**VHSL Regionals 2016-2017 - Round 01 - First Period, Fifteen Tossups**

1. These two characters falling asleep twice is represented by a light going black and then being turned back on. These two characters hide from a pirate attack by jumping into some conveniently located barrels, and they are astonished that a flipped coin can turn up heads eighty-five times in a row. These two men meet a group of players who are rehearsing *The Murder of Gonzago* on their way to Elsinore. For 10 points, name these two supporting characters from *Hamlet* who "Are Dead" in the title of a Tom Stoppard play.
ANSWER: **Rosencrantz** and **Guildenstern** [or ***Rosencrantz*** *and* ***Guildenstern*** *are Dead*; names may be given in either order, but do not accept or prompt if only one name is given]

2. This leader introduced the jokingly named "Sinatra Doctrine." The Gang of Eight's failed August Coup (KOO) was directed against this man in 1991 and featured Boris Yeltsin addressing a crowd. As General Secretary, this man reversed the Brezhnev Doctrine and advocated the policies of glasnost and perestroika (PAIR-uh-STROY-kuh) to improve relations with the United States. For 10 points, name this final leader of the Soviet Union.
ANSWER: Mikhail **Gorbachev**

3. The founder of this website and Larry O'Connor were sued by Shirley Sherrod after she was fired. A contributor to this website alleged that former Donald Trump campaign manager Corey Lewandowski grabbed and bruised her. Another contributor to this website posed as a prostitute while secretly taping a conversation with employees of the group ACORN. Its executive chairman, Stephen Bannon, became the CEO of the Trump campaign. For 10 points, name this website considered a leader of the "alt-right" movement.
ANSWER: **Breitbart** News Network [or **Breitbart**.com]

4. The method of reducing matrices to row-echelon form is named for Jordan and this mathematician. This man's namesake integers is given to complex numbers with integer real and integer imaginary parts. This mathematician published the first proofs, six different ones, for the law of quadratic reciprocity. Legendarily, when this mathematician was a child, he stunned his teacher by quickly adding up the numbers one through one hundred. For 10 points, give this German mathematician, for which the normal distribution is sometimes named.
ANSWER: Carl Friedrich **Gauss**

5. These people told a myth about a brave soldier who put his hand into a fire without showing pain, shocking their enemies. In another quasi-mythical story of these people, invaders were repelled after defenders were alerted by the cackling of sacred geese. They placed statues of household gods called "lares" (LARR-ayz) at the table during meals. These people believed in a goddess of wisdom they called Minerva. For 10 points, what people worshiped the gods Juno and Jupiter?
ANSWER: **Roman**s [do not accept "Greeks"]

6. Steven Chu, the first Secretary of Energy under Obama, did research on using these devices to produce a Bose Einstein Condensate by cooling rubidium atoms. These devices rely on more atoms being in an excited state than the ground state, which is known as population inversion. These devices, which originally used rubies for the gain medium, operate through stimulated emission of radiation. These devices emit coherent, monochromatic beams of light, unlike LEDs. For 10 points, what devices can be housed in "pointers", which can blind people if used improperly?
ANSWER: **LASER**s [or **Light Amplification by Stimulated Emission of Radiation**]

7. This character's father, Ban, is slain fighting the villainous Claudas. He learned his name after an encounter at a castle called the Dolorous (DOH-lore-USS) Guard. This man's surname stems from the fact he was raised by the Lady of the Lake. He is the father of a knight who manages to finally retrieve the Holy Grail and is named Galahad. This man's illicit romance with Guinevere leads to the destruction of the Round Table. For 10 points, what knight has an affair with King Arthur's queen?
ANSWER: **Lancelot** du Lac [or **Lancelot** of the Lake]

8. A character in this story repeatedly refers to people who abandon their traditions as fools, and then recalls a rhyme that an event happening in June implies that "corn be heavy soon." The opening paragraphs of this story include a description of some boys guarding a pile of rocks. An object central to this story is a black box placed on a stool in which the inhabitants of a village write their names on strips of paper. This story ends with Tessie being selected to be stoned to death. For 10 points, name this story about a game of chance by Shirley Jackson.
ANSWER: "The **Lottery**"

9. A character named Hagen drowns in his attempt to claim this object. This thing is constructed by Alberich and is sought after by Wotan. It is first created in *Das Rheingold* and is last seen returning to the Rhine river in an opera whose title translates as *Twilight of the Gods*. This thing names a series of operas which include such passages as the "Ride of the Valkyries" (VALK-rees). For 10 points, what powerful magical object names a cycle of operas based on Germanic myths by Richard Wagner (REE-kard VOGG-ner)?
ANSWER: the **Ring** [or the **Ring** of the Nibelung]

10. A book by Stephen Jay Gould describes how this animal uses an extended sesamoid bone as a "thumb" while eating. A subspecies of this animal with brown fur lives in a mountain range near Sichuan (SETCH-wan) Province. After being the first U.S. president to visit these animals' native country, Richard Nixon received a gift of two of them. The World Wildlife Fund uses one of these animals as its logo. For 10 points, name these black-and-white bears that feed on bamboo forests in China.
ANSWER: giant **panda**s [do not accept "red pandas"]

11. A community named for this location is governed by a rotating board of planners and has its workings narrated to Professor Burris by T. E. Frazier. A book named for this location opens with the narrator describing how he purchased his freedom for slightly more than twenty eight dollars in a section titled "Economy." This location partially names a utopian novel by B. F. Skinner, and it is the setting of an account subtitled "Life in the Woods." For 10 points, name this Massachusetts pond where Henry David Thoreau moved to write his most famous book.
ANSWER: **Walden** Pond [or ***Walden*** *Two*; or ***Walden****; or, Life in the Woods*]

12. The relative severity of these events is categorized by the VEI index. These events are called "phreatic" (free-AT-tick) if they form steam. Particulates were injected into the atmosphere by the Pinatubo and Krakatoa examples of these events. These phenomena can be classified into Peléan (PAY-lee-an), Plinian (PLIN-nee-an), Strombolian, or Hawaiian types. Dangerous lahars (la-HAWRS) occur when water meets the pyroclastic flows formed by these occurrences. For 10 points, what geologic events produce ash and lava?
ANSWER: volcanic **eruption**s

13. Part of this song is performed in Spanish at the end of the musical *Rock of Ages*. This song spiked in popularity after it was used in the series finale of *The Sopranos*. This song, which describes "strangers waiting up and down the boulevard," is the highest-selling song by the cast of *Glee*. This song describes two characters who "took the midnight train going anywhere," one of which was "born and raised in south Detroit." For 10 points, name this most popular song by Journey.
ANSWER: "**Don't Stop Believin'**"

14. The year after this event, a similarly named incident in Annapolis targeted the *Peggy Stewart*. After this event, Robert Murray unsuccessfully offered to pay 90,000 pounds to Lord North. Four of the Coercive, or Intolerable, Acts were passed in response to this event. It was perpetrated by men dressed as American Indians who were actually members of the Sons of Liberty targeting the East India Company. For 10 points, what December 16, 1773, event featured chests of a beverage thrown into a New England harbor?
ANSWER: **Boston Tea Party**

15. Milwaukee elected a mayor from this party four times as part of a movement named for sewers. Led by Norman Thomas, it expelled the author Upton Sinclair after he tried to run for governor as a Democrat. A leader of this party once ran for the presidency while in prison and was previously the leader of the American Railway Union. That frequent candidate of this party was Eugene V. Debs. For 10 points, what far-left political party eventually lost many members to the Communist Party?
ANSWER: **Socialist** Party of America

 **VHSL Regionals 2016-2017 - Round 01 - Directed Period**

1A. Name either of the two Asian countries that use the word "Bahasa" in the native names of their languages.
ANSWER: **Indonesia** [or **Malaysia**]

1B. Platinum, rhodium, and what silver-white metal with atomic number 46 are the main catalysts in catalytic converters?
ANSWER: **palladium** [or **Pd**]

2A. What band became the first band to play on all seven continents after performing "Enter Sandman" and nine other songs inside a dome in Antarctica?
ANSWER: **Metallica**

2B. The Questing Beast has the head of which animal that is depicted eating itself in the Ouroboros (ORE-uh-bore-USS) symbol?
ANSWER: **snake**s [or **serpent**s; or **dragon**s]

3A. This is a 20-second calculation question. Let O be a regular octagon with opposite vertices A and B. The line segment AB cuts O into two halves; how many diagonals of O cross from one half of the regular octagon to the other half of the regular octagon?
ANSWER: **nine** [there are three vertices between A and B on each side, and any diagonal from one set of three to the other set crosses both halves; there are 3 \* 3 = 9 such diagonals.]

3B. This is a 20-second calculation question. What are the coordinates of the point where the function negative 1 plus the quantity e to the x crosses the x-axis?
ANSWER: **(0,0)** [set function equal to zero and solve for x; e to the x equals one when x equals zero].

4A. Encounters with massive birds called Rocs occur during the seven voyages of which sailor who appears in the *Arabian Nights*?
ANSWER: **Sinbad**

4B. Mark Twain wrote a memoir titled "Life on" which river, on which he captained a steamboat?
ANSWER: **Mississippi** River [or *Life on the* ***Mississippi***]

5A. Which three word hyphenated phrase refers to the literary theme popularized by Horatio Alger in which a character rises from poverty to great wealth?
ANSWER: **rags-to-riches**

5B. What successor to Tony Blair is, to date, the most recent Labour Party leader to become Prime Minister of the United Kingdom?
ANSWER: Gordon **Brown** [or James Gordon **Brown**]

6A. What is the most general quadrilateral that is defined as having congruent, opposite sides? It may help to know that a square is the most specifically defined quadrilateral.
ANSWER: **parallelogram**

6B. The War of the Austrian Succession was fought over the right of what female Hapsburg ruler to ascend to the Austrian throne?
ANSWER: **Maria Theresa** [or **Maria Theresa** Walburga Amalia Christina]

7A. What pioneer of bebop was a jazz musician noted for playing a "bent" trumpet?
ANSWER: John Burks "Dizzy" **Gillespie**

7B. In 2016, LIGO announced that it had detected what distortions of spacetime predicted by Einstein's theory of general relativity?
ANSWER: **gravitational wave**s [or **gravity wave**s]

8A. This is a 30-second calculation question. Let A and B be angles in the first quadrant with sine of A equal to four over five and sine of B equal to seven over twenty-five. What is the sine of quantity A plus B?
ANSWER: **117/125** [The Pythagorean Identity tells us that cos(A)=3/5 and cos(B)=24/25. Thus sin(A+B)=sin(A)cos(B)+sin(B)cos(A)=(4/5)\*(24/25)+(7/25)\*(3/5)=117/125.]

8B. This is a 30-second calculation question. If A and B are independent events, the probability of A occurring is 0.6, and the probability of B occurring is 0.3, what is the probability that *neither* A *nor* B occur?
ANSWER: **.28** [the probability of A or B is 0.6+0.3-0.6\*.3=0.6+0.3-0.18=0.72, and the desired probability is the complement of that, or 1-0.72.]

9A. In what novel by Robert Louis Stevenson does David Balfour wander across Scotland during the Jacobite Rising accompanied by Alan Breck?
ANSWER: ***Kidnapped***

9B. The Parana River flows into what body of water, on which the capital cities Buenos Aires and Montevideo are situated?
ANSWER: **Rio de la Plata**

10A. Libertarian presidential candidate Gary Johnson was widely mocked for seemingly not knowing the significance of what foreign city?
ANSWER: **Aleppo**

10B. What couple was controversially executed in 1953 for passing along atomic secrets to the Soviet Union?
ANSWER: **Rosenberg**s [or Julius and Ethel **Rosenberg**]

 **VHSL Regionals 2016-2017 - Round 01 - Third Period, Fifteen Tossups**

1. Flu-de-oxy-glucose is used as a tracer in a process that observes the emission of this particle to study metabolic activity. This particle was discovered at Caltech in the early 1930s by Carl Anderson. This particle was first predicted by Paul Dirac as the negative energy solution to the Dirac equation. Richard Feynman proposed that this positively charged, spin 1/2 particle travels backwards in time. This particle is usually written as an e with a plus sign superscript. For 10 points, what is the antiparticle of the electron?
ANSWER: **positron**

2. Although this painter wasn't French, Charles X awarded him the gold medal at the 1824 Paris Salon. This artist's friendship with the bishop John Fisher inspired one of his two paintings of Salisbury Cathedral. This artist painted a cottage owned by his father's neighbor, Willy Lott, to the left of three horses pulling the title vehicle across a river. *Dedham Vale* and *Wivenhoe Park* are among the many landscapes painted by, for 10 points, what British artist of *The Hay Wain*?
ANSWER: John **Constable**

3. This landmark is surrounded by a square moat whose sides are two miles long. This landmark's five towers are meant to represent the five peaks of Mount Meru. Tourists visiting this landmark pass through the city of Siem Reap. Suryavarman (SOOR-yah-VAR-man) II broke tradition by dedicating this landmark to Vishnu instead of Shiva. This landmark, which appears on a national flag, was built by the Khmer (kuh-MARE) Empire. For 10 points, name this largest religious monument in the world, a temple in Cambodia.
ANSWER: **Angkor Wat** [prompt on Angkor]

4. This author described watching an insect struggle for life in a window ledge in the essay "The Death of the Moth." In a novel by this author, the shell-shocked veteran Septimus Smith throws himself out of a window. Another novel by this author is set during the Ramsay family's vacations to the Hebrides. One of her novels revolves around the preparations for a dinner party hosted by the title character, Clarissa. For 10 points, name this modernist author of *To the Lighthouse* and *Mrs. Dalloway*.
ANSWER: Virginia **Woolf** [or Adeline Virginia **Stephen**]

5. Silver nitrate is used in a type of this technique pioneered by Golgi (GOHL-jee). The H&E type of this process uses hematoxylin (he-muh-TOX-uh-lin) and eosin Y and is very common in histology. Peptidoglycan (pep-tid-uh-GLY-can) content can be detected with safranin and crystal violet in a form of this process named for Gram. It is usually applied to fixed cells to enhance contrast. For 10 points, name this technique of making specimens easier to see under a microscope by giving them color.
ANSWER: **stain**ing [or **dye**ing; prompt on pigmenting; accept word forms]

6. A deity of craftsmen who was worshiped in this present day country was often depicted with green skin. In myths originating from this country, the feather of Ma'at decided the future of souls in the afterlife. A symbol of life from this country consists of a cross with a circular loop instead of the upper half and is called an Ankh. A creature that lived in its major river was shown with the head of a crocodile. For 10 points, name this country where Ptah (puh-TAH) and Sobek were worshiped at cities such as Heliopolis and Memphis.
ANSWER: **Egypt** [or Arab Republic of **Egypt**; or Gumhuriyat **Misr** al-Arabiyah]

7. This composer's *Great Mass* in C minor includes a soprano part written for his wife Constanze. He wrote an opera in which Guglielmo and Ferrando trade places and test the faithfulness of their wives. In another opera by this composer, a statue of the Commendatore (koh-MEN-dah-TOH-ray) comes to life to take the title character to hell. This composer of *Così fan tutte* (KOH-see fan TOO-tay) and *Don Giovanni* also wrote *Eine kleine Nachtmusik* (EYE-nuh KLYE-nuh KNOCKED music). For 10 points, name this Austrian child prodigy.
ANSWER: Wolfgang Amadeus **Mozart**

8. John Candy has a cameo in this film as the head of a traveling polka band. A supporting character in this movie is rumored to have murdered his family with a snow shovel. That character, Old Man Marley, appears at the end of this film to attack Harry and Marv. This is the first movie in a series in which the protagonist fights the "Wet Bandit" burglars with a variety of painful booby traps. For 10 points, what 1990 Christmas film is about a boy named Kevin who is accidentally left behind by his family?
ANSWER: ***Home Alone***

9. The abc conjecture states there are only finitely many coprime triples such that this operation applied to a and b yields a result greater than a certain power of c. The integers form a group under this operation. The result of applying this operation to two vectors can be found using the parallelogram rule. An uppercase sigma represents repeated application of this operation. Like multiplication, this operation is both associative and commutative. For 10 points, what operation gives the integer eight when applied to the integers three and five?
ANSWER: **addition**

10. This man defeated both former *Survivor* contestant Rupert Boneham and John R. Gregg in a 2012 election but dropped out of a potential 2016 rematch with Gregg. On March 26, 2015, this governor signed the Religious Freedom Restoration Act into law, which he eventually revised to address discrimination against LGBT people. This successor to Mitch Daniels was thought by many to win his only debate with his Democratic counterpart, Tim Kaine. For 10 points, name this Governor of Indiana who served as Donald Trump's 2016 running mate.
ANSWER: Michael "Mike" **Pence**

11. This man's national organizer was far-right clergyman Gerald L.K. Smith. This author of the speculative book *My First Days in the White House* was killed by the son-in-law of a judge he opposed. Getting his nickname from a character on the *Amos and Andy* radio show, he was killed by Dr. Carl Weiss at the State Capitol in 1935. This man proposed the "Share Our Wealth" populist program. For 10 points, what Governor and Senator of Louisiana during the 1930's was known as the "Kingfish"?
ANSWER: Huey **Long** Jr.

12. A man with this title known as the "mad" had a delusion that he was made of glass. Blanche of Castile was the mother of a man with this title who was canonized and participated in the Seventh and Eighth Crusades. The first man to use this title was Philip II, or Philip Augustus, a member of the House of Capet (ka-PAY). In the 1300's, members of the House of Valois (VAL-wah) assumed this title. For 10 points, what royal title was held by such men as Louis IX?
ANSWER: **king** of **France** [or **roi** de **France**]

13. This man controversially distributed lands in places like Parthia to his children in the Donations of Alexandria. Thus man's navy was destroyed by Agrippa at the Battle of Actium. He previously teamed with a future emperor to win the Battle of Philippi (FILL-uh-PIE) against Brutus and Cassius. This man was part of the Second Triumvirate with Lepidus and the nephew of Julius Caesar. For 10 points, what man, after being defeated by former partner Octavian, killed himself with his lover, Cleopatra?
ANSWER: Mark **Antony** [or Marcus **Antonius**]

14. In a play by this author, a woman is saddened to hear the word "jail" being spoken in passing, and she tries to use astrology and horoscopes to learn about her missing son. In that play by this author, Joe Keller grapples with guilt over selling faulty parts to the Air Force. He wrote a play in which Abigail Williams is angered when her lover terminates their affair, causing her to implicate the wife of John Proctor with charges of witchcraft. For 10 points, name this author of *All My Sons* and *The Crucible*.
ANSWER: Arthur **Miller**

15. Bézout's identity states that this value for two integers *a* and *b* can be written as a linear combination of *a* and *b*. An algorithm used to compute this value involves replacing the larger of two numbers with the difference between the larger number and other number, and is known as the Euclidean algorithm. If this function for *a* and *b* is one, then *a* and *b* are relatively prime. This function of *a* and *b* divided by *a* times *b* equals the least common multiple. For 10 points, name this function that takes two integer inputs and returns the largest integer that divides both of them.
ANSWER: **greatest common divisor** [or **gcd**]

 **VHSL Regionals 2016-2017 - Round 01 - Tiebreaker Questions**

1. One form of this technique whose resolution does not depend directly on buffer composition is also known as gel filtration. The outputs of a form of this technique are often further analyzed using mass spectrometry. Analytes in this technique can be identified based on their R-f values. Foil plates sheathed in silica are used in the thin-layer type of this technique, whose "paper" variant can be used to find out which dyes are present in an ink. For 10 points, name this technique where a mobile phase passes through a stationary phase to separate the components of a mixture.
ANSWER: **chromatography** [or **chromatographic** techniques; or gas **chromatography**; or liquid **chromatography**; or paper **chromatography**; or thin layer **chromatography**]

2. This country's Fort Jesus was frequently contested by Portugal and the sultanate of Oman. In 2016, this country deterred poachers by burning a world-record 105-ton pile of ivory. This country's first president named his anthropological study of its native Kikuyu people after a mountain. Malindi and Mombasa are historically significant ports in this country, which contains an extension of its neighbor Tanzania's Serengeti National Park. For 10 points, name this African country whose capital is Nairobi.
ANSWER: **Kenya** [or Republic of **Kenya**]

3. A submarine belonging to this country sank a ship called the *General Belgrano*. A leader of this country once made the pun "The lady's not for turning" to defend her views. In 1990, Poll Tax Riots broke out in this country, protesting the policies of its Conservative government. This country easily defeated Argentina in the Falklands War. For 10 points, what country was led in the 1980's by Margaret Thatcher?
ANSWER: **United Kingdom** of Great Britain and Northern Ireland [or **UK**; or **Britain**; or **England**]

4. This novel's protagonist brings a firebrand to confront a pair of eyes in a cave, only to find that those eyes belong to a goat. In this novel, a man is enslaved in Sallee after being captured by Moors. This novel's protagonist finds a footprint on the beach, which he initially thinks belongs to the devil. The title character of this novel is stranded on the Island of Despair, where he meets a cannibal named Friday. For 10 points, name this novel about a castaway by Daniel Defoe.
ANSWER: ***Robinson Crusoe***

5. This artist became outraged when Gustave Courbet (cor-BAY) painted his frequent model, Joanna Hiffernan, in the nude. This man painted a white-clad Hiffernan standing on a bear skin rug in a *Symphony in White*. This artist's depiction of Battersea Bridge at night was titled *Nocturne: Blue and Gold*. His painting officially titled *Arrangement in Grey and Black No. 1* shows an older woman sitting and facing the left. For 10 points, name this artist who famously painted his mother in 1871.
ANSWER: James **Whistler** [James Abbott McNeill **Whistler**]

In triangle ABC, side BC measures 4 units, side AC measures 7 units, and angle BAC measures 30 degrees. What is the sine of angle ABC?
ANSWER: **7/8** [or **.875**] [the law of sines tells us that 4/0.5 = 7/sine ABC; we can cross-multiply to solve the proportion.]

Which three-headed dog guards the entrance to the Greek underworld?
ANSWER: **Cerberus**