



1. The reduction of these particles is assigned zero volts on the scale of reduction potentials. Bicarbonate ions consist of carbonate ions attached to one of these particles. These particles were discovered when alpha particles scattered backward in Rutherford's gold foil experiment. pH is calculated as the negative logarithm of the concentration of these particles. For 10 points, name these particles which are found with neutrons in the atomic nucleus and have a positive charge.

ANSWER: **protons** [or **hydrons** or **H+** or **H-plus**; prompt on **H**]

190-12-73-04101

2. One play from this country describes a cockroach who is neglected by a butterfly. Another play from here includes six washer-women gossiping about a desperate barren woman who kills her husband. The Generation of '27 and Generation of '98 came from this country, where a gay playwright wrote the "Rural Trilogy" of *Blood Wedding*, *Yerma*, and *The House of Bernarda Alba*. For 10 points, name this European country where Federico Garcia Lorca was killed at the onset of civil war.

ANSWER: **Spain** [or **España**]

104-12-73-04102

3. This man ran alongside William King in an election where he defeated fellow New Hampshirean John Hale. During his term, his eventual successor met Pierre Soule and John Mason at the behest of his Secretary of State, William Marcy, to discuss the acquisition of Cuba. That meeting led to the Ostend Manifesto. This President opened settlement for two new territories and replaced the Missouri Compromise by signing the Kansas-Nebraska Act. For 10 points, name this President who won the 1852 election.

ANSWER: Franklin **Pierce**

149-12-73-04103

4. As a boy, this character had a *Hopalong Cassidy* book where he recorded "General Resolves" such as "No more wasting time at Shafters." When this man is told that he cannot repeat the past, he replies, "Why of course you can!" This character introduces the narrator to a man who supposedly fixed the 1919 World Series, Meyer Wolfsheim. Wilson shoots this man in his swimming pool after Daisy kills Myrtle. For 10 points, name this title character of a novel by F. Scott Fitzgerald.

ANSWER: Jay **Gatsby** [or **Jay** Gatsby; or James **Gatz**; or **James** Gatz; or the Great **Gatsby**]

121-12-73-04104

5. The density of this phenomenon, symbolized with a capital J, is equal to the electric field times conductivity. This non-vector quantity is multiplied by mu-nought over four times pi in the Biot-Savart law. The unit of this phenomenon shares a name with a law that relates this quantity to the perpendicular magnetic field that it produces. Thomas Edison and George Westinghouse got into a "war" over the direct and alternating types of it. For 10 points, name this phenomenon measured in Amperes.

ANSWER: electric **current**

121-12-73-04105

6. In one myth from this society, thousands of gallons of pomegranate beer are brewed to pacify a lion goddess. Another god from this society was tricked into a lead-lined cask and cut into fourteen pieces; that green-skinned god carries a crook and flail. This society believed that the snake Apep emerged every night to fight a barge which makes daily trips across the sky. For 10 points, name these worshippers of Sekhmet, Osiris, and the sun god Ra.

ANSWER: ancient **Egyptian**

104-12-73-04106

7. This operation yields the golden ratio divided by two for an input of pi over five. According to the law of this operation, c-squared equals a-squared plus b-squared minus the product of 2 a b and this operation on the angle between a and b. That law is used when two side lengths and one angle are known. The reciprocal of this function is the secant. For 10 points, name this trigonometric function defined as side adjacent to the input angle over the hypotenuse.

ANSWER: **cosine**

014-12-73-04107

8. This structure was built in 1937 under the direction of Joseph Strauss, though Irving Morrow selected its distinctive "International Orange" color. Its north end terminates in Marin (muh-RIN) County. A 2006 movie by Eric Steel consists of footage of this structure from 2004, including twenty-three suicides. In 1964, it was replaced as the world's longest bridge by the Verrazano-Narrows. For 10 points, name this iconic suspension bridge that passes over a section of the San Francisco Bay.

ANSWER: **Golden Gate** Bridge

019-12-73-04108

9. A group known as the "Three Tramps" was arrested after this event, which was also followed by the murder of J.D. Tippit. This event was recorded by Abraham Zapruder, and John Connally was shot during this event. This event took place at Dealey Plaza, and the perpetrator of this event was killed by a nightclub owner named Jack Ruby. This event was investigated by the Warren Commission and took place in Dallas. For 10 points, name this November 22, 1963, action carried out by Lee Harvey Oswald.

ANSWER: **assassination of JFK** [or the **assassination** of **John Fitzgerald Kennedy**; or clear equivalents for "assassination" such as **killing**, etc.; prompt on answers that only include **Kennedy** without a first name or initial, so as to distinguish from the assassination of Robert Kennedy]

189-12-73-04109

10. The Kronecker type of this is a function that takes two values and returns 1 if the values are equivalent, 0 otherwise. This letter represents the Laplace operator. Partial charges of a polar molecule are represented by this letter plus or minus. With epsilon, it is used in giving the precise definition of a limit. One version of this letter is used to represent the change in the quantity it is paired with. For 10 points, name this Greek letter, the capital type of which looks like a triangle.

ANSWER: **delta**

121-12-73-04110

11. One painting by this man depicts a woman in a green coat with one glove on drinking tea. This painter of *Automat* also created a work in which two women are seated in a restaurant with a red teapot and green bowl on the table. This artist of *Chop Suey* showed an advertisement for five cent Phillies cigars above three customers and a man in white who are all in a diner. For 10 points, name this American realist whose work includes the painting *Nighthawks*.

ANSWER: Edward **Hopper**

023-12-73-04111

12. A lecture about this work, subtitled "The Monsters and the Critics," described the importance of the fantasy in this work, as opposed to looking at it only historically. That lecture about this work in alliterative verse was given by J.R.R. Tolkien. This work employs such terms as "battle-sweat" and "whale-road" to describe blood and the ocean in characteristic uses of kennings. For 10 points, name this poem in Old English that describes how the title character slays Grendel.

ANSWER: **Beowulf**

023-12-73-04112

13. The Fisher hypothesis states that this phenomenon's effect is unrelated to real interest rate. Response to this phenomenon is hindered by the existence of menu costs and shoeleather costs. Real interest rate is found by taking nominal interest rate minus the rate of this phenomenon, which comes in "cost-push" and "demand-pull" varieties. The rate of this is measured by changes in the Consumer Price Index. For 10 points, name this phenomenon, a decrease in the value of money.

ANSWER: **inflation**

192-12-73-04113

14. This poet tells Charles Lamb that "no sound is dissonant which tells of Life" in "This Lime-Tree Bower My Prison." One poem by this man tells of an "Abyssinian maid...singing of Mount Abora" that inspires the speaker to build in a place "where Alph, the sacred river, ran." In another poem by this man, the speaker exclaims, "water, water everywhere, nor any drop to drink," after the shooting of an albatross curses his ship. For 10 points, name the poet of "Kubla Khan" and "The Rime of the Ancient Mariner."

ANSWER: Samuel Taylor **Coleridge**

140-12-73-04114

15. In the trial following this event, Samuel Quincy and Robert Treat Paine faced off against Josiah Quincy. Privates Hugh Montgomery and Matthew Kilroy were found guilty of manslaughter following this event, though a British officer named Thomas Preston was acquitted. Paul Revere created a depiction of this 1770 event, which included the deaths of five men, including Crispus Attucks. For 10 points, name this event in which British soldiers killed Americans in Massachusetts.

ANSWER: **Boston Massacre**

189-12-73-04115



1A. What John Steinbeck novel adapts the story of Cain and Abel into the saga of the Trask family?

ANSWER: East of Eden

1B. What leading member of Egypt's National Salvation Front was once head of the International Atomic Energy Agency?

ANSWER: Mohamed ElBaradei

2A. Which operatic composer included the aria "Nessun Dorma" in his *Turandot*, in addition to composing *Madame Butterfly*?

ANSWER: Giacomo Puccini

2B. "Blessed are the poor in spirit" is one of what set of eight teachings given by Jesus during the Sermon on the Mount in the Book of Matthew?

ANSWER: Beatitudes

3A. This is a 20-second calculation question. Give the range of the function defined by $y = 5 + 2 \sin 3x$.

ANSWER: 3 to 7 inclusive [or [3,7]; or 3 less than or equal to x, less than or equal to 7]

3B. This is a 20-second calculation question. If there is a 50% chance of rain every day for two days in a row, what is the probability it does not rain on either?

ANSWER: 25% [or 0.25; or 1/4]

4A. What English composer used Wilfred Owen poems in his *War Requiem* and lifted a Henry Purcell theme for his *Young Person's Guide to the Orchestra*?

ANSWER: Benjamin Britten, Baron Britten [or Edward Benjamin Britten]

4B. Which language, which is read from right to left and whose diacritical marks include the "fat'ha" and "kasrah," is primarily spoken in the Middle East and North Africa?

ANSWER: Arabic

5A. What thirty-year-long war pitted the Delian League and its lead city Athens against the forces of Sparta?

ANSWER: Peloponnesian War

5B. What religious figure was painted "on the rocks" by Leonardo da Vinci, and with a goldfinch and on the meadow by Raphael?

ANSWER: Madonna [or Mary; or the Virgin Mary]

6A. Name the Greek mathematician who formulated the principle stating that the buoyant force of an object is equal to the fluid displaced by the object.

ANSWER: Archimedes

6B. Name the value given by multiplying a number by all the positive numbers before it, which is symbolized by an exclamation point.

ANSWER: factorial

7A. What event, which resulted in the cancellation of the 2013 Winter Classic, is a labor impasse being negotiated by Donald Fehr and Gary Bettman?

ANSWER: 2012-2013 NHL lockout [or National Hockey League lockout; do not accept "strike"]

7B. What French short story author wrote “Ball of Fat” and a story noted for its ironic ending, “The Necklace”?

ANSWER: Guy de **Maupassant** (MOE-puh-sahnt) [or Henri Rene Albert Guy de **Maupassant**]

8A. This is a 30-second calculation question. What is the determinant of the two-by-two matrix whose first row is one comma seven and whose second row is negative two comma four?

ANSWER: **18**

8B. This is a 30-second calculation question. A cone and a cylinder have equal height and equal volume. If the cylinder has radius 3 units, what is the radius of the cone?

ANSWER: **3** times the square **root** of **3** units [or **3 radical 3** units; or equivalents to **3*sqrt(3)** units]

9A. What Kiefer Sutherland played character fought terrorists and frequently utilized torture on the show 24?

ANSWER: Jack **Bauer** [or **Jack** Bauer]

9B. During the 1605 Gunpowder Plot, what Catholic was found underneath the House of Lords with a bunch of explosives?

ANSWER: Guy **Fawkes**

10A. What contact force counteracts gravity, points perpendicular to and away from a surface, and is multiplied by the coefficient of friction to give friction?

ANSWER: **normal** force [prompt on **F_N**]

10B. What "Napoleon of Crime" tumbles off Reichenbach Falls in a deadly fight with his rival Sherlock Holmes?

ANSWER: James **Moriarty** [or **James** Moriarty]



1. In one work by this author, Charles Gould operates a silver mine in the country of Costaguana. This author of *Nostramo* also wrote a work in which the narrator visits the "Intended" of another character, who wrote "exterminate all the brutes" on an important report. This author wrote about a trip to the Inner Station made by Marlow, who hears "The horror! The horror!" exclaimed by Kurtz as he dies. For 10 points, name this Polish-born English author of *Heart of Darkness*.

ANSWER: Joseph **Conrad** [or Jozef Teodor Konrad **Korzeniowski**]

023-12-73-04117

2. This process is aided by the VLPO neurons, which send signals to the locus coeruleus from the hypothalamus, and by the accumulation of adenosine. Orexin inhibits this process, which leads to delta activity on an EEG in its "slow-wave" subtype. Signals from the pineal gland release melatonin before this process during the circadian rhythms. For 10 points, name this biological process which has four stages other than the REM stage, in which dreaming occurs.

ANSWER: **sleeping** [or **rest**]

104-12-73-04118

3. In 1971, this country opened the Zaza Reservoir, which replaced Milk Lake as its largest internal body of water. This country's religious center is the shrine to the Virgin of Charity in Cobre. The second-largest city in this country is overlooked by the Morro Castle and sits within a valley of the Sierra Maestra. It controls the Isle of Youth and has an extraterritorial spot on its southeast owned by the United States. For 10 points, the Guantanamo Bay naval base is found in what country, ninety miles south of Florida?

ANSWER: Republic of **Cuba** [or República de **Cuba**]

019-12-73-04119

4. Organisms in this phylum have ameobocytes (uh-MEE-boh-sites), which move around in the mesohyl (MESS-oh-hill) and secrete spicules (SPY-cools) that give support. The internal body lining of organisms in this phylum contains choanocytes (co-ANN-oh-sites), which use flagella to obtain nutrients. Members of this phylum have an asymmetric body plan and do not move, obtaining nutrients from water flowing through them. For 10 points, name the simplest animal phylum, which is comprised of sponges.

ANSWER: **porifera** [or **poriferans**; or **sponges** until it is read]

140-12-73-04120

5. This prime minister gave police better riot control equipment after the Brixton Riots. Controversial actions by this leader include letting Bobby Sands die in an IRA hunger strike and implementing a poll tax called the "community charge." Succeeded by John Major, this prime minister privatized state-owned companies like British Steel. This leader also won the Falklands War and worked closely with Ronald Reagan. For 10 points, name this "Iron Lady," the only female prime minister of the UK.

ANSWER: Margaret Hilda **Thatcher** [or Margaret Hilda **Roberts**]

080-12-73-04121

6. This material differentiates or changes chemical composition through convective mixing and assimilation of the surrounding wall. The progression in which crystals materialize out of this substance is called Bowen's reaction series. Plutons are formed by the cooling of intrusions of this substance. This material can be found in namesake chambers, and can be ejected explosively as tephra. For 10 points, name this melted rock inside the Earth that, after erupting, is called lava.

ANSWER: **magma** [do not accept "lava"]

001-12-73-04122

7. This expression was first coined, in German, in the Goethe (GUR-tuh) play *Clavigo* and was used to title a Johann Strauss waltz in 1885. In contemporary times, it is tattooed on Zac Efron's right hand, and Ervin McKinness tweeted it before dying in a drunk-driving crash. This expression first became a catchphrase after it was shouted in "The Motto" by Drake. For 10 points, identify this popular hashtag of 2012, which refers to the number of chances one has at life.

ANSWER: **#YOLO** [or **You Only Live Once**]

019-12-73-04123

8. A highly reflective region on this moon is paired with a dark region; those regions are called Xanadu and Shangri-la, the latter of which was the site of a probe landing. Precipitation on this moon is driven by the methane cycle, which takes place in its majority-nitrogen atmosphere, the only one of its kind to be found on a satellite. The Cassini-Huygens mission discovered hydrocarbon lakes and rivers on the surface of this moon. For 10 points, name this largest moon of Saturn.

ANSWER: **Titan**

149-12-73-04124

9. The speaker of one of this man's poems claims, "Those that I fight I do not love, those that I guard I do not love." That poem, "An Irish Airman Foresees His Death," appeared in his collection *The Wild Swans at Coole*. Another poem by this man describes how "things fall apart; the center cannot hold," and asks "what rough beast, its hour come round at last, slouches towards Bethlehem to be born?" For 10 points, name this Irish poet who wrote "Sailing to Byzantium" and "The Second Coming."

ANSWER: William Butler **Yeats**

121-12-73-04125

10. This organ fails to fuse in its namesake "divisum." Zollinger-Ellison syndrome results from tumors in its gastrin-producing areas. The duct of Santorini connects it to the duodenum in some humans, though the duct of Wirsung is the usual connection. Ghrelin, which stimulates hunger, is produced in its epsilon cells, and glucagon is produced from its alpha cells. Groups of cells in this organ compose the islets of Langerhans. For 10 points, name this endocrine organ that secretes insulin.

ANSWER: **pancreas**

192-12-73-04126

11. One candidate in this state's 2012 Senate election was serving as its Secretary of State at the time and was criticized by the People's Alliance for underprinting voter registration materials. The race here was changed when Steve Woods agreed to drop out and endorse the eventual winner. Republican Charles Summers and Democrat Cynthia Dill both lost to a former governor of this state who pledged to caucus with Democrats. For 10 points, name this state which elected independent Angus King to the Senate.

ANSWER: **Maine**

019-12-73-04127

12. The *Bringing Them Home* report was about the treatment of these people, with whom John Batman signed an unfair treaty. The Half-Caste Act allowed the government to take mixed-race children of this group and raise them in missionary schools. In 2007, a formal apology to these people for the "stolen generations" policy was issued by Kevin Rudd. For 10 points, name these people who invented the didgeridoo and boomerang before whites settled Australia.

ANSWER: **aboriginal** Australians [or **aborigines**; or **stolen generations** until it is read]

104-12-73-04128

13. The Sirens were changed into their bird-like form after failing to find this goddess, who fought with Venus over Adonis. This goddess' original name was Kore (KO-ray), which simply meant "maiden." In the most famous story involving her, she ate six pomegranate seeds and was then forced to spend that many months below ground each year. For 10 points, name this daughter of Demeter, who was abducted by Hades to become queen of the underworld.

ANSWER: **Persephone** (per-SAY-fo-nee)

140-12-73-04129

14. This country introduced the AOC system for restricting names of agricultural products to their original regions of production. This country's poor may live in the hastily built "can towns," or in immigrant-heavy suburbs where 2005 rioting occurred, known as "banlieues" (BON-loo). In 2004, this country banned the wearing of religious symbols in schools in accordance with its "laïcité" (lye-sit-EY) policy. For 10 points, name this country, located across the English Channel from the U.K. and north of Spain.

ANSWER: **France** [or **French Republic**; or **République Française**]

019-12-73-04130

15. In this novel, the six-year-old son of the mayor kicks one of the characters in the shin after she refuses to retrieve a ball for the boy. The only sentences in this work that are not contained in letters state, "You better not tell nobody but God. It'd kill your mammy." The blues singer Shug Avery is a role model for this work's main character, who is raped by her stepfather Alphonso and is sold to her husband Albert. For 10 points, name this novel about Celie, by Alice Walker.

ANSWER: *The **Color Purple***

030-12-73-04131



1. PMD and PLCP are two sublayers of this technology's physical layer. This technology's IBSS mode allows for the creation of ad-hoc systems, but most implementations are based on infrastructure mode. Security for this technology can be provided by WPA. SSIDs are used to differentiate individual structures in this technology. The standards for this type of connection include a, b, g, and 802.11n. For 10 points, name this wireless local area network technology used in homes and coffee shops.

ANSWER: **Wi-Fi** [or **Wireless Fidelity**; or **802.11** until it is read; prompt on **wireless** local area network; prompt on **WLAN**]

001-12-73-04132

2. This man used the alias Isaac Smith to rent the Kennedy Farm near the location of one of his future actions. The first casualty of one action organized by this man was railroad employee Heyward Shepherd. This man took sixty people hostage as part of a plan he hoped would start an uprising on nearby plantations. For 10 points, name this white abolitionist who was responsible for the Pottawatomie Massacre and for the October 1859 raid on Harpers Ferry.

ANSWER: John **Brown**

023-12-73-04133

3. Termination of this process can be Rho-dependent or Rho-independent. Initiation of this process often involves a sigma factor, and in prokaryotes, often involves attachment to the Pribnow box. A 5-prime cap and a poly A tail are added to its product in eukaryotes. Retroviruses employ a reverse form of this process. In this process, RNA polymerase binds to a promoter and creates a molecule that is later used in translation. For 10 points, name this process in which messenger RNA is produced from DNA.

ANSWER: **transcription**

140-12-73-04134

4. In one work by this author, the wealthy Winston Niles Rumfoord gets caught in a chrono-synclastic infundibulum. In another work by this author, Paul Lazzaro kills the main character because of his role in the death of Roland Weary. That work by this author is about an optometrist who meets Kilgore Trout and becomes unstuck in time. For 10 points, name this American novelist of *The Sirens of Titan*, who created Billy Pilgrim in *Slaughterhouse-Five*.

ANSWER: Kurt **Vonnegut**

023-12-73-04135

5. This element's hydroxide salt, called sassonite, is actually a Lewis acid. P-type semiconductors often use silicon doped with this element. This element's carbide is often used in nuclear reactors' control rods, and Pyrex laboratory glass contains this element's silicate. This element is usually electron-deficient in compounds, forming only three bonds. It is the first element to have an electron in a p orbital and is the lightest metalloid. For 10 points, name this element with atomic number 5.

ANSWER: **boron** [or **B**]

190-12-73-04136

This is a calculation question. If the height of a trapezoid is 4 and the length of the smaller base is $\frac{3}{2}$, find the length of the larger base if the area of the trapezoid is 12.

ANSWER: **4.5** [or **9/2**]

What composer of *Petrushka* and *The Firebird* also wrote *The Rite of Spring*, which caused a riot at its 1913 premiere in Paris?

ANSWER: Igor **Stravinsky**