

1. **A complex variety of this quantity includes an imaginary term proportional to the electrical conductivity over the angular frequency. Cauchy's Formula gives this quantity as a function of one over the wavelength squared. The Maxwell Relation approximates it as the square root of the dielectric constant, and the ratio of this quantity for two materials is equal to the ratio of the (*) sines of the incident angles by Snell's Law. For 10 points, name this quantity that gives the ratio of the speed of light in a vacuum to the speed of light in a material.**

ANSWER: index of refraction [or refractive index; prompt on n]

003-09-6-02102

2. **The American Anti-Imperialist League formed to oppose this war, which was encouraged by reports about the cruelty of "Butcher" Weyler. The *USS Oregon* sailed over fourteen thousand miles to participate in this war. During this war, one commander issued the directive "you may (*) fire when ready, Gridley," and the U.S. won the battles of Las Guasimas and El Caney. The U.S. emerged as a naval power by winning the battles of Santiago and Manila Bay during this war. For 10 points, name this war, sparked by the explosion of the *USS Maine* in Havana, which resulted in the United States taking control of the Phillipines and Cuba.**

ANSWER: Spanish-American War

004-09-6-02103

3. **As a signaling molecule, this molecule can activate P2 membrane receptors. Paul Boyer showed that the purpose of a certain proton gradient is to remove it from its namesake synthase. During muscle contraction, the heads of the myosin molecule hydrolyze this molecule. In plants, this molecule is synthesized in the (*) thylakoid membrane of the chloroplasts. Two molecules of it are synthesized as the end product of glycolysis. For 10 points, name this compound that is sometimes referred to as the "energy currency" of the cell.**

ANSWER: ATP [or adenosine-5-triphosphate]

040-09-6-02104

4. **An autobiographical work by this author begins by describing days, months, and years as travelers of eternity. He abandoned his early "shriveled chestnuts" style. One of his later poems focuses on the sound of water as a frog jumps in to a pond. This author of *The (*) Narrow Road to Deep North* lived in the Genroku era. He used *kigo*, or "season words," richly in his works. For 10 points, what poet, who traveled around Japan under the Tokugawa Shogunate, was a master of the seventeen-syllable *haiku*?**

ANSWER: Matsuo Basho [or Matsuo Munefusa]

034-09-6-02105

5. **In 1996 the "Defence Line" surrounding this city became a UNESCO World Heritage Site. Just east of this city is the neighborhood of IJburg (A-burg), which is built on artificial islands. This city is on the southwestern shore of the IJsselmeer (A-sell-mere), a freshwater remnant of the (*) Zuider Zee (ZI-der ZAY). It is sometimes known as the "Venice of the North" for its many canals. This city is served by Schiphol airport, which, like most of this city, is located below sea level. For 10 points, name this largest city in, and capital of, the Netherlands.**

ANSWER: Amsterdam

003-09-6-02106

6. **This composer reused a triplet motif from his *Romance for Piano for Six Hands* in the second movement of a work by him, which begins with piano chords and low Fs that resemble the tolling of (*) bells. Another work by this composer is based on a painting by Arnold Böcklin and uses the *Dies Irae* theme. This composer wrote variations on a violin caprice in his *Rhapsody on a Theme of Paganini*. For 10 points, name this Russian Romantic composer of *The Isle of the Dead*.**

ANSWER: Sergei Vasilievich **Rachmaninoff**

036-09-6-02107

7. **His scientific innovations, including the extraction of zinc from tailings in the "froth flotation" process, were published in his book *Principles of Mining*. During World War I, he was the head of the U.S. Food Administration, a position that vaulted him into the Supreme Economic Council after the war, and enabled him to set up a Quaker relief group to help with the logistics of distributing food in Europe. His support of Warren Harding led to his appointment as Secretary of (*) Commerce, a post which he left to run against the first Catholic candidate, Al Smith, for President. For 10 points, name this President under whose single term the Great Depression began.**

ANSWER: Herbert **Hoover**

040-09-6-02108

8. **The title character of one work of literature from this nation is enraged when a hare-lipped girl that he loved is stoned to death. This country was the home to the author of that work, *Barabbas*, who also wrote about Piccoline in *The Dwarf*. Another author from here wrote chamber plays, such as the one in which Jacob Hummel takes revenge on Arkenholz, *The Ghost Sonata*. Another work from this nation sees the (*) valet Jean have an affair with an idealistic woman who commits suicide with a razor. For 10 points, name the home of Par Lagerkvist and the author of *Miss Julie*, August Strindberg.**

ANSWER: **Sweden**

034-09-6-02109

9. **Since this model's formulation, it has been modified by the natural-rate hypothesis into an expectations-augmented version. Robert Lucas supported the "policy ineffectiveness proposition" by stating that this construct is temporary and that this theory depends on workers being "fooled." Belief in this model was eroded by the (*) stagflation of the 1970s. For 10 points, name this economic graph which purports to show that inflation rises when unemployment drops and vice-versa.**

ANSWER: **Phillips** Curve

030-09-6-02110

10. **One member of this literary family wrote a parody of a Tennyson poem about a sea monster, entitled "MacCracken." In a poem by another person of this surname, "fruits which unknown orchards bore" are presented to Laura and Lizzie. The brother of this family collected his sonnets in *The House of Life* and responded to Poe with "The (*) Blessed Damozel," while the sister of this name wrote "Goblin Market." For 10 points, give this common surname of the sister-and-brother poets in the Pre-Raphaelite Brotherhood, Christina and Dante Gabriel.**

ANSWER: **Rosetti**

019-09-6-02111

11. **This people believed in a celestial realm called the Hanan Paca and a lower realm called the Ukhu Paca, while humans resided in the middle realm, Cay Paca. Sacred sites known as Huacas (WAH-kuz) were used in rituals by this culture. They believed that their civilization was founded by Mama Ocello and Manco Capac, a descendent, through Inti, of their creator deity, (*) Viracocha. A great flood around the shores of Lake Titicaca also features in the myths of, for 10 points, what South American civilization whose language, Quechua, was spoken in their capital of Cuzco?**

ANSWER: Incas [or Incas]

040-09-6-02112

12. **This city's lower classes were known as the "popolo minuto" and led by the wool carders in the 1378 Revolt of the Ciompi (chee-AHM-pee). One of this city's political factions broke into "white" and (*) "black" groups after defeating the Ghibellines. This home of the Guelphs saw a period of intense religious zeal during the Bonfire of the Vanities under Savonarola. For 10 points, name this city, that supported countless Renaissance artists under Lorenzo the Magnificent and other members of the Medici family.**

ANSWER: Florence [or Firenze]

015-09-6-02113

13. **Only fragments survive of this man's comedic play *The Tracking Satyrs*. He wrote a play in which Deianeira (DIE-uh-NARR-uh) accidentally kills Heracles with the shirt of Nessus, *The Women of Trachis*. One of his plays is the middle part of a trilogy and is set "at (*) Colonus." His two plays about the outwitted of the Sphinx make up a trilogy, along with a play about a niece of Creon, who insists on burying Polyneices (PALL-ee-NEESE-eez) despite Creon's decree. For 10 points, name this playwright whose "Theban Plays" include *Antigone* (an-TIG-uh-nee) and *Oedipus Rex*.**

ANSWER: Sophocles

024-09-6-02114

14. **This man painted Jesus wrapped in a red loincloth and flanked by two angels, one in red and one in green, in his depiction of the Crucifixion. The Hall of Constantine, Room of Heliodorus, and Room of the Fire in the Borgo were among the (*) *stanzae* painted for the Pope's residence by this artist. This painter of the *Sistine Madonna* painted a man in blue reclining on a series of steps near Averroes (AV-err-OH-ess) and Pythagoras. For 10 points, name this artist who painted *The School of Athens*.**

ANSWER: Raphael [or Raphael Sanzio]

033-09-6-02115

15. **A character in this movie proclaims that tigers love pepper but hate cinnamon. In another scene in this film, a police officer notes that large persons sometimes take two shocks with a taser to put down. One of this movie's key plot points involves the transfer of a (*) "Holocaust ring" from a dentist to a stripper. Ken Jeong plays the villainous Mr. Chow in, for 10 points, what 2009 movie starring Bradley Cooper and Zach Galifianakis, about a night in Vegas gone awry?**

ANSWER: *The Hangover*

053-09-6-02116

16. This organization's political wing lost its coalition partner, the Freedom Union, which rendered it politically defunct. Its leaders often wore black Madonna buttons, and its early programs were tied to the Catholic Social Teaching policies. This organization went underground when it was outlawed by the Sejm (SAME), and it teamed with the PUWP to elect (*) Tadeusz Mazowiecki (TAD-oysh maz-uh-WISH-kee) as its nation's first non-Communist premier in forty years. This organization began during a strike in the Gdansk shipyards. For 10 points, name this trade union, founded by Lech Walesa, that broke Soviet power in Poland.

ANSWER: Solidarity [or Solidarnosc; or Independent Self-Governing Trade Union]

026-09-6-02117

17. This artist depicted seventeenth-century Britain in *Cromwell Dissolving the Long Parliament*. He also created Biblical scenes such as *Saul and the Witch of Endor* and *Saul Before Samuel and the Prophets*. Although this man is not Albert Pinkham Ryder, he created a work called *Death on a Pale Horse*. This man depicted a political agreement in *Penn's Treaty With the Indians*, but he is best known for a work that depicts a prominent (*) Canadian battle from the French and Indian War. For 10 points, name this American painter who depicted the demise of the title character at the Plains of Abraham in *The Death of General Wolfe*.

ANSWER: Benjamin West

056-09-6-02118

18. High pressures are usually needed to synthesize this element's black allotrope, while its violet allotrope is sometimes named after Johann Hittorf, who was the first to recrystallize it from molten lead. In its red allotrope, one of its usual tetrahedral bonds is broken, allowing bonding with neighboring tetrahedrons and a more stable structure. Its (*) white allotrope has alpha and beta forms depending on the temperature and is the most volatile and reactive allotrope; hence its use as an additive in napalm. For 10 points, name this chemical element, number 15, which was used in early matches.

ANSWER: phosphorus [or P]

040-09-6-02119

19. This man was killed with a lance tipped with the venom of a stingray. After his death, his son by an extramarital affair, Telegonus, married his wife, and his son by his wife married the mother of Telegonus. His affair that produced Telegonus occurred on Aea, where Hermes gave him *moly* to allow him to resist (*) Circe's magic. Along with his son Telemachus, he slew over one hundred suitors for his wife Penelope. For 10 points, name this king of Ithaca whose journey back from the Trojan War was told by Homer.

ANSWER: Odysseus [or Ulysses]

003-09-6-02120

20. The second and third editions of this text contained the essay General Scholium, in which its author dealt proclaimed that he frames no hypotheses, as well as a set of Rules of Reasoning in Philosophy, which was followed by a list of Phenomena. Its second book fought against the astronomical hypothesis of vortices, while the third book, *On the System of the World*, contained derivations of (*) Kepler's Laws and explanations for the movements of Jupiter's Moons and comets. For 10 points, name this scientific text that also outlined theories *On the Motion of Bodies*, the principal work of Isaac Newton.

ANSWER: Principia Mathematica [or Mathematical Principles of Natural Philosophy]

040-09-6-02121

21. **This man wrote a novel in which Peter and his schoolteacher father, George Caldwell, long to escape Alton; that is this author's *The Centaur*. This creator of black Vietnam veteran Skeeter wrote a story about a trio of bare-shouldered girls and Sammy, who resigns from a job at an (*) A&P. A character created by this author inherits a Toyota dealership, marries Janice, and is *Remembered* in a 2001 novella, which follows books where that character is *at Rest* and *Rich*. For 10 points, name this author who created Harry Angstrom in *Rabbit, Run*.**

ANSWER: John Hoyer Updike

020-09-6-02122

22. **This deist attempted to oppose the new Cult of Reason by founding the Cult of the Supreme Being. Along with his colleague Louis de Saint-Just, this man was the target of the Thermidorian Reaction. One observer exclaimed "The blood of (*) Danton chokes him!" during the guillotining of this man. For 10 points, name this leader of the Committee of Public Safety, who oversaw the "Reign of Terror" during the French Revolution.**

ANSWER: Maximilien François Marie Isidore de Robespierre

002-09-6-02123

23. **The first form of this biological material to develop is lanugo, which typically gives way to vellus after birth. The arrector pili, smooth muscles cells associated with it, contract in response to cold or fright. It consists of three concentric layers known as the medulla, cortex, and cuticle, the latter two of which are made of hard (*) keratin. This material is found on the skin of all mammals. For 10 points, give this material that is found in such places as armpits, beards, and eyelashes.**

ANSWER: hair

003-09-6-02124

1. This text examines four alternative scenarios of Abraham's sacrifice of Isaac in the section "Exordium." For 10 points each:

[10] What is this Christian existentialist work, that introduces the distinction between slaves, knights of infinite resignation, and knights of faith?

ANSWER: ***Fear and Trembling*** [or ***Frygt og Bæven***]

[10] This Danish philosopher of many pseudonyms, whose broken engagement with Regine Olsen influenced his philosophy greatly, wrote *Fear and Trembling*, in addition to *The Sickness Unto Death*.

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

[10] The title choice of this Kierkegaard work, written with the pseudonym Victor Eremita, is between the aesthetic life and the ethical life. The former is exemplified by Mozart's *Don Giovanni*.

ANSWER: ***Either/Or***

034-09-6-02201

2. Name these bones of arm and shoulder, for 10 points each.

[10] This s-shaped bone attached the trapezius and deltoid muscles is also known as the collarbone.

ANSWER: **clavicle**

[10] Monteggia fractures occur in the proximal third of this bone, that with the radius makes up the forearm.

ANSWER: **ulna**

[10] This bone articulates with the clavicle and humerus and is colloquially known as the shoulder blade.

ANSWER: **scapula**

033-09-6-02202

3. It ends with the title character shooting Gesler through the heart. For 10 points each:

[10] Name this opera, in which Arnold falls in love with the Hapsburg princess Mathilde, and the title character shoots an apple off of his son's head.

ANSWER: ***William Tell*** [or ***Guillaume Tell***]

[10] This Italian composer of the operas *The Turk in Italy* and *The Thieving Magpie* wrote *William Tell*.

ANSWER: Gioachino Antonio **Rossini**

[10] This Rossini opera contains the aria, "Largo Al Factotum" which introduces the title character as "Figaro, Figaro, Figaro." In this opera, the title character helps Almaviva woo Rosina.

ANSWER: *The **Barber of Seville***

015-09-6-02203

4. Clifford, who returns paralyzed and impotent from war, is reliant on the housekeeper Mrs. Bolton in this novel. For 10 points each:

[10] Name this scandalous work, in which the title character, the gardener Mellors, begins an affair with Connie.

ANSWER: *Lady Chatterly's Lover*

[10] This author, who placed himself under a savage pilgrimage, wrote novels such as *Sons and Lovers* and *The Plumed Serpent* in addition to *Lady Chatterly's Lover*.

ANSWER: David Herbert Lawrence

[10] In this sequel to *The Rainbow*, Lawrence depicts the romantic lives of the Brangwen sisters, and the suicide of Gerald Crich.

ANSWER: *Women in Love*

034-09-6-02204

5. This man theorized that physical disabilities lead to "organ inferiority." For 10 points each:

[10] Name the psychologist who argued that human interactions are based on power relationships after breaking with Freud.

ANSWER: Alfred Adler

[10] Adler also introduced this concept, which is the feeling of inadequacy that leads to compensation through behaviors such as aggression or withdrawal.

ANSWER: inferiority complex

[10] Adler's magnum opus is about people who have a "constitution" defined by these behaviors, which are psychological flaws of a less serious degree than psychoses.

ANSWER: neuroses [or neurotic or other word forms]

034-09-6-02205

6. When it was exhibited, the subject's name was withheld. For 10 points each:

[10] Name this painting of Virginie Gautreau, that shows a woman in a black dress looking over her left shoulder while leaning on a table to her right.

ANSWER: *Madame X*

[10] This American artist painted a work featuring soldiers with bandages over their eyes, *Gassed*, in addition to *Madame X*.

ANSWER: John Singer Sargent

[10] This other Sargent work features two girls in white dresses, standing among a field of flowers and lighting Chinese lanterns.

ANSWER: *Carnation, Lily, Lily, Rose*

051-09-6-02206

7. This player is married to supermodel Gisele Bündchen. For 10 points each:

[10] Name this football player, who was named the MVP of Super Bowls 36 and 38 as the starting quarterback for the New England Patriots.

ANSWER: Tom Brady

[10] In the 2001 AFC playoffs, Charles Woodson sacked Brady and forced a fumble that was called back because of this rule, enabling Adam Vinatieri to kick the game-tying field goal.

ANSWER: tuck rule

[10] This quarterback, drafted out of USC, was the Patriots' backup quarterback from 2006 until the 2008 season, when an injury to Brady made him the starter. In 2009, he was traded to the Kansas City Chiefs.

ANSWER: Matt Cassell

004-09-6-02207

8. This man wanted to react to an attack by Susquehannock Indians, and did so with help from the Tutelo, Saponi, and Occaneechi before turning on those allies. For 10 points each:

[10] Name this man, who started a rebellion against the colonial government of Virginia before dying of dysentery in 1676.

ANSWER: Nathaniel **Bacon**

[10] This man was the governor who got into a disagreement with Nathaniel Bacon. Charles II questioned this man's reaction to the rebellion.

ANSWER: William **Berkeley**

[10] Berkeley was forced to flee this capital town during Bacon's Rebellion. This settlement, established by men such as John Rolfe and John Smith, was burned down by Bacon's forces a month before Bacon's death.

ANSWER: **Jamestown**

023-09-6-02208

9. This New Testament Gospel opens with the line "In the beginning was the Word, and the Word was with God, and the Word was God." For 10 points each:

[10] What non-synoptic gospel's third chapter, verse sixteen, states "For God so loved the world, that he gave his only begotten Son, that whosoever believeth in him should not perish, but have everlasting life?"

ANSWER: the Gospel of **John** [accept any reasonable alternative titles that include the name **John**, such as The Gospel According to **John**, The Book of **John**, or titles which refer to John as Saint John]

[10] John is the only canonical gospel to include the story of Jesus attending a wedding at this location and turning water into wine.

ANSWER: **Cana**

[10] In chapter eighteen, verse thirty-eight of the Gospel of John, this Roman asks Jesus "What is truth?" He symbolically washes his hands after freeing Barrabas.

ANSWER: Pontius **Pilate**

004-09-6-02209

10. It is responsible for the Marangoni Effect. For 10 points each:

[10] Name this phenomenon also utilized by water striders, which results from cohesive forces between liquid molecules.

ANSWER: **surface tension**

[10] Detergents, laxatives, and paint are examples of products that contain these substances that lower surface tension.

ANSWER: **surfactants**

[10] Surface tension also plays a role in the appearance of these mixtures of immiscible liquids.

ANSWER: **emulsions** [prompt on **colloids**]

040-09-6-02210

11. His poetry attacking Elena Osorio and her family got him expelled from Madrid, an experience that inspired his play *La Dorotea*. For 10 points each:

[10] Name this Spanish playwright, who is believed to have written as many as 1800 plays between 1596 and 1635.

ANSWER: Lope de **Vega** Carpio

[10] In addition to writing *The Mayor of Zalamea* and *The Surgeon of His Honor*, this Spanish contemporary of Lope de Vega depicted King Segismundo in *Life is a Dream*.

ANSWER: Pedro **Calderon** de la Barca

[10] Before being killed by a firing squad during the Spanish Civil War, this Spanish playwright wrote about death leading the Bridegroom to his Bride and her lover Leonardo in *Blood Wedding*.

ANSWER: Federico Garcia **Lorca**

030-09-6-02211

12. His son David II married Joan of the Tower to meet the terms of the Treaty of Northampton. For 10 points each:

[10] Name this winner of the Battle of Bannockburn, who ruled Scotland after the Wars of Scottish Independence.

ANSWER: **Robert the Bruce** [or **Robert I**; prompt on **Robert**]

[10] This other leader of the Scottish Wars of Independence won at Stirling Bridge but lost at Falkirk. His deeds were recorded by Blind Harry.

ANSWER: William **Wallace**

[10] Robert the Bruce and William Wallace fought against the first English king of this name. He was nicknamed "Longshanks" because of his height.

ANSWER: **Edward**

015-09-6-02212

13. Name these things related to object-oriented programming, for 10 points each.

[10] This fundamental unit of an object-oriented program can come in an "abstract" variety and is made up of methods. Multiple instances of these may be created.

ANSWER: **classes**

[10] This concept of object-oriented programming allows for the creation of subclasses that include methods identical to those of their superclasses.

ANSWER: **inheritance**

[10] This corollary to inheritance allows subclasses to substitute for a generic superclass in a program, assuming that the subclass inherits from the superclass.

ANSWER: **polymorphism**

038-09-6-02213

14. One side's forces in this event were led by Christian de Bonchamps, while the other side possessed gunboats under the command of Horatio Kitchener. For 10 points each:

[10] Name this diplomatic controversy, stemming from the need to construct a transcontinental railroad across Africa.

ANSWER: **Fashoda** Incident

[10] Name either of the two European powers involved in the Fashoda Incident.

ANSWER: Great **Britain** [or **United Kingdom**] or **France**

[10] The town of Fashoda is located in this present-day African country, where Kitchener had earlier defeated an uprising led by the Mahdi at Omdurman.

ANSWER: **Sudan**

040-09-6-02214

15. Identify these Russian rivers, for 10 points each.

[10] This river rises southeast of Tula and flows into the Sea of Azov. Its valley was populated by a namesake tribe of Cossacks, as described in a Mikhail Sholokhov novel.

ANSWER: **Don** River

[10] Some canals connect the Don to this bigger river, the largest in Europe in terms of length. Ten large Russian cities are located along this river's banks.

ANSWER: **Volga** River

[10] This river flows into Lake Ladoga and through the city of St. Petersburg.

ANSWER: **Neva** River

020-09-6-02215

16. His first major work focused on the Roman general Scipio Africanus. For 10 points each:

[10] Name this Italian poet of *Africa* and the collection *Il Canzoniere* (CAHN-see-oh-NAY-ray), who has a namesake sonnet form.

ANSWER: **Petrarch** [or Francesco **Petrarca**]

[10] Petrarch wrote many sonnets to this woman, whom the poet spotted in an Avignon church.

ANSWER: **Laura**

[10] Petrarch discovered a collection of this Roman author's letters entitled *ad Atticum*. This author modeled a series of speeches against Marc Antony after the Philippics of Demosthenes (deh-MOSS-thuh-nee-z).

ANSWER: Marcus Tullius **Cicero** [or **Tully**]

022-09-6-02216

17. Ahuizotl (AH-wee-ZOT-ul) was one ruler over this people's empire when it was at its largest size. For 10 points each:

[10] Name this people who inhabited Tenochtitlan in Mexico. They were conquered by Hernan Cortes, whom they thought was their god.

ANSWER: **Aztecs**

[10] This Aztec ruler was taken prisoner by Hernan Cortes. The Aztecs believed the Spaniards killed him, while Spanish accounts claim that he was killed by angry subjects stoning him.

ANSWER: **Montezuma II** [or **Moctezuma II**; or **Motecuhzoma Xocoyotl**]

[10] This final emperor of the Aztecs was Montezuma II's nephew. He was hanged by Hernan Cortes during a trip to Honduras.

ANSWER: **Cuauhtemoc**

027-09-6-02217

18. Although Raina initially looks down upon Bluntschli for deserting the Serbian army, she eventually sees the hollowness of war and gives up her fiancée for the deserter, in this writer's *Arms and the Man*. For 10 points each:

[10] Name this playwright of *Saint Joan* and *Major Barbara*.

ANSWER: George Bernard **Shaw**

[10] In this Shawn play, Professor Higgins is able to train the Cockney-speaking flower girl Eliza Doolittle so that she can pass as a duchess at a high-society party.

ANSWER: **Pygmalion**

[10] When the title character is confronted by her husband Reverend Morell and the young poet Eugene Marchbanks, she chooses the "weaker of the two" in this Shaw play, whose title was inspired by a Voltaire novel.

ANSWER: **Candida**

034-09-6-02218

19. Name these constants from mathematics, for 10 points each.

[10] This constant is equal to the limit as n goes to infinity of the difference between the harmonic series and the natural logarithm, and is approximately equal to .57721.

ANSWER: **Euler**-Mascheroni Constant [or **gamma**]

[10] The ratio of the terms of the Fibonacci sequence as those terms increase approaches this aesthetically pleasing constant, which equals one plus the square root of five, all divided by two.

ANSWER: **golden** ratio [or **divine** ratio; or **golden** mean; or other equivalents including the word **golden** or **divine**; prompt on **phi**]

[10] The sum as n goes from one to infinity of one over n squared equals the square of this constant divided by six. In trigonometry, one hundred and eighty degrees is equal to this many radians.

ANSWER: **pi**

033-09-6-02219

20. Identify these works of Wolfgang Amadeus Mozart, for 10 points each.

[10] Mozart began writing this work in anticipation of his own death but died before it was finished; Franz Sussmayr completed it.

ANSWER: **Requiem** in D Minor

[10] The Queen of the Night gives the title enchanted instrument to Tamino and Papageno in this Mozart opera.

ANSWER: *The **Magic Flute*** [or *Die **Zauberflote***]

[10] This penultimate Mozart symphony is one of two Mozart symphonies, along with the "Little" symphony, that are written in a minor key.

ANSWER: the "**Great**" Symphony [or Mozart's **40th** Symphony]

025-09-6-02220

21. Although born in Sri Lanka, Michael Ondaatje lives and works in this country. For 10 points each:

[10] Name the country, the home to the novelist Alice Munro and the poet of "In Flanders Fields," John McCrae.

ANSWER: **Canada**

[10] This Canadian author of *Alias Grace* and *The Blind Assassin* wrote about genetically-engineered animals in her novel *Oryx and Crake*.

ANSWER: Margaret **Atwood**

[10] This dystopian Atwood novel is set in the Republic of Gilead, and centers on Offred, whose job is to bear children for a theocratic state.

ANSWER: *The **Handmaid's Tale***

034-09-6-02221

22. Chemical systems and reactions will alter themselves toward equilibrium if a change onto the system occurs. For 10 points each:

[10] That principle is most often named after this French scientist.

ANSWER: Henry Louis **Le Chatelier** [or **Le Chatelier's** Principle]

[10] This effect is a direct result of Le Chatelier's Principle, suppressing the dissociation of two acids or bases if any of the charged particles they split into are shared.

ANSWER: **common ion** effect

[10] This law related to Le Chatelier's Principle states that the rate of a reaction is proportional to the product of the reactant and product concentrations.

ANSWER: law of **mass action**

033-09-6-02222