

1. A recently developed one of these with a good proven competitive ratio is called tango. One of these that operates on a restricted key set with log log n performance is named after van Emde Boas (vahn EM-dah BOH-az). The zig-zag step is one of the steps which can be used in creating the splay type of these. A set of coloration rules are used in the red-black type, which is an example of the balanced binary search class of these. Their topmost nodes are known as root nodes. For 10 points, name these data structures whose terminal nodes are called leaves.

ANSWER: trees

024-09-9-02101

2. Black snakes float down from the heavens as a warning in this novel's opening location of Wen-Te Hall. One character in this work pretends to be drunk to surprise his enemies. That character is Chang Fei (chahng fay). Ssu-ma Yen ("sue"-mah yen) is the emperor at the end of this work. In this work, Liu Pei (LEE-oo PAY) captures two of the title political entities and General Cao Cao ("sow" "sow") is portrayed as a villain. For 10 points, name this work by Luo Guanzhong (LEW-oh GWAN-zong) that describes a tumultuous period in Chinese history.

ANSWER: Romance of the Three Kingdoms [or Sanguozhi Yanyi]

030-09-9-02102

3. Explanations for this event include encephalitis, ergot poisoning, and a ploy by religious leaders such as Samuel Parris to increase church membership. Sarah Good was the first victim. Cotton Mather advised caution and rejected spectral evidence, but the depositions of Mary Walcott and Ann Putnam led to convictions in the namesake town and village as well as in nearby Andover. Giles Corey was pressed to death when he refused to enter a plea. Fifty people, including the slave Tituba, confessed. For 10 points, name this incident in Massachusetts that sent nineteen people to the gallows for alleged Satanic communion.

ANSWER: Salem Witch Trials

063-09-9-02103

4. This element, whose most stable form is the rhombic (ROM-bick) allotrope (AL-oh-trope), is extracted by pumping superheated steam into deposits in the Frasch (FRASH) process. Thiols (THY-olls) are alcohol analogs with oxygen replaced by this element. A platinum or vanadium (vuh-NAY-dee-um) catalyst is used in the contact process, which synthesizes a compound consisting of oxygen, hydrogen, and this element. Although blue in flame test, it is yellow as a solid and a liquid. This element forms cross-links in rubber vulcanization. For 10 points, name this element with atomic number 16.

ANSWER: sulfur [or S]

034-09-9-02104

5. This composer was named in a set of variations on St. Anthony's chorale by Brahms. This man used the melody of "Deutschland Uber Alles" (DOYTCH-lahnd OO-bear ALL-less) in his "Emperor" string quartet. His 45th symphony was written to have the performers leave the stage in protest of his employers, who were the Esterhazy (ESS-tair-HAH-zee) family. His 94th symphony includes an extremely loud chord in an otherwise quiet passage. For 10 points, name this prolific composer of over a hundred symphonies, including the "Farewell" and "Surprise."

ANSWER: Franz Joseph Haydn

023-09-9-02105

6. During this conflict, one side's forces were repulsed in the Battle of Queenston Heights, though the other side suffered the loss of their general Isaac Brock. Brock earlier refused to give ground in confronting Isaac Hull, leading to Hull's surrender of Detroit and the subsequent Battle of Fort Dearborn. The only permanent territorial gain for the United States was the port of Mobile, Alabama. All other gains and losses in this war were nullified by the Treaty of Ghent. For 10 points, name this war with the battles of Lundy's Lane and New Orleans, which was named for the year in which it began.

ANSWER: War of **1812**

040-09-9-02106

7. It can be divided into thirty *ajza* (AJ-zah) each containing two *ahzab* (AH-zahb), or into seven stations called *manazil* (MAH-nah-zeel). Translated by Salman the Persian and Robert of Ketton, it is analyzed spiritually through *tawil* (tah-WEEL) and its commentary is known as *tafsir* (TAHF-seer). Its second chapter tells of how Samiri constructed the golden calf and was banished after Moses's return. Each of its chapters except the ninth opens with the *basmala* (bahs-MAHL-lah); those 114 chapters are known as *suras*. For 10 points, name this holy text of Islam.

ANSWER: **Koran** [or **Qur'an**]

040-09-9-02107

8. The final ruler of this civilization was held at the so-called "Ransom Room" before being suffocated to death. This empire's downfall came after its royal procession was ambushed at the Battle of Cajamarca (KAH-hah-MAR-kah). The ruler of this civilization was known as Sapa. Its semi-legendary first ruler was Manco Capac. It ruled from the Kingdom of Cuzco until its final ruler, Atahualpa (AHT-ah-HWALL-pah), was captured. For 10 points, name this civilization that built the mountain fortress of Macchu Picchu and was conquered by Francisco Pizarro.

ANSWER: the **Incans** [or Kingdom of **Cuzco** before it is read]

026-09-9-02108

9. This figure is sometimes depicted holding a book on the 'seat of wisdom.' In one painting, this figure stands on a base decorated with sphinxes, which were wrongly identified by Vasari as harpies. Caravaggio's ("CARE"-ah-VAH-jee-ohs) depiction of this figure's death depicts her swollen feet and belly. A man in the lower right unfurls a scroll while this woman totes a large baby in a painting by Parmigianino (PAR-meh-JEE-ah-NEE-no), in which she is "of the long neck." For 10 points, name this Biblical woman who looks over the infant Jesus and John the Baptist near "the rocks" in a painting by da Vinci.

ANSWER: **Mary** [or the **Madonna**; or **Virgin** Mary; prompt on **Mother of Jesus**; prompt on **Our Lady**]

034-09-9-02109

10. Monomitic systems occur when only the generative type of these structures is present. Other types of them include the elongated and thick walled skeletal type and the multi-branching binding variety. Their tips are sometimes the site of haustoria (how-STOR-ee-uh) in parasites. Those tips are the source of their expansion through an organelle known as the spitzenkorper (SPIT-zen-kor-per). Most of them are divided into cells by barriers called septa. A collection of these structures is known as a mycelium (my-SEEL-ee-um). For 10 points, name these structures that make up most of a fungus.

ANSWER: **hyphae**

040-09-9-02110

11. One character in this work kneels to pay homage to a one hundred year old cupboard. That character frequently references billiards and is named Gayef (GAH-yeff). One character's son Grisha (GREE-shah) drowned, leading to that character's departure for France. That character rejects a suggestion to build and rent out villas to pay a mortgage. At one point, the servant Firs claims that he is ready to die now that Madame Ranevsky has returned home. At a party late in this work, Lopakhin ("LOW"-pah-keen) announces that he has purchased the title estate. For 10 points, name this final play by Anton Chekhov.

ANSWER: *The Cherry Orchard* [or *Vishniovy Sad*]

022-09-9-02111

12. This law's integral and differential forms can be related by the Kelvin-Stokes Theorem. The original formulation of this law broke the rule that the divergence of a curl must be zero; that flaw was corrected with the addition of a displacement current by James Maxwell. In cases with the requisite symmetry, this law is used in place of the more cumbersome Biot-Savart (BEE-oh suh-VAR) Law. For 10 points, name this law that states that the line integral of the magnetic field around a closed loop is proportional to the current passing through it.

ANSWER: Ampere's Law

040-09-9-02112

13. The highest point of this nation is only 103 meters and is located on the Jebel Dukhan (JEH-bell DO-kahn). Its capital city is the site of the current WTO Development Round. The Inland Sea is in the southeast of this nation. The Hawar Islands are off its western coast. Ruled by Hamad bin Khalifa Al-Thani (kah-LEE-fah all TAH-nee), it currently boasts the second highest GDP per capita in the world because of its rich oil and natural gas deposits. Located to the south east of Bahrain, for 10 points, what small peninsular nation bordering Saudi Arabia has its capital at Doha?

ANSWER: State of Qatar [or Dawlat Qatar]

034-09-9-02113

14. One pope of this name supported the Second Desmond Rebellion, one of two measures he advocated to overthrow Elizabeth's rule in Ireland. Urban II called the Council of Piacenza (pee-uh-CHEN-zah) to flesh out a controversy that occurred during the rule of one pope of this name, for whom Henry IV did penance at Canossa after the Investiture Controversy. The seventh pope of this name was born Hildebrand and the first sent Augustine to England to spread Christianity. For 10 points, give this papal name whose holders popularized a namesake calendar and chant.

ANSWER: Gregory [or Gregory XIII; or Gregory VII; or Gregory I]

020-09-9-02114

15. This mythical figure used the story of “turning an old ram into a young ram” in order to convince Pelias’s daughters to kill Pelias. She also killed the bronze giant Talos by driving him insane. At one point, this character was taken to her aunt, Circe (SEER-cee), to receive cleansing after she chopped her brother into pieces. She also killed Glaucé (GLAU-see) and her own children to enact revenge upon her former husband, who was protected from some fire-breathing oxen and a sleepless dragon with her help. For 10 points, name this sorceress who aided Jason.

ANSWER: Medea

052-09-9-02115

1A. English monarchs have been crowned in this building for centuries, and it also houses many of their burial sites. Geoffrey Chaucer is among those buried in the Poet's Corner of what London landmark?

ANSWER: Westminster Abbey

1B. It causes difficulty at the task of identifying a color in which a word is written, when the word spells out the name of another color. Name this psychological effect.

ANSWER: Stroop Effect

2A. What condiment takes its name from a Latin term meaning "sour wine"?

ANSWER: vinegar

2B. Name the American regionalist painter who used his sister as a model in his *American Gothic*.

ANSWER: Grant DeVolson Wood

3A. Name the metrical foot which was used in *The Song of Hiawatha* and includes a stressed syllable followed by an unstressed syllable.

ANSWER: trochee [or trochaic]

3B. Name the diagram used to predict the probability of certain genotypes manifesting in offspring by crossing a paternal allele with a maternal allele.

ANSWER: Punnett square

4A. This is a 10-second calculation question. Find the center and radius of the circle with equation  $x^2 - 12x + y^2 + 4y = 41$ .

ANSWER: center (6, -2) and radius 9

4B. This is a 10-second calculation question. Find the least common multiple of 6, 12, 15, and 40.

ANSWER: 120

5A. Name the large depression formed at the top of volcanoes when an eruption causes the volcano to collapse.

ANSWER: calderas

5B. Name the type of five line poem which follows an AABBA rhyme scheme and takes its name from a town in Ireland.

ANSWER: limerick

6A. This is a 20-second calculation question. Simplify the expression  $(x^2 + 11x + 24)/(x^2 - 9)$ .

ANSWER: (x+8)/(x-3)

6B. This is a 20-second calculation question. Evaluate  $(2/15)^2$  times 25 plus 3 times  $4/7$ .

ANSWER: 136/63 [or 2 10/63]

7A. Name the type of wave that falls between radio and infrared on the electromagnetic spectrum.

ANSWER: microwaves

7B. Name the ABC sitcom that stars Portia di Rossi and concerns life at a massive corporation called Viridian Dynamics.

ANSWER: *Better Off Ted*

8A. What French author opened his *Remembrance of Things Past* series with the novel *Swann's Way*?

ANSWER: Marcel Proust

8B. Name the Virginian inventor whose mechanical reaper revolutionized farming.

ANSWER: Cyrus Hall McCormick, Sr.

9A. This is a 30-second calculation question. In a population with a mean height of 67 inches and a standard deviation of 2.5 inches, find the standard score (or z-score) of a person with a height of 71 inches.

ANSWER: 1.6

9B. This is a 30-second calculation question. Using 3.14 as the value for pi, give the volume of a cylinder with radius 7 inches and height 4 inches.

ANSWER: 615.44 cubic inches

10A. She created a dance work called *Deuce Coupe* that was the first to combine modern dance and ballet techniques. In 2005, she created the show *The Times, they Are a-Changin'*, which featured the music of Bob Dylan. Name this American choreographer who won a Tony award in 2003 for *Movin' Out*.

ANSWER: Twyla Tharp

10B. Name the former governor of Arizona and current Secretary of Homeland Security who was criticized for saying "the system worked" following a Christmas Day bombing attempt.

ANSWER: Janet Napolitano

1. Marc-Joseph du Fresne was killed in this nation that was originally called Staten Landt by the first European to land here at Murderer's Bay. During the 1830s, it was home to a series of Musket Wars that led to the enslavement of many of the people of the Chatham Islands. In 1835, it saw a declaration of independence signed under the auspices of James Busby. William Hobson oversaw what was in effect its annexation into Great Britain via the 1840 Treaty of Waitangi. Home to the Maori (may-"OAR"-ee), this is, for 10 points, what nation with North and South islands home to the cities of Auckland and Wellington?

ANSWER: New Zealand

040-09-9-02117

2. In September 2009, Los Angeles mayor Antonio Villaraigosa criticized this company's decision to fire one fourth of its laborers during an illegal immigration investigation. In 2007, this company was sued by Woody Allen for using two images from the film *Annie Hall* on billboards without permission. A "fake" arbitration hearing designed to obscure a settlement was one outcome of the sexual harassment lawsuits filed against its CEO, Dov Charney, who claimed that wearing pants should be optional at a company that makes underwear. For 10 points, identify this clothing manufacturer that uses amateur fashion models in its ads and boasts of its "sweatshop-free," made-in-the-U.S. products.

ANSWER: American Apparel

019-09-9-02118

3. In one novel by this author, Paul D travels to Cincinnati in his search for Baby Suggs and the mother of Denver. This author wrote about the navel-less Pilate, who is the aunt of Macon. In one novel by this author, Nel Wright's best friend seduces her husband Jude. That work by this author is titled *Sula*. This author wrote about the slave Sethe's escape over the Ohio river, which happened before she murdered her two year old daughter. This author created the character Milkman Dead. For 10 points, name this author of *Song of Solomon* and *Beloved*.

ANSWER: Toni Morrison [or Chloe Anthony Wofford]

027-09-9-02119

4. An outdated model for the structure of this entity was proposed by Davson and Danielli. Enzymes such as flippases ("FLIP"-aces") move molecules within this structure. It contains glycolipids (GLY-ko-LIP-idz) such as gangliosides (GANG-lee-oh-sides"). The fluidity of this structure is regulated by the amount of cholesterol within it. The fluid mosaic model of this structure holds that proteins and lipid rafts are embedded in a freely moving phospholipid (FOSS-fo-LIP-id) bilayer. For 10 points, name this structure that encloses the cell and separates it from the outside environment.

ANSWER: cell membrane

032-09-9-02120

5. In one of this author's short stories, Mahony meets a "queer old josser." The narrator of another of one of his novels becomes fixated with the word "paralysis" after the death of Father Flynn. This author of "Araby" and "The Sisters" wrote about Morkans' annual dance and Michael Furey's tragic death in a story about Gabriel Conroy. That work, "The Dead," is the final piece in the short story collection *Dubliners*. For 10 points, Stephen Dedalus appears in both *A Portrait of the Artist as a Young Man* and *Ulysses* by what Irish author?

ANSWER: James Augustine Aloysius Joyce

034-09-9-02121

6. Russia destroyed this empire's navy at the Battle of Chesma, after which this country was forced to sign the humiliating treaty of Kuchuk-Kainarji (kuh-NAR-juh). One battle involving this empire saw it opposed by Prince Lazar, who died during that loss to this empire. King Louis II of Hungary died at the hands of this empire at the 1526 Battle of Mohacs (MO-hotch). For 10 points, name this empire that clashed with Europe under such leaders as Mehmet II and Suleiman the Magnificent.

ANSWER: the **Ottoman** Empire [or **Turkish** Empire; or **Turkey**; or **Osmanli** Imparatorlugu; or **Osmanli** Devleti]

026-09-9-02122

7. In this work, the central family is told by Monsiuer Loyal that they must move out of their home. One of the central characters in this work fears prosecution for treason due to incriminating papers from his friend Argus that are being used as blackmail. Elmire's illness is ignored by her husband in this play. Cleante warns of the title character's machinations throughout this work. Valere and Mariane are married in this work. In this play, Orgon hides under a table and learns about the true nature of the title character. For 10 points, name this work about the title religious hypocrite written by Moliere.

ANSWER: *The **Tartuffe**, or the Impostor* [or *Le **Tartuffe**, ou L'Imposteur*]

030-09-9-02123

8. This function's Taylor series approximation begins  $1 - X^2/2! + X^4/4!$  ("One minus X squared over two factorial plus X to the fourth over four factorial"). In Euler's Formula, this function added to  $i(\sin(x))$  ("I times the sine of X") is equal to  $e^{ix}$  ("E to the I X"). This function is also equal to the square root of  $1 - \sin^2(\theta)$  ("One minus sine squared of theta") and approaches zero as theta approaches  $\pi/2$  ("pi over two"). Name this function equal to a triangle's adjacent side over its hypotenuse.

ANSWER: **cosine**

059-09-9-02124

9. Cimon ("SIGH"-moan) was sent to fight a war this group initiated after a massive earthquake. These people were policed by the kryperia, a secret dagger wielding force with the authority to kill members of this group caught wandering at night. These people's chief responsibility was tilling a piece of land called the 'klaros.' Members of this group could become neodamodes (nee-odd-ah-modes) by extensive military services. Members of this group had fewer rights than the perieoki (PAIR-ee-OH-kee), and every year the ephors (eff-FORS) declared war on them. For 10 points, name this low class of Spartan laborers.

ANSWER: **helots**

015-09-9-02125

10. A missive written to these people by St. Clement outlines the division of ministerial orders and the doctrine of apostolic succession. In earlier texts, they are asked "If the whole body were an eye, where were the hearing?" and told that "when I became a man, I put away childish things," shortly before the declaration "For now we see through a glass, darkly." Other advice to these people approves the eating of meat offered to idols and suggests that women be silent in church. For 10 points, identify these Christian inhabitants of a certain Greek city who received two namesake Pauline epistles in the New Testament.

ANSWER: the **Corinthians**

019-09-9-02126

11. This writer coined the term "Boston Brahmin" in his novel *Elsie Verner*. One of this poet's poems described a man as "the last leaf upon the tree in the Spring" and is titled "The Last Leaf." Another poem described how a title entity will no more feel the victor's tread but that it's better that it will sink beneath the wave. A third poem by this man describes a title entity's construction of "stately mansions...as the swift seasons roll." For 10 points, name this American Fireside Poet who wrote "Old Ironsides" and "The Chambered Nautilus."

ANSWER: Oliver Wendell **Holmes**, Sr.

059-09-9-02127

12. In 2005, Burger King stopped serving ice cream cones in the United Kingdom because a swirl on the cone allegedly spelled out this word. A similar situation with this word led to a recall of Nike Air shoes in 1998. In January 2010, several churches in Malaysia were firebombed in opposition to Christians using this word. For 10 points, what is this word that most Arabic speakers of any religion use to mean "God," but which is most frequently used to refer to the supreme figure of Islam?

ANSWER: **Allah**

019-09-9-02128

13. In one sonnet, this poet remembers pausing in the morning to feel a "calm so deep" caused by "all that mighty heart...lying still." In addition to "Sonnet Composed upon Westminster Bridge," this poet wrote that he'd rather "be a pagan, suckled in a creed outworn" in another sonnet. In one poem, this poet claims that a "green pastoral landscape" is "more dear...for thy sake" when addressing his sister Dorothy. That poem begins "five years have passed." This poet of "The World is Too Much with Us" wrote that he "wandered lonely as a cloud" in "Daffodils." For 10 points, name this British poet of "Tintern Abbey."

ANSWER: William **Wordsworth**

026-09-9-02129

14. One model for the formation of these regions was proposed by John T. Wilson. One of these regions, nicknamed the "Great Meteor," may be responsible for diamond-containing kimberlite deposits. Rhyolites (RYE-oh-lites) are formed when basaltic magma from these regions bubbles under a continental crust. One of them created the Galapagos island chain. A currently active one resulted in the formation of the Hawaiian island chain. For 10 points, name these areas on the earth's crust where very hot plumes of magma result in unusually high levels of volcanic activity.

ANSWER: **hotspots** [or **mantle plumes**]

032-09-9-02130

15. A bust of one person with this last name, who defeated Chief Cornstalk at the Battle of Point Pleasant, was placed in the Old Hall of the Virginia House of Delegates in 2009. Another person with this last name was assassinated in Grinder's Stand, Tennessee, after being appointed governor of the Louisiana Territory in 1806. That person was the personal secretary to Thomas Jefferson, who nominated that man with this last name to an expedition to reach the Pacific Ocean. For 10 points, identify this surname shared by the eighteenth century general Andrew and Meriwether, the partner of William Clark.

ANSWER: **Lewis** [or Andrew **Lewis**; or Meriwether **Lewis**]

045-09-9-02131

1. The protagonist of this novel mixes lemonade and Coca-Cola at a drugstore and later works as a bell-hop. Its author was inspired to write it when he read about the execution of Chester E. Gillette. The protagonist's parents were Kansas City street preachers. That character chooses to buy Hortense a coat rather than help his sister. The protagonist idealizes Sondra and takes Roberta Alden out on a canoe with disastrous consequences. Partly set in the factory-filled city of Lurgus, for 10 points, name this novel about Clyde Griffiths that was written by Theodore Dreiser.

ANSWER: An *American Tragedy*

063-09-9-02132

2. This man wrote a symphony containing one adagio lamenting women standing in line at the store and another adagio denouncing a massacre of Jews, which were both settings of Yevgeny Yevtushenko (YEV-"two"-SHANE-koh) poems. He composed two cello concertos for Mstislav (MIS-ti-slav) Rostropovich. This composer of the *Babi Yar* symphony wrote an earlier work that had the opening movement feature a tranquil melody interrupted by the invasion theme. For 10 points, name this composer whose experience during the Nazi invasion of Russia inspired his *Leningrad* symphony.

ANSWER: Dmitri Dmitriyevich **Shostakovich**

052-09-9-02133

3. In a book subtitled "the Puzzle of the Bomb," William Poundstone applied this construct to nuclear warfare. The iterated form of this construct was the subject of a tournament held by Robert Axelrod, which held that "tit for tat" was the best strategy for approaching it. The only Nash Equilibrium in the iterated form of this game is to defect every time. In the most common formulation of this game, players receive six months if both stay loyal but ten years if their partner enters a plea bargain. For 10 points, name this common situation in game theory.

ANSWER: **prisoner's dilemma**

015-09-9-02134

4. A form of these substances that marks a shift to a specific electric potential is known as the redox type. The most notable type of these substances includes chemicals like cresol (KREE-sol) red and bromothymol (BRO-mo-THY-moll) blue and demonstrates the endpoint of an acid-base titration. For 10 points, name these chemicals that reversibly change color at a certain chemical point and include acid-base examples like phenolphthalein (FEE-nolf-THALE-een).

ANSWER: **indicator** [or pH **indicator**; or acid-base **indicator**]

032-09-9-02135

5. A disease related to this organelle is caused by a lack of hexosaminidase (HEX-ose-am-IN-ih-dace) A, characterized by a red spot in the iris, and called Tay-Sachs disease. Mannose-6-phosphate tags proteins destined for this organelle. This organelle contains namesake hydrolases and can absorb material via autophagy. This organelle's V-class proton pumps create an acidic environment to carry out its main function. For 10 points, name this organelle that breaks down macromolecules and cellular waste.

ANSWER: **lysosome**

032-09-9-02136