1. This equation needs to be modified into the Goldman-Hodgkin-Katz equation when multiple ions are in a solution. This equation can be written so that a side is equal to the gas constant times temperature over the number of moles times Faraday's constant, all times the natural log of the reaction quotient. For 10 points, name this equation that can be used to find the voltage of an electrochemical cell or to find the concentration of an ion in a voltaic cell.
ANSWER: **Nernst** equation

2. This novel's protagonist changes his style of dress after a major in his home town forces him to march for forgetting to salute. Characters in this novel include Detering, Leer, and Tjaden, who becomes angry at the jingoistic schoolteacher Kantorek after the death of their classmate Joseph Behm. It shifts to the third person for its final chapter, which describes the death of Paul Baumer. For 10 points, name this novel about German soldiers fighting in World War I by Erich Maria Remarque.
ANSWER: *All Quiet on the Western Front*

3. Aldous Huxley satirized this man's utopianism found in novels like *Men Like Gods.* Hilaire Belloc and G.K. Chesterton attacked the dismissal of Christianity and belief in human progress in his *Outline of History.* In a novel by this writer, the upper-class and working-class evolve into separate species, the childish Eloi and underground-dwelling Morlocks. Those groups are found by a traveler to the year 802,701. For 10 points, name this author of *The Time Machine.*
ANSWER: Herbert George **Wells**

4. The affinity type of this procedure is often used to purify proteins, while the flash type applies pressure to perform this technique. These procedures rely on the different concentration ratios of each component, known as the partition coefficient. Absorbent materials are used in the thin-layer type of this procedure, in which the mobile phase flows through the stationary phase. For 10 points, name this technique in which a mixture is separated into different components.
ANSWER: **chromatography**

5. In this novel, a dispute between a wife's brothers and husband is settled by the egwugwu, one of whom is played by the protagonist. In this novel, Mr. Brown is allowed to build a church in the "Evil Forest," although that church is burned down after Rev. Smith takes over. The protagonist of this novel is exiled after he violates the "Week of Peace," and helps kill his foster son Ikemefuna. This novel is about the Igbo people in Nigeria. For 10 points, name this novel about Okonkwo written by Chinua Achebe.
ANSWER: *Things Fall Apart*

6. A character created by this author shouts, "You're one of my own children!" to the man who shoots her dead. In one of this author's stories, the mentally retarded girl Lucynell gets left behind by her fiancé Tom Shiftlet at a diner. Julian is disgusted by his mother's gift of a quarter to an African-American child in the title story of this author's *Everything That Rises Must Converge*. For 10 points, name this Southern Gothic writer, who described the Misfit's murder of the Grandmother in "A Good Man is Hard to Find."
ANSWER: Flannery **O'Connor**

7. During Reconstruction, this state was governed by Powell Clayton. Earl Van Dorn was defeated by Samuel Curtis in this state at Pea Ridge. The 101st Airborne Division was sent to protect black students in this state after the governor, Orval Faubus, prevented them from entering Little Rock Central High School. For 10 points, name this Southern state whose former governors include Bill Clinton and Mike Hukabee.
ANSWER: **Arkansas**

8. This quantity's relation to enthalpy and temperature can be seen in the van't Hoff equation. This value has no units since all quantities used to calculate it are divided by a standard pressure or concentration. The law of mass action can be used to find this constant for a chemical reaction, which is compared with a related value, Q, to determine which direction a reaction will shift. For 10 points, name this value equal to the concentrations of the products over the reactants in a chemical reaction, symbolized capital K.
ANSWER: **equilibrium constant** [accept capital **K** until the end of the question]

9. Mr. Beresford tries to escape a man following him home in this author's posthumously published story "Paranoia." Eleanor commits suicide by driving into a tree after leaving Dr. Montague's psychology experiment in a novel by this author. In one of her short stories, a woman screams "It isn't fair" shortly before the rest of her town surrounds her to stone her to death. For 10 points, name this author of *The Haunting of Hill House* and "The Lottery."
ANSWER: Shirley **Jackson**

10. In the buildup to this battle, orders were disobeyed by James Neill, who left his command before this battle. Two surviving witnesses of this battle were the infant Angelina and her mother Susanna Dickinson. A legend about this battle describes how a line was drawn in the sand by William Travis that the ill Jim Bowie had to be carried over. For 10 points, name this battle in which Santa Anna's forces killed Davy Crockett and all the Texan defenders of a fortified mission in San Antonio.
ANSWER: Battle of the **Alamo**

11. One ruler of this city built a giant sundial which pointed to the Altar of Peace on his birthday. Twelve bodyguard-like officers in this city carried an axehead tied to a bundle of sticks, from whose name we derive the word "fascism." Its highest executives were two men elected to a simultaneous year-long term, and its tribunes represented the lower-class plebeians against its upper-class patricians. For 10 points, name this city whose consuls and senators wore togas.
ANSWER: **Rome** [or **Roma**]

12. In one book, this writer described his observations of red and black ants fighting, and he began an essay by endorsing the motto, "That government is best which governs least." One of his essays was written after he was arrested for refusing to pay a poll tax supporting the Mexican-American War, and his most famous book describes his time living in a cabin by the title pond. For 10 points, name this transcendentalist who wrote "Civil Disobedience" and *Walden.*
ANSWER: Henry David **Thoreau**

13. This letter denotes a constant that shows how much a certain material will contract or expand to changes in temperature, the coefficient of thermal expansion. In statistics, this letter represents a Type I error. Angular acceleration is symbolized by this letter. The highest ranking member of a community of organisms has this letter designation, as does the brightest star in a constellation. For 10 points, name the first letter of the Greek alphabet.
ANSWER: **alpha**

14. The west bank of this lake is the location of a kittbutz on the En Gedi oasis. A peninsula known as "The Tongue" separates this body of water into two basins, and Mount Sodom is located at its southwestern end. Khirbat Qumran was the location of a discovery made by a shepherd boy in a cave near this body of water's shores in 1947. For 10 points, name this salt lake between Israel and Jordan that is about 1,300 feet below sea level and is known for its namesake scrolls.
ANSWER: **Dead Sea** [prompt on **Salt Sea**]

15. Teresa Stolz was the star soprano in many operas by this composer. An opera by this composer includes a canzone about the flightiness of women sung by the Duke of Mantua. This composer created an opera featuring the jealous Amneris and conquering hero Radames. This composer of the aria "La donna e mobile" wrote an opera that had live camels and elephants on stage during its 1871 premiere in Cairo. For 10 points, name this Italian composer of operas about the hunchbacked jester *Rigoletto* and Ethiopian princess *Aida.*
ANSWER: Giuseppe **Verdi**

1A. In a poem written by Thomas Gray, what animal named Selima "tumbled headlong" into a lake and drowned?
ANSWER: **cat**

1B. 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**

2A. What mathematician's namesake sums can be used to estimate integrals? His namesake hypothesis is a Millenium Prize Problem about roots of the zeta function.
ANSWER: Bernhard **Riemann**

2B. What organization's Unit 61398 was revealed by security firm Mandiant to be behind large-scale corporate espionage in the United States?
ANSWER: **People's Liberation Army** [or **PLA**; or Zhongguo Renmin **Jiefangjun**; or Chung-kuo Jen-min **Chieh-fang-chun**; prompt on **Chinese army** and equivalent answers]

3A. What female photographer captured the spirit of the Great Depression in her image *Migrant Mother*?
ANSWER: Dorothea **Lange**

3B. Name the tallest mountain in Virginia, located in Grayson and Smyth Counties.
ANSWER: Mount **Rogers**

4A. What Polish anthropologist examined the kula exchange system in his *Argonauts of the Western Pacific*?
ANSWER: Bronislaw **Malinowski**

4B. Name the U.S. naval base that was attacked by the Imperial Japanese Navy on December 7, 1941.
ANSWER: **Pearl Harbor**

5A. Wan and the light spirit Raava were revealed to have defeated the dark spirit Vaatu in what popular Nickelodeon series?
ANSWER: *The **Legend of Korra***

5B. Edward Jenner popularized a method of conferring immunity against what disease, using a virus that primarily infected cows?
ANSWER: **smallpox**

6A. This is a 20-second calculation question. What is the side length of a rhombus that has perimeter 64 inches?
ANSWER: **16** inches

6B. This is a 20-second calculation question. Consider a deck of 24 cards consisting only of twos through sevens in each of the four suits. What is the probability that the top two cards in the deck sum to nine?
ANSWER: **4/23**

7A. What bank agreed to a $5.1 billion settlement with the Federal Housing Finance Agency for misleading Fannie Mae and Freddie Mac about mortgage-backed securities it sold them?
ANSWER: **J.P. Morgan** Chase and Company

7B. Which King of England was killed at the Battle of Bosworth Field, ending the War of the Roses?
ANSWER: **Richard III** [prompt on **Richard**]

8A. What politician became the first president of the Fifth French Republic when it was established during the Algerian war of independence?
ANSWER: Charles **de Gaulle**

8B. After it was leaked early, what band streamed their album *Reflektor* with clips from the movie *Black Orpheus?*
ANSWER: **Arcade Fire**

9A. What layer of the Earth lies below the boundary known as the Moho discontinuity?
ANSWER: **mantle**

9B. What abstract expressionist painter gained notoriety for his method of dripping paint directly onto a canvas?
ANSWER: Jackson **Pollock**

10A. This is a 30-second calculation question. What is the square of the quantity, sine of 15 degrees plus cosine of 15 degrees?
ANSWER: **3/2** [or **1.5**; or **1 1/2**]

10B. This is a 30-second calculation question. Glorps have three eyes and two mouths and Fleebles have four eyes and one mouth. In a mixed group of Glorps and Fleebles, there are 68 eyes and 32 mouths. How many Glorps are in the group?
ANSWER: **12**

1. This character dies of starvation in a graveyard while clutching the dead body of his love interest. He is named for the Sunday after Easter after being abandoned by his birth parents. This character is captured and imprisoned by the soldier Phoebus after he is caught obeying the commands of his adopted father Archdeacon Frollo. His love for the gypsy Esmeralda is unrequited due to his hideous appearance. For 10 points, name this bell ringing title character of *The Hunchback of Notre Dame.*
ANSWER: **Quasimodo**

015-13-93-08117

2. This man put in an extended cadenza for the soloist in the first movement of his only concerto, a Violin Concerto in D minor. A tone poem by this composer uses an English horn to depict a swimming bird. That piece, *The Swan of Tuonela,* is one of his many compositions influenced by the mythology of his home country. He produced a brass-heavy composition that he often renamed to evade Russian censors. For 10 points, name this composition of the unofficial national anthem *Finlandia.*
ANSWER: Jean **Sibelius**

142-13-93-08118

3. Words for "below" "above" and "beyond" trigger nouns in this case. This case is taken by the objects of the pronouns "proxume," "secundum," "apud," "circa" "inter" and "per." The subject of an indirect statement is in this case. This case's singular forms end in "m" and its plural forms end in a vowel plus "s." For 10 points, name this Latin noun case most commonly used for direct objects of verbs.
ANSWER: Latin **accusative** case

019-13-93-08119

4. This hero was rescued from the sea on the island of Seriphos by the fisherman Dictys. He accidentally killed his grandfather Acrisius with a discus. He was born after his mother Danae was impregnated by Zeus as a shower of gold. This man used a helm of invisibility and the reflection from a shield to accomplish his most famous task, which resulted in the birth of Chrysaor and Pegasus. For 10 points, name this Greek hero who slayed Medusa.
ANSWER: **Perseus**

186-13-93-08120

5. This man's most famous concept came from a loophole in Goldstone's theorem, and was a consequence of the broken symmetry present in electroweak theory. This man teamed with Francois Englert and others to elucidate a mechanism by which a field interacts with particles to give them mass. That theory was validated in the CMS and ATLAS experiments, which revealed the existence of a new particle around 126 GeV, resulting in a 2013 Nobel for this man. For 10 points, name this physicist whose boson is often referred to as the "God particle" by the media.
ANSWER: Peter **Higgs**

020-13-93-08121

6. Beams of these particles can be used in a precise, but very expensive form of cancer treatment. These particles have been theoretically predicted to have a lifetime of around ten to the thirty-sixth power years. The number of these particles in an atom increases by one in beta-minus decay. They are composed of two up quarks and a down quark. A hydrogen ion consists of one of these particles. For 10 points, name this positively charged subatomic particle that is found in the nucleus.
ANSWER: **proton** [accept **antiproton** until "thirty-sixth power"]

7. This country used the codename "Chagai-I" for underground nuclear tests it conducted in 1998. Its president Yahya Khan was replaced by the People's Party after it lost territory in 1971. This country was the site of the 2007 assassination of Benazir Bhutto; the next year, this country had its president, Pervez Musharraf, resign. It formerly controlled Bangladesh. For 10 points, name this Asian country, the site of a military campaign against the Taliban.
ANSWER: **Pakistan**

8. Some acacia trees produce Beltian bodies in a mutualistic relationship with these animals. The subject of a book by E. O. Wilson and Bert Holldobler, these animals often use formic acid in their venom, and together with wasps and bees they form the order Hymenoptera. Fungus cultivation is practiced by the "leaf-cutter" kind of these organisms. These organisms may cultivate aphids, and they include "carpenter" and "army" varieties. For 10 points, name these common insects whose underground hives are often topped by hills.
ANSWER: **ant**s [or **Formicidae**]

9. This element is present in the active site of rubisco, bound to a lysine. This element and zinc block transport through NMDA receptors. It is the central atom of the porphyrin ring in chlorophyll. This element is the most common divalent cation to which ATP binds to make it active. The hydroxide of this element is a common antacid and laxative that resembles milk in appearance. For 10 points, identify this element with symbol Mg.
ANSWER: **magnesium** [or **Mg** until it is read]

10. Albert Schweitzer argued that this event was misperceived by its witnesses. According to a detail found only in the Gospel of Matthew, Peter's life had to be saved after he tried duplicating this event. This event took place after the feeding of the five thousand, on a night when the performer was alone on the Sea of Galilee. For 10 points, name this physics-defying miracle performed by Jesus.
ANSWER: Jesus **walking on water** [or equivalents]

11. The most efficient implementation of Dijkstra is done using a Fibonacci one of these structures. Priority queues are typically implemented using a binary of them. A n log n sorting algorithm that uses these data structures adds elements to one, maintaining their namesake property, and then removes the elements while again maintaining that property. For 10 points, identify this data structure similar to a tree except parent nodes must either always be less than or always be greater than their children.
ANSWER: **heap**s

12. This poet's reputation was transformed by a 1947 book of criticism by Northrop Frye. His long poems include the prophetic epics *Jerusalem* and *The Four Zoas.* This poet described "mind-forg'd manacles" in a poem in which he wanders through the chartered streets of the title city. Another of his poems describes an animal "burning bright in the forests of the night." For 10 points, name this eccentric poet of "London" and "The Tyger."
ANSWER: William **Blake**

13. Some worshippers of this god interpret the Pacaratra text to describe his five aspects. This god's mount, the enemy of the nagas, is a giant bird called Garuda. This god wields the Sudarshana Chakra and is often depicted holding a conch shell in one of his four hands. This consort of Lakshmi's avatars include Rama and Krishna. For 10 points, name this preserver god from Hindu mythology, one of the Trimurti along with Brahma and Shiva.
ANSWER: **Vishnu**

14. This country's major poet is often depicted playing the stringed *dombra.* The Irtysh River flows through Lake Zaysan in this country, while the Ili River flows into its Lake Balkash. The largest city in this country is Almaty. It contains the largest space launch facility in the world, the Baikonur Cosmodrome. Nursultan Nazarbayev is the president of this largest landlocked country in the world. For 10 points, name this Central Asian country south of Russia and west of Mongolia.
ANSWER: **Kazakhstan**

15. A character in this novel first finds out that his name isn't Maury soon after his grandmother Damuddy's funeral, when he first realizes that his sister "smells like trees". That character later gets castrated. Another protagonist of this novel jumps to his death in the Charles River, when he finds out that his sister Caddy became pregnant with Dalton Ames. This novel is titled for a passage from *Macbeth* about a "tale told by an idiot." For 10 points, name this novel about Quentin, Benjy, and the rest of the Compson family written by William Faulkner.
ANSWER: *The **Sound and the Fury***

hsapq

1. This quantity equals the line integral of the electric field between two points. The energy stored in a fully-charged capacitor equals one-half this quantity times the separated charge. Dividing the square of this quantity by the resistance gives the power dissipated by a resistor. Capacitance is the ratio of charge to this quantity. Two resistors in parallel must have the same value for this quantity. For 10 points, name this electrical quantity that equals the product of current and resistance in Ohm's Law.
ANSWER: **voltage** [or electric **potential difference**;accept **emf**; accept **electromotive force**]

185-13-93-08132

2. The longest serving person to hold this office was Cordell Hull, who served under FDR. One holder of this position was a signatory of the Kellogg-Briand Pact. Through the "Corrupt Bargain," Henry Clay took this position following the Election of 1824. The first person to hold this position was Thomas Jefferson, and it is currently held by John Kerry. For 10 points, name this Cabinet position, whose holder deals with foreign affairs.
ANSWER: Secretary of **State**

140-13-93-08133

3. Patients with this disease sometimes suffer overheating and fatigue when exposed to hot weather thanks to Uhthoff's phenomenon, and feel the "barber chair phenomenon" when bending their heads forward. Jean-Marie Charcot was the first to describe and name this disease, whose name refers to scars in the brain's white matter produced by the destruction of the myelin sheathes that insulate neurons. For 10 points, name this neurological disease more common in women than men, which can cause muscle weakness and paralysis.
ANSWER: **MS** [or **multiple sclerosis**]

020-13-93-08134

4. This author wrote a play in which Stephan asks his estranged father, a wealthy arms manufacturer, for money. That arms manufacturer then promises to donate to the Salvation Army, angering his devote daughter. This author is perhaps best known for a play where Henry Higgins wagers that he can pass the cockney Eliza Doolittle for an upper-class woman. For 10 points, name this author of *Major Barbara* and *Pygmalion*.
ANSWER: George Bernard **Shaw**

230-13-93-08135

5. One writes expressions for this quantity in mesh analysis. This quantity is measured in a circuit by using a device hooked up in series that has negligible internal resistance. This quantity divided by cross-sectional area gives its namesake density, symbolized J. Conventionally, its direction is defined as the flow of positive charge. Power dissipated across a resistor is equal to voltage times this quantity. For 10 points, identify this quantity measured in amperes.
ANSWER: **current** [do not accept "current density"]

226-13-93-08136

What work's fourth book focuses on the love affair between Dido of Carthage and the title Trojan prince?
ANSWER: ***Aeneid***

This is a calculation question. What is the area of the triangle enclosed by the lines "x plus y equals 7", "x minus y equals 3", and the y-axis?
ANSWER: **4** square units