1. This experiment used zinc sulfide (SOUL-fide) as a detector and generated one of its materials from the decay of radium. It was performed with the help of Marsden and Geiger, and its results were compared to tissue paper deflecting a bullet. It fired alpha particles at its namesake material, disproving the plum pudding model in favor of a model that depicted the nucleus as a very small, dense center. For 10 points, name this experiment which involved a thin sheet of a certain precious metal, conducted by Ernest Rutherford.
ANSWER: Rutherford **gold foil** experiment [accept **Geiger-Marsden** experiment before mention]

064-12-54-03101

2. One poem by this author begins "My heart aches, and a drowsy numbness pains my sense, as though of hemlock I had drunk." That poem's speaker later declares "tender is the night" and asks "do I wake or sleep?" Another poem by this author describes a "happy melodist...forever piping songs forever new." That poem addresses an "unravish'd bride of quietness" and ends by declaring, "Beauty is truth, truth beauty." For 10 points name this English Romantic poet of "Ode to a Nightingale" and "Ode on a Grecian Urn."
ANSWER: John **Keats**

141-12-54-03102

3. This process includes serial communities composed of r-selected species. The gap phase type of this process occurs when there is a break in the canopy of a climax community. Nitrogen fixers, lichens (LIE-kens), moss, and shrubs are the first organisms to arrive in this process. The primary type of this process can begin with the formation of a new lake or volcanic eruption, and the secondary type is caused by disturbances such as fire. For 10 points, name this process of species in a region changing over time.
ANSWER: ecological **succession**

124-12-54-03103

4. Inhabitants of one of these institutions, established by Gargantua, live only by the single rule, "Do what thou wilt." William of Baskerville solves a series of murders that occurs in one of these places in *The Name of the Rose.* After reading Anne Radcliffe novels, Catherine Morland expects one of these places, called Northanger, to be full of mystery in a Jane Austen novel. For 10 points, name these buildings which house monks or nuns and are overseen by abbots.
ANSWER: **abbey**

121-12-54-03104

5. One example of these entities enters through the plasmodesmata (plahs-mod-dehs-MAH-tuh) using the protein P30. Icosahedral (eye-kos-uh-HEE-dral) is one type of capsid structure in these entities. One type of these uses reverse transcriptase (tran-SCRIPT-ays) to produce DNA from RNA. They can reproduce by either the lytic or lysogenic (lie-soh-GEN-ick) cycles, and the "retro" variety includes HIV. When they attack bacteria, they are known as bacteriophages (back-TEE-ree-oh-fay-jehs). For 10 points, name this class of infectious agents that includes rabies, tobacco mosaic, and influenza.
ANSWER: **virus**

127-12-54-03105

6. In this work, Brevet misidentifies Champmathieu (SHAWMP-math-yoo), who is arrested for stealing apples. The protagonist of this work stays with Bishop Myriel before fleeing to Montreuil-sur-mer (mahn-troo-EEL-suhr-mair). In this novel, Enjolras (ON-joel-rahs) leads the Friends of the ABC in a revolt during which Gavroche is killed. In this novel, Marius falls in love with Cosette, the daughter of Fantine, who died of shock when Javert (zhah-VAIR) pursued the protagonist to Fantine's deathbed. For 10 points, name this work by Victor Hugo about the escaped convict Jean Valjean.
ANSWER: Les **Miserables** (lay mee-zair-AHB) [or The **Miserable Ones** or similar translations]

124-12-54-03106

7. With William Mead, this man went on trial for unlawful assembly in Bushell's Case. This man attacked England in the discourse *No Cross, No Crown* while in the Tower of London. This man's establishment of peaceable relations with the Lenape (leh-NAH-pay) Indians is shown in a Benjamin West painting. He died in debtors' prison after starting a colony he called a "holy experiment," where he founded the City of Brotherly Love. For 10 points, name this Quaker who founded the colony of Pennsylvania.
ANSWER: William **Penn**

080-12-54-03107

8. One equation that modifies this law contains variables labeled "a" and "b" that take into account particle interactions. It can be rewritten to equate pressure to density divided by molar mass. This law is not accurate at low temperatures and high pressures or during phase transitions. It can be replaced with the related, and somewhat more accurate, van der Waals (van dur VALZ) law. This law is a combination of Boyle's, Charles's, and Avogadro's (ah-vo-GOD-roz) laws. For 10 points, name this law, which is usually written as "PV equals nRT."
ANSWER: the **ideal gas law**

140-12-54-03108

9. A character with this profession moves from Tostes ("totes") after his wife is depressed by a ball at La Vaubyessard (voe-byeh-SARD). Another character with this profession is separated from his lover after being captured by the army of Liberius, and discovers the suicide of Pavel Antipov. This is the profession of Charles, the husband of Emma Bovary. Another character with this job is the rival of Komarovsky (com-ah-ROV-skee) for Lara, who is separated from him by the Russian Revolution. For 10 points, name this profession held by Boris Pasternak's character Yuri Zhivago.
ANSWER: **doctor**s [or country **doctors**; or **physician**s; or obvious equivalents]

004-12-54-03109

10. The Lorentz transform reduces to a transform named for this man at small velocities. He feuded with Thomas Harriot over sunspots and with Grassi over comets. He increased the magnitude of telescopes twenty-fold. This scientist developed laws of falling bodies by rolling a ball down a gently sloped plane. His observations of the Mediterranean Sea led to his theory of tides, which he included in a work that angered Pope Urban VIII. For 10 points, name this Italian scientist who was put on trial by the Inquisition.
ANSWER: **Galileo** Galilei

124-12-54-03110

11. With Gerry and Pinckney, this man traveled to France during the XYZ affair. During this man's term, he affirmed that interstate commerce could be regulated in *Gibbons v. Ogden* and that Congress could create a Bank of the United States in *McCulloch v. Maryland*. After John Adams made midnight appointments, this man's court established the process of judicial review in *Marbury v. Madison*. For 10 points, name this long-serving fourth Chief Justice of the Supreme Court.
ANSWER: John **Marshall**

124-12-54-03111

12. This goddess assumes the guise of Mentor to speak to Telemachus (te-lay-MOCK-us). Many stories relate how she assumes the name "Pallas" after accidentally killing her friend. This goddess is often referred to by the epithet "grey-eyed," and is frequently identified with an owl. She is born in full armor when Hephaestus (huh-FESS-tis) splits open the head of her father Zeus. For 10 points, name this Greek counterpart of the Roman Minerva, the goddess of war and wisdom.
ANSWER: **Athena** [or **Minerva** until it is read]

13. During this election, William Yancey supported a southern candidate through his Alabama Platform. John Bell represented the Constitutional Union Party in this election, and John Breckenridge was the Southern Democratic candidate. The winning candidate's running mate was Hannibal Hamlin, and that Republican victor defeated Northern Democrat Stephen Douglas. For 10 points, name this election that put Abraham Lincoln into the White House for the first time.
ANSWER: United States Presidential election of **1860**

14. When these objects are rotating, the Kerr metric describes them. They can be described by their mass, charge and spin according to the no-hair theorem. When the mass of a neutron star exceeds the Tolman-Oppenheimer-Volkoff limit, the star may form one of these. The Schwarzchild radius is the distance from their center to the event horizons that surround them. The supermassive type is found at the center of galaxies. For 10 points, name these regions from which light can't escape.
ANSWER: **black hole**s

15. Federal troops were sent to Martinsburg, West Virginia by this man during the Great Railroad Strike. Under this President, the first African-American graduated from West Point. He vetoed a law ordering the Treasury to purchase over two million dollars worth of silver, called the Bland-Allison Act. This President's withdrawal of troops from the South ended Reconstruction. For 10 points, name this President who served one term after defeating Samuel Tilden in an election because of the Compromise of 1877.
ANSWER: Rutherford Birchard **Hayes**

1A. Two consecutive quarters of declining GDP define what periods of slowdown in economic growth and activity?
ANSWER: **recession**s

1B. Which school, which is moving to the SEC in 2012, fired its football coach Mike Sherman after a 6-6 season in 2011?
ANSWER: **Texas A&M** University [do not accept or prompt on "Texas"]

2A. In what U.S. state would one find geologic formations like the Bubble Rock or the Somes Sound in Acadia National Park?
ANSWER: **Maine**

2B. Identify the data structure from computer science which comes in AVL and red-black forms, and in which nodes without child nodes are called "leaves".
ANSWER: **tree**s

3A. This is a 10-second computation question. What is the surface area of a closed right cylinder with radius 3 units and height 5 units? Express your answer in terms of pi.
ANSWER: **48 pi** square units

3B. This is a 10-second calculation question. What is the range of the following set of numbers? {2, 2, 4, -5, 8, 10, 1, 2}
ANSWER: **15**

4A. What term refers to a line that a graph approaches but never reaches, such as the x-axis with respect to the graph of $y = 2^x$?
ANSWER: **asymptote**

4B. What chemist gives his name to a definition of an acid as a species that accepts electrons?
ANSWER: Gilbert **Lewis**

5A. *The Romance of the Three Kingdoms* and *Journey to the West* are novels from what country?
ANSWER: **China**

5B. This is a 20-second calculation question. What is the slope of a line perpendicular to the line that passes through the points (-2, 5) and (3, -3)? Express your answer as a reduced fraction.
ANSWER: **5/8**

6A. This is a 20-second calculation question. Find all numbers b such that $x^2 + bx + 4$ has two distinct integer roots.
ANSWER: **{5, -5}** [do not accept partial answer]

6B. What composition by Maurice Ravel features an ostinato (os-ti-NAH-toh) rhythm played by the snare drum?
ANSWER: *Bolero*

7A. The change in frequency of a wave whose source is in motion with respect to an observer is known as what effect?
ANSWER: **Doppler** effect

7B. Gelatin is a hydrolyzed form of what protein, the most abundant in the human body, that is plentiful in connective tissues such as cartilage?
ANSWER: **collagen**

8A. Name the George Clooney-directed movie about CBS journalist Edward Murrow's conflict with Joseph McCarthy.
ANSWER: *__Good Night, and Good Luck__*

8B. Jaques tells the audience that "all the world's a stage, and all the men and women merely players" in what Shakespeare play?
ANSWER: *__As You Like It__*

9A. *A Girl with a Watering Can* was painted by what Impressionist, better known for *Luncheon of the Boating Party*?
ANSWER: Pierre-Auguste **Renoir** (ren-WAR)

9B. In March and April 2012, Francois Hollande will be running as the Socialist candidate against what current president of France?
ANSWER: Nicolas **Sarkozy**

10A. This is a 30-second calculation question. Solve for x on the interval x is between 0 and 2 pi radians, inclusive: cos x plus cos 2x = 0.
ANSWER: **pi/3, pi and 5pi/3** [or **60 degrees, 180 degrees and 240 degrees**; do not accept partial answers]

10B. This is a 30-second calculation question. You buy a $5 raffle ticket. If the raffle prize is $1000, then how many other people must buy raffle tickets for your expected raffle outcome to be $0?
ANSWER: **199** people

1. Unlike a related tongue, this language has four contrastive tones instead of nine and is polysyllabic (PAH-lee-sill-AH-bik) instead of monosyllabic (MON-oh-sill-AH-bik). In Singapore, this language is called Huayu (wah-YOO). The KMT enforced a policy of using only this language in a country where it is known as Guoyu (GWO-yoo). Potonghua (poe-tong-WAH) is the official name for this language, which is based on the Beijing dialect. For 10 points, name this most widely spoken Chinese language, which differs from both Wu and Cantonese.
ANSWER: **Mandarin** Chinese [or **Potonghua** before it is read; prompt on **Chinese**]

124-12-54-03117

2. Forces in this war were assembled by Queen Margaret, whose husband was captured at the Battle of Northampton. Edward IV was crowned king after winning the Battle of Towton, which followed the Second Battle of St. Albans during this war. Richard Neville became known as the "kingmaker" during the course of this war, which was ended when Richard III lost to the eventual Henry VII at the Battle of Bosworth Field. For 10 points, name this war between the Houses of Lancaster and York.
ANSWER: **War of the Roses** [or **Wars of the Roses**]

149-12-54-03118

3. In one work by this artist, a woman wearing a gold bracelet stands in front of a vase containing two roses as she faces a customer reflected in a mirror. This artist of *A Bar at the Folies-Bergere* (foh-lee-AY bear-JER) also depicted a servant holding a bouquet of flowers who stands behind a bed on which a black cat stands. In another work by this man, two fully dressed men sit with a naked woman near a picnic basket. For 10 points, name this French painter of the reclining nude *Olympia* and *The Luncheon on the Grass*.
ANSWER: Edouard **Manet**

105-12-54-03119

4. The advent of this technology necessitated the construction of star forts. Basilisks and culverines were specific types of these weapons. A gigantic example named Orban was used by Mehmet II in the siege of Constantinople. Ignatius of Loyola's career as a soldier was ended when he was injured by a projectile fired from one. Napoleon legendarily used one to disperse a mob in 1795 with a "whiff of grapeshot." For 10 points, name this artillery piece that fires non-explosive iron balls.
ANSWER: **cannon**s

020-12-54-03120

5. One work of this poet concludes, "The world no longer let me love; my hope and treasure lies above." That poem describes awaking to "that fearful sound of 'fire' and 'fire'" and is titled "Verses upon the Burning of Our House." In another poem, she tells the addressee, "The heavens reward thee manifold, I pray," and begins, "If ever two were one, then surely we." For 10 points, name this poet of the Massachusetts Bay Colony who wrote "To My Dear and Loving Husband."
ANSWER: Anne **Bradstreet**

014-12-54-03121

6. This man's reputation fell after he gave orders to troops during the Tonypandy Riot. In his final term as Prime Minister, he dealt with the Malayan Emergency and dispatched soldiers to counter the Mau Mau Rebellion. As Chancellor of the Exchequer, he oversaw Britain's return to the gold standard. This man claimed that "This was their finest hour" in reference to airmen during the Battle of Britain. For 10 points, name this Prime Minister of Britain during World War II.
ANSWER: Winston Leonard Spencer **Churchill**

040-12-54-03122

7. Alexander McClurg complained that this novel was insufficiently patriotic. The protagonist of this novel is tended to by Simpson, and is frequently referred to as "the youth." Its protagonist is shaken by the death of Jim Conklin, and leads a successful assault as a flag-bearer in its final chapter. This novel's protagonist is hit on the head with a rifle after abandoning his regiment. Union soldier Henry Fleming receives the title wound in, for 10 points, what novel by Stephen Crane?
ANSWER: The **Red Badge of Courage**

004-12-54-03123

8. This man was a longtime collaborator with Robert Bunsen, with whom he co-discovered cesium and rubidium (roo-BIH-dee-um). He described the spectrum that is emitted from a hot solid object and from a hot gaseous object in his three laws of spectroscopy (spek-TRAW-skuh-pee). Another set of laws named for him describe the sum of potential differences and the sum of currents in an electrical circuit. Those are known as his loop and point rules. For 10 points, name this German scientist whose circuit laws describe conservation of charge.
ANSWER: Gustav **Kirchoff**

064-12-54-03124

9. In this book, one character goes to a Quaker settlement after pushing a man off a cliff. Another character is beaten to death by Quimbo and Sambo in this work. Topsy is educated by Ophelia in this novel, in which the title character refuses to reveal the location of Cassy and Emmeline. Augustine St. Clare purchases this work's title character at the behest of his daughter Eva. For 10 points, name this novel, in which Simon Legree purchases and kills a pious slave, written by Harriet Beecher Stowe.
ANSWER: *Uncle Tom's Cabin*

149-12-54-03125

10. The mayor of this city has fewer Twitter followers than a profane Twitter account bearing his name. On Thanksgiving 2011, this city's former first lady died of breast cancer. Natives Lupe Fiasco and Rhymefest had a Twitter fight about this city's Occupy movement, which is found in Grant Park. After Mayor Richard M. Daley retired, Barack Obama's former chief of staff won its 2011 mayoral election. For 10 points, Rahm Emanuel is the mayor of what large Illinois city?
ANSWER: **Chicago**

079-12-54-03126

11. One poem by this man opens, "My long two-pointed ladder's sticking through a tree." This poet of "After Apple-Picking" wrote another poem in which a boy proclaims "Don't let him, sister!" after cutting his hand with a buzz-saw. In addition to writing "Out, Out--," this author wrote, "My little horse must think it queer to stop without a farmhouse near" in a poem that ends, "and miles to go before I sleep." For 10 points, name this New England poet of "Stopping by Woods on a Snowy Evening" and "The Road Not Taken."
ANSWER: Robert Lee **Frost**

149-12-54-03127

12. The rulers of the twelve divisions of this empire were called "farbas." This empire was founded when a native of Kangaba won the battle of Kirina (keh-REE-nuh) against the Sosso chief Sumanguru (soo-man-GOO-roo) and established a capital at Niani (nee-AHN-ee). One ruler of this empire brought Egyptian scholars to the cities of Gao and Timbuktu after going on his hajj and devaluing gold in Cairo. For 10 points, name this West African empire that rose after Ghana, and was founded by Sundiata (soon-dee-AH-tuh) and ruled by Mansa Musa.
ANSWER: **Mali** Empire

13. This man adapted Kenneth Grahame's *The Wind in the Willows* for the stage as the play *Toad of Toad Hall.* This playwright of *The Red Mystery House* wrote 1925's *Gallery of Children,* parts of which later became stories set in the Hundred Acre Wood. For 10 points, name the author who detailed the adventures of his son, Christopher Robin, and his stuffed animals in *Winnie-the-Pooh.*
ANSWER: Alan Alexander **Milne**

14. The longest river in this country is the Scheldt, which flows through a city named after a giant whose hand was chopped off and thrown into the river, and another city where the treaty ending the War of 1812 was signed. Besides Ghent, this country is also home to Bruges (BROOJ) and a province that shares a name with its neighboring Grand Duchy, Luxembourg. For 10 points, name this country between France and Germany, the home of Antwerp, which is comprised of the regions of Wallonia, Flanders and Brussels.
ANSWER: Kingdom of **Belgium** [or Royaume de **Belgique**; or Koninkrijk **Belgie**]

15. Racine's *Phedre* (FAY-druh) makes use of the alexandrine (al-ex-AND-reen) type of these poetic units. The elegiac (el-uh-JY-ik) variety of this poetic unit alternates pentameter (pen-TAH-meh-ter) with hexameter (hex-AH-meh-ter). *An Essay on Man* is written entirely in an end-stopped variety of these units. "The Miller's Tale" is written in these units. Shakespearean sonnets end with one of these units. Alexander Pope notably used the heroic type of this unit. For 10 points, name this poetic term for a pair of consecutive rhyming lines.
ANSWER: rhyming **couplet**

1. In one section, this river has the word "mountain" added to its name and contains the Fula Rapids. Before entering one lake, this river goes over the Murchison Falls. The creation of the Owen Falls Dam in 1954 submerged a portion of this river at Ripon Falls. Those falls were named in 1862 by John Hanning Speke, the first European to find this river's source. For 10 points, name this river with "blue" and "white" branches, which runs for over four thousand miles from Lake Victoria north through Egypt into the Mediterranean.
ANSWER: **Nile** River [or Bahr al-**Nil**; or Nahr al-**Nil**]

023-12-54-03132

2. During the last three days of this period, all candles but one are extinguished during Tenebrae services. The days before this period are known as Shrovetide. This period ends with Holy Week, which starts after Palm Sunday and includes Maundy Thursday and Good Friday. This religious period begins with foreheads being marked with ashes and lasts for forty days. For 10 points, name this Christian period that is ended by Easter, and during which many Christians give something up.
ANSWER: **Lent** [accept **Holy Week** before "Shrovetide" is read]

023-12-54-03133

3. This thinker claimed that the soul was in the pineal (pie-NEE-uhl) gland, whose "animal spirits" allowed mind/body interaction. He imagined an "evil demon" that had deceived him into thinking there was an outside world as part of his method of systematic doubt. His idea that mind and body were strictly separated is called his namesake "dualism." His works include *Discourse on Method* and *Meditations on First Philosophy*. For 10 points, name this thinker, who said "I think, therefore, I am."
ANSWER: Rene **Descartes** (day-CART)

080-12-54-03134

4. This man's first music tutor was Joe "King" Oliver, who invited this man to join Oliver's Creole Jazz Band. Later in life, he took command of Luis Russell's orchestra, which backed up this man for eight years. This man is known for his renditions of "Hello, Dolly" and "What a Wonderful World," and he popularized the use of improvised nonsense vocals called scat singing. For 10 points, name this jazz trumpeter, whose nickname was "Satchmo."
ANSWER: Louis **Armstrong** [or **Satchmo** before it is read]

140-12-54-03135

5. The growth of this region is hypothesized to release heat to its neighboring region and contribute to the dynamo effect. The boundary dividing this region from that neighbor is called the Lehmann discontinuity. This region is thought to be younger than the Earth and consists mainly of iron and nickel crystals under high pressure. For 10 points, name this layer of the earth surrounded by a liquid "outer" region.
ANSWER: **inner core** [do not accept or prompt on "core"]

105-12-54-03136

This is a calculation question. If it takes a car 30 minutes to travel the first 25 miles of a trip, and 90 minutes to travel the next 75 miles, what is the average speed of the trip?
ANSWER: **50 miles per hour** [or **50 mph**]

105-12-54-03137

Identify the Jewish holiday on which hamantashen (HAH-mun-tah-shen) are eaten to celebrate Esther's saving of the Jews.

ANSWER: **Purim**