



1. Top-level categories of this type of rock includes rudites, arenites and lutites. This type of rock includes conglomerates and breccia. The last stage in the formation of this type of rock is cementation, the opposite of which is dissolution, which can lead to the formation of stalagmites and stalactites. They contain the fossil record and are formed after the weathering of pre-existing rock. For 15 points, identify this type of rock paired with igneous and metamorphic.

ANSWER: sedimentary rock [prompt on limestone]

066-12-85-06101

BONUS: What author of *Bonfire of the Vanities* wrote about Ken Kesey and LSD in *The Electric Kool-Aid Acid Test*?

ANSWER: Tom Wolfe [or Thomas Kennerly Wolfe; do not accept "Thomas Wolfe"]

015-12-85-0610-1

2. The change in this quantity is equal to negative RT times the natural log of the equilibrium constant. The partial derivative of this value with respect to particle number is equal to a system's chemical potential. This quantity is similar to one named for Helmholtz, but is measured at a constant pressure and temperature. When this quantity is negative, then a reaction is spontaneous. For 15 points, name this quantity that represents the amount of work that can be drawn from a system.

ANSWER: Gibbs free energy [or free enthalpy; or Gibbs function]

149-12-85-06102

BONUS: What Canadian singer collaborated with Owl City on the 2012 hit "Good Time"?

ANSWER: Carly Rae Jepsen

079-12-85-0610-1

3. This conflict was opposed by the Congressional "spot resolutions" that challenged official accounts of the Thornton affair. This war merged with the Bear Flag Revolt. This conflict, alluded to in the first line of the US Marine Hymn, made Zachary Taylor a household name after Buena Vista. After this war, America gained millions of acres by the Treaty of Guadalupe Hidalgo. For 15 points, name this war during James K. Polk's presidency between the US and its southern neighbor.

ANSWER: Mexican-American War

104-12-85-06103

BONUS: What Austrian member of the Vienna Secession used gold leaf in works like *The Kiss* and *Portrait of Adele Bloch Bauer*?

ANSWER: Gustave Klimt

015-12-85-0610-1

4. This character investigates a distress call from a Bottle Ship with members of the Galactic Federation's Seventh Platoon, including Anthony Higgs and Commander Adam Malkovich. This character, who is aided by Chozo DNA, escapes the destruction of an abandoned freighter orbiting Tallon IV in another game. This character receives energy and special powers from the death of a title creature in one game, enabling her to defeat Mother Brain on the planet Zebes. For 15 points, name this armored bounty hunter, the heroine of Nintendo's Metroid games.

ANSWER: Samus Aran [or Samus Aran]

194-12-85-06104

BONUS: What term refers to the set of elemental isotopes that do not decay, so called because they form a diagonal line when atomic number is plotted against mass number?

ANSWER: **band of stability**

132-12-85-0610-1

5. In Islamic tradition, this man bargains with Allah to get the required number of prayers from fifty to five. This son-in-law of Jethro made water flow from a rock by striking it with his staff. He was succeeded as leader of the Israelites by Joshua. This brother of Miriam and Aaron led the Israelites through the wilderness for forty years after parting the Red Sea and bringing down ten plagues on the Egyptians. For 15 points, name this man who saw the Burning Bush and delivered the Israelites from slavery.

ANSWER: **Moses** [or **Musa**]

015-12-85-06105

BONUS: Not counting its constant multiples or zero, what is the only function to be equal to its own derivative?

ANSWER: **exponential** function [or **e to the power of x**]

121-12-85-0610-1

6. While in high school, this player was named the Co-MVP of the 2006 All-American Game with Chase Budinger. This player wears the number 35 in honor of his murdered coach Charles Craig. This man won the Rookie of the Year award with the Superonics in 2008. This three-time scoring champion hit the game-winning shot in game 1 of the 2012 Western Conference quarterfinals against the Mavericks. For 15 points, name this small forward for the Oklahoma City Thunder.

ANSWER: Kevin **Durant**

186-12-85-06106

BONUS: Shia Muslims believe the Caliphate's rightful line of succession passed through what son-in-law of Muhammad?

ANSWER: **Ali** ibn Abi Talib

015-12-85-0610-1

7. Canada cut diplomatic ties with this country in September 2012. After an hour-long telephone call, Barack Obama rejected a "clear red line" policy proposed by Benjamin Netanyahu that dealt with one of this country's energy initiatives. The Principalists won the March 2012 legislative elections in this country seen as the target of proposed Israeli attacks on its nuclear program. For 15 points, name this country led by Ayatollah Khamenei and President Mahmoud Ahmadinejad.

ANSWER: Islamic Republic of **Iran** [or *Jomhuri-ye Eslami-ye Iran*]

153-12-85-06107

BONUS: What Victor Hugo novel follows the ex-convict Jean Valjean, who raises Fantine's child Cosette as his own?

ANSWER: *Les **Miserables*** (LAY mee-zair-AHB) [or *The **Miserable Ones***]

014-12-85-0610-1

8. This people's music is collected in a canon called the Twelve Muqam. Despite speaking a Turkic language, they use the Arabic alphabet. After two members of this group were killed at a toy factory, they began a riot targeting the Han in their city of Urumqi (oo-ROOM-chee). This people follows Islam and populates a region they call East Turkestan. For 15 points, name this Turkic ethnic group that populates China's Xinjiang (SHIN-jang) region.

ANSWER: **Uyghur** people

080-12-85-06108

BONUS: What hard polymer makes up the exoskeletons of insects and the cell walls of fungi?

ANSWER: **chitin**

104-12-85-0610-1

9. Examples of this literary form include a work following the family of Jia Baoyu (ZHAH bow-YOO), who is born with a piece of jade in his mouth. That work, *The Dream of the Red Chamber*, is one of the "Four Great Classical" ones written in Chinese. Candidates for the first work of this form written in English include Thomas Nashe's *The Unfortunate Traveller* and Daniel Defoe's *Robinson Crusoe*. For 15 points, name this type of long prose narrative, examples of which include *Great Expectations*.

ANSWER: **novels**

014-12-85-06109

BONUS: This is a calculation question. What are the x-intercepts of the function $f(x) = 2x^2 - 12x + 18$?

ANSWER: (**3**, 0) [or (**3**,0) and (**3**, 0); or x = **3**]

080-12-85-0610-1

10. One type of these generic objects used in CPU instructions comes in immediate, indexed, and direct modes. TLBs cache mappings of the virtual type of these objects. A group of one networking type of these general entities can be rolled up into a single multicast one. Ethernet uses the 48 bit Media Access Control type of these entities to identify devices. The Internet uses versions four and six of the IP type. For 15 points, name these identifiers that allow computers to locate resources, such as the web one www.nist.gov.

ANSWER: **address** [or memory **address** before networking; or IP **address** before "IP"; prompt on **IP** before it is read]

001-12-85-06110

BONUS: What 20th-century Italian playwright wrote metatheatrical works such as *Tonight We Improvise* and *Six Characters in Search of an Author*?

ANSWER: Luigi **Pirandello**

014-12-85-0610-1

11. One leader of this country organized the Sergeants' Revolt, overthrowing the government of Carlos Manuel de Cespedes. Another leader of this country organized the 26th of July Movement and gave the "History Will Absolve Me" speech after being arrested for assaulting the Moncada Barracks. That leader of this country overthrew Fulgencio Batista with the help of Che Guevara and crushed the Bay of Pigs Invasion. For 15 points, name this Caribbean nation formerly led by Fidel Castro.

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

014-12-85-06111

BONUS: What Englishman's designs for "difference engines" are considered the precursors for modern computers, earning him the title "Father of the Computer"?

ANSWER: Charles **Babbage**

192-12-85-0610-1

12. Tests to measure the function of this pathway include the PT and PTT. This process, which can be triggered by both the intrinsic and extrinsic pathways, uses proteins like von Willebrand factor and factor VIII. This process results in the creation of a cross-linked fibrin mesh, is non-functional in people with hemophilia, and is assisted by platelets. For 15 points, name this biological process triggers by cuts, which prevents bleeding.

ANSWER: blood **clotting** [accept **coagulation**; do NOT accept "agglutination"]

048-12-85-06112

BONUS: This is a 30-second calculation question. What is the measure, in degrees, of each interior angle of a regular octagon?

ANSWER: **135** degrees

197-12-85-0610-1

13. The author of this poem appended a series of intentionally ridiculous explanatory notes in response to criticism that it was obscure. One character in this poem rises “a sadder and a wiser man” on the following day after listening to another character’s tale. That character describes, “water, water, everywhere, nor any drop to drink” after recalling how he used his crossbow to kill an albatross. For 15 points, name this ballad by Samuel Taylor Coleridge about an old sailor.

ANSWER: “The **Rime of the Ancient Mariner**”

014-12-85-06113

BONUS: This is a calculation question. Find the length of a ladder against a 10 meter rock wall if it makes a 30 degree angle with the ground.

ANSWER: **20** meter

020-12-85-0610-1

14. One work by this writer opens by asking questions such as “When is there to be an end of that unbridled audacity of yours?” and “How long must you abuse our patience?” This writer’s works include the philosophical dialogue *De Re Publica*, and he wrote a series of denunciations of the conspirator Catiline. He drew on the tradition of Demosthenes (deh-MOSS-thuh-nees) in his own series of *Philippics* attacking Mark Antony, on whose orders he was killed. For 15 points, name this Roman writer known for his legendary skills as an orator.

ANSWER: Marcus Tullius **Cicero** [or **Tully**]

014-12-85-06114

BONUS: British singer Adele recorded the theme to what 2012 James Bond film?

ANSWER: **Skyfall**

079-12-85-0610-1

15. One leader of this present-day state lost much of his power in the Bayonet Constitution. The Blount Report was commissioned after an 1893 revolt in this state gave control to Sanford Dole. Long represented by Daniel Inouye (ih-NO-ay) in the Senate, this state was the last admitted to the Union. The USS *Arizona* was destroyed during a battle that took place in this state. For 15 points, name this state that was attacked on December 7, 1941, at Pearl Harbor.

ANSWER: **Hawai'i**

015-12-85-06115

BONUS: Which Egyptian president was assassinated in 1981 and had earlier signed the Camp David Accords with Israeli prime minister Menachem Begin?

ANSWER: Muhammad Anwar el-**Sadat**

030-12-85-0610-1

16. This novel ends with a bird saying “poo-tee-weet.” The refrain “So it goes” is invoked in this novel whenever death is mentioned. Its protagonist is married to the obese Valencia Merble and works as an optometrist in Ilium, New York. That protagonist is kidnapped by the alien Tralfamadorians and placed in a zoo with Montana Wildhack. In this novel, Billy Pilgrim meets Kilgore Trout and becomes “unstuck in time.” For 15 points, name this novel by Kurt Vonnegut.

ANSWER: **Slaughterhouse-Five**

015-12-85-06116

BONUS: What American state is the home of the cities Las Cruces, Carlsbad, and Alamogordo?

ANSWER: New Mexico

019-12-85-0610-1

17. In one film by this director, the sight of a necklace belonging to Carlotta Valdes leads the protagonist to confront Judy, who falls from the bell tower of the Mission San Juan Bautista. That film by this director made innovative use of the dolly zoom to represent the disorienting title phenomenon experienced by Scottie Ferguson. In another of his films, motel owner Norman Bates stabs to death Marion Crane in an iconic shower scene. For 15 points, name this British director of *Vertigo* and *Psycho*.

ANSWER: Alfred Hitchcock

014-12-85-06117

BONUS: What is the name of the massive world tree in Norse mythology?

ANSWER: Yggdrasil

015-12-85-0610-1

18. This quantity for a magnetic moment in the presence of a magnetic field is calculated as the dot product of negative m and the B -field. Deriving this for two point charges from Coulomb's (COO-lawm's) law yields $k q_1 q_2$ over r . The gravitational form of this quantity is the product of mass, gravitational acceleration, and height, or $m g h$. For 15 points, identify this quantity symbolized U , the change of which is equal to the change in kinetic energy.

ANSWER: potential energy

189-12-85-06118

BONUS: Name the Norwegian composer who included "In the Hall of the Mountain King" and "Morning Mood" in his incidental music to *Peer Gynt*.

ANSWER: Edvard Grieg

014-12-85-0610-1

19. This character prefers the companionship of his dog Wolf to that of his nagging wife. He encounters a group of men in old-fashioned clothing playing nine-pins while walking in the Catskill Mountains. This character is reproached for declaring his loyalty to King George, not realizing the American Revolution has taken place. Earlier, he nods off after drinking some mysterious purple liquor. For 15 points, name this character from a Washington Irving story who wakes up after being asleep for twenty years.

ANSWER: Rip Van Winkle [or Rip Van Winkle]

015-12-85-06119

BONUS: What property of a massive object, discussed in Newton's first law, is the tendency of an object to resist changes in its motion?

ANSWER: inertia

132-12-85-0610-1

20. In this opera, the female lead sings "Una voce (VO-chay) poco fa" in her first appearance, and the title character boasts of his importance in his introductory aria, "Largo al factotum." In this opera, a bribe is offered to the music teacher Basilio by Count Almaviva, who recruits the title character to help him woo and marry Rosina, the beautiful ward of Dr. Bartolo. For 15 points, name this Gioachino (JOE-ah-KEE-no) Rossini opera featuring Figaro, whose occupation involves shaving his customers.

ANSWER: *The* Barber of Seville [or *Il* Barbiere di Siviglia]

014-12-85-06120

BONUS: This is a 30-second calculation question. After taking four quizzes, a student's average score is 90 percent. Assuming the highest possible quiz grade is 100, what is her highest possible average after taking the fifth quiz?

ANSWER: **92** percent [or **0.92**]

121-12-85-0610-1

21. This city contains the 88-story Jin Mao Tower, the Yuyuan Garden, and the City God Temple. This city's hosting of the 2010 World Expo led to the reopening of its waterfront, the Bund. Its Pudong district is a Special Economic Zone. The Huangpu (WONG-poo) River flows through this city, which is a province-level municipality bounded by Zhejiang (JEH-jang) Province, Jiangsu (JANG-soo) Province, and the East China Sea. For 15 points, name this city whose population of 23,000,000 makes it the largest in China.

ANSWER: **Shanghai**, China

080-12-85-06121

BONUS: What country experienced a revolution against Soviet influence in 1956 before the government of Imre Nagy (NAHJ) was put down in favor of Janos Kadar?

ANSWER: **Hungary** [or **Magyarország**]

023-12-85-0610-1

22. These compounds are characterized by a structure of seventeen carbon atoms in four rings, forming a namesake "nucleus" of gonane, which is the simplest of these compounds. Some of these compounds are used to reduce inflammation and suppress the immune system, which can treat rheumatoid arthritis; examples include prednisone and cortisone. Hormonal examples of them include estradiol, an estrogen, and testosterone, an androgen. For 15 points, tissue and muscle growth can be stimulated by the anabolic form of what compounds?

ANSWER: **steroids**

066-12-85-06122

BONUS: Name the slave whose 1831 rebellion in Southampton County resulted in around 60 white people being killed.

ANSWER: Nat **Turner**

023-12-85-0610-1

23. The title bird sits atop a wooden fence amidst a snowy landscape in this painter's work *The Magpie*. This man painted the *Poplars* and *Haystacks* series. Another series by this man showed a Gothic cathedral in different seasons and at different times of day. This painter of the *Rouen Cathedral* series moved his studio to Giverny, where he created many paintings of a plant he found floating on the garden pond. For 15 points, name this impressionist who painted many *Water Lilies*.

ANSWER: Claude **Monet**

149-12-85-06123

BONUS: What cynical Italian political philosopher wrote that it was preferable to be feared than love in *The Prince*?

ANSWER: Niccolo **Machiavelli**

080-12-85-0610-1

24. This ruler helped put Stanislaw Poniatowski (POWN-yuh-TOHV-skee) on the throne of Poland. This ruler came to power with help from Grigory Orlov and apocryphally was shown fake villages constructed by Grigory Potemkin. A Cossack named Pugachev led a rebellion against this ruler while pretending to be this ruler's dead husband, Peter III. For 15 points, name this eighteenth-century German-born empress who helped westernize and add territory to Russia.

ANSWER: **Catherine the Great** [or **Catherine II** of Russia; or **Yekaterina Alekseyevna**; or **Yekaterina Velikaya**; or **Sophie Frederike Auguste**; prompt on **Catherine**]

023-12-85-06124

BONUS: In which Shakespeare romance does Antigonus "exit, pursued by a bear" while under orders from Leontes?

ANSWER: *The **Winter's Tale***

190-12-85-0610-1

25. 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 15 points, name this phenomenon, a decrease in the value of money.

ANSWER: **inflation**

192-12-85-06125

BONUS: This is a 20-second calculation question. Let theta be the arccosine of the quantity negative square root of two, divided by two, close quantity. Find the tangent of theta.

ANSWER: **-1** [do not accept "1"]

174-12-85-0610-1



26. One version of this effect formed the basis for the Ives-Stillwell experiment; that version was predicted by special relativity and is the transverse form. This effect is responsible for blueshift and redshift, which is an increase and decrease, respectively, in the frequency of light depending on whether the source is moving away from, or towards, an observer, respectively. For 15 points, name this effect that causes the frequency of a siren to increase as it approaches an observer.

ANSWER: Doppler effect [or relativistic Doppler effect; accept shift in place of effect]

149-12-85-06126

BONUS: What term denotes an operation used to determine whether or not an object is chiral, as well as the way light bounces off a mirror, in optics?

ANSWER: reflection

023-12-85-0610-1

27. This author was good friends with the opera singer Olive Fremstad, who was the basis for Thea Kronborg in her novel *The Song of the Lark*. She wrote about a Pittsburgh high school student who runs away to New York and throws himself in front of a train in "Paul's Case." In one novel, she wrote about Jim Burden's experiences with the Bohemian Shimerda family. For 15 points, name this novelist who wrote pioneer stories about the Nebraska prairies such as *My Antonia*.

ANSWER: Willa Cather [or Willa Sibert Cather]

015-12-85-06127