**VHSL Regular Season 2016-2017 - Round 18 - First Period, Fifteen Tossups**

1. This physicist's namesake unit of length is about 10 to the minus 35 meters and is the scale at which quantum gravity dominates. This physicist demonstrated that electromagnetic energy can only be emitted at certain wavelengths. A law named for him states that energy is equal to frequency times his namesake constant, the quantum of photon energy. For 10 points, whose namesake constant is represented h and equal to 6.626 times 10 to the minus 34 Joule seconds?
ANSWER: Max **Planck**

2. Two potted plants can be seen at the top of a staircase on the far left of this painting. A red barn can be seen in the background of this painting, and it also features a pointed window of the Dibble House in its center. This painting's male subject was modeled after the artist's dentist. For 10 points, name this painting that depicts a woman in an apron and a man holding a pitchfork standing in front of an Iowa house, a masterpiece by Grant Wood.
ANSWER: ***American Gothic***

3. This country is home to the Fossa Regia, which separated Numidia from the Romans. George Lucas was inspired by this country to create Tatooine (TAT-too-EEN). Tourists at this country's national museum were killed by ISIS sympathizers in 2015. A street vendor who set himself on fire in this country began the Arab Spring. For 10 points, name this Mediterranean country that borders both Algeria and Libya, whose capital is located where Carthage once stood.
ANSWER: **Tunisia** [or **Tunisian Republic**; or al-Jumhuriyah at-**Tunisiyah**]

4. Fractals are said to have this property in relation to themselves at all length scales. For two triangles, a way to test for this property is to check that two sides are in the same proportion and that their included angle is equal, which is the SAS test. Two polygons have this property if they have congruent corresponding angles and proportional corresponding side lengths. For 10 points, name this property shared by two figures that are the same shape but not the same size.
ANSWER: **similarity** [or **similar**; do not accept "congruent"]

5. A general in this war died after being hit with a cannonball in the Battle of Rain. A general during it contemplated defecting from Ferdinand II and was named Wallenstein. This war effectively began in Bohemia when two emissaries of the king were thrown out of a castle's window in Prague as part of a conflict between Protestants and the Catholic League. For 10 points, what war that featured numerous European powers ran from 1618 to 1648?
ANSWER: **Thirty Years** War [prompt on Bohemian Revolt until it is mentioned]

6. The world's tallest statue of this man, reaching 172 feet, is located in Western Poland. The first chapel on the right as one enters St. Peter's Basilica is occupied by a statue of this man, the only artwork Michelangelo ever signed. An Art Deco statue of this man located in Rio de Janeiro stands at 98 feet tall and shows him with outstretched arms. For 10 points, name this Biblical man which Michelangelo's *Pietà* depicts lying in the lap of his mother, Mary.
ANSWER: **Jesus** Christ [or Jesus **Christ**]

7. In a dissent to this case, John McLean claimed the majority's arguments were more "taste than…law." This case hinged on an U.S. Army surgeon bringing another person to both Illinois and the Wisconsin territory. In its majority opinion, Chief Justice Roger Taney ruled that portions of the Missouri Compromise were unconstitutional. For 10 points, what unpopular 1857 Supreme Court case ruled that African-Americans could not be citizens?
ANSWER: ***Dred Scott*** *v. Sandford* [or *Sandford v.* ***Dred Scott***; or *Dred Scott v.* ***Sandford***; or ***Sandford*** *v. Dred Scott*]

8. This deity produced three goddesses by eating her brother's sword and spitting out the pieces. This deity was born from the left eye of Izanagi (EE-sah-NAH-gee). After her brother Susanoo (SUE-sah-NOH) threw a horse carcass at her, she retreated into a cave, causing worldwide darkness. The Japanese nobility claimed descent from this goddess, who is venerated at the Grand Shrine of Ise (EE-say). For 10 points, name this Shinto sun goddess.
ANSWER: **Amaterasu** (AH-ma-teh-RAH-soo)

9. Commonly-used tests of this concept include the Cattel Culture Fair III test, which analyzes both the "crystallized" and "fluid" components of it. The Stanford-Binet (buh-NAY) scale was developed by Lewis Terman to measure this concept. Scores of 70 or below on most scales that measure it indicate "feeble-mindedness." For 10 points, name this test of human mental capacity that is often measured using a namesake "quotient" abbreviated IQ.
ANSWER: **intelligence** [or **IQ** before it is read]

10. In 1971, this country's leader gave the July Theses speech advocating such things as improved Party education systems. Its leader and his wife, Elena, were executed on Christmas Day. In the revolutions of 1989, this was the only Communist government to be violently overthrown. For 10 points, what Eastern European country was led for over thirty years by Nicolae Ceausescu (CHOW-chess-KOO), who was killed after fleeing Bucharest (BEWK-uh-REST)?
ANSWER: **Romania**

11. In the last scene of this play, a king exclaims, "O, she's warm!" when he touches the hand of his supposedly dead wife. In this play, a sheep-shearing feast is attended by Florizel (FLOR-ih-zell) and Perdita (PER-dih-tuh), the respective children of Polixenes (puh-LIKS-uh-nees) and Leontes (lee-ON-tees). For 10 points, name this late romance by Shakespeare that includes the stage direction "Exit, pursued by a bear."
ANSWER: *The* ***Winter's Tale***

12. A solution of 96 percent this compound and 4 percent water is a popular example of an azeotrope. This polar molecule is a good solvent because its non-polar ethyl group is attached to a polar hydroxyl ion. E15 and E25 contain 15 and 25 percent, respectively, of this compound blended with gasoline. In an anaerobic process, sugars are converted into carbon dioxide and this product by yeast. For 10 points, what two-carbon alcohol is found in beverages such as beer?
ANSWER: **ethanol** [or **ethyl alcohol**; or **drinking alcohol** until alcohol is read; or **EtOH**; or **C H 3 C H 2 O H**; or **C 2 H 5 O H**; or **C 2 H 6 O**; prompt on alcohol]

13. This actress won an Academy Award for her 1954 role opposite Bing Crosby in *The Country Girl.* She played the Quaker wife of town marshal Will Kane in the Western *High Noon.* In another role, this actress helps her wheelchair-bound photographer boyfriend spy on his neighbors and uncover a murder. For 10 points, name this Classic Hollywood actress who starred in *Rear Window* and married Prince Rainier of Monaco.
ANSWER: Grace **Kelly** [or Princess **Grace**]

14. Hin-D-3 is a "restriction" type of these molecules used to make recombinant DNA. Some of these molecules can be regulated by allosteric (al-oh-STAIR-ic) binding of a ligand outside of their active sites. Most of them are proteins ending in the suffix "ase" ("aze"), such as catalase (CAT-uh-laze). For 10 points, name these biological catalysts that speed up reactions.
ANSWER: **enzyme**s [or restriction **enzyme**s; prompt on catalysts before it is read]

15. This character states, "I had been happy…had I nothing known" before bidding farewell to the "pride, pomp and circumstance of glorious war." After stabbing himself, this character says, "I kissed thee ere I killed thee." This character smothers his wife Desdemona (dez-deh-MO-nuh) after being persuaded of her infidelity by Iago. For 10 points, name this title Moor of Venice of a Shakespeare tragedy.
ANSWER: **Othello**

 **VHSL Regular Season 2016-2017 - Round 18 - Directed Period**

1A. What masterful Roman speaker gave the Catiline (CAT-uh-LINE) Orations and was later executed for giving speeches against Mark Antony?
ANSWER: Marcus Tullius **Cicero**

1B. What bacterium in the genus *Bacillus* forms endo-spores that can infect humans and has been used in bioterrorism?
ANSWER: **anthrax** [or *Bacillus* ***anthracis***]

2A. What South African comedian succeeded Jon Stewart as the host of *The Daily Show* in 2015?
ANSWER: Trevor **Noah**

2B. What contemporary author of *The Corrections* objected to his novel being selected by Oprah's Book Club?
ANSWER: Jonathan **Franzen**

3A. This is a 20-second calculation question. What is the product of the complex number 3+5i and its complex conjugate?
ANSWER: **34**

3B. This is a 20-second calculation question. How many different ways are there to rearrange the letters of the word "SQUARE"?
ANSWER: **720**

4A. What four-time Italian Prime Minister was a media tycoon frequently accused of corruption?
ANSWER: Silvio **Berlusconi**

4B. What Egyptian deity scoured the world for the pieces of her husband Osiris after he was dismembered by his brother?
ANSWER: **Isis**

5A. In French, which form of a verb may end in the suffixes "*e-r*," "*i-r*," or "*r-e*"?
ANSWER: **infinitive** [or ***infinitif***]

5B. What is the term for the circular DNA in bacteria that can be used to transfer genetic material during conjugation?
ANSWER: **plasmid**s

6A. What American author wrote the autobiographical novel *A Death in the Family*?
ANSWER: James **Agee**

6B. What J.S. Bach piece for solo keyboard is a set of thirty movements based on an opening "aria" movement written to soothe a sleepless count?
ANSWER: ***Goldberg Variations*** [or ***Goldberg-Variationen***]

7A. What vitamin can be derived from beta-carotene and comes in various forms called retinoids (RET-uh-noyds)?
ANSWER: vitamin **A** [or **retinol**; or **retinal**; or **retinoic acid**]

7B. What Canadian province's Athabasca Oil Sands were threatened by a wildfire at Fort McMurray in 2016?
ANSWER: **Alberta**

8A. This is a 30-second calculation question. What is the area of a triangle with one vertex at the origin and whose two other vertices are the x and y intercepts of the line 2y + 3x equals 6?
ANSWER: **3**

8B. This is a 30-second calculation question. What is the sum of the cosecant of the quantity pi over two and the cotangent of the quantity pi over four?
ANSWER: **2**

9A. Sadiq Khan, who was born in the district of Tooting, is the first Muslim mayor of what European city?
ANSWER: **London**

9B. Paris and London are the title metropolises of what Charles Dickens novel set during the French Revolution?
ANSWER: *A* ***Tale of Two Cities***

10A. What powerful ancient kingdom conquered the northern kingdom of Israel and had a capital at Nineveh?
ANSWER: **Assyrian** Empire [or Neo-**Assyrian** Empire]

10B. What word, derived from Arabic, is an object that is believed to have magical properties which gives good luck?
ANSWER: **talisman**

 **VHSL Regular Season 2016-2017 - Round 18 - Third Period, Fifteen Tossups**

1. An early sea battle in this war was fought near Flanders and featured one side losing its navy at Sluys (SLOOS). Its early phrases featured a victory at Poitiers (PWAH-tee-AY) by the Black Prince, whose father, Edward III, had claimed another kingdom's crown. This war included Henry V's victory at the Battle of Agincourt (AH-jin-CORE) and the heroism of Joan of Arc. For 10 points, what war between England and France is noted for its extreme length?
ANSWER: **Hundred Years'** War

2. This composer wrote a D minor concerto for two solo violins. His *The Musical Offering* was commissioned by Frederick the Great, who later employed this composer's son Carl Philipp Emanuel. This composer's third Orchestral Suite is the source of the violin showpiece *Air on the G String*. Pablo Casals popularized this composer's six suites for solo cello. For 10 points, name this composer of the *Brandenburg Concertos*.
ANSWER: J.S. **Bach** [or Johann Sebastian **Bach**]

3. A foreign occupation of this government's territory was ended by the Locarno Treaties. This government's forces murdered Rosa Luxemburg, who led the Spartacist uprising against it. This government issued the Rentenmark to combat massive hyperinflation. France occupied the Ruhr Valley due to the inability of this government to pay war reparations ordered by the Treaty of Versailles (ver-SIGH). For 10 points, name this post-World War I German state.
ANSWER: **Weimar** Republic [prompt on Germany]

4. At the beginning of this novel, the protagonist is released from McAlester State Penitentiary. Near the end of this novel, Rose of Sharon breastfeeds a starving man. In this novel, the former preacher and labor leader Jim Casy is beaten to death for leading a strike. This novel traces the journey of the Joad family during the Dust Bowl. For 10 points, name this novel by John Steinbeck.
ANSWER: *The* ***Grapes of Wrath***

5. A con man in this film melts an enormous popsicle and resells it to bankers leaving work. In this film, a farmer's daughter realizes that "night howlers" are not wolves, but flowers. Near the end of this film, assistant mayor Bellwether shoots someone with a blueberry. Its protagonist teams up with the fox Nick Wilde to investigate a series of predator animals "going savage." For 10 points, name this 2016 animated Disney film about bunny cop Judy Hopps.
ANSWER: ***Zootopia***

6. A man from this country leads a movement which has founded numerous American charter schools, such as Utah's Beehive Science and Tech Academy. The Gulen movement, which is led by a man living in Pennsylvania, was linked by this country to terrorism and subversion. A July 2016 coup (KOO) attempt in this country led by the armed forces failed to overthrow the President. For 10 points, what country is currently led by President Recep Erdogan?
ANSWER: Republic of **Turkey**

7. A poet from this country wrote the lines, "The memory of you emerges from the night around me," and "In you everything sank!" A writer from this country wrote about the Trueba (troo-AY-buh) family in her novel *The House of the Spirits*. A poet from this country wrote *Twenty Love Poems and a Song of Despair.* For 10 points, name this South American country home to Isabel Allende ("eye"-END-ay) and Pablo Neruda (nay-ROO-duh).
ANSWER: **Chile**

8. In a novel by this author, a disease that begins by killing off thousands of rats in Oran (oh-RON) is combated by Dr. Bernard Rieux (ree-YOO). In a novel beginning with the sentence, "Mother died today," he wrote about a man who is executed for killing an Arab on the beach. For 10 points, name this French existentialist who created Meursault (mur-SO), the title character of his novel *The Stranger.*
ANSWER: Albert **Camus** (al-BAIR kah-MOO)

9. Myths from this modern-day country told of two boats called the Mandjet and Mesektet (MESS-eck-TET). A story here claimed that each night, the serpent Apep would try to stop one of the boats in the underworld. A goddess in this modern-day country is in the shape of a cow and is named Hathor, while a god venerated here was the ibis or baboon-headed deity Thoth. For 10 points, an empire in what modern-day country used the *Book of the Dead* in its funeral rituals?
ANSWER: Arab Republic of **Egypt**

10. While fighting this monster, a hero kills a vicious crab that Hera later turned into the constellation Cancer. The warrior Iolaus helped a Greek kill this monster, who resided in the marshes of Lerna. This creature, had a single immortal head that was buried under a rock. After defeating the Nemean Lion, a hero killed this creature. For 10 points, name this monster defeated by Heracles, which grew two more heads every time one was cut off.
ANSWER: **Hydra**

11. Random variables with the same probability distribution and this property are denoted by the abbreviation iid. The pairwise example of this property does not imply its mutual example. Two events A and B have this property if the product of their individual probabilities is equal to the probability of both events occurring, because the events' outcomes are unaffected by each other. For 10 points, what adjective describes an input variable that one manipulates in an experiment?
ANSWER: **independent** [or **independence**; or word forms]

12. The quantum number characterizing this value is the fourth, after the principal, azimuthal, and magnetic ones. This quantity was discovered when a beam of silver atoms was sent through an inhomogeneous magnetic field, in the Stern-Gerlach experiment. Particles with integer values for this quantity are bosons. For 10 points, Pauli's exclusion principle requires that electrons in the same orbital must have values of plus one-half and minus one-half for what quantity?
ANSWER: **spin** angular momentum [prompt on intrinsic angular momentum; do not accept "momentum"]

13. This man's newspaper, the *Dearborn Independent*, was notoriously anti-Semitic. He joked that his product was available in any color "as long as it is black," and he hired thugs to beat up UAW organizers outside his River Rouge plant. A proponent of welfare capitalism, this man began paying workers five dollars a day in 1914. For 10 points, what automobile tycoon popularized the assembly line and introduced the "Model T" car?
ANSWER: Henry **Ford**

14. The microscopic constituents of this material are called maceral (MAH-sehr-uhl). The vast majority of deposits of this material occur in seams from the Carboniferous. Diagenesis (die-uh-JEN-uh-sis) due to increases in temperature and depth create different ranks of this material, progressing from bituminous, to lignite, to anthracite. The source of this material is buried peat. For 10 points, what fossil fuel is burned to create most of the electricity in the United States?
ANSWER: **coal**

15. It's not London, but a 400-foot-tall needle-like structure in this city stands where a pillar honoring Horatio Nelson once stood. The use of the word "shift" at this city's Abbey Theatre triggered a 1907 riot. Aer [AIR] Lingus and Ryanair are headquartered in this city, whose Trinity College is where the medieval-era Book of Kells is kept. This city on the River Liffey is where the Guinness brewery was founded. For 10 points, name this capital of Ireland.
ANSWER: **Dublin**

 **VHSL Regular Season 2016-2017 - Round 18 - Tiebreaker Questions**

1. The use of the word "philistine" to denote an uncultured or anti-intellectual person derives from this poet's book *Culture and Anarchy.* This poet described the "eternal note of sadness" Sophocles heard on the Aegean. This poet wrote about a "darkling plain…where ignorant armies clash by night" in a poem beginning, "The sea is calm tonight." For 10 points, name this Victorian poet who wrote "Dover Beach."
ANSWER: Matthew **Arnold**

2. Exportin helps molecules exit this structure through pore complexes. The namesake envelope surrounding this organelle is contiguous with the ER and breaks down during prometaphase (pro-MET-uh-phase). This organelle contains chromatin (KRO-muh-tin), which consists of condensed chromosomes. For 10 points, name this eukaryotic (YU-"carry"-AW-tic) organelle where DNA is found and which surrounds the nucleolus (nu-KLEE-uh-lus).
ANSWER: **nucleus** [or **nuclear membrane**; or **nuclear envelope** before "envelope" is read]

3. This Senator was frequently attacked on broadcasts of Edward R. Murrow's television show *See It Now*. An attorney for the U.S. Army, Joseph Welch, asked this man "have you no sense of decency?" He gave a speech during which he claimed he held in his hand a list of 205 people in the State Department who were potential traitors. For 10 points, what Wisconsin Senator led an intense anti-Communist crusade during the 1950's?
ANSWER: Joseph "Joe" **McCarthy**

4. The oldest of these buildings in North America is found in Newport, Rhode Island, on Touro Street. Adherents of the Reform tradition place a reader's table called the Bimah at the front of these buildings. Orthodox-run examples of these buildings have a partition that divides the men's and women's seating areas. A cabinet in these buildings called the ark is where the scrolls of the Torah are kept. For 10 points, name these Jewish houses of prayer.
ANSWER: **synagogue**s [or **Bet Kenesset**; or **Bet Tefila**; or **shul**]

5. A location in this national park inspired the name of the cleaner "20 Mule Team Borax," a reference to the large borax mines once found here. Its only authorized concession operations is Stovepipe Wells Village. At this park, Furnace Creek reportedly once had a temperature of 134 degrees. Badwater Basin here is 282 feet below sea level. For 10 points, name this national park in the California desert, which contains the lowest point in North America.
ANSWER: **Death Valley** National Park

What is the minimum value of the function three plus the cosine of theta?
ANSWER: **2**

What sequence of numbers contains the subsequence 21, 34, 55, 89, 144?
ANSWER: **Fibonacci** numbers