



1. The symbols I and K are used for a type of these things when it is present in the inner and outer core. The two most common surface types of these things are named for Rayleigh and Love. A shadow zone results from one type of these things not penetrating the outer core and another type of them being refracted by the core-mantle boundary. Those two types are P and S. For 15 points, identify these things whose travel time is used to determine an earthquake's hypocenter.

ANSWER: seismic waves

066-13-104-02101

BONUS: What language spoken in the canton of Grisons (GREE-zun) is one of the official languages of Switzerland along with French, Italian, and German?

ANSWER: Romansh language

015-13-104-0210-11

2. A composer for this instrument collected fifty-six pieces in *The Rhetoric of the Gods*. A famous piece for this instrument was accompanied by the lyrics "Happy, happy, they that in hell, Know not the world's despite." This instrument developed out of an Arab instrument called the "Ud" introduced in the conquest of Spain. An English composer for this instrument wrote the song "Flow My Tears" and had music described as "Semper Dolens," a pun on his name, John Dowland. For 15 points, name this popular Renaissance instrument that was replaced by the guitar.

ANSWER: lutes

080-13-104-02102

BONUS: This is a 20-second calculation question. How many different ways can I make a hop, a skip, and a jump if I can make 3 different hops, 4 different skips, and 10 different jumps?

ANSWER: 120 ways

003-13-104-0210-11

3. This author depicted the aftermath of the Appin Murder in his novel *Catriona*, a sequel to his novel in which Alan Breck flees from the government with David Balfour. The prosecutor Gabriel John Utterson seeks out a man who assaulted a young girl in another of his novels. This author of *Kidnapped* created Jim Hawkins and Long John Silver. For 15 points, name this Scottish novelist of *Strange Case of Dr. Jekyll and Mr. Hyde* and *Treasure Island*.

ANSWER: Robert Louis Stevenson

014-13-104-02103

BONUS: Frankie Stein, Dracula, and Clawdeen Wolf are among the characters in what Mattel fashion doll line that features the offspring of movie fiends?

ANSWER: Monster High

030-13-104-0210-11

4. This conflict saw the last sitting British monarch lead an army in battle, which occurred at Dettingen. The first major clash in this conflict occurred at the battle of Mollwitz. Frederick the Great had promised one side in this war neutrality if part of Silesia was given to Prussia, but that solution was rejected by a Hapsburg monarch. This war ended in 1748 with the treaty of Aix-la-Chapelle (EYE-lah-shuh-PELL). For 15 points, name this war sparked by the Pragmatic Sanction's elevation of Maria Theresa to the throne.

ANSWER: War of the Austrian Succession

230-13-104-02104

BONUS: What Danish Christian philosopher wrote at length about Abraham's sacrifice of Isaac in *Fear and Trembling*?

ANSWER: Søren Aabye **Kierkegaard** [or Johannes de **Silentio**; or Victor **Eremita**; or William **Afham**; or Frater **Taciturnus**; or Constantine **Constantius**; or Vigilius **Haufniensis**; or Nicolaus **Notabene**; or A.B.C.D.E.F. **Godthaab**; or A.B.C.D.E.F. **Rosenblad**; or **Inter et Inter**; or **Procul**; or Captain **Scipio**; or **Judge William**; or **A.F.**; or Hilarius **Bookbinder**; or Johannes **Climacus**; or **H.H.**; or **Anti-Climacus**; prompt on **A**; prompt on **B**]

014-13-104-0210-11

5. A character in this novel confesses that while driving a wedding party sledge, he once saved his own life by tossing the bride and groom overboard. The second book of this novel, "The Hired Girls," recounts how the title character's employer Wick Cutter once tried to rape her, and describes her romantic rivalry with Lena Lingard. The narrator of this novel remembers how he and the title character took the same train to Black Hawk, Nebraska. For 15 points, name this Willa Cather novel about Jim Burden and his Bohemian childhood friend.

ANSWER: **My Antonia**

020-13-104-02105

BONUS: What company made a leap as a content provider by distributing the original series *House of Cards* and airing the fourth season of *Arrested Development*?

ANSWER: **Netflix**

015-13-104-0210-11

6. This man referred to South African bodyguards as the "Gestapo" when making a trip on behalf of Prime Minister Jan Smuts (YUN SMOOTS). Known as the "Industrial Prince" for his frequent tours of coal mines and factories, he was the father of a woman called "Lilibet." This king took the throne after his older brother, Edward VIII, abdicated to marry Wallis Simpson. He underwent speech therapy with Dr. Lionel Logue to overcome his stammer. For 15 points, name this King of Britain during World War II, the father of Elizabeth II.

ANSWER: **George VI** [prompt on **George**]

052-13-104-02106

BONUS: What type of sonnet is divided into an octave and a sestet by a volta, or turn?

ANSWER: **Petrarchan** sonnet [or **Italian** sonnet]

014-13-104-0210-11

7. The square of this quantity is equal to the derivative of pressure with respect to volume. This quantity equals the square root of the bulk modulus over density. In air, it increases roughly 0.6 units for each degree Celsius increase in temperature. If a fluid is irreversibly flowing at a velocity less than this number, then the fluid will speed up. Exceeding it produces a shock wave. The ratio of velocity to this quantity is the Mach number. For 15 points, name this quantity equal to about 343 meters per second in air, the speed at which acoustic waves can travel.

ANSWER: **speed of sound** [or **velocity of sound** waves; prompt on **c**]

190-13-104-02107

BONUS: This is a calculation question. If the sine of a first-quadrant angle is $\frac{3}{5}$, what is the tangent of that angle?

ANSWER: **$\frac{3}{4}$**

003-13-104-0210-11

8. In 1944, the plan for this non-American structure was proposed by John Lucian Savage. In 1992, 177 members of the National People's Congress voted against its construction. A monument near it features the poem "Swimming," composed by a leader who endorsed this project but never completed it thanks to the Great Leap Forward. Its construction threatened the endangered Siberian Crane and the Baiji river dolphin, and it resulted in sediment build-up near towns in the Hubei province. For 15 points, name this hydroelectric dam that spans the Yangtze River.

ANSWER: **Three Gorges Dam**

052-13-104-02108

BONUS: Name the US city which overlooks the Puget Sound and is home to the Pike Place Market, where the original Starbucks is located.

ANSWER: **Seattle**

225-13-104-0210-11

9. Histamine is secreted in this organ by enterochromaffin (en-TARE-oh-kroh-MAFF-in)-like cells. A valve at the bottom of this organ is called the pyloric sphincter. A bacteria localized to it uses chemotaxis (kee-moh-TAK-sis) to burrow into the mucus lining the wall of this organ, which expands using rugae (ROO-guy). That bacteria, *H. pylori*, increases the prevalence of peptic ulcers in this organ. For 15 points, identify this organ which sends chyme (KIME) to the small intestine after receiving it from the esophagus.

ANSWER: **stomach**

239-13-104-02109

BONUS: What rookie quarterback led the New York Jets to an 8-8 record in 2013 after leaving West Virginia University?

ANSWER: Geno **Smith**

015-13-104-0210-11

10. One of these beings died in St. Thomas, Ontario, supposedly while trying to save his friend, Tom Thumb, from being hit by a train, and was stuffed and donated to Tufts University by his owner. One of these creatures at Luna Park was electrocuted in 1903, an event infamously caught on film by Thomas Edison. Another of these creatures, named Mary, was lynched after killing her abusive trainer at the Sparks World Famous circus. For 15 points, name this type of animal exemplified by P.T. Barnum's "Jumbo," which grew up in the African bush.

ANSWER: **elephant**

052-13-104-02110

BONUS: What quantity is the rotational analogue of force?

ANSWER: **torque**

014-13-104-0210-11

11. The double dabble algorithm converts values from this system into another system. In this system, signed numbers can be represented using two's complement notation. Every grouping of four digits in this system corresponds to one digit in hexadecimal, which uses symbols from 0 to F. This system can represent two to the n distinct numbers, where n is the number of bits used. For 15 points, name this number system used by computers that only has zeroes and ones.

ANSWER: **binary** number system [or **base-two** number system]

132-13-104-02111

BONUS: This is a 30-second calculation question. What is the domain of the function $f(x)$ equals the quantity $x^2 + 4x + 3$, all over the quantity $x^2 - 6x - 7$?

ANSWER: x equals all **numbers other than -1 and 7** [do not accept any domain that just excludes 7]

003-13-104-0210-11

12. The scientific name of an animal named for this color is *Balaenoptera musculus*. This color is produced by radiation from particles modeled by the Frank-Tamm formula. Ferrocyanide salts can be found in a pigment of this color named for Prussia. Stars of this color inhabit the left part of the Hertzsprung-Russell diagram, which includes the star Rigel (RYE-jul). A solvated electron forms when alkali metals are dissolved in ammonia, displaying this color. It is not green, but solutions of copper ions are this color. For 15 points, what color does Rayleigh scattering impart to the sky?

ANSWER: **blue**

239-13-104-02112

BONUS: What Cavalier poet instructed, "Gather ye rosebuds, while ye may," in his "To the Virgins, to Make Much of Time"?

ANSWER: Robert **Herrick**

014-13-104-0210-11

13. When given the task of censoring letters, this character signs the names "Washington Irving" or "Irving Washington." He has a brief affair with Nurse Duckett that ends soon after Kid Sampson's death. This character is stalked by "Nately's whore" near the end of the novel, who nearly stabs him to death. After witnessing the death of Snowden, he refuses to go on flying missions and decides to escape Pianosa at the end of the novel in which he appears. For 15 points, name the protagonist of Joseph Heller's *Catch-22*.

ANSWER: John **Yossarian**

140-13-104-02113

BONUS: Name the city in which the Dakar Rally traditionally starts, the Roland Garros tennis open runs, and the most prestigious race in the Grand Tour of cycling ends.

ANSWER: **Paris**

153-13-104-0210-11

14. A conflict among these people started when four girls fought over who was the true wife of William Brind. In less than a week, James Busby and William Hobson wrote a treaty signed by these people agreeing to British sovereignty. These people were decimated when an influx of firearms sparked the Musket Wars. In another conflict among these people, Pikauterangi (PEEK-ow-teh-RON-gee) was defeated at the battle of Hingakaka (HING-guh-KAH-kah). For 15 points, name these signers of the Treaty of Waitangi (why-TONG-ghee), the indigenous population of New Zealand.

ANSWER: **Maori**

239-13-104-02114

BONUS: This is a 30-second calculation question. Triangle ACF is an isosceles right triangle with leg length 8 units. What is the distance between the circumcenter and the orthocenter of ACF? Express your answer in simplest radical form.

ANSWER: **4 square root of 2** units

003-13-104-0210-11

15. In a device invented by Gaston Plante, this compound reacts to oxidize lead and reduce lead oxide. Since this compound is capable of dehydrating sugars, when mixed with sucrose, it forms pure black carbon. A superacid must have a lower pKa than this compound. This compound is formed industrially using a vanadium compound in the contact process. Of the common strong acids, it is the only one which is diprotic. For 15 points, name this acid found in car batteries with formula H₂SO₄.

ANSWER: **sulfuric acid** [or **H₂SO₄** until it is read]

190-13-104-02115

BONUS: What Greek god was lame, worked at a forge, and married to Aphrodite?

ANSWER: **Hephaestus**

023-13-104-0210-11

16. George Balanchine re-choreographed this ballet specifically for Gelsey Kirkland. Some characters in this ballet perform a "round dance" and play a game with golden apples. Leopold Stokowski was renowned for his recordings of the berceuse (BARE-soo-zuh), the infernal dance, and other highlights from three suites excerpted from this ballet. Its protagonist destroys an egg holding the immortality of his enemy, and sees thirteen dancing princesses before encountering the title creature in the realm of Kaschei (kuh-SHAY) the Immortal. For 15 points, name this Stravinsky ballet about Prince Ivan.

ANSWER: *The **Firebird*** [or *L'**oiseau de feu***; or ***Zhar-ptitsa***]

020-13-104-02116

BONUS: What monk founded genetics with his experiments on pea plants?

ANSWER: Gregor **Mendel**

014-13-104-0210-11

17. A character in this poem encounters allegorical representations of Sin and Death, to whom he is related, who allow him to pass through a gate. This poem's author revised its ten-book version into a twelve-book version for its second edition in 1674. In this poem's second book, Moloch speaks at a council held in the city of Pandemonium, where a character presides who decides to fly to Earth to corrupt Adam and Eve. For 15 points, name this religious epic by John Milton.

ANSWER: ***Paradise Lost***

014-13-104-02117

BONUS: What Jewish holiday commemorates the events recounted in the Book of Esther?

ANSWER: **Purim**

014-13-104-0210-11

18. A summer festival in this religion is dedicated to improving relationships between brothers and sisters, and it also has a holiday that takes place once every twelve years involving pilgrimages to four sacred cities, the Kumbh Mela. Bilga leaves are offered to a major god of this religion during its month of Phalguna. A spring festival in this religion involves throwing colored powder and is called Holi. For 15 points, name this religion that also celebrates the fall festival of lights Diwali and the birthdays of Rama and Krishna.

ANSWER: **Hinduism**

019-13-104-02118

BONUS: Name the tallest mountain in Virginia, located in Grayson and Smyth Counties.

ANSWER: Mount **Rogers**

225-13-104-0210-11

19. This element's sulfide can build up on the inside of electronics in a phenomenon called "whiskering". Electrum is an alloy of gold and this element. A test that distinguishes aldehydes from ketones uses a nitrate of this element dissolved in ammonia, called Tollens's reagent. This transition metal, which has the lowest electrical resistivity of any element, is below copper and above gold on the periodic table. For 15 points, name this precious metal which forms an alloy with copper named sterling, an element with atomic symbol Ag.

ANSWER: **silver** [or **Ag** until it is read]

239-13-104-02119

BONUS: What student of Franz Boas wrote *Patterns of Culture* and *The Chrysanthemum and the Sword*?

ANSWER: Ruth **Benedict**

014-13-104-0210-11

20. A man in this novel is seen at night walking with a candle into an empty room to signal that food has been left for a convict. This novel's epilogue reveals that "Vandaleur" embezzled money in Costa Rica. This novel reveals that a butterfly-obsessed man named Jack Stapleton kidnapped his own wife and used phosphorus to evoke the frightening appearance of a legendary monster that supposedly killed Sir Charles in a moor. For 15 points, name this Sherlock Holmes novel whose culprit was not, in fact, the title dog.

ANSWER: *The Hound of the Baskervilles*

020-13-104-02120

BONUS: This is a 30-second calculation question. If you repeatedly roll two fair dice, what is the probability of rolling a seven before rolling a six?

ANSWER: 6/11

003-13-104-0210-11

21. Structures created by this phenomenon are known as ventifacts. A type of transport via this phenomenon is known as saltation. This phenomenon is the primary driving force behind surface ocean currents. The Beaufort scale is used to classify this phenomenon based on observed sea conditions. This phenomenon is responsible for creating aeolian landforms, such as dunes and sand-blasted rocks. For 15 points, name this phenomenon that results from the uneven heating of Earth's surface

ANSWER: wind

066-13-104-02121

BONUS: Brian Wilson, Al Jardine, and Mike Love were members of what American rock band whose albums include *Pet Sounds*?

ANSWER: The Beach Boys

030-13-104-0210-11

22. Many angiosperms arose as a result of a polyploidy-based type of this process. Niles Eldredge and Stephen Jay Gould proposed that this process happens over brief time periods in punctuated equilibrium. The most common form of this process occurs when a group of organisms becomes geographically isolated and undergoes genetic divergence compared to a parent population; that is its allopatric type. For 15 points, identify this term for the process by which new species arise.

ANSWER: speciation [or obvious equivalents, such as the creation of new species, until "new species arise" is read; prompt on anagenesis; prompt on cladogenesis; prompt on genetic drift; prompt on natural selection; prompt on evolution]

066-13-104-02122

BONUS: What simple animal phylum contains sponges?

ANSWER: Porifera

014-13-104-0210-11

23. A series of bombings in this country occurred during the "Hot Summer" and were triggered by the influx of "retornados." The song "And After the Farewell" was the signal to begin a revolution in this country, which was led by the MFA and overthrew Marcelo Caetano. This country was led by Antonio Salazar's Estado Novo, and during its liberalization, its colonies in Mozambique and Goa achieved independence. For 15 points, name this country whose autonomous regions include Madeira and the Azores.

ANSWER: Portugal

048-13-104-02123

BONUS: What Cleveland building, which houses the Ahmet Ertegun Exhibition Hall and seven floors of other exhibits, is entered through a glass pyramid designed by I.M. Pei, much like Paris's Louvre?

ANSWER: Rock and Roll Hall of Fame and Museum

019-13-104-0210-11

24. These things are divided into monolithic and micro types, the latter of which is exemplified by the as-yet-unfinished GNU Hurd (NEW HERD). Programs request service from these things by executing a system call. A BSD-based example of these things was originally used in OS X. The Tanenbaum-Torvalds debate concerned the implementation of a type of these things for Linux. For 15 points, identify this component of an operating system that serves as an interface between hardware and software applications.
ANSWER: **kernel** [prompt on **operating system**]

081-13-104-02124

BONUS: What Greek king, the father of Alexander the Great, was assassinated in 336 BCE by Pausanias (pow-SAY-nee-us) of Orestis?

ANSWER: **Philip II** of Macedon [prompt on **Philip**]

015-13-104-0210-11

25. This book begins with the protagonist mocking rich people who make drivers carry a sticker saying "No Riders." The third chapter of this novel is about a turtle trying to cross a highway. Near the end, a character declares that whenever a cop is beating up a guy, he will be there. Characters in this book include the former preacher Jim Casy and the pregnant Rose of Sharon. For 15 points, name this John Steinbeck novel about the Joad family, Oklahoma tenant farmers trapped in the Dust Bowl.

ANSWER: *The **Grapes of Wrath***

052-13-104-02125

00--20-0210-11

26. This politician has children with the author of a book criticizing Japanese cartoons called *The Channel-Surfing Kids Are Fed-Up*. This man was romantically involved with a journalist named Valerie Trierweiler (tree-EH-vee-LOR). The magazine *Closer* claimed in January 2014 that he was having an affair with actress Julie Gayet (GUY-yay). This man, a former partner of fellow politician Segolene Royal, was nominated for the presidency after Dominique Strauss-Kahn's arrest. This Socialist Party leader defeated Nicolas Sarkozy in May 2012. For 15 points, name this president of France.

ANSWER: Francois **Hollande**

052-13-104-02126

00--20-0210-11



27. In a play by this author, Eben Cabot fathers a child with his father's wife Abbie Putnam. In one of this man's plays, the former Pullman porter Brutus becomes the ruler of an island. This author of *Desire Under the Elms* and *The Emperor Jones* wrote a play in which "Hickey" convinces the denizens of Harry Hope's saloon to give up their "pipe dreams." For 15 points, name this American playwright of *The Iceman Cometh* who created the Tyrone family in *Long Day's Journey Into Night*.

ANSWER: Eugene **O'Neill**

186-13-104-02127

00--20-0210-11

28. After the Sharpeville Massacre, this man became the commander of the newly formed Spear of the Nation. During the Rivonia Trial, he gave the "I am Prepared to Die" speech. This leader established the Truth and Reconciliation Commission after sharing the Nobel Peace Prize with F.W. de Klerk. He spent eighteen years imprisoned on Robben Island before winning a 1994 election that was the first to allow black voters. For 15 points, name this president of South Africa who helped to end apartheid.

ANSWER: Nelson Rolihlahla **Mandela**

023-13-104-02128