**2016 VHSL Conferences - Round 08 - First Period, Fifteen Tossups**

1. These systems can experience a phenomenon in which certain alleles are overrepresented by a few early migrants, called the founder effect. The bottleneck effect occurs when a decrease in the size of one of these systems results in decreased genetic diversity. The variable k represents the maximum size of this system given the resources of an environment, and is called the carrying capacity. For 10 points, give this term that describes the total number of organisms for a species in a particular area.
ANSWER: **population**

2. This hero journeys to the underworld with his friend Pirithous **(pih-RIH-thoo-uss)**. His wife Phaedra is spurned by this hero's son with Hippolyta. This hero battles bandits such as Procrustes **(pro-"CRUST"-eez)** on his way to Athens, where he meets his father Aegeus **(AY-jee-uss)**. He volunteers as sacrifice on a journey to Crete where he meets Minos's daughter Ariadne **("airy ADD knee")** and uses a ball of yarn to navigate the Labyrinth. For 10 points, name this hero who slays the Minotaur.
ANSWER: **Theseus**

3. During this war, a general sent a letter to a Congressman stating "there is no substitute for victory." This war included the Battle of Pork Chop Hill. After leaving his command during this war, a general said "old soldiers never die: they just fade away." During this war, General Douglas MacArthur was removed from command by President Truman. For 10 points, name this war fought between 1950 and 1953 in which the United States supported an Asian country against its Communist northern neighbor.
ANSWER: **Korea**n War

4. In the triple-negative form of this disease, certain cells lack gene expression for Her2/neu and two hormone receptors. Namesake genes mutated in this disease were patented by Myriad Genetics. Those BRCA **(BRACK-uh)** one and two alleles **(uh-LEELZ)** increase the risk of ovarian cancer and this disease. This disease may be treated by removing tumors via a mastectomy, and it can be detected with a mammogram. For 10 points, name this cancer of the structures that produce milk in women.
ANSWER: **breast cancer** [prompt on **cancer** before it is read]

5. A protein described with this adjective has a serine-65, tyrosine-66, glycine-67 motif buried within a beta barrel. Marty Chalfie won a Nobel for characterizing that protein named with this adjective found in the species *Aequorea* **(ee-KWOR-ee-uh)** *victoria*. A molecule with this color comprises the reaction center P700. This color is emitted by a protein isolated from jellyfish that is used to fluorescently label genes. For 10 points, name this color of a namesake fluorescent protein and chlorophyll.
ANSWER: **green** [prompt on **fluorescent** before "color" is read]

6. This person revived the concept of the Fourth Shore to justify an invasion. Over a year after being rescued in the Gran Sasso raid, this leader fled his Salo Republic and was killed and hung from a meat-hook along with his mistress. This leader wanted to use the name "Pact of Blood" for the Pact of Steel he signed with a northern ally. This leader recognized the Vatican with the Lateran Treaty and led his Black Shirts in a March on Rome. For 10 points, name this Axis leader and fascist dictator of Italy.
ANSWER: Benito **Mussolini** [or Benito Amilcare Andrea **Mussolini**; prompt on Il **Duce**]

7. A character in this story has a name pronounced "Dellacroy," even though it is "Delacroix" **(dell-a-kwah)**. A character in this story predicts meals of "stewed chickweed and acorns" and mocks Joe Summers' leadership of the title event. It features a proverb about how the title event in June means "corn be heavy soon." This story ends with Tessie Hutchinson being stoned to death after drawing a marked slip. For 10 points, name this Shirley Jackson story about the title morbid small-town ritual.
ANSWER: "The **Lottery**"

8. A blizzard tosses around a cabin that this actor finds refuge in a film starring this actor depicting the Klondike Gold Rush. This actor frantically screws nuts onto machines on a speeding assembly line in the movie *Modern Times*. In several movies, he played a bumbling vagrant wearing a top hat. This actor exploited the similarity of his mustache to Hitler's in a 1936 film satirizing the Nazis. For 10 points, name this star of *The Great Dictator,* a famed silent film actor known for playing "The Tramp."
ANSWER: Charlie **Chaplin** [or Sir Charles Spencer **Chaplin**]

9. This singer, who is featured on Dawin's song "Dessert," released a single in October 2015 in which he says "see me on your top 9, you the only one that can hit me on the FaceTime." This singer of "All About You" recorded his hit song shortly before beginning his senior year of high school in Georgia, and set its music video in a school gym. In that song, he proclaims "tell em break your legs" while doing the two title dances. For 10 points, name this teenage rapper of "Watch Me (Whip/Nae Nae)."
ANSWER: **Silentó** [or Richard Lamar **Hawk**]

10. A character in this play relates an affair she had with Florence, whose husband was run over by a tram. At the beginning of this play, a man comments that a bronze ornament by Barbedienne **(bar-BED-ee-en)** is an "atrocity" before asking for his toothbrush from a valet with no eyelids. At the climax of this play, Estelle stabs Inez with a pen-knife shortly before Garcin **(gar-SAN)** claims that "hell is other people." For 10 points, name this existentialist play by Jean-Paul Sartre **(SAR-truh)**.
ANSWER: ***No Exit*** [or ***Huis Clos***; or ***In Camera***]

11. During the summer, around 20 million bats inhabit this state's Bracken Cave. The Edwards Aquifer, which lies under the middle of this state, is home to a species of "blind" salamander. A nine-day gusher at Spindletop triggered an oil boom in this state. This state's Big Bend National Park is named for a bend in the course of the Rio Grande. For 10 points, name this state, home to the southernmost extent of the Keystone Pipeline at Houston.
ANSWER: **Texas**

12. The Freer Gallery of Art in DC contains this man's painting *The Princess from the Land of Porcelain* in its Peacock Room. John Ruskin accused him of "flinging a pot of paint in the public's face" with his painting of a fireworks display subtitled "The Falling Rocket." This artist of *Nocturne in Black and Gold* depicted an austere woman sitting facing left in his *Arrangement in Grey and Black No. 1* For 10 points, name this American artist who painted his mother.
ANSWER: James **Whistler** [or James Abbott McNeill **Whistler**]

13. The 1965 Highway Beautification Act is sometimes nicknamed for a person who held this position at the time. Another person in this position consulted astrologer Joan Quigley and was the pioneer of the "Just Say No" campaign. A person in this position in the late 1970's established a namesake center in California to help treat the drug-addicted. In the 1980s, a woman in this position was mocked for her expensive state dinners. For 10 points, name this position held for most of the 1980s by Nancy Reagan.
ANSWER: **First Lady** of the United States

14. In this city, Anita Alvarez announced that there would be no charges filed in the death of Ronald Johnson. A Burger King manager revealed that eighty-six minutes of security footage was deleted in this city shortly after Jason Van Dyke's actions in October 2014. Garry McCarthy resigned as head of this city's police department as part of the fallout from the shooting of Laquan McDonald. For 10 points, name this city where police shooting scandals have affected mayor Rahm Emanuel.
ANSWER: **Chicago**

15. This goddess punishes Erysichthon **("airy"-SICK-thon)** with eternal hunger after he chops down a sacred tree. She saves her disciple Triptolemus **("trip"-TAH-lee-muss)** and founds the Eleusinian Mysteries. This goddess places the child Demophon in a hearth to try and make him immortal. Her grief causes crops to wither away and winter to arrive as a consequence of her daughter's kidnap at the hands of Hades. For 10 points, name this mother of Persephone, the Greek goddess of the harvest.
ANSWER: **Demeter**

 **2016 VHSL Conferences - Round 08 - Directed Period**

1A. What 1964 bill, which outlawed discrimination in public accommodations, prompted Lyndon Johnson to say "we have lost the South for a generation"?
ANSWER: **Civil Rights** Act of 1964

1B. What player announced that he will retire following the 2016 Major League Baseball season, after hitting 503 career home runs, mostly as a designated hitter for the Twins and Red Sox?
ANSWER: David **Ortiz** [David Américo **Ortiz** Arias]

2A. What Art Deco William Van Alen skyscraper in Manhattan built as the headquarters of a car company was the tallest building in the world for less than a year?
ANSWER: **Chrysler** Building

2B. In what country did the new centrist alliance Ciudadanos and the left-wing Podemos challenge the leadership of conservative prime minister Mariano Rajoy **(rah-HOY)** in 2015?
ANSWER: **Spain** [Kingdom of **Spain**; or Reino de **España**]

3A. This is a 20-second calculation question. Lines AB and CD are perpendicular and intersected by line EF at points G and H, respectively. The measure of angle AGE is 40 degrees. Give all possible values for the measure of angle CHF.
ANSWER: **50** degrees and **130** degrees [do not accept answers with more or fewer than two values]

3B. This is a 20-second calculation question. What is the sum of the infinite series with first term 2 and constant ratio negative two-thirds?
ANSWER: **6/5** [or **1.2**]

4A. During what election year did the first-ever presidential debates air on television and allegedly help this election's winner due to his opponent's sickly appearance?
ANSWER: Election of **1960**

4B. What Greek term, often interpreted as the "tragic flaw" which drives a tragic hero's actions, was introduced into literary theory by Aristotle?
ANSWER: **hamartia**

5A. What most widespread Austroasiatic language uses both the Chinese-derived "Chữ nôm" **(CHOO nahm)** character set and the modified Latin "quốc ngữ" **(QUAHK NOO-uh)** alphabet?
ANSWER: **Vietnamese** [or **tiếng Việt**]

5B. Molecules with two bonds and two lone pairs of electrons, such as water, have what kind of molecular geometry according to VSEPR theory?
ANSWER: **bent** geometry

6A. What somber W.H. Auden poem includes instructions to "Pack up the moon and dismantle the sun" and opens with the line "Stop all the clocks, cut off the telephone"?
ANSWER: "**Funeral Blues**"

6B. In the Cartesian plane, a function's roots are equivalent to what points at which the ordinate is zero?
ANSWER: **x-intercept**

7A. What 17th century English poet attacked Thomas Shadwell in his satire *MacFlecknoe* and commemorated the "miracle year" of the city of London in his poem *Annus Mirabilis*?
ANSWER: John **Dryden**

7B. The Corinth and Panama Canals both cut through what type of narrow landmass, which is named for the Ancient Greek word for "neck"?
ANSWER: **isthmus**

8A. This is a 30-second calculation question. If cosine of theta equals 24/25, find all possible values of cosine of 2 theta.
ANSWER: **527/625** [do not accept answers with more than one value]

8B. This is a 30-second calculation question. I flip a coin five times and test the null hypothesis that the coin is fair against the alternative hypothesis that the coin is not fair. Given that each outcome of five flips is equally likely, what is the probability that I reject the null hypothesis at the 5% significance level?
ANSWER: **1/16** [the null hypothesis is only rejected for the outcomes of "all heads" and "all tails"]

9A. What American novelist wrote about Tod Hackett and Homer Simpson in his Hollywood novel *The Day of the Locust*?
ANSWER: Nathanael **West**

9B. What modern-day country was renamed as "Zaire" **(zie-EAR)** while it was led by the dictator Mobutu Sese Seko?
ANSWER: Democratic Republic of the **Congo** [**DRC**; or Republique Democratique du **Congo**; or **Congo-Kinshasa**; do not accept or prompt on "Republic of the Congo" or "People's Republic of the Congo"]

10A. What school of Buddhism, prominent in Thailand, Cambodia, and Laos, believes in "arhats" and reads the Pali Canon?
ANSWER: **Theravada** Buddhism [or **Hinayana** Buddhism]

10B. What device – which consists of a motor, a belt, two combs, and a metal dome – generates a voltage and is used in hair-raising static electricity demonstrations?
ANSWER: **Van de Graaff generator**

 **2016 VHSL Conferences - Round 08 - Third Period, Fifteen Tossups**

1. This god's elder brother is transferred out of his mother's womb to avoid being killed by Kansa. As a child, this god is often depicted playing the flute and stealing butter. During the Kurukshetra War, this god sides with the Pandavas as a charioteer, and takes on his universal form to encourage the prince Arjuna in a dialogue called the Bhagavad Gita **(BAH-gah-vahd GEE-tah)**. For 10 points, name this avatar of Vishnu who is evoked in a Sanskrit mantra that begins "Hare" **(HAH-ray)**.
ANSWER: **Krishna**

2. Max and Charlotte appear in the play-within-a-play *House of Cards* written by Henry in this author's play *The Real Thing*. A play by this author is set at Sidley Park and jumps between two time periods that feature Thomasina Coverley and Hannah Jarvis. A play by this author opens with a coin-flip resulting in heads 92 straight times for two minor characters borrowed from Shakespeare's *Hamlet*. For 10 points, name this British playwright of *Arcadia* and *Rosencrantz and Guildenstern Are Dead*.
ANSWER: Tom **Stoppard** [or Tomáš **Straussler**]

3. Andre Breton called this artist "Avida Dollars" because of his commercialization. This painter collaborated with a director on a short that opens with a woman's eyeball being sliced open with a razor blade; that film is *Un Chien Andalou*. In one of his paintings, swans reflect in a lake so that their necks become elephants' trunks. This artist's most famous work features a clock covered in ants and other clocks melting. For 10 points, name this Spanish surrealist painter of *The Persistence of Memory*.
ANSWER: Salvador **Dali** [or Salvador Domingo Felipe Jacinto **Dali** i Domenech]

4. A figure in this poem is described as having "eyes of flame" and is killed shortly after coming through the "tulgey wood." The title creature of this poem is dispatched by a "vorpal blade" and is first introduced alongside the "Jubjub bird" and the "frumious Bandersnatch." This poem begins by noting how "'Twas brillig, and the slithy toves did gyre and gimble in the wabe." For 10 points, name this Lewis Carroll poem filled with nonsense words.
ANSWER: "**Jabberwocky**"

5. At constant temperature and pressure, this quantity is equal to the derivative of free energy with respect to surface area. This quantity times the sum of the reciprocals of the radii of curvature is equal to the pressure difference according to the Young-Laplace equation. This quantity is decreased by surfactants, and it is caused by materials trying to minimize their surface areas at liquid-air interfaces, creating a meniscus. For 10 points, name this phenomenon that allows certain bugs to walk on water.
ANSWER: **surface tension**

6. Near "Pete's Parking Lot" at this location, Pete Conrad made a joke to win a bet with a reporter who claimed his words would be censored by the government. This location was said to have "magnificent desolation," and Michael Collins did not join his two colleagues in exploring it. A man at this location had the word "a" obscured when he said "That's one small step for man, one giant leap for mankind." For 10 points, name this location where Neil Armstrong walked after the landing of Apollo 11.
ANSWER: the **Moon** [anti-prompt on specific locations like the **Sea of Tranquility**]

7. After an early failure of this project, Ferdinand de Lesseps was threatened with jail time. This project was finished thanks to the leadership of George Washington Goethals and the medical discoveries of Walter Reed. The Hay-Bunau-Varilla Treaty helped set up this project by recognizing a country that had become independent from Columbia. For 10 points, name this project completed by the US in 1913, which built a waterway in Central America to connect the Atlantic and Pacific Oceans.
ANSWER: **Panama Canal** project

8. If austenite is cooled too quickly during the production of this material, martensite forms. Carburization is used to harden this material by heating in the presence of a carbon source. A popular type of this alloy resistant to corrosion contains at least 12% chromium and a smaller amount of nickel. Henry Bessemer patented the Bessemer process to produce it by blowing air through molten pig iron to remove impurities. For 10 points, name this iron alloy that comes in a stainless variety.
ANSWER: **steel**

9. RNA levels can be detected using the quantitative reverse-transcription type of this technique. This technique was made possible by the discovery of *Thermus aquaticus*. This process involves denaturation and annealing steps. Complementary primers specify the target region Taq polymerase will synthesize in this technique, which can be used to identify individuals in paternity tests. For 10 points, name this technique used to amplify specific DNA sequences.
ANSWER: **PCR** [or **polymerase chain reaction**]

10. One can determine this quantity by multiplying the square of the z-score by variance and dividing by the square of the desired margin of error. The central limit theorem states that if this quantity is at least thirty, one can use a normal distribution. Since all the data for a population is usually unknown, the denominator of the variance is usually this quantity. For 10 points, identify this term applied to the quantity of data or observations one takes from a population in order to make some sort of inference.
ANSWER: **sample size** [or obvious equivalents]

11. The speaker of a poem by this author marvels at "the achieve of; the mastery of the thing!" while observing a "dapple-dawn-drawn Falcon." This man attempted to mimic human speech in his poems by employing "sprung rhythm." The second stanza of a poem by this man praises a figure for creating "All things counter, original, spare, strange" and opens "Glory be to God for dappled things." For 10 points, name this Jesuit priest who authored "The Windhover" and "Pied Beauty."
ANSWER: Gerard Manley **Hopkins**

12. This team gave playing time to Tyler Ulis, Alex Poythress, and Marcus Lee under its "platoon" system, and was led in scoring by Aaron Harrison and Karl-Anthony Towns. This SEC team was knocked out of the NCAA semifinals by Sam Dekker and Frank Kaminsky's Wisconsin squad. For 10 points, name this John Calipari-coached team which went undefeated in the 2014-2015 regular season, during which it played home games at Rupp Arena in Lexington.
ANSWER: 2014-2015 University of **Kentucky** basketball team [or **UK**; prompt on **Wildcat**s]

13. The wooden cup used by the ruler of this group was described by the diplomat Priscus. This tribe was defeated by Flavius Aetius on the Catalaunian Plain at the Battle of Chalons. A leader of this tribe demanded to marry Honoria after receiving a ring from her, but died of a nosebleed after marrying another woman. Pope Leo I legendarily stopped the sack of Rome by this tribe by meeting with their leader, who was known as the "Scourge of God." For 10 points, name this nomadic tribe led by Attila.
ANSWER: **Hun**s

14. For an economy, this property is measured by the Gini coefficient, which is derived from plotting the Lorenz curve. This phenomenon is driven by the fact that "r is greater than g" according to Thomas Piketty's *Capital in the Twenty-First Century*, which says that it inevitably increases under capitalism. For 10 points, name this measure of the magnitude of difference in wealth or income between richer and poorer segments of society.
ANSWER: income **inequality** [or wealth **inequality**]

15. The southern end of this location contains the Monument to the People's Heroes. A 1976 incident here took place on Tomb Sweeping Day and was prompted by the death of Premier Zhou Enlai **(JOE en-LAI)**. This location is south of its namesake gate, the front entrance to the Imperial City. During a protest in this place, an unidentified man carrying a shopping bag blocked a column of tanks. For 10 points, name this large public square in central Beijing, the site of student protests in 1989.
ANSWER: **Tiananmen** Square

 **2016 VHSL Conferences - Round 08 - Tiebreaker Questions**

1. This text ends with the story of a dead man who revives while on his own funeral pyre to explain the afterlife. Concluding with the "myth of Er," this text features a speaker defining the "child of goodness" as the sun. In a section of this text, Glaucon imagines prisoners forced to look at shadows on a wall, which they believe to be reality. This text promotes the reign of wise philosopher kings and contains the allegory of the cave. For 10 points, name this dialogue by Plato about the just city-state.
ANSWER: *The* ***Republic*** [or ***Politeia***; or *De* ***Republica***]

2. UNESCO helped rebuild one of these places in Mostar after its destruction in the Bosnian War. In 1967, one of these places was dismantled and reconstructed in Lake Havasu City, Arizona. In 2015, many "love locks" were removed from one of these places in Paris. One of these places "of Sighs" is located in Venice. Seven of these places connected various parts of Königsberg. For 10 points, identify these structures that include one that is named for the Tower of London and crosses the Thames.
ANSWER: **bridge**s

3. This group’s operation of *reduction* settlements was a factor in their suppression in Portugal in 1759. European maps were spread by a member of this group named Matteo Ricci. After being wounded by a cannonball, the founder of this group went to a cave to write his *Spiritual Exercises*. This group's activities in Asia were led by Francis Xavier, and this organization was founded by Ignatius of Loyola. For 10 points, name this Catholic order called the "Soldiers of God" for their evangelical activities.
ANSWER: **Jesuit**s [or **Society of Jesus**]

4. At the end of this novel, a pharmacist receives the cross of the Legion of Honor. The protagonist of this novel starts an affair with Leon Dupuis **(doo-PWEE)** under the guise of receiving piano lessons. The protagonist of this novel has Berthe with her husband, a country doctor. The title character of this novel poisons herself with arsenic after accumulating debts and having an affair with Rodolphe Boulanger **(boo-lahn-ZHAY)**. For 10 points, name this novel by Gustave Flaubert **(floh-BAIR)**.
ANSWER: ***Madame Bovary***

5. In *Crassulaceae* **(crass-yu-LAY-see-ai)**, this molecule is sequestered for future use in the form of malate in vacuoles. Two molecules of 3-phosphoglycerate **(foss-foh-GLIS-uh-rate)** are formed when RuBP reacts with this molecule. Photorespiration occurs when oxygen instead of this molecule binds to RuBisCO, which assimilates this molecule in the Calvin cycle. For 10 points, name this gaseous molecule plants fix to make sugars in photosynthesis, symbolized CO2.
ANSWER: **carbon dioxide** [or **CO2** before it is read]

What Italian word meaning "detached" refers to the practice of playing notes very abruptly, and is the opposite of "legato?"
ANSWER: **staccato**

This is a calculation question. A regular hexagon is bisected to form two congruent isosceles trapezoids, each with height 3 times the square root of 3, all over 2. What is the area of the hexagon?
ANSWER: **27** times the square **root** of **3** all **over 2** square units [or **27** times **rad**ical **3** all **over 2** square units]