**VHSL Regionals 2016-2017 - Round 04 - First Period, Fifteen Tossups**

1. This text opens by listing five constant factors that the reader should consider, including "the moral law," "Heaven," and "Earth," although the latter two refer to the seasons and terrain. This book emphasizes deception, as seen by the line "when we are near, we must make the enemy believe we are far away." It discusses nine common battlegrounds and five types of intelligence sources. For 10 points, name this book by Sun Tzu (ZOO), a Chinese text on military strategy.
ANSWER: *The* ***Art of War*** [or the ***Sunzi*** until "Sun Tzu" is read; or ***Sunzibingfa*** until "Sun Tzu" is read]

2. When this man took the throne, he inherited the Kalmar War from his father, which he lost. During his victory at the Battle of Rain, his nemesis, the Count of Tilly, died. This man died in a battle when he became isolated by smoke and fog while fighting Wallenstein's forces. This ruler decisively led Protestant forces to victory at the Battle of Breitenfeld, but later died at Lutzen. For 10 points, name this "Lion of the North," a powerful Swedish king killed during the Thirty Years War.
ANSWER: **Gustavus Adolphus** [or **Gustav II** Adolf]

3. Metabolic acidosis can cause this Kussmaul type of this process. A forced form of this process uses the internal intercostals (in-ter-KOSS-tuls). Frogs use the positive pressure form of this process. It may be assessed by measuring the tidal volume. This process is assisted by surface tension-reducing surfactant to prevent collapse of alveoli (al-vee-O-lye), and it is mediated by expansion and contraction of the diaphragm and rib cage. For 10 points, name this process of inhalation and exhalation carried out by lungs.
ANSWER: **breathing** [or **ventilation**; or **respiration**; or **inhalation** or **exhalation** before they are read; accept word forms]

4. The so-called "Cheddar Man" was discovered on this island. A ruler here constructed an earthwork known as Offa's Dyke. Seven kingdoms on this island, known as the Heptarchy (HEP-tark-EE), were later unified. The Danelaw was the region of this island where Vikings lived. Small kingdoms on this island included Mercia, Wessex, and Kent, and rulers here included Alfred the Great. For 10 points, what island is where England is located?.
ANSWER: Great **Britain** [prompt on England until it is read]

5. A deity of this activity was born from a drop of Shiva's sweat or blood and is named Mangala. A Japanese god of this activity was venerated by the Minamoto clan, is the subject of the second most numerous type of Shinto shrine, and bears the name Hachiman. The Kauravas and the Pandavas engage in this activity in the main plot point of the *Mahabharata*, and it was the primary domain of the Greek god Ares and the Roman god Mars. For 10 points, name this activity that often involved archery or sword fighting.
ANSWER: **war** [or **fighting** until "fighting" is read; prompt on archery]

6. The varying mass of these particles can be explained by the seesaw mechanism, and the 2015 Nobel Prize in Physics was awarded for detection of their oscillation. These particles come in electron, mu, and tau flavors. These particles were proposed by Wolfgang Pauli to preserve energy and momentum conservation in beta decay. These particles were incorrectly observed to be traveling faster than light by the OPERA experiment in 2011. For 10 points, what weakly interacting, nearly massless leptons are named for the Italian translation of "little neutral one", as opposed to "big" neutrons?
ANSWER: **neutrino**s

7. Human totipotent (toh-TIH-"potent") cells can differentiate into all three germ layers and this structure derived from trophoblasts (tro-fo-blasts). This organ is biopsied in chorionic villus (kohr-ee-ON-ik VILL-uss) sampling. It secretes hCG after implantation of the blastocyst. Alcohol can pass through this structure and cause fetal alcohol syndrome. For 10 points, name this organ attached to the umbilical cord that acts as an interface between mother and fetus.
ANSWER: **placenta**

8. This author is the namesake of the principle that every element introduced in a piece of literature must have an ultimate, concrete purpose, which is known as his namesake "gun." A play by this writer ends with a servant resigning himself to his death amidst the sound of axes chopping down the title grove. He wrote a play in which Konstantin shoots himself and Nina's need for freedom is compared to that of the title bird. For 10 points, name this Russian dramatist who wrote *The Cherry Orchard* and *The Seagull*.
ANSWER: Anton **Chekhov**

9. Restoration of a painting of this scene was made possible by Giampietrino's (jahm-pyet-TREE-nose) exact copy of it. Paolo Veronese (vair-row-NAY-zay) was forced by the Inquisition to rename his painting of this scene after the House of Levi. In a painting of this scene, a shadowy man tips over a salt cellar after hearing its central person tell his companions "One of you will betray me." For 10 points, name this scene painted by Leonardo da Vinci that shows Jesus and the Apostles having a meal.
ANSWER: the **Last Supper**

10. This world leader was mocked for conflating presidential candidates and describing a certain "Hillary Trump". Thousands of citizens chanted "resign now" at this leader as he gave the traditional "Independence Scream" in September 2016. He is the target of the "Yo Soy 132" student movement. This member of the PRI was mocked for his hosting of Donald Trump in August 2016, even though Trump has called for a wall built between this leader's country and the U.S. For 10 points, name this current President of Mexico.
ANSWER: Enrique Pena **Nieto** (NEE-ay-TOH)

11. After tweeting images of mosquito repellent, this player was mocked with the chant "Zika!" In 2007, this player angrily criticized coach Greg Ryan after being benched in favor of veteran Briana Scurry. This player was charged with assault in 2014 for actions against her half-sister and nephew. She was suspended after remarking that the Swedish team was "a bunch of cowards" during the 2016 Olympics. For 10 points, name this longtime goalkeeper for the U.S. women's soccer team.
ANSWER: Hope **Solo** [or Hope **Stevens**]

12. Seven protesters in this city, including Abbie Hoffman and Jerry Rubin, were put on trial after disrupting a political event here. This city's longtime mayor was Richard J. Daley, who was in office during the riot-torn 1968 Democratic National Convention. NBA player Dwyane (DWAYNE) Wade's cousin was recently killed in this city, which has had over 3,000 shootings in 2016. For 10 points, Rahm Emanuel is currently the mayor of what city in Illinois?
ANSWER: **Chicago**

13. Prices in this scenario can be described by the Ramsey Problem, under which social welfare is unexpectedly maximized. The natural type of this scenario is often characterized by high increasing returns to scale. This scenario invariably creates more deadweight loss than under perfect competition, because the relevant company can set prices to a level that maximizes profits. For 10 points, name this economic scenario wherein there is only one producer of a specific good or service.
ANSWER: **monopoly**

14. The protagonist of this novel has a brief love affair with a female typist whom he meets in a public swimming pool. In this novel's first section, the protagonist writes a letter for his neighbor to send to the neighbor's girlfriend, though his neighbor beats her after they quarrel. This book begins with an announcement of the death of the protagonist's mother, and it ends with the title character awaiting execution for shooting an Arab on a beach. For 10 points, name this existentialist novel about Meursault (mer-SO) written by Albert Camus (al-BAIR kah-MOO).
ANSWER: *The* ***Stranger*** [or *L'****Etranger***; or *The* ***Outsider***]

15. The *dunun* and the goblet-shaped *djembe* (duh-JEM-bay) are two kinds of these objects always used together. The *tama* type of this object common in West Africa is often nicknamed "talking" and can be manipulated by pulling tension cords. Natives of Trinidad and Tobago use a type of this object made from steel for calypso. Other kinds of this object from the Caribbean include the paired bongos and the tall congas. For 10 points, name these percussion instruments beaten with hands or namesake "sticks."
ANSWER: **drum**s [or **percussion** until it is read]

 **VHSL Regionals 2016-2017 - Round 04 - Directed Period**

1A. During DNA replication, the lagging strand must form what namesake "fragments" in order to be synthesized 5-prime to 3-prime?
ANSWER: **Okazaki** fragments

1B. What Beyoncé album's twelve tracks all appeared on the *Billboard* Hot 100, including the politically controversial song "Formation"?
ANSWER: ***Lemonade***

2A. Which writer claimed that tragedy was able to invoke the catharsis of emotions in the audience in part of his book *Poetics*?
ANSWER: **Aristotle**

2B. What year in the mid-nineteenth century featured numerous European revolutions in places such as France, Germany, and Hungary?
ANSWER: **1848**

3A. This is a 20-second computation question. Find the side length of a rhombus whose diagonals have lengths sixteen and thirty.
ANSWER: **seventeen** [the diagonals bisect each other, dividing the rhombus into four right triangles with legs 16/2=8 and 30/2=15; the side length of the rhombus is the hypotenuse of the right triangles, which is sqrt(8^2+15^2)=17 by the Pythagorean Theorem.]

3B. This is a 20-second calculation question. What is the value of i to the sixteenth power?
ANSWER: **one** [i to the 16th = i to the 4th, all to the 4th = 1 to the 4th = 1]

4A. What English composer wrote *The Young Person's Guide to the Orchestra* and gave the title role of his opera *Peter Grimes* to his partner Peter Pears (peers)?
ANSWER: Benjamin **Britten** [or Edward Benjamin **Britten**]

4B. What author used his experiences in the Vietnam War to write books such as *The Things They Carried* and *Going After Cacciato*?
ANSWER: Tim **O'Brien**

5A. The Precambrian is divided into the Hadean, Archean, and Proterozoic, which are three instances of what units of geologic time?
ANSWER: **eon**s [do not accept or prompt on "supereons"]

5B. Which Southern woman wrote the short stories "A Worn Path" and "Why I Live at the P.O."?
ANSWER: Eudora **Welty**

6A. What 1887 act divided American Indian tribal land into allotments for individual Indians?
ANSWER: **Dawes** Act [or **Dawes** Severalty Act of 1887; prompt on General Allotment Act]

6B. What German word literally means "double-goer" and refers to a supernatural double of a living person?
ANSWER: **doppelganger**

7A. Catherine Morland is the protagonist of what Jane Austen novel that satirizes the genre of Gothic fiction?
ANSWER: ***Northanger Abbey***

7B. What Florida Congresswoman resigned as Chairperson of the Democratic National Committee after the 2016 convention?
ANSWER: Deborah "Debbie" Wasserman **Schultz** [or Deborah **Wasserman**]

8A. This is a 30-second calculation question. A coin is weighted so that it only comes up heads thirty percent of the time. If the coin is flipped three times, what is the probability of getting exactly one head?
ANSWER: **0.441** [There are three ways we can get one head: on the first flip, the second flip, or the third flip; our overall probability is then 3\*0.3\*0.7\*0.7=0.441.]

8B. This is a 30-second calculation question. Find all solutions for x between zero and two pi of two times sine of three x, equals two.
ANSWER: **pi over six**, **five pi over 6**, and **nine pi over six** [the last value may be given as **three pi over two**; do not prompt on partial answers] [dividing by two gives sin(3x)=1, so 3x must equals pi/2 + 2k pi; dividing by 3 yields pi/6 + 4/6 k pi, so we can get answers from k=0, 1, and 2.]

9A. Life expectancy, education, and average income are the three factors that determine what index of how advanced a country is?
ANSWER: **Human Development** Index [or **HDI**]

9B. What fundamental force is mediated by gluons and binds quarks together in hadrons such as the proton and neutron?
ANSWER: **strong** force [or **strong** nuclear force; or **strong** interaction]

10A. What Whig was elected to the presidency on a campaign that emphasized such images as a log cabin and apple cider?
ANSWER: William Henry **Harrison**

10B. Which longtime head of a Bryn Mawr school in Baltimore wrote the introductory text *Mythology: Timeless Tales of Gods and Heroes*?
ANSWER: Edith **Hamilton**

 **VHSL Regionals 2016-2017 - Round 04 - Third Period, Fifteen Tossups**

1. A fictional example of this kind of work is *Twilight Syndrome: Murder Case*, which the evil bear Monokuma uses to incite murder in *Danganronpa 2*. People who interact with another kind of this work named *The World* fall into comas in the *.hack* ("dot hack") series. Roger Ebert once said that this kind of work can never be art after watching the movie version of *Doom*. For 10 points, name this type of work, such as *Pong* and *Super Mario Brothers*.
ANSWER: video **game**s [or **MMO**RPGs; or Massively Multiplayer Online Role Playing **Game**s; or online **game**s]

2. This city is home to the largest single courthouse in the United States. A red brick office building here was named for a powerful local brewer and was co-designed by Dankmar Adler. The Wainwright Building, one of the earliest skyscrapers in history, was designed for this city by Louis Sullivan. Eero (air-ROW) Saarinen designed the centerpiece of the Jefferson National Expansion Memorial, the world's tallest arch, in this city. For 10 points, the Gateway Arch is in what U.S. city?
ANSWER: **St. Louis**

3. This monarch supported the Polish group known as the Targowica Confederation. This ruler founded the museum now known as the State Hermitage Museum. This monarch was opposed by a Cossack rebellion led by Pugachev, and also ordered the annexation of the Crimea. This ruler's many lovers included Count Orlov and Grigori Potemkin. She overthrew her husband, Peter III, to become empress. For 10 points, name this longest-reigning female leader of Russia.
ANSWER: **Catherine the Great** [or **Catherine II**; or **Sophie** Friederike Auguste von Anhalt-Zerbst-Dornburg; accept **Yekaterina** for "Catherine"]

4. The earliest example of this art form still performed today is *L'Orfeo* by Claudio Monteverdi. The name for this genre comes from the Italian word for "work." It involves spoken dialogue called recitatives, which performers memorize off of a script called the *libretto*. This art form is best-known for dramatic solo numbers called arias, such as "La donna è mobile" (LAH dah-nuh MOH-bee-lay) from *Rigoletto*. For 10 points, name this art form that combines classical music with drama, such as in Georges Bizet's *Carmen*.
ANSWER: **opera**

5. If two vectors have this property, then their dot product is zero. Using Thales's theorem, if points A, B, and C are on a circle, and segment AC is a diameter of the circle, segments AB and BC have this property. The shortest distance from a point to any line is a line segment that has this property with respect to the line. Two lines have this property if their slopes are negative reciprocals. For 10 points, what adjective describes two lines that meet at a ninety degree angle?
ANSWER: **perpendicular** [or **orthogonal**; or **normal**; or they **form a ninety degree angle** until "ninety degree angle" is read]

6. This ruler's mother is the patron saint of new discoveries, Helena. He eventually executed his former colleague Licinius (LUH-sin-EE-us), who ruled the eastern portion of the empire. This ruler passed the tolerant Edict of Milan and defeated Maxentius at the Battle of the Milvian Bridge. Prior to that battle, this ruler saw the message "with this sign, you will conquer," which referred to a cross. For 10 points, name this first Roman emperor to convert to Christianity.
ANSWER: **Constantine** the Great [or **Constantine** I]

7. Duplication events cause paralogs while this process is responsible for orthologous genes. This process can be facilitated by reinforcement of prezygotic barriers. Polyploidy ("polly"-ploy-dee) and habitat differentiation may lead to its sympatric (sim-"patrick") type, and its allopatric form occurs when a geographic barrier impedes mating between populations. For 10 points, name this process in which a unique type of organism arises in the taxon below genus.
ANSWER: **speciation** [accept descriptive answers such as "making a **new species**"]

8. Because he supported one of these institutions, Louis McLane was removed from the Cabinet in favor of Roger Taney (TAWNY). Nicholas Biddle headed one of these things, which the President fought by rewarding so-called "pet" ones instead. Maryland's attempt to fight one of these institutions led to the case *McCulloch v. Maryland*. Andrew Jackson fought a "war" with men like Henry Clay over one of these institutions. For 10 points, Alexander Hamilton proposed a national kind of what institution to establish financial order?
ANSWER: a national **bank** [or First **Bank** of the United States; or Second **Bank** of the United States; or **BUS**]

9. SBP-ase regenerates a molecule in this pathway. Aspartate (uh-SPAR-tate) or malate (MAY-late) is shuttled to bundle sheath cells to provide a reactant for this process in C4 organisms. When stomata close, an enzyme in this pathway may bind to oxygen and perform photo-respiration. In its first step, CO2 is added to RuBP with the help of RuBisCO. For 10 points, name this cycle in plants that fixes carbon and uses the products of the light reactions of photosynthesis.
ANSWER: **Calvin** cycle [or **Calvin**-Benson-Bassham; or **light-independent** reactions; or **dark reaction**s; or **C3 cycle**; or **carbon fixation** before "fixes carbon" is read; prompt on photosynthesis]

10. This country's "rush hour of the gods" was the massive growth in new religious movements in the 20th century. Followers of a religion in this country chant a phrase translated as "devotion to the mystic law of the Lotus Sutra." The world's largest Buddhist lay organization, SGI, is based here. This country's indigenous religion venerates gods called "kami," (kah-MEE) including the sun goddess Amaterasu (AH-ma-teh-RAH-soo). For 10 points, Shinto originated in what country?
ANSWER: **Japan**

11. This character becomes transfixed within a grove after learning it is sacred to the Eumenides (yoo-MEN-ih-dees). This character dies in the wake of a storm after predicting that his two sons will kill each other. He is troubled when he hears reports of how Laius was murdered at a crossroads, and he blinds himself when he realizes that he fulfilled a prophecy by marrying Jocasta and taking the throne of Thebes. For 10 points, name this character who appears "at Colonus" and as "the King" in two plays by Sophocles.
ANSWER: **Oedipus**

12. If a sequence is monotone and bounded, it will have this property. One might be asked to determine the radius of this property for a power series. A sequence can be shown to have this property using epsilon-delta techniques. If the ratio of successive terms in a series is less than one as the series goes to infinity, then it has this property according to the ratio test. A series will have this property if it does not sum to infinity. For 10 points, give this property of sequences that approach some limit, as contrasted with divergent sequences.
ANSWER: **convergent** [or **convergence**; or it **converge**s; or it **has a limit** until "limit" is read]

13. In this novel, the scandalous practice of entertaining guests on the ground floor is carried out by Mrs. Manson Mingott. This novel ends with its protagonist sitting on a park bench in Paris and deciding not to go up and see former love interest, the Countess Ellen Olenska. This book hinges on the impending marriage of the New York socialites May Welland and Newland Archer. For 10 points, name this novel by Edith Wharton.
ANSWER: *The* ***Age of Innocence***

14. A story by this writer ends with Ginnie putting half of a sandwich back into her pocket. "Just Before the War with the Eskimos" is a story that this writer put into *Nine Stories*, which also contains a story in which Seymour kills himself with a revolver after telling a story about the title fictional animal to the girl Sybil. This author featured members of the Glass family in stories such as "A Perfect Day for Bananafish." For 10 points, name this man who also wrote about Holden Caulfield in *The Catcher in the Rye*.
ANSWER: J. D. **Salinger** [or Jerome David **Salinger**]

15. Mathias Rust landed a plane in this city in 1987, leading to the dismissal of several defense officers. Like Washington, D.C., this city is home to a government building called the White House, where a politician gave a speech atop a tank in 1991. To honor the fall of Kazan, a ruler had a cathedral with colorful onion-shaped domes built in this city. Every May 9th, massive Victory Day parades march through this city's Red Square. For 10 points, name this city home to the Kremlin, the capital of Russia.
ANSWER: **Moscow**, Russia [or **Moskva**]

 **VHSL Regionals 2016-2017 - Round 04 - Tiebreaker Questions**

1. A large settlement in this modern-day state was named "New Helvetia," or "New Switzerland." El Camino Real (ree-ALL), or The Royal Road, was a large road in this modern-day state connecting Franciscan outposts. Father Junipero Serra founded at least nine missions in this future state when it was a province of New Spain. This current state was where an 1848 discovery was made on Sutter's (SOOT-err's) Fort. For 10 points, what state was the site of an 1840's gold rush?
ANSWER: **California**

2. In a myth from this country, a group of people were granted immortality when they ate magical peaches every six thousand years. A flood story from this country includes a partially successful remedy of expanding soil that was employed by Gun. A set of beings from its myths are the Eight Immortals. A place heralded as the world center or axis mundi of this country is Kunlun Mountain. For 10 points, name this country where the year of the dragon is one of twelve years in its zodiac.
ANSWER: **China** [People's Republic of **China**; or **Zhongguo**; or **Zhonghua Renmin Gongheguo**]

3. A poem by this author compares the sea to a "wilderness of glass" and begins by declaring that "Death has reared himself a throne in a strange city lying alone." The speaker of a different poem by this author is filled with "fantastic terrors never felt before" when he observes "the silken, sad, uncertain rustling of each purple curtain." He wrote a poem set in "bleak December" once "upon a midnight dreary." For 10 points, name this author of "The City in the Sea" and "The Raven."
ANSWER: Edgar Allan **Poe**

4. This structure contains the suprachiasmatic (SU-pruh-kee-us-MA-tic) nucleus. Osmo-receptors in this structure may signal it to *produce* vasopressin. The pre-optic area of this structure performs thermoregulation. This structure uses a portal system to distribute releasing hormones such as GnRH, which triggers secretion of follicle-stimulating hormone from the anterior pituitary. For 10 points, name this brain structure that lies right below the thalamus.
ANSWER: **hypothalamus**

5. This religion preaches that sins like lust and greed are the "Five Thieves." The country with its second most followers is Canada, particularly on the Pacific coast. Followers of this faith frequently visit a shrine in the city of Amritsar (OMM-reet-ZAR). Its founder legendarily disappeared for several days, returning to say "there is no Hindu, there is no Muslim." Adherents to this religion believe its scripture holds the eternal title of Guru Granth Sahib (sah-HEEB). For 10 points, what religion was founded by Guru Nanak?
ANSWER: **Sikh**ism (SEEK-ism) [or **Sikhi**]

Scott is playing a game in which he *randomly* selects an integer from one to ten, inclusive. If he chooses a power of two, he wins that number of dollars. Otherwise, he loses that number of dollars. In dollars, what is Scott's expected winnings from playing the game once?
ANSWER: **minus $2.50** [or **minus 5/2** dollars] [the sum of the positive payouts is 1+2+4+8=15 and the sum of the negative ones is -3-5-6-7-9-10=-40; each number has a 1/10 probability of being selected, so the expected winnings are (15-40)/10=-2.5]

What Persian king, the son of Darius, mounted a failed invasion of Greece in 480 BC?
ANSWER: **Xerxes** I [or **Xerxes the Great**]