1. **This building, whose lobby ceiling is decorated with Edward Trumbull murals, is the tallest brick structure in the world. It was, for about eleven months, the tallest building in the world after its secretly constructed metal spire was raised. William Van Alen designed this Art (\*)** Deco skyscraper to have gargoyles resembling 1920s hood ornaments. For 10 points—what New York building is named for an American automaker?  
answer: Chrysler Building  
<FA, OTHER>

2. **The most common retcon of this achievement explains skirting The Maw as close as possible makes for a shorter trip, but this is dangerous as The Maw is a black hole cluster. That explains why the captain of a Corellian** [kuh-RELL-yun] **freighter might (\*)** boast to potential passengers about the *distance* of this trip rather than the *time*. For 10 points—name this smuggling “run” that Han Solo's *Millennium Falcon* accomplished in ”12 parsecs.”  
answer: Kessel Run (accept made the Kessel Run in 12 parsecs or similar answers that mention Kessel Run; accept Kessel by itself after “run”) [Alternatively, Han Solo is merely trying to impress rubes with a meaningless statement.]  
<TRASH, POP CULT>

3. **This city contains art museums within both its Bargello** [bar-JEL-loh] **palace and Pitti Palace. Giorgio Vasari** [JOR-joh vah-SAH-ree] **built his namesake elevated “corridor” on top of this city's covered Ponte Vecchio** [pahn-TAY VAY-kee-oh] **bridge, which passes by an art museum called the (\*)** Uffizi [oo-FEET-see]. This city sits on the River Arno, which flows downstream towards Pisa [PEE-suh]. The capital of Tuscany is—for 10 points—what Italian city, dubbed the “birthplace of the Renaissance”?  
answer: Florence (or Firenze)  
<FA, OTHER>

4. **As a light source, an incandescent bulb has a value of about 2 percent for this quantity; it is about 100 percent as a heat source. Sadi Carnot** [kar-NOH] **showed it could not exceed 1 minus the ratio of reservoir temperatures for a heat engine. In engineering, it is the ratio of actual (\*)** mechanical advantage to ideal mechanical advantage. For 10 points—name this ratio of input power to output power denoted by the Greek letter eta.  
answer: efficiency (accept electrical efficiency or thermodynamic efficiency or mechanical efficiency)  
<SCI, PHYS>

5. **During this president's second term, seven U.S. attorneys were fired on a single day at the urging of White House counsel Harriet Miers. This man had previously withdrawn his nomination of Miers to the Supreme Court to replace Sandra Day O'Connor, instead nominating (\*)** Samuel Alito. Colin Powell and Condoleezza Rice served as secretary of state under—for 10 points—what Republican president who succeeded Bill Clinton?  
answer: George W(alker) Bush (accept Bush 43 or Bush the Younger; prompt on “Bush” or “George Bush”; do not accept or prompt on “George H(erbert) W(alker) Bush”)  
<CE, CE>

6. **This character idly wonders what a lemon is after she recites a few lines from a nursery rhyme about church bells. While wearing a sling, she pretends to fall to pass a note. This character tears off her Junior (\*)** Anti-Sex League sash during a rendezvous with an Outer Party member employed at the Ministry of Truth. For 10 points—name this lover of Winston Smith in George Orwell's novel *Nineteen Eighty-Four*.  
answer: Julia  
<LIT, BRIT>

7. **A viral ad campaign for *Halo 2* involved an alternate reality game titled “I Love” these animals. The parasitic mite *Varroa destructor*** [vah-ROH-uh dee-STRUCK-tor] **targets these animals, a Japanese species of which can ”ball” a giant hornet to death by overheating it. August teaches Lily how to care for these animals in the (\*)** Sue Monk Kidd novel “the secret life of” them. Royal jelly is produced by—for 10 points—what insects that also make honey?  
answer: bees (accept honeybees or bumblebees or I Love Bees or The Secret Life of Bees; accept Apidae or Apis or Apis mellifera or Apis cerana japonica; do not accept or prompt on “wasp(s)” or “hornet(s)”)  
<MISC., MISC.>

8. **The eutectic** [yoo-TEK-tik] **mixture between two substances is defined by having the lowest value for this quantity. Adding ethylene glycol** [ETH-uh-leen GLYE-kahl] **to solutions lowers it, as (\*)** “depressing” this value is a colligative property. The latent heat transferred at this temperature is the heat of fusion. At standard pressure, this value for water is 0 degrees Celsius. For 10 points—name this temperature at which a liquid becomes a solid.  
answer: freezing point (accept melting point)  
<SCI, CHEM>

9. **One ruler of this dynasty killed his brothers in the Xuanwu** [zhoo-ahn-woo] **Gate Incident. The Abbasids** [uh-BAH-sids] **defeated this dynasty at the Battle of Talas** [TAHL-us]**. One emperor of this dynasty, Xuanzong** [zhoo-ahn-zong]**, had a consort named Yang Guifei** [yong gwee-fay]**, who was strangled for her involvement in the rebellion of a Sogdian** [SOG-dee-un] **general named (\*)** An Lushan [ahn loo-shan]. The rule of Empress Wu interrupted—for 10 points—what Chinese dynasty during which the poets Du Fu and Li Po lived?  
answer: Tang Dynasty (or Tang Cháo)  
<HIST, WORLD>

10. **A working draft of this poem described ”evil houses leaning all together” in a section depicting the narrator's “Pervigilium”** [pur-vih-JIL-ee-um]**. This poem's narrator wears a “rich and modest” necktie “asserted by a simple pin.” After realizing that he has “measured out” his life “with (\*)** coffee spoons,” this poem's title character asks “do I dare to eat a peach?” “Women come and go / talking of Michelangelo” in—for 10 points—what poem by T. S. Eliot?  
answer: The Love Song of J. Alfred Prufrock (prompt on “Prufrock”)  
<LIT, BRIT>

12. **At this battle, 225 soldiers were sniped by Vasily Zaitsev** [vah-SEE-lee ZYTE-seff]**, who was profiled in *Enemy at the Gates*. During this battle, Friedrich Paulus's troops were surrounded in Operation Uranus, a maneuver planned by Georgy Zhukov** [ZHOO-koff]**. Defenders rallied behind the slogan “There is no land beyond the (\*)** Volga!” in this five month-long battle. For 10 points—name this World War II battle that halted the German invasion of Russia.  
answer: Battle of Stalingrad  
<HIST, EURO>

13. **In Karl Marx's *Theses on Feuerbach*** [FOY-er-“bach”]**, people who study this topic are criticized for having only “interpreted the world” instead of changing it. Diogenes Laërtius** [dye-AH-jeh-neez lay-“AIR”-tee-us] **wrote “The Lives and Opinions of Eminent” people who practiced this discipline, including (\*)** Thales [THAY-leez] of Miletus, who is said to be the first person to study it. For 10 points—identify this discipline whose name is Greek for “love of wisdom,” whose fields include ethics.  
answer: philosophy (accept philosophers)  
<RMPSS, PHIL>

14. **HIV was discovered in this scientist's namesake institute, where the *lac*** [“lack”] **operon model was developed by Jacob and Monod** [muh-NOH]**. This man extended the work of Francesco Redi with experiments in which he exposed swan-neck flasks of broth to air and found no microorganisms, disproving (\*)** spontaneous generation. He also created the first anthrax and rabies vaccines. For 10 points—name this Frenchman who heated milk to kill bacteria.  
answer: Louis Pasteur [LOO-ee pass-TUR] [The process of heating milk to kill bacteria is known as pasteurization.]  
<SCI, BIO>

15. **This play concludes with a warning that “great words of prideful men are ever punished with great blows.” The suicides of both Eurydice** [yoo-RIH-dih-see] **and Haemon** [HAY-mahn] **follow the death of this play's title character, who claims “there is nothing shameful in piety,” and rebukes her sister (\*)** Ismene [iss-MAY-nay] as a coward. The title character defies Creon's order and buries Polyneices [PAH-lih-NYE-seez] in—for 10 points—what Sophocles [SAH-fuh-kleez] tragedy about a daughter of Oedipus [ED-uh-puss]?  
answer: Antigone [ann-TIG-uh-nee]  
<LIT, OTHER>

16. **This archipelago's cool temperatures are due to the upwelling of the Cromwell Current. The blue-footed booby is endemic to these islands, the only place penguins are found in the Northern hemisphere. Robert (\*)** Fitzroy's crew used the term ”imps of darkness” to describe these islands' native marine iguanas. Various finches and giant tortoises reside in—for 10 points—what Pacific archipelago visited by Charles Darwin?  
answer: Galápagos [gah-LAH-puh-gohss] Islands (or Archipiélago de Colón; accept Islas de Colón or Islas Galápagos)  
<GEO, GEO>

17. **A god of this culture let his foot get bitten off by the genderless crocodile Cipactli** [see-PAHKT-lee]**, whose body was used to create the world. A goddess of these people was impregnated by a ball of feathers and gave birth to a “left-footed hummingbird.” This culture believed that a raft of (\*)** snakes carried away a beloved feathered serpent god. For 10 points—name this civilization that venerated Quetzalcoatl [ket-zahl-koh-AH-tull].  
answer: Aztec Empire or Aztecs (or aztecas or Aztec Triple Alliance or Mexica(s) [may-SHEE-kah] or Tenochcas [teh-NOHCH-kuz] or Excan Tlahtoloyan)  
<HIST, WORLD>

18. **Sergei Rachmaninoff's** [sair-gay rahk-MAH-nih-nawff] **piano concerto of this number ends with an *Alla breve*** [AHL-lah BRAY-vay] **finale in the home key of D minor. This many instruments play in a Ludwig van Beethoven piece titled *Archduke*. Camille Saint-Saëns's** [kuh-MEEL san-SAHNSS'Z] **symphony of this number features an (\*)** organ. Beethoven's symphony of this number has a second-movement funeral march and was originally dedicated to Napoleon. For 10 points—give the number of the *Eroica Symphony*.  
answer: 3 (accept third)  
<FA, AUDIO>

19. **This city's territory was slowly annexed by Masinissa** [MAA-suh-NIH-suh] **of Numidia following a peace treaty that forbade it from declaring war without permission. This city's remaining citizens were sold as slaves after its siege and capture by (\*)** Scipio Aemilianus [SKIP-ee-o “eye”-mee-lee-AH-“noose”] in 146 BC. Cato the Elder concluded his speeches in the Roman Senate by declaring this city “must be destroyed.” For 10 points—name this opponent of Rome in three Punic [PYOO-nik] Wars.  
answer: Carthage (or Carthago or Kart-hadasht)  
<HIST, WORLD>

20. **This author imagined that “private industry” would be abolished by the EPIC** [“epic”] **movement in the book *I, Governor of California, and How I Ended Poverty*, which he published shortly before a failed 1934 gubernatorial run. Marija** [mah-REE-ah] **is forced into prostitution in a novel by this author that centers on the immigrant (\*)** Jurgis [YOOR-ghis] Rudkus, who finds work in an unsanitary Chicago slaughterhouse. For 10 points—name this author of *The Jungle*.  
answer: Upton (Beall) Sinclair (Jr.)  
<LIT, AMER>

21. **James Strachey** [“STRAY-key”] **translated this author's term *Besetzung*** [buh-SET-zoong]**, which loosely means “mental investment,” as ”cathexis”** [kuh-THEK-siss] **in a book by this author which includes five studies of hysteria. This man's teacher Josef Breuer** [YO-sef BROY-er] **developed the ”talking cure,” which inspired this thinker's technique of (\*)** free association. Psychoanalysis was developed by—for 10 points—what Austrian psychologist who wrote *The Interpretation of Dreams*?  
answer: Sigmund Freud [froyd] (or Sigismund Schlomo Freud)  
<RMPSS, SOC SCI>

22. **This religion has been criticized for baptizing dead Holocaust victims without their families' consent. This religion allowed black people to enter priesthood for the first time after its leaders received a 1978 revelation. It has been governed by the (\*)** Quorum of the Twelve Apostles since the 1840s, when it aimed to create the state of Deseret [dehz-uh-RET] in the American West. For 10 points—name this faith founded by Joseph Smith.  
answer: Mormonism (or The Church of Jesus Christ of Latter-Day Saints; accept LDS Church)  
<RMPSS, REL>

23. **This nation's leader, the 2016 chair of the G7 summit, has been criticized for the failings of a namesake economic plan based on “three arrows.” This country's Soka Gakkai** [soh-kah gah-kye] **religious movement is a principal backer of its Komeito** [koh-may-ee-toh] **party, which along with its Liberal Democratic Party forms the ruling coalition in this country's National (\*)** Diet. For 10 points—name this Asian nation led by Prime Minister Shinzo Abe [sheen-zoh ah-bay] from Tokyo.  
answer: Japan (or Nihon-koku or Nippon-koku) [The economic plan is called “Abenomics.”]  
<CE, CE>

24. **Podzolization** [POD-zoh-lih-ZAY-shun] **takes place in this biome, which may be labeled Dsc** [“D-S-C”]**, Dwc** [“D-W-C”]**, or Dfc** [“D-F-C”] **in the Köppen classification system depending on the presence of a dry season. Fires in these areas may spur transitions from their “closed-crown” subtype to a variant in which much of the ground is covered by lichen** [“liken”]**. The (\*)** tree line separates this largest terrestrial biome [“BY”-ohm] from the tundra. For 10 points—name this evergreen forest biome.  
answer: taiga [“TIE”-guh] (accept boreal forests; prompt on “subarctic” or “boreal” before “subtype”)  
<SCI, BIO>

Bonuses

1. When an ice skater pulls his arms in while twirling, he will spin faster. For 10 points each—

1. That is because of this conservation law.
   1. law of the conservation of angular momentum (accept law of the conservation of rotational momentum; do not accept or prompt on answers that contain neither “angular” nor “rotational”)
2. His angular momentum can be calculated as his angular velocity times this quantity, the rotational analogue of mass.
   1. (first) (mass) moment of inertia (prompt on “rotational inertia” or “angular inertia”)
3. Moment of inertia, in turn, can be calculated as the sum of this expression for every particle making up the skater and his equipment. Express your answer in terms of *r*, the distance of each particle from the axis of rotation, and *m*, the mass of the particle.
   1. m r2 [”*m* (times) *r* squared”] or r2 m [”*r* squared (times) *m*”] (accept dm in place of m)

<SCI, PHYS>

2. For 10 points each—name these events that occurred in Mexico in 1994:

1. In the “December mistake” of 1994, the Mexican central bank suddenly devalued this Mexican currency, prompting a U.S. bailout of the Mexican economy.
   1. (Mexican) peso(s)
2. Earlier in 1994, Mexico received an influx of foreign investment following its signing of this free trade agreement with Canada and the U.S.
   1. NAFTA or North American Free Trade Agreement (or Tratado de Libre Comercio de América del Norte or TLCAN or Accord de libre-échange nord-américain or ALÉNA)
3. In response to the signing of NAFTA, this leftist militant group began a rural uprising against the Mexican government in the state of Chiapas [chee-AH-puss]. This group's longtime figurehead was the ski mask-wearing Subcomandante Marcos.
   1. Zapatista [ZAH-puh-TEE-stuh] Army of National Liberation (or Zapatistas or EZLN)

<HIST, WORLD>

3. This song was covered by Alien Ant Farm, and is about a man who “left bloodstains on the carpet.” For 10 points each—

1. Name this song whose singer asks “Annie are you OK? Would you tell us that you're OK?” because she's been hit and struck by the title person.
   1. Smooth Criminal
2. This original performer of “Smooth Criminal” sang “Wanna Be Startin Something” as the opening track to his album *Thriller*.
   1. Michael Jackson
3. “Smooth Criminal” was released on this follow-up album to *Thriller* that included the single “Dirty Diana” and was titled for a song where Jackson announced “Your butt is mine.”
   1. Bad

<TRASH, POP CULT>

4. For any two positive integers *a* and *b*, consider the set of all integers *x* such that when *a* and *b* are both divided by *x*, neither leaves any remainder. For 10 points each—

1. This name is given to the largest *x* in that set.
   1. greatest common divisor (of a and b) or greatest common factor (of a and b) or gcd(a,b) or gcf(a,b) (accept highest or largest in place of greatest; do not accept or prompt on answers that contain “denominator”)
2. If the greatest common divisor of *a* and *b* is *n*, then in terms of *n*, what is the greatest common divisor of *a* [pause] and ”*b* plus 1”?
   1. 1 [No number (except 1) that divides *b* can divide *b* plus 1, so no number (except 1) that divided *a* and *b* can divide *a* and *b* + 1.]
3. Dividing the product of two numbers by their greatest common divisor gives this other function of those numbers. It is abbreviated “LCM.”
   1. least common multiple (or lowest common multiple; accept denominator in place of multiple)

<SCI, OTHER>

5. The failure of British, French, and Israeli forces to effectively retake this waterway led to the resignation of British Prime Minister Anthony Eden. For 10 points each—

1. Name this waterway connecting the Mediterranean and Red Seas, whose 1956 nationalization by Egypt set off an international crisis.
   1. Suez Canal (or Qanat al-Suwais; accept Suez Crisis)
2. This president of Egypt touched off the Suez Crisis by nationalizing the canal.
   1. Gamal Abdel Nasser
3. Nasser resigned for a period of one day after Israel crushed the combined forces of Egypt, Syria, and Jordan in this short June 1967 war, in which Israel gained the Gaza Strip and West Bank.
   1. Six-Day War (accept al-Naksah or Milhemet Sheshet HaYamim or Third Arab-Israeli war or answers mentioning three or third war between Arab(s) or Arab(ic) countries and Israel(is))

<HIST, WORLD>

6. For 10 points each—name these authors who compared the American abolitionist John Brown to a meteor:

1. Brown was called “the meteor of the war” in “The Portent,” a poem by this author who wrote about a sailor's execution in *Billy Budd*.
   1. Herman Melville
2. 1859 is said to be the “Year of meteors! Brooding year” when Brown “mounted the scaffold” in a poem that appears in this author's collection *Leaves of Grass*.
   1. Walt(er) Whitman
3. This Transcendentalist author of *The Maine Woods* wrote in his diary that Brown was “meteor-like, flashing through the darkness in which we live.”
   1. Henry David Thoreau [thoh-ROH]

<LIT, AMER>

7. This policy gave rise to an effect known as “Little Emperor Syndrome,” since those born during its implementation often became the sole center of attention in a family. For 10 points each—

1. Name this population-control policy first implemented by an Asian nation in the late 1970s.
   1. one-child policy (or family planning policy; accept similar answers indicating a limit of one child or a single or only child per family)
2. In October 2015 this country's Communist Party announced it planned to relax the one-child policy.
   1. (People's Republic of) China (or PRC or Zhongguo or Zhonghua Renmin Gongheguo; do not accept or prompt on “Republic of China”)
3. China's one-child policy was enacted under the leadership of this man, the *de facto* ruler of China from 1978 to 1992.
   1. Deng Xiaoping [dayng zhhao-ping] (prompt on “Xiaoping”)

<HIST, WORLD>

8. For 10 points each—answer the following about the TV roles of George Clooney:

1. For much of the 1990s Clooney played a doctor named Doug Ross on this medical drama set in Chicago, whose other stars included Anthony Edwards.
   1. ER ['E' 'R']
2. One of his first roles was as George Burnett in the later seasons of this '80s sitcom, whose central characters included a rich girl named Blair and her dormmates at Eastland School.
   1. The Facts of Life
3. He also played a doctor on a two-part episode of this '90s sitcom; in that episode, his character went on a double date with Rachel and Monica.
   1. Friends

<TRASH, POP CULT>

9. A brass player who encounters the instruction *con sordino* [kawn “SOAR”-dee-noh] will insert one of these things into their instrument's bell. For 10 points each—

1. Name these musical accessories used to partially muffle or dampen an instrument's sound.
   1. Mutes
2. Trumpet and trombone players often use these common household implements as a type of mute, holding one over the bell while opening and closing it to create a distinctive “talking” sound.
   1. (toilet) plunger [A trombone with a plunger mute was used to create the “mwah-mwah” adult voice effects in the *Peanuts* animated specials.]
3. Players of this brass instrument can create its ”stopped” sound either by using a specially-designed mute, or by using their hand to completely close off the bell.
   1. French horn (or orchestral horn or horn in F; accept stopped horn; do not accept or prompt on “natural horn”)

<FA, AUDIO>

10. In this poem's fourth canto, Umbriel travels to the Cave of Spleen, and brings back a bag filled with bad feelings. For 10 points each—

1. Name this mock-epic in which the Baron cuts Belinda's hair.
   1. The Rape of the Lock
2. *The Rape of the Lock* compares the bag given to Umbriel with the bag of winds that this mythological king received from Aeolus [EE-uh-luss].
   1. Ulysses [yoo-LIH-seez] or Odysseus [oh-DIH-see-uss]
3. *The Rape of the Lock* was written by this English poet, who satirized his enemies in the *Dunciad*.
   1. Alexander Pope

<LIT, BRIT>

10.: These devices can be characterized by the type of their frame, as well as by the source of their effect. For 10 points each—

1. Name these devices, which cut or shape pieces of material by pushing down on them. Johannes [yoh-HAH-nes] Gutenberg invented a version of this kind of device used for printing.
   1. presses (accept printing presses)
2. A simple press can be built to have the required force amplified by one of these devices, another version of which is used to lift cars to change tires.
   1. Jacks
3. Jacks are generally based on this simple machine in which an inclined plane is wrapped around a cylinder.
   1. screw

<SCI, PHYS>

10. This country's Stirling Castle was held by English forces until 1314. For 10 points each—

1. Name this country that maintained its independence after Edward II [“the second”] was defeated at the Battle of Bannockburn.
   1. (Kingdom of) Scotland (or Rioghachd na h-Alba)
2. This king of Scotland was the winning commander at Bannockburn. He murdered his main rival for the throne, John Comyn.
   1. Robert the Bruce (or Robert I of Scotland; prompt on “Robert”)
3. Scotland's King James IV [“the fourth”] was killed at the Battle of Flodden, a struggle against the army of this English king.
   1. Henry VIII [“the eighth”] of England (prompt on “Henry”)

<HIST, EURO>

10. Paul Hermann Müller won a 1948 Nobel Prize for discovering this substance's insecticidal qualities. For 10 points each—

1. Identify this pesticide, known by a three-letter abbreviation, which was criticized by Rachel Carson in her book *Silent Spring*.
   1. DDT (or dichlorodiphenyltrichloroethane)
2. One bird threatened by DDT was this common raptor, the fastest member of the animal kingdom.
   1. peregrine falcon [PEH-ruh-grin] (accept duck hawk; prompt on “falcon”; accept Falco peregrinus)
3. Müller carried out his work in this European country that is home to the headquarters of IUPAC [“EYE-you-pack”] and the World Health Organization.
   1. Switzerland (or Swiss Confederation or Schweiz or Schweizerische Eidgenossenschaft or Confederation Suisse or Confederazione Svizzera or Confederaziun Svizra)

<SCI, OTHER>

10. A 12-volume work by the French author Jean de La Fontaine [zhawn duh lah fawn-ten] is named after this type of story. For 10 points each—

1. Name this genre of short fiction, which often features anthropomorphic animals.
   1. fables (accept Fables choisies or fabulae; do not accept or prompt on “fairy tale(s)” or “legend(s)” or “parable(s)”)
2. In a La Fontaine fable, one of these birds opens its beak and drops a piece of cheese after it is asked to sing by a duplicitous fox.
   1. crows (or corbeaux; accept ravens or Corvus; accept The Crow and the Fox or The Fox and the Crow or The Raven and the Fox or The Fox and the Raven or Le Corbeau et le Renard)
3. La Fontaine's “The Crow and the Fox” is based on a fable attributed to this ancient Greek, who described the consequences of lying in “The Boy Who Cried Wolf.”
   1. Aesop [EE-sahp] (or Aisopos; accept Aesop's fables)

<LIT, EURO>

10. This media network announced its American TV channel would cease broadcasting in April 2016. For 10 points each—

1. Name this satellite broadcaster, the most widely available source of news in the Arabic world.
   1. Al-Jazeera [ahl-juh-ZEER-uh]
2. Al-Jazeera is owned by the government of this small country, where it broadcasts from Doha.
   1. (State of) Qatar [KAHT-tar] (or Dawlat Qatar)
3. Nabeel Rajab [nah-BEEL rah-ZHAHB] criticized Al-Jazeera for its lack of coverage of this country's 2011 uprising; that uprising called for the deposition of King Hamad and was decisively crushed on Bloody Thursday.
   1. (Kingdom of) Bahrain [“bah-RAIN”] (or Mamlakat al-Bahrayn)

<CE, CE>

10. Pencil and paper ready. A regular octahedron [ahk-tuh-HEE-drun] has 8 faces that are each equilateral triangles. For 10 points each—

1. How many edges does an octahedron have?
   1. 12 edges [There are 8 triangular faces, which cumulatively have 8 × 3 = 24 sides, but since each edge is shared by exactly 2 triangles, the actual count is 24/2 = 12 edges.]
2. If each edge of the octahedron has a length of 4, what is the area of a single triangular face? You have 10 seconds, and should note that the edges also form the sides of the triangles.
   1. 4 times the square root of 3 or 4 root 3 or 4 radical 3 [*A* = (sqrt(3)/4) × *s*2 = (sqrt(3)/4) × 42 = 4 root 3]
3. What is the total surface area of an octahedron whose edges each have a length of 4?
   1. 32 times the square root of 3 or 32 root 3 or 32 radical 3 [Per Part B, each face has an area of 4 root 3, so the total surface area is 8 × (4 root 3) = 32 root 3.]

<SCI, OTHER>

10. This character's nickname comes from his abnormally small number of fears. For 10 points each—

1. Name this character who trains prospective members of the Dauntless faction.
   1. Four (or Tobias Eaton; accept any underlined portion)
2. Tris [triss] Prior falls in love with Four in this author's *Divergent* series.
   1. Veronica Roth
3. Roth's short story “Free Four” retells a scene from *Divergent* in which Tris and others are taught to throw these weapons.
   1. knives (or knife)

<LIT, AMER>

10. Allen Dulles was the first civilian director of this agency, whose subsequent leaders included Robert Gates and William Casey. For 10 points each—

1. Name this American spy agency headquartered in Langley, Virginia.
   1. CIA or Central Intelligence Agency
2. This member of the CIA was captured after his U-2 plane was shot down over the Soviet Union in 1960.
   1. (Francis) Gary Powers
3. A year after the incident involving Powers, the CIA sponsored a group known as Brigade 2506 in this failed invasion of Cuba.
   1. Bay of Pigs invasion (or Playa Girón or Bahía de Cochinos)

<HIST, AMER>

10. In this country, the Wabar [waw-bar] meteorite impact craters were discovered by the British officer John Philby, who was searching for the so-called “Atlantis of the Sands.” For 10 points each—

1. Name this oil-rich Middle Eastern kingdom whose capital is Riyadh [ree-YAHD].
   1. (Kingdom of) Saudi Arabia (or al-Mamlakah al-Arabiyah as-Suudiyah)
2. The Wabar craters lie in this largest sand desert in the world; this part of the Arabian Desert covers most of southern Saudi Arabia.
   1. Rub' al-Khali [roob al-KAH-lee] (or Empty Quarter)
3. The Rub' al-Khali contains much of Saudi Arabia's southwestern border with this nation, which is currently experiencing a civil war between its president Abd Rabbuh Mansur Hadi [ahb-drah-BOO mahn-SOOR HAH-dee] and Houthi [HOO-thee] rebels in the northwest.
   1. (Republic of) Yemen [YEH-men] (or Al-Jumhuriyya al-Yamaniyya)

<GEO, GEO>

10. For 10 points each—answer the following about nymphs in Greek mythology:

1. Dryads [“DRY-ads”] and hamadryads [HAH-muh-“DRY-ads”] were the nymphs of these plants, especially oaks.
   1. trees (accept oak trees)
2. Freshwater sources such as springs, streams, and fountains were the domain of these water nymphs. They are not to be confused with saltwater Oceanids [oh-shee-AA-nids] or Mediterranean Nereids [“NEAR”-ee-idz].
   1. Naiads [NYE-ads] (or Naiades)
3. Oreads [OR-ee-ads] like Britomartis [BRIH-toh-MAR-tiss] and Cyllene [“SIGH”-leen] lived in these landforms, examples of which include Othrys [OH-thriss] and Parnassus [par-NAA-sis].
   1. mountains (accept mounts or Mount Othrys or Mount Parnassus or Mount Cyllene)

<RMPSS, MYTH>

10. Molecules are constantly in motion. For 10 points each—

1. Fick's laws describe this process, the random motion of particles of a substance down its concentration gradient.
   1. diffusion or diffusing (do not accept or prompt on “effusion” or “effusing”)
2. The random motion of molecules in liquids and gases, and of the electrons within them, gives rise to these weak intermolecular forces that occur between all molecules.
   1. London dispersion forces (accept either underlined portion; prompt on “van der Waals (forces)”)
3. This term names the energy possessed by a molecule when its molecular motion is at its absolute minimum.
   1. zero-point energy (prompt on “ZPE”)

<SCI, CHEM>

10. For 10 points each—answer the following about bodies of water that border Minnesota:

1. Minnesota's city of Duluth sits at the west end of this largest Great Lake, which borders the northern coast of Michigan's Upper Peninsula.
   1. Lake Superior
2. The Red River of the North forms nearly the entire border between Minnesota and this state, in which one can visit Theodore Roosevelt National Park.
   1. North Dakota
3. The northernmost part of Minnesota contains a portion of this lake this is also shared between the Canadian provinces of Manitoba and Ontario.
   1. Lake of the Woods

<GEO, GEO>

10. In his 2016 State of the Union President Obama reiterated his call to make these institutions tuition-free. For 10 points each—

1. Name these institutions that offer associate's degrees.
   1. community colleges or junior colleges (accept two-year colleges; prompt on “college(s)”)
2. In summer 2015 Governor Kate Brown signed free community college legislation into law in this state; in October 2015 its Umpqua Community College was the site of a mass shooting.
   1. Oregon
3. This governor of Maine, who made headlines with racist statements about ”drug dealers,” was accused of forcing out the head of Maine's community college system during a failed impeachment attempt.
   1. Paul (Richard) LePage

<CE, CE>

10. Wendell Stanley won a share of the 1946 Nobel Prize in Chemistry for isolating this pathogen. For 10 points each—

1. Name this virus that affects a nicotine-producing plant.
   1. TMV or tobacco mosaic virus (accept tobacco mosaic after “virus”)
2. In TMV, this protein coat that surrounds the genome [JEE-nohm] of a virus consists of about 2,000 copies of a single, small protein.
   1. capsid [KAP-sid]
3. This crystallographer [“crystal”-AH-gruh-fur], whose work on DNA provided crucial aid to James Watson and Francis Crick, built a model of TMV for the 1958 World's Fair.
   1. Rosalind (Elsie) Franklin

<SCI, BIO>