this country depicted workers at Ford Motor Company in *Detroit Industry* and redid an artwork after the Rockefeller family objected to its depiction of Lenin. This country is the birthplace of the artist of *Man at the Crossroads*, whose wife often painted self portraits with monkeys and sported a unibrow. For 10 points, name this North American country home to the muralist Diego Rivera.

ANSWER: United States of **Mexico** [or **United Mexican States**; or **Estados Unidos Mexicanos**]

186-13-93-11131



1. In this organ, the Wnt signaling pathway directs differentiation of Lgr-5 expressing stem cells as they climb out of crypts lined with Paneth cells. Coeliac disease affects this organ. Brunner's glands secrete mucus in this organ, which receives bile from the pancreas through the Sphincter of Oddi in order to emulsify fats. The three main sections of this organ are called the ileum, the jejunum, and the ileum. For 10 points, name this organ which is connected to the stomach, which is where most absorption of nutrients takes place, along with its larger counterpart.

ANSWER: small intestines

190-13-93-11132

2. Amortized analysis is used to analyze these things. A "greedy" one of these things always makes the locally optimal choice. Big O notation is used to quantify the complexity of these things in terms of the amount of data. Those that rely on recursively breaking down a problem and combining the solutions are classified as divide-and-conquer and include quicksort. For 10 points, identify these step-by-step procedures for solving a problem that are often used in computer science.

ANSWER: algorithms

066-13-93-11133

3. This character is killed shortly after asking "Which is better-to have rules and agree, or to hunt and kill?" At the end of the novel in which he appears, Ralph cries for this boy. When this character dies, a conch is broken into pieces. This character's glasses are used to start a fire and he is crushed by a boulder by children who have become savage while on an island. For 10 points, name this overweight child and character in William Golding's *Lord of the Flies*.

ANSWER: Piggy

052-13-93-11134

4. The publication of this author's nonfiction text *Two Hundred Years Together* late in life led to him being accused of anti-Semitism. The protagonist of one of this author's novels sees an "evil man" throw tobacco into the eyes of a monkey while visiting a zoo shortly after undergoing cancer treatment in Uzbekistan. In another work by this author, the title character is given part of Tsezar's food package, ending a day of forced labor in extreme conditions. For 10 points, name this Soviet dissident author of *Cancer Ward* and *One Day in the Life of Ivan Denisovich*.

ANSWER: Aleksandr Isayevich Solzhenitsyn

230-13-93-11135

5. This country lost a war that started after two years of joint rule over Schleswig-Holstein. This country that lost the Seven Weeks' War was ruled for nearly seventy years by Franz Joseph. A minister from this country organized a meeting attended by Castlereagh and Talleyrand. In 1867, this country became part of a dual monarchy with its eastern neighbor, Hungary. For 10 points, name this European country served by Klemens von Metternich, who used its capital to host the Congress of Vienna.

ANSWER: Republic of Austria [or Republik Oesterreich]

023-13-93-11136

"Morning Mood" and "In the Hall of the Mountain King" are in what Norwegian composer's *Peer Gynt Suite*?

ANSWER: Edvard Grieg

This is a calculation question. If tangent of x equals one-fourth the square root of 3, what is tangent of x times cotangent of x ?

ANSWER: 1