



1. The locus coeruleus (sir-RULE-ee-us) is theorized to be responsible for the motor inhibition characteristic of this state, which can be tonic or phasic depending on whether muscle activity is intermittent or absent. In the first ultradian (ul-TRAY-dee-an) cycle, it lasts for approximately five to fifteen minutes, but goes on longer as "slow-wave" periods shorten throughout the night. For 10 points, name this stage of sleep notable for the predominance of dreams.

ANSWER: **REM** sleep [or **rapid eye movement** sleep]

142-13-93-03101

2. One story about this deity tells of how he spent a night in the thumb of a giant's glove and he once dressed as Freya to retrieve his weapon from the giant Thrym. This deity had received that object after his wife's golden hair was cut off. This husband of Sif has a chariot pulled by two goats and will kill and be killed by the Midgard Serpent at Ragnarok. For 10 points, name this wielder of the hammer Mjolnir, the Norse god of thunder.

ANSWER: **Thor**

141-13-93-03102

3. A woman who held this position said George H.W. Bush was "born with a silver foot in his mouth." Besides being held by Ann Richards, it was held by a man who released the anti-homosexual YouTube video "Strong" and who could not remember the third government agency he would eliminate while debating other Republicans. While holding this position, George W. Bush was elected president in 2000. For 10 points, name this position currently held by Rick Perry.

ANSWER: **governor of Texas**

052-13-93-03103

4. Examples of these bonds include sigma and pi bonds. Lewis diagrams can be used to depict these bonds, which are more likely to occur between elements with similar electronegativity. When charge separation occurs, creating a dipole moment and enabling hydrogen bonding, these bonds can be labeled as polar; that charge separation occurs due to unequal sharing. For 10 points, name this kind of chemical bond that forms when valence electrons are shared by two atoms.

ANSWER: **covalent bonds**

147-13-93-03104

5. This man was advised on investments by Frederick Taylor Gates, and he donated the funds that helped to create the University of Chicago. Along with Samuel Andrews and Henry Flagler, he founded a successful business in Cleveland, Ohio. He founded a company denounced by Ida Tarbell, which was eventually broken up into 34 new companies, such as Continental Oil. For 10 points, name this "robber baron," the founder of the Standard Oil Company.

ANSWER: John Davison **Rockefeller**

052-13-93-03105

6. Behind Samsung and Intel, this company is the third largest manufacturer of semiconductors in the world. Patrick Haggerty was integral to this company's success as he brought onboard Gordon Teal and Willis Adcock. Their development of the 7400 series of TTL chips resulted in the popularity of integrated circuits being used for computer logic. For 10 points, name this company famous for its graphing calculator series that include the 83 and 83-Plus.

ANSWER: **Texas Instruments**

147-13-93-03106

7. A voting registration drive orchestrated by this man was instrumental in electing Harold Washington Mayor of Chicago in 1983. With Florence Pendleton, he was one of the first "shadow senators" for Washington, D.C. This man served as national director of Operation Breadbasket from 1967 to 1971 and founded People United to Save Humanity after being suspended from the SCLC. For 10 points, name this founder of the Rainbow Coalition who sought the Democratic presidential nomination in 1984 and 1988.

ANSWER: Jesse **Jackson** [or Jesse Louis **Burns**]

030-13-93-03107

8. The phreatic type of these events is characterized by large volumes of steam. The VEI scale can be used to quantify the strength of these events, during which fumaroles and fissure vents may form. One of these events caused the "Year Without a Summer" in 1816. These events can create pillow basalts when they occur underwater, while scoria and pumice are often constituents of pyroclastic flow resulting from these events above ground. For 10 points, identify these phenomena often accompanied by the expulsion of lava.

ANSWER: **volcanic eruptions** [or obvious equivalents]

228-13-93-03108

9. A grey individual climbs a ladder up to the broken egg-shell of a "tree-man" in this painting, whose face is the artist's. When closed, the exterior panels of this painting show the world on the third day of creation. A number of pink statues receive rivulets from a giant fountain in the background of this painting, whose right depicts a hellscape, and whose left shows Adam being introduced to Eve in the title Biblical location. For 10 points, name this proto-surrealistic triptych by Hieronymus Bosch.

ANSWER: ***Garden of Earthly Delights***

135-13-93-03109

10. This country's toilet paper shortage led its government to take control of a toilet paper factory in September 2013. Until 2007, this country was the only one in the Western Hemisphere to be a member of OPEC. Nicolás Maduro became vice-president here in 2012, and succeeded to the presidency after the death of this country's leader in March 2013. For 10 points, name this South American country that until Maduro had as its president Hugo Chavez.

ANSWER: **Venezuela**

121-13-93-03110

11. A woman crosses herself as she kneels in this artist's first commissioned work, *The Prayer*. Three of his pieces are part of an ensemble at Targu Jiu, including *The Table of Silence* and a stack of seventeen rhomboidal pieces known as *Endless Column*. His most famous sculptures accentuate the sleekness and speed of their subject, and were taxed as manufactured objects because US customs officers didn't consider them art. For 10 points, name this Romanian sculptor of *Bird in Space*.

ANSWER: Constantin **Brancusi**

127-13-93-03111

12. A compound of this element bound to three oxygens, one of which is bound to a hydrogen, is important in the blood buffer system. Molecules composed entirely of this element are called fullerenes, such as the one named for Buckminster Fuller. An alloy of this element and iron is known as steel. A single-layered honeycomb lattice of this element is known as graphene. This element's 14 isotope has a half-life of 5,730 years, which is why it is commonly used for radiometric dating. For 10 points, name this element with atomic number six whose chemical symbol is C.

ANSWER: **carbon**

066-13-93-03112

13. This author used the example of a waiter who acts too waiter-like to illustrate the concept of "bad faith" in his essay *Being and Nothingness*. This lover of Simone de Beauvoir wrote a notable play which takes place in a Second Empire drawing room and centers upon Garcin, Estelle, and Inez's relationship. For 10 points, identify this French existentialist who wrote that "Hell is other people" in his play *No Exit*.

ANSWER: Jean-Paul **Sartre**

126-13-93-03113

14. Languages in this paradigm often contain the special variable "this" or "self" that implement open recursion. Data of one type can be used as data of another type by the use of subtype polymorphism in this paradigm. By concealing the way data is implemented in this paradigm, one can organize data with encapsulation. The procedures associated with the namesakes of this paradigm are called methods. For 10 points, name this programming paradigm that includes languages like Java.

ANSWER: **object-oriented** programming [or **OOP**]

135-13-93-03114

15. The equilibrium output "Y" can be found on this man's namesake "cross." John Hicks used the IS/LM model to explain this man's work. He defined aggregate demand as the sum of consumption, investment, and government spending, and he argued that government spending is required for 100% employment, which in turn allows for successful free markets. For 10 points, name this economist, the author of *The General Theory of Employment, Interest, and Money*.

ANSWER: John Maynard **Keynes**

088-13-93-03115



1A. Identify the African river that separates Brazzaville and Kinshasa, the capital cities of two countries that share this river's name.

ANSWER: **Congo** River

1B. Name the frightening literary genre exemplified by Horace Walpole's *The Castle of Otranto*.

ANSWER: **Gothic** fiction

2A. This is a 20-second calculation question. The ratio of a circle's area to its circumference is 16 inches. What is the diameter of the circle?

ANSWER: **64** inches

2B. This is a 20-second calculation question. The mean of 5 numbers is 80. When a sixth number is added to the set, the mean becomes 83. What is the sixth number?

ANSWER: **98**

3A. Thomas Hunt Morgan worked with what type of insect in his experiments, specifically the species *Drosophila melanogaster*?

ANSWER: fruit **fly**

3B. What second book of the Old Testament recounts Moses being given the Ten Commandments?

ANSWER: Book of **Exodus**

4A. Name the team that won Super Bowl XLVII against the San Francisco 49ers thanks to the play of the game's MVP, Joe Flacco.

ANSWER: **Baltimore** Ravens [or Baltimore **Ravens**]

4B. What female American poet wrote "Renascence" and included the popular epigram "First Fig" in her collection *A Few Figs from Thistles*?

ANSWER: Edna St. Vincent **Millay**

5A. Name the state home to the General Sherman Tree in its Sequoia National Park.

ANSWER: **California**

5B. What object was given by Death to Ignotus Peverell according to the Tale of the Three Brothers?

ANSWER: Harry Potter's **Invisibility Cloak**

6A. Identify the Egyptian pharaoh who built Abu Simbel, was married to Nefertari, and was known to some as Ozymandias.

ANSWER: **Ramses II** [or **Ramses the Great**; or **Ramesses II**; or **Ramesses the Great**; prompt on **Ramses**; prompt on **Ramesses**]

6B. What silent, apart from ambient noise, piece by John Cage is named for its duration?

ANSWER: **4'33"**

7A. What longtime director of the New York Philharmonic composed the music for *West Side Story*?

ANSWER: Leonard **Bernstein**

7B. Name the region awarded to Rollo by Charles the Simple that was later led by a conqueror whose forces won at Hastings and killed Harold Godwinson.

ANSWER: **Normandy** [or **Normandie**]

8A. Giuseppe Peano put forth a number of of what things, synonymous with postulates, from which all other mathematical results can be derived?

ANSWER: **axioms**

8B. What French-Spanish hybrid language is spoken principally in northeastern Spain, particularly in Barcelona?

ANSWER: **Catalan**

9A. This is a 30-second calculation question. How many distinct real roots does the polynomial "x cubed plus 3 x squared plus 9 x plus 7" have?

ANSWER: **1**

9B. This is a 30-second calculation question. Find all values of x such that the absolute value of x equals the absolute value of the quantity 2x minus 5.

ANSWER: **5** and **5/3** [or **5** and **1 2/3**]

10A. What man replaced Timothy Geithner as Barack Obama's Secretary of the Treasury?

ANSWER: Jacob "Jack" **Lew**

10B. What dance's music originated from the Jacques Offenbach composition "Infernal Galop" in the opera *Orpheus in the Underworld*?

ANSWER: **Can-can**



1. Native crocodiles in this country can be found at the Zapata Swamp. This country owns the Isle of Youth, which was also known as the "Isle of Parrots" and "Treasure Island." The oldest Spanish settlement here was at Baracoa. It is to the west of the "Windward Passage," which separates it from an island split into two countries. The United States maintains a base on a bay in this country named Guantanamo. For 10 points, name this Caribbean island 90 miles to the south of Florida.

ANSWER: Cuba

052-13-93-03117

2. These things are described by the principal, azimuthal, and magnetic quantum numbers. These things are visualized as spheres and dumbbells. The block named for the fourth of these things contains the lanthanides and actinides. They come in s, p, d, and f varieties. For 10 points, give this term for the function that describes an electron's probability distribution around an atom.

ANSWER: atomic orbital

127-13-93-03118

3. In a play by this author, the title character steals morphine from a doctor to kill himself and proves unable to successfully shoot a professor. This man once remarked "if in Act One, you have a pistol hanging on the wall, then it must fire in the last act," a principle known as his "gun." He wrote about Konstantin Treplyov killing himself some time after shooting the title bird in one play. For 10 points, name this Russian author of such plays as *Uncle Vanya* and *The Seagull*.

ANSWER: Anton Pavlovich Chekhov

052-13-93-03119

4. In a form of this process that uses PEP carboxylase, oxaloacetate is converted to malate. Glyceraldehyde 3-phosphate is the first product of this process that is catalyzed by Rubisco. CAM and C4 plants have special adaptations for this process. Guard cells open stomata to intake carbon dioxide in the dark reactions of this process. For 10 points, name this process in which plants convert light energy to starch.

ANSWER: photosynthesis [or carbon fixation]

124-13-93-03120

5. In one novel by this author, Isaac Morris and Fred Narracott gather a group on Indian Island, where Judge Wargrave punishes people who got away with crimes. In another book by this writer, a character discovers that the man he knew as Mr. Ratchett is actually the fugitive Cassetti who killed Daisy Armstrong. In that book by this author, Cassetti is killed near Vinkovci after a snow drift stops a train. For 10 points, name this British author of *And Then There Were None* and a book including the Belgian detective Hercule Poirot, *Murder on the Orient Express*.

ANSWER: Agatha Christie [or Agatha Mary Clarissa Christie; or Agatha Mary Clarissa Miller]

023-13-93-03121

6. The discovery of neutral currents in these particles helped to formulate the concept of the electroweak force. The Ice Cube experiment in Antarctica is a one cubic mile experiment looking for these particles. A collaboration between CERN and Gran Sasso, OPERA, conducts experiments on these particles. These particles were proposed to maintain conservation of energy, momentum, and angular for beta decay, by Wolfgang Pauli. For 10 points, named from the Italian for "small neutral one".

ANSWER: neutrino

135-13-93-03122

7. This character promises to help Prue stop drinking, but he learns that she has died a few days later. George gives this man a dollar to wear around his neck. This husband of Chloe rescues Eva St. Clare from drowning, and she, in turn, rescues him from Mr. Haley. After he refuses to reveal the whereabouts of Emmeline and Cassy, who have run away, this character is beaten to death by Simon Legree. For 10 points, name this slave, the title character of a novel by Harriet Beecher Stowe.

ANSWER: Uncle **Tom**

131-13-93-03123

8. This profession is taken up by a vacuum cleaner salesman named James Wormold in Graham Greene's novel *Our Man in Havana*. The unassertive Mr. Verloc is the title character with this profession in a novel by Joseph Conrad. Another character with this profession was created by Ian Fleming. For 10 points, name this profession of James Bond.

ANSWER: **spy** [or **secret agent**; or obvious equivalents]

014-13-93-03124

9. Gilbert Ryle described a theory of this thinker as the "ghost-in-the-machine" concept of mind. He offered a proof for God in a treatise that imagines a situation where all sensory and even mental experiences were unreliable. In *Discourse on Method*, he showed that his own existence was the only fact it was impossible to doubt. For 10 points, name this French philosopher who proved his own existence with the argument "I think, therefore I am."

ANSWER: René **Descartes**

121-13-93-03125

10. In one speech, this man said his wife owned a "respectable Republican cloth coat." After failing to win the 1962 California gubernatorial election, he angrily said the press wouldn't have him to kick around anymore. This man engaged in the Kitchen Debate with Nikita Khrushchev and defended his fundraising in a speech named for his cocker spaniel, Checkers. For 10 points, name this man who served as Dwight Eisenhower's Vice-President and who would eventually be elected President in 1968.

ANSWER: Richard Milhous **Nixon**

052-13-93-03126

11. In this novel, a character who had spent all his time making shoes becomes sane after seeing his daughter. The cruel Marquis de Evremonde is murdered in this novel. A character in this book is acquitted of being a spy when a lawyer notes that he could have been mistaken for the defendant; that character is Sydney Carton. For 10 points, name this novel in which Sydney saves Charles Darnay from the guillotine, a Charles Dickens novel set in both Paris and London.

ANSWER: A **Tale of Two Cities**

131-13-93-03127

12. A famous incident during this event saw Jan Palach set himself on fire, and this event was supported with a pamphlet by Ludvik Vaculik entitled the "Two Thousand Words." Followed by a period of "normalization" led by Gustav Husak, this event's main goals were carried out by the Action Program. Billed as "socialism with a human face," for 10 points, name this event led by Alexander Dubcek, a 1968 attempt at reform in Czechoslovakia.

ANSWER: **Prague Spring**

141-13-93-03128

13. This thinker wrote the book *Liber Abaci*, which helped spread the use of Arabic numerals to Europe, referring to it as the Modus Indorum. In the same book, this mathematician introduced a solution that addressed the growth in population of rabbits; that solution is a series of numbers that approaches the golden ratio as it progresses. For 10 points, name this Italian mathematician, best known for his namesake sequence of numbers starting 1, 1, 2, 3, 5.

ANSWER: Leonardo **Fibonacci** [or **Leonardo of Pisa**; or Leonardo **Pisano**; or Leonard Pisano **Bigollo**; or Leonardo **Bonacci**]

088-13-93-03129

14. A 1984 Reagan campaign ad claimed it was smart to “be as strong as” one of these animals, if there was one of them. One of these animals lives under the sign “Mr. Sanders” and mistakes his footprints for those of a wozzle. Boo Boo was the best friend of one of these creatures, who claimed to be “smarter than the average” one. A.A. Milne wrote about one who was friends with Piglet and Christopher Robin. For 10 points, name these animals which include Winnie-the-Pooh.

ANSWER: **bears**

121-13-93-03130

15. This element is the only one for which the Schrodinger Equation can be solved exactly. Stars in their main sequence are comprised of about seventy-five percent of this element. A slush form of this element was used for the fuel in the NASA space shuttle rockets. Two atoms of this element are present in diprotic acids such as sulfuric acid. For 10 points, name this element, the lightest in the universe, with a chemical symbol of H.

ANSWER: **hydrogen**

135-13-93-03131



1. The thermal utilization factor is a ratio between this process and absorption, while the reproduction factor is an average of how many neutrons are produced in this event. This reaction is sustained at a multiplication factor of one, and when uranium undergoes this process, it releases 2.5 neutrons on average. Discovered by Hahn and Meitner, for 10 points, name this process in which an atomic nucleus is split into two pieces.

ANSWER: nuclear **fission**

236-13-93-03132

2. In this novel, a group of men are compared to "mule drivers" and "mud diggers." At the end of the novel, the protagonist becomes a flag-bearer and he and his friend Wilson take a group of several men prisoner. In one scene, the protagonist sees his friend Jim Conklin wounded, and comes to the realization that a wound would be akin to the title honor. For 10 points, name this novel about Henry Fleming that takes place during the American Civil War, written by Stephen Crane.

ANSWER: *The **Red Badge of Courage***

064-13-93-03133

3. A king of this name died from food poisoning after eating an excess of lampreys. An emperor of this name was forced to abdicate in 1105. A 1587 namesake war was fought between three men of this name, and a French king of this name enacted the Edict of Nantes. Another person with this name was the first monarch of the Tudor dynasty. For 10 points, give this name shared by many European rulers, including an English king with six wives.

ANSWER: **Henry**

145-13-93-03134

4. This quantity assumes a negative sign in the Lagrangian. Substitution into Hooke's law provides the formula one-half displacement squared times the spring constant, and in gravitational settings this quantity, unlike force, is inversely proportional to the first power of distance. The change in this quantity equals mass times gravitational acceleration times the change in height, and it assumes a value of zero at infinity. For 10 points, identify this quantity that represents the stored energy of a system, contrasted with kinetic energy.

ANSWER: **potential energy** [or **potential** after "energy" is read]

234-13-93-03135

5. One character in this novel makes a list of "feathers in his cap" and "black eyes" in his quest to become a general. That character in this work is Colonel Cathcart. Milo Minderbender bombs his own comrades-in-arms in this novel, whose title conundrum is that people who claim to be insane in order to avoid flying missions must actually be sane. For 10 points, name this novel about Yossarian's inability to leave the military during World War II, a work by Joseph Heller.

ANSWER: **Catch-22**

030-13-93-03136

What kind of figurative language constructs a comparison using "like" or "as"?

ANSWER: **simile**

This is a calculation question. What is the range of the function $y = -x^2 + 2x - 5$?

ANSWER: y is **less than or equal to -4** [do not accept "less than -4"]