hsapq

1. Reactive oxygen species formed in this organelle can be disproportionated by superoxide dismutase. The malate-aspartate shuttle moves electrons around this organelle. FAD+ (F A D plus) is reduced to FADH2 (F A D H 2) in this organelle. Bcl-2 controls the release of cytochrome c from this organelle at the start of apoptosis (EY-pop-TOH-siss). This organelle's DNA is inherited maternally. Its matrix is formed by folds of the inner membrane called cristae. For 10 points, name this organelle in which the Krebs cycle and the electron transport chain occur as part of cellular respiration.
ANSWER: **mitochondria** [or **mitochondrion**]

190-13-96-01101

2. The third chapter of this novel devolves into three simultaneous conversations, presented completely as dialogue, including a lecture given by the D.H.C. This novel ends by describing the protagonist's feet rotating counterclockwise. Characters in this book are programmed to say "Mending is better than ending" and "Everyone belongs to everybody else." Linda and her Shakespeare-obsessed son encounter Bernard Marx in this novel. For 10 points, name this dystopian novel about John the Savage, written by Aldous Huxley.
ANSWER: *__Brave New World__*

190-13-96-01102

3. These events can be quantified on the INES (I N E S) scale, and the Liquidators were a group of people who responded to one of these events. President Carter created the Kemeny Commission to investigate one of these events that occurred near the Susquehanna River. These events release the isotopes iodine-131 and cesium-137. For 10 points, identify these disasters in which a fission plant overheats and releases radiation into the environment, exemplified by the Chernobyl incident.
ANSWER: **nuclear** power plant **meltdown** [or **nuclear** power plant **disaster**, etc.]

234-13-96-01103

4. A method of root-finding named for this word is identical to Newton's method, but is used when no analytical derivative exists for the function. When two of these lines are drawn from a single point to a circle, then the length of the segment times the length of the external segment is constant. The derivative of this function of x equals this function of x times the tangent of x. This word refers to any line that passes through a curve twice, and in a right triangle, this function of an angle equals the hypotenuse divided by the side adjacent to the angle. For 10 points, name this reciprocal of the cosine.
ANSWER: **secant**

190-13-96-01104

5. A character in this story mistakenly believes he hears a mouse or cricket on his floor. That character is an old man who has an eye resembling that of a vulture's. In this story's climax, the narrator hears a sound like the noise "a watch makes when enveloped in cotton." At the end of this story, the narrator screams "I admit the deed--tear up the planks!" after repeating the word "louder" several times. For 10 points, name this Edgar Allan Poe story in which a murderer is driven insane by what he believes is the sound of the title object beating under floorboards.
ANSWER: "The **Tell-Tale Heart**"

052-13-96-01105

6. This god's son Vali was turned into a wolf that kills Narfi, another son of this god. A goat was used by this god in order to make Skadi laugh. Heimdall and this god are fated to kill one another during Ragnarok. Frigg told this god that only mistletoe could harm her son Balder. This god's wife Sigyn (SIG-in) stays by his side to catch venom that drips towards his face, which was his punishment from the Aesir (EY-seer). For 10 points, name this shape-shifting Norse god known for being an untrustworthy trickster.
ANSWER: **Loki**

7. The Sahtu people in this country speak the endangered "Slavey" language, and the book *Languages in Conflict* describes its "bilingual belt." The "children of Bill 101" here are educated in a specific language. In a territory of this country, Inuktitut (in-UHK-teh-TUT) and Inuinnaqtun (IN-oo-uh-NOK-tin) are official languages. Leonard Jones sued to challenge the 1969 Official Languages Act here. This country features a large French-speaking Acadian minority in a bilingual province. For 10 points, name this country where both English and French are spoken in places such as New Brunswick.
ANSWER: **Canada**

8. The first and last coefficients of an integer polynomial can be used to guess solutions to the polynomial with this property. Dividing one polynomial by another gives a function described by this adjective. The Greeks proved that the square root of two did not have this property. It is possessed by any number with a terminating decimal expansion, and any integer, but not any real number. For 10 points, identify this type of number which can be expressed as a fraction of two integers.
ANSWER: **rational** [or **rational** number; or **rational** function]

9. In thermodynamics, this letter symbolizes the reciprocal of Boltzmann's constant times temperature. The probability of not rejecting the null hypothesis when it is false is symbolized by this letter. Plaques of an amyloid named for this letter are common in Alzheimer's disease patients. Cells that produce insulin are named for this Greek letter. This letter names a radioactive decay that occurs when either a positron or an electron is emitted from a nucleus. For 10 points, name this letter that symbolizes type II error, as it is the second letter of the Greek alphabet.
ANSWER: **beta** [do not accept or prompt on "B"]

10. This author wrote a short story in which a character unsuccessfully tries to reach "the boys" at a claim on Henderson Creek. A novel by this author includes a man in a red sweater training a pet stolen from Judge Miller. In that novel by this author, John Thornton saves the main character from Hal. This author's stories include one in which a man dies after failing to warm himself and another in which Buck joins a wolf pack. For 10 points, name this American author of "To Build a Fire" and *The Call of the Wild.*
ANSWER: Jack **London** [or John Griffith **Chaney**]

11. At a battle in this state, Charles Mawhood fought with Hugh Mercer, and John Sullivan accepted the surrender of troops in Nassau Hall. The legend of Molly Pitcher was born at this state's Battle of Monmouth. A plan named for it favored small states and rivaled the Virginia Plan at the Constitutional Convention. George Washington crossed the Delaware to surprise some Hessians in this state. For 10 points, name this site of the Battle of Princeton and the Battle of Trenton.
ANSWER: **New Jersey**

12. Though he sided with the Greeks during the Trojan War, this god escorts Priam to Achilles's camp in the *Iliad.* Odysseus was descended from this god, as his grandfather was Autolycus (AH-tow-LYE-kuss). Two snakes intertwined around a staff, or a caduceus, is a symbol of this deity. His mother was the eldest of the Pleiades and was named Maia (MY-uh). As a child, this god used the entrails of Apollo's cattle to fashion a lyre. For 10 points, name this god depicted with winged sandals, a trickster and messenger god.
ANSWER: **Hermes**

13. This man was photographed by Gaetano Faillace (fye-LAH-chay) standing next to an enemy general. He was unsuccessfully targeted in the Kyujo Incident, and his surrender message referenced a "new and most cruel" weapon with "incalculable" damage. This man gave the "Jewel Voice Broadcast" to signify his country's unconditional surrender, and was then forced to renounce his divinity by Douglas MacArthur. This ruler was never tried for war crimes, unlike his military leaders such as Hideki Tojo. For 10 points, name this Emperor of Japan during World War II.
ANSWER: **Hirohito** [or the **Showa** Emperor]

14. Glenn Frank was instrumental in saving lives during this event by persuading people to leave the scene. A Pulitzer-winning photograph taken during this event by John Filo depicts Mary Vecchio kneeling over the body of Jeffrey Miller. This event was the subject of Neil Young's anti-war song "Ohio." Three years after this event, the eight National Guardsmen who opened fire were acquitted on the grounds of self-defense. For 10 points, name this 1970 shooting on a college campus in Ohio, which prompted a student strike against the Vietnam War across the country.
ANSWER: **Kent State** shootings [or **May 4 massacre**]

15. 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 10 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**]

1A. What classic 1973 film follows the scams perpetrated by Robert Redford and Paul Newman and is set to the music of Scott Joplin?
ANSWER: *The **Sting***

1B. What law states that the pressure of a gas is inversely proportional to the gas's volume?
ANSWER: **Boyle's** law

2A. What college basketball coach won a national championship with Kentucky in 2012?
ANSWER: John **Calipari**

2B. What Latin poet coined the phrase "Carpe diem" in his *Odes*?
ANSWER: **Horace** [or Quintus **Horatius** Flaccus]

3A. This is a 20-second calculation question. Two angles in a triangle measure x + 20 and 3x - 5 degrees. What is the measure of the third angle?
ANSWER: **165-4x**

3B. This is a 20-second calculation question. What is the period of the sinusoid "y = 3 sine x"?
ANSWER: **2 pi** radians [or **360** degrees]

4A. What leader of the Christian Democratic Union won her third general election to remain Chancellor of Germany in 2013?
ANSWER: Angela **Merkel**

4B. What action was divided into anomic, egoistic, altruistic, and fatalistic varieties in a book by Emile Durkheim?
ANSWER: **suicide**

5A. What text fundamental to Daoism was written by Lao Tzu?
ANSWER: the ***Dao De Jing*** [or the ***Tao Te Ching***; or the ***Book of the Way*** *and its Power*]

5B. What simple animal phylum contains sponges?
ANSWER: **Porifera**

6A. What Canadian province borders Washington, Idaho, and Montana?
ANSWER: **British Columbia**

6B. What American filmmaker directed such landmarks as *2001: A Space Odyssey* and *The Shining*?
ANSWER: Stanley **Kubrick**

7A. RSA is an example of a public-key system used to accomplish what process?
ANSWER: **encryption**

7B. What industrial process, named for a German chemist and important in World War I, was the first efficient way of producing ammonia?
ANSWER: **Haber** process [or **Haber-Bosch** process]

8A. The Ohio city of Cleveland and the New York city of Buffalo lie on the shore of what lake?
ANSWER: Lake **Erie**

8B. What woman known as "The Maid of Orleans" was burned at the stake in 1431?
ANSWER: **Joan of Arc** [or **Jeanne d'Arc**; or **Saint Joan**; prompt on partial answer]

9A. This is a 30-second calculation question. The two roots of a second degree polynomial P are i and negative i. If the y-intercept of the graph of P of x is 2, what is the polynomial in standard form?
ANSWER: **2x squared + 2**

9B. This is a 30-second calculation question. A dartboard with radius 10 inches has an inner bullseye of radius 5 inches. A dart on the bullseye is worth 100 points and a dart on the outer circle is worth 20 points. What is the expected value of a single dart that hits the dartboard?
ANSWER: **40** points

10A. What name is given to the area around the equator characterized by weak winds, which was called the doldrums by sailors?
ANSWER: **ITCZ** [or **Intertropical Convergence Zone**]

10B. What Heian (HEY-yon)-era woman wrote the classic Japanese novel *The Tale of Genji?*
ANSWER: Lady **Murasaki** [or **Murasaki** Shikibu]

1. This man depicted himself surrounded by owls and bats in *The Sleep of Reason Produces Monsters.* This artist depicted a nude scene of a reclining woman, which can be found in the Prado next to his "clothed" version of the same woman. This man also painted the scene of a demonic creature consuming his offspring as a part of his *Black Paintings* series. For 10 points, name this Spanish artist of *Saturn Devouring His Children* who painted the massacre of Spanish citizens by Napoleon's army in *The Third of May, 1808.*
ANSWER: Francisco **Goya**

227-13-96-01117

2. These items included a trip through Oscar de la Renta and Bergdorf Goodman before an anniversary party. These items motivated a man to subtly advertise a bottle of Anatabloc to his staff during a meeting on health care. Jonnie Williams, one-time CEO of Star Scientific, offered $135,000 worth of these items to their possessor, who was partly motivated by his wife Maureen's credit card debt. Ken Cuccinelli's campaign was tarnished by the existence of these items, helping Terry McAuliffe become governor. For 10 points, name these dubiously-legal donations to a Republican governor of Virginia.
ANSWER: Bob **McDonnell's gifts** [or **gifts** to the **McDonnell family**; or **gifts** from **Jonnie Williams**; or **gifts** in the **Star Scientific** scandal; or other equivalents]

080-13-96-01118

3. One of this author's novels ends when Dallas, the protagonist's son, goes alone to visit his father's lover in Paris. Another character created by this author is disgusted to learn from Simon Rosedale that Bertha Dorset and Lawrence Selden carried on an affair, and eventually overdoses on chloral. This author wrote a book about a crippled inhabitant of Starkfield, Massachusetts who suicidally sledded into a tree. For 10 points, name this author of *The Age of Innocence* and *Ethan Frome.*
ANSWER: Edith **Wharton**

190-13-96-01119

4. 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 10 points, name this King of Britain during World War II, the father of Elizabeth II.
ANSWER: **George VI** [prompt on **George**]

052-13-96-01120

5. This character asks why a dog, a horse, or a rat should have life but another character should have no breath. He dies immediately after telling onlookers to look at a dead woman's lips. This ruler meets a madman calling himself Tom O'Bedlam after he journeys out to the heath accompanied by his Fool. He earlier becomes infuriated when Cordelia fails to praise him as much as his other daughters Goneril and Regan. For 10 points, name this title character of a Shakespeare play, an elderly king.
ANSWER: King **Lear**

052-13-96-01121

6. In one of this man's operas, a character steals the baby of Count di Luna, and the most famous song is performed by Azucena (ohd-zoo-CHAIN-uh) and the other gypsies. In another of this composer's operas, the title jester discovers that his daughter has been killed shortly after he hears a duke singing about fickle women. This man composed arias such as the "Anvil Chorus" and "La donna e mobile," and an opera about an Ethiopian princess. For 10 points, name this Italian composer of *Il trovatore* (TROH-vuh-TOR-ey), *Rigoletto*, and *Aida* (eye-EE-duh).
ANSWER: Giuseppe **Verdi**

7. This five-word question titles a children's book illustrated by Svein Nyhus. According to ethologists, correct answers to this question include a rattling noise known as "gekkering," a "trisyllabic greeting warble," and a "ululating siren-like shriek." Less scientific answers posited for this question include "Ring-ding-ding-ding-dingeringeding," "Wa-pa-pa-pa-pa-pa-pow," and "Joff-tchoff-tchoff-tchoffo-tchoffo-tchoff." For 10 points, what is this question about animal vocalization which introduces the chorus of a 2013 YouTube hit from satirical electronic band Ylvis (ILL-viss)?
ANSWER: "**What does the fox say?**"

8. During embryonic development, these cells undergo axophilic migration. Camillo Golgi created a method for staining these cells. Saltatory conduction occurs between these cells. These cells undergo a depolarization, repolarization, and hyperpolarization of their membrane potential during an action potential. Glia support these cells, which come in "sensory" and "motor" types. For 10 points, name these cells that have axons and dendrites and make up the nervous system.
ANSWER: **neuron**s [or motor **neuron**s; or sensory **neuron**s; or inter**neuron**s]

9. For attempting to go on a walk, this character is sentenced to be whipped thirty-six times each by men in the Bulgarian army. At the end of the novel, this character decides that he must go "cultivate his garden." This character argues with Martin about the morality of sinking a ship with an evil captain. This student of "metaphysico-theologico-cosmolo-nigology" is expelled from the Castle Thunder-ten-Tronckh (TRONK) for kissing Cunegonde (coo-nay-GOND). For 10 points, name this student of Pangloss, the optimistic namesake of a 1759 novella by Voltaire.
ANSWER: **Candide**

10. This character was disowned by his father, but was allowed to return home thanks to the intervention of his beloved younger sister Fan. This man sees two children called Ignorance and Want, and has his possessions sold to Old Joe by his charwoman and laundress. He once had a fiancée named Belle and was employed by the jovial Mr. Fezziwig. After being warned by Jacob Marley, this character begins to treat Bob Cratchit better. For 10 points, name this protagonist of Charles Dickens's novel *A Christmas Carol.*
ANSWER: Ebenezer **Scrooge** [or **Ebenezer** Scrooge]

11. A seventy-four-minute Wilhelm Furtwangler recording of this symphony is sometimes cited as the specific reason why CDs have a seventy-four-minute playing time. Leonard Bernstein conducted a version of it at the Brandenburg Gate to celebrate the fall of the Berlin Wall. This symphony ends with lyrics referencing a "beautiful spark of divinity" and "daughter from Elysium," performed by vocalists singing words taken from Friedrich Schiller's poem "Ode to Joy." For 10 points, name this final complete symphony of Ludwig van Beethoven.
ANSWER: **Choral** symphony [or **Beethoven's Ninth** Symphony; Beethoven is not needed after being mentioned; do not accept or prompt on "Ode to Joy"]

12. Pompey's son Sextus Pompeius led a revolt on this island. The First Punic War began when the Mamertines (MAH-mur-teenz) occupied its city of Messana. A city on this island was led by the tyrants Dionysius I and Hiero (HEER-oh) II, who commissioned Archimedes to design a claw and a heat ray for its defense. It was the origin and power base of the Mafia. For 10 points, name this island which includes the city of Syracuse and which is separated from Italy by only two miles.
ANSWER: **Sicily** [or **Sicilia**]

13. The work function of a metal can be found by taking Planck's constant times frequency for the absorbed photon and subtracting this quantity for the emitted electron. The equipartition theorem sets it equal to three-halves times Boltzmann's constant times temperature. Its rotational component is proportional to the angular velocity squared. It is conserved in elastic, but not inelastic, collisions. Its change is equal to the work done on the system. For 10 points, name this quantity equal to half of mass times velocity squared, the energy of motion.
ANSWER: **kinetic** energy [or **KE**; or **E sub k**]

14. Fifty-one stories of this type were written by John Gay for the future Duke of Cumberland. More than seven hundred stories of this type were collected into a book by Ben Edwin Perry. Twelve books filled with this kind of story were written by Jean de La Fontaine. These stories are generally followed by a maxim, and their use of anthropomorphism differentiates them from parables. For 10 points, name this type of story, exemplified by the mouse saving a trapped lion and the hare losing a race to a tortoise, as told by Aesop.
ANSWER: **fable**s

15. Over fifty people died on this river during the 1989 *Marchioness* disaster. Others were killed when the sea flooded this river's Canvey Island. The area of it known as the Tideway is downstream from Teddington Lock. The artificial Jubilee River contains this river's overflow and was named for the Diamond Jubilee. Pollution in this river reached alarming levels in the 1858 Great Stink, and it has been blamed for giving Prince Albert his fatal case of typhoid. For 10 points, name this longest river entirely in England, which flows through London.
ANSWER: River **Thames**

1. Some types of these biological objects have elaiosomes (EH-lie-oh-zomes), which allow them to undergo myrmecochory (MYRRH-meh-cok-oar-ee) through ants. The radicle is the first part to emerge from this object, which contain a triploid tissue called endosperm. The outer wall of these objects is sometimes called a testa, while cotyledons forms within them. Birds, insects, and wind help disperse these items, which are an embryo surrounded by nutrients and a coat. For 10 points, name this result of fertilization in flowering plants, which can be sown to grow a new plant.
ANSWER: **seed**s

140-13-96-01132

2. 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 10 points, name this John Steinbeck novel about the Joad family, Oklahoma tenant farmers trapped in the Dust Bowl.
ANSWER: *The **Grapes of Wrath***

052-13-96-01133

3. Unusually, singlet oxygen and both hydrogen and hydroxyl radicals form during this type of reaction. Enthalpies of reaction are usually calculated by using substance-specific enthalpies of formation or enthalpies of this process. The Otto and Diesel cycles extract work from the enthalpy of this type of reaction. Carbon monoxide is generated in the incomplete form of this reaction, which occurs at low external oxygen concentrations. For 10 points, name this exothermic reaction in which hydrocarbons produce water and carbon dioxide by burning.
ANSWER: **combustion** [or word forms; prompt on **burn**ing until it is read]

190-13-96-01134

4. This quantity is the negative line integral of electric field between two points. Its corresponding unit is Joules per Coulomb. Its sum around any closed loop in a circuit must be zero. The change in this quantity across a resistor equals the current times the resistance by Ohm's Law. For 10 points, name this quantity also known as electric potential difference, which is supplied by batteries.
ANSWER: **voltage** [or **voltage drop**; or electric **potential** difference until it is read; do not accept or prompt on "potential energy"]

190-13-96-01135

5. This document mandated that all foreign relations be conducted under the "Model Treaty," a template for bilateral agreements that focused on free trade and defined lists of contraband. This document created an executive body called the Committee of the States, and the government organized under it passed the Northwest Ordinance. The 1787 Shays Rebellion highlighted the weakness in this document. For 10 points, name this ineffectual early U.S. governing charter that was abolished in the Constitutional Convention.
ANSWER: **Articles of Confederation** and Perpetual Union

064-13-96-01136

This is a calculation question. If you choose a number between 1 and 1000 inclusive, what is the probability that the number is divisible by 2 and 4 but not 8?
ANSWER: **1/8** [or **0.125**; or **12.5%**]

What twentieth-century Russian composer wrote a famous second piano concerto in in C minor as well as *Rhapsody on a Theme of Paganini*?

ANSWER: Sergei **Rachmaninoff**