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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl****Regular Season 2014****Round 4****First Period, Fifteen Tossups** |

1. This man used the battle cry of "Westminster Abbey or Victory!" while leading forces at the Battle of Cape St. Vincent. This man once "crossed the T" to split up the forces of Pierre Villeneuve. This general ignored Hyde Parker's signals at the Battle of Copenhagen by holding a spyglass to his blind eye. This lover of Emma Hamilton won the Battle of the Nile and said "England expects that every man will do his duty" at another battle. For 10 points, name this British admiral who died at the Battle of Trafalgar.

ANSWER: Horatio **Nelson**

2. This operation can be performed on integer data by a generalization of the bin strategy known as radix. A popular algorithm for this operation divides a set into smaller and smaller subsets before merging those sets subsets back together. Most of the efficient methods for doing this run in big O of n log n time, including the "quick" variety. For 10 points, name this operation in computer science, which orders the objects in a set by a specified quality.

ANSWER: **sort**ing

3. The first X-ray source thought to be one of these objects is Cygnus X-1, which is paired with a blue supergiant. These objects are characterized by their charge, mass, and angular momentum by the no-hair theorem. Their radius is smaller than the Schwarzschild radius. Sagitarrius A-star in the Milky Way is thought to harbor a "supermassive" example of these objects, which are thought to be found at the center of most galaxies. For 10 points, name these astronomical objects from which light cannot escape.

ANSWER: **black hole**s

4. Clyde Dunbar is absent from the title event of this story because his leg is broken. In this story, a three-legged stool is used by a man named Mr. Summers who organizes the town dances during Halloween. This story closes with a woman exclaiming "It isn't fair, it isn't right" after drawing a piece of paper with a black dot on it. For 10 points, name this short story about the stoning of Tessie Hutchinson written by Shirley Jackson.

ANSWER: "The **Lottery**"

5. Gabriel's horn has a finite value of this quantity. One can find this quantity for a solid by taking the triple integral of dx dy dz over the solid. Archimedes found that this quantity for a sphere was two-thirds that of a similarly sized cylinder, while one must multiply one-third by base times height when finding this quantity for a cone. For 10 points, identify this quantity, which gives the amount of space enclosed by a surface, and which is four-thirds pi r-cubed for a sphere.

ANSWER: **volume**

6. This actress manages the bookstore Embryo Concepts in a film best known for an extreme, overexposed close-up shot of her eyes, mouth, and nose. In another role, this actress plays a crown princess who is shown around the title city by a reporter played by Gregory Peck. In a third role, she throws a cat out of a taxi cab near the conclusion and sings a famous rendition of "Moon River." This star of *Funny Face* and *Roman Holiday* plays Holly Golightly in an adaptation of a Truman Capote novel. For 10 points, name this legendary actress who starred in *Breakfast at Tiffany's.*

ANSWER: **A**udrey **Hepburn** [prompt on **Hepburn**]

7. Father Le Loutre's War started after the establishment of this province's capital, which was decimated in 1945 by 25,000 allied soldiers in a celebratory V-E Day riot. This province contains Sable Island and connects via the Canso Causeway to Cape Breton Island. Its capital was devastated in 1917 when the *Mont Blanc* collided with the *Imo* and exploded. Lying east of Prince Edward Island and New Brunswick, for 10 points, name this Canadian province whose capital is Halifax.

ANSWER: **Nova Scotia**

8. Mark Twain helped this man write his memoirs to raise money for his family while this politician was dying of throat cancer. His Secretary of State, Hamilton Fish, resolved the *Alabama* claims. The Whiskey Ring was one of the many scandals that occurred during this man’s presidency. Previously, this man became known as “Unconditional Surrender” during the Civil War. For 10 points, name this former Union commander elected President in 1868.

ANSWER: Ulysses S. **Grant** [or Hiram Ulysses **Grant**]

9. A song by this group described a man who “carries the reminders of every glove that laid him down.” This band sang about a woman who is told to “stroll around the grounds until you feel at home,” and noted that “the words of the prophets are written on the subway walls” in a song that begins, “Hello, darkness, my old friend.” For 10 points, name this American musical duo who recorded songs such as “The Boxer,” “Mrs. Robinson,” and “The Sound of Silence.”

ANSWER: **Simon and Garfunkel**

10. One member of this phylum causes a parasitic disease called strongyloidiasis. Another member of this phylum was used by Mello and Fire to study RNA interference and is unusual in that its sexes are male and hermaphrodite. That member of this phylum was the first multicellular organism to have its genome sequenced and is *C. elegans*. Parasitic members from this phylum include hookworms. For 10 points, identify this phylum of roundworms.

ANSWER: **nematode**s [or **Nematoda**; or **roundworm**s until it is read]

11. In Book I of the *Iliad,* a person with this ability named Calchas implores Achilles for protection against Agamemnon. A man with this ability was blinded by either Athena or Hera and was transformed into a woman after hitting a pair of mating snakes. Apollo cursed a daughter of Priam who had this ability so that nobody believed what she said. For 10 points, identify this ability possessed by people like Cassandra and Tiresias, who could foresee the future.

ANSWER: **prophecy** [or word forms like **prophet**; or **divination**; or **telling** the **future** or obvious equivalents until "foresee"]

12. The leader of this group garnered criticism for a fancy watch he wore during a July 2014 speech. This group publishes an online magazine called *Dabiq.* In June 2014, this group came away with 429 million dollars after looting the Central Bank in Mosul. Members of this organization beheaded journalist James Foley in August 2014. For 10 points, name this jihadist group led by Abu Bakr al-Baghdadi that is attempting to overthrow the regime of Nouri al-Maliki.

ANSWER: **Islamic State** [or **ISIS**; or **ISIL**]

13. One of this country's southern neighbors gained independence from it following the Cisplatine War. A civil war in this country centered on a budding town called Canudos. The Rio Branco Law and the Golden Law abolished slavery in this country, which was ruled by Pedro II. In 1960, this country's capital was moved inland from Rio de Janeiro. For 10 points, name this largest South American country, which was once a key territory of the Portuguese empire.

ANSWER: **Brazil** [Federative Republic of **Brazil**] [or República Federativa do **Brasil**]

14. In an allegorical painter by this artist, a nude girl stares at the viewers while crossing her arms to conceal her genitals. This artist of *Puberty* painted seven dark-clothed mourners around a bed in *Death in the Sickroom.* Another painting by this artist of *Frieze of Life* series features a red-orange sky and a person with an agonized expression and contorted face. For 10 points, name this Norwegian artist of *The Scream.*

ANSWER: Edvard **Munch**

15. In a speech from this play, the speaker concludes, “We are such stuff are dreams as made on, and our little life is rounded with a sleep.” In this play, the drunken servants Trinculo and Stephano befriend Sycorax’s son. In this play, Ferdinand falls in love with Miranda, the daughter of a sorcerer named Prospero who was usurped as the Duke of Milan. For 10 points, name this late Shakespeare play set on an island where the characters are stranded by the title storm.

ANSWER: *The* ***Tempest***

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl****Regular Season 2014****Round 4****Directed Round** |

1A. What type of function displays symmetry across the origin and is defined symbolically as f of minus x equals minus f of x?

ANSWER: **odd** function

1B. What country is estimated to have lost 90% of its adult male population in a disastrous war against a "Triple Alliance" of Argentina, Brazil, and Uruguay?

ANSWER: **Paraguay**

2A. What prose allegory by John Bunyan describes the journey of Christian?

ANSWER: *The* ***Pilgrim’s Progress***

2B. Karl Liebknecht's Spartacist League was suppressed by what republic that led Germany between the World Wars?

ANSWER: **Weimar** Republic [or **Weimarar Republik**]

3A. This is a 20-second calculation question. What is the thirty-fourth number in the sequence whose first four numbers are -1, 3, 7, and 11?

ANSWER: **131**

3B. This is a 20-second calculation question. A village square is bordered by A Street and B Street, which run north-south and are exactly 1 mile apart, and 1st and 2nd Avenues, which run east-west and are exactly 1 mile apart. If Ken runs around the square at an average of 5 miles per hour, how long will it take him to run 3 laps around the square?

ANSWER: **2 hours 24 minutes** [or **2 and 2/5 hours**; or **144 minutes**]

4A. What city, home to the headquarters of the TVA, is also the site of the flagship campus for the University of Tennesee?

ANSWER: **Knoxville**, Tennessee

4B. What philosophical concept, studied in Epistemology, was considered by Edmund Gettier as “justified true belief?”

ANSWER: **Knowledge**

5A. The Wyandotte and Lecompton constitutions were attempts to govern what future U.S. state, wracked by violence over the slavery issue in the 1850s?

ANSWER: **Kansas**

5B. What ride-share company has, as part of its Operation SLOG, been accused of ordering thousands of fake rides from its main competitor Lyft?

ANSWER: **Uber**

6A. What device, commonly used to demonstrate Newton's laws, consists of two masses on different ends of a string that is hung over a pulley?

ANSWER: **Atwood**'s machine

6B. What is the term for viruses that infect bacteria and whose examples include the lambda and T4?

ANSWER: bacterio**phage**s

7A. The use of what jazz instrument was pioneered by Wes Montgomery, Charlie Christian, and Django Reinhardt?

ANSWER: **guitar**

7B. What novel by William S. Burroughs follows the drug addict William Lee as he travels to Interzone?

ANSWER: ***Naked Lunch***

8A. This is a 30-second calculation question. How many different ways are there to select exactly four of the letters in BANKRUPTCY, if order *does not* matter?

ANSWER: **210**

8B. This is a 30-second calculation question. For a ball thrown at an angle theta with initial speed *v*, its horizontal speed is given by *v* cosine theta and its vertical speed is measured by *v* sine theta. A ball is thrown such that its vertical speed is 21 miles per hour. If the initial speed of the ball *v* is 75 miles per hour, what is the horizontal speed of the ball?

ANSWER: **72** miles per hour

9A. What adjective describes rhymes that match a stressed syllable followed by one or more unstressed syllables, such as the rhyme between “candle” and “sandal”?

ANSWER: **feminine** rhyme [or **weak** rhyme]

9B. Provide the three-word national Motto of France, which translates into English as “liberty,” “equality,” and “brotherhood”.

ANSWER: **Liberte, Egalite, Fraternite**

10A. Name the forgetful blue fish voiced by Ellen DeGeneres in the film *Finding Nemo.*

ANSWER: **Dory**

10B. What Spanish member of the Generation of ‘27 wrote *Gypsy Ballads* and authored the play *Blood Wedding*?

ANSWER: Federico Garcia **Lorca**

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl****Regular Season 2014****Round 4****Third Period, Fifteen Tossups** |

1. This book describes a society in which chains and chamber pots are made out of gold. The author included authentic letters between himself and Peter Gilles to build the frame narrative. This book is narrated by Raphael Hythloday, a fictional traveler who visits the title island. For 10 points, name this book by Thomas More, whose title has become a common word for an idealized perfect society.

ANSWER: ***Utopia***

2. The Avery-MacLeod-McCarty Experiment demonstrated that this molecule, rather than proteins, carried information during bacterial transformation. Radioactive phosphorus to track this molecule's entrance into cells infected by bacteriophages in an experiment of Hershey and Chase. Meselson and Stahl proved that this molecule's replication was semi-conservative, producing one new and one distinct strand of its double helix. For 10 points, name this molecule that encodes genetic material.

ANSWER: **DNA** [or **deoxyribonucleic acid**]

3. This school is the alma mater of Julio Jones, and its only first overall draft choice was Harry Gilmer. This team vacated five wins from its 2007 season after an NCAA violation involving textbooks. This team’s rivalry with Auburn is fought annually in the Iron Bowl. Mark Ingram is this school’s only Heisman Trophy winner, and Bear Bryant led this team to six national championships. For 10 points, name this college football team currently coached by Nick Saban.

ANSWER: **Alabama** Crimson Tide [or Alabama **Crimson Tide**; prompt on **‘Bama**]

4. An implication of one law named for this scientist is that magnetic monopoles are forbidden. Applying another law named for this person to an infinite plane requires using a cylindrical "pillbox", which is one of his namesake surfaces. That law named for him states that the electric flux through a closed surface is proportional to the charge enclosed by said surface. For 10 points, name this German mathematician whose laws for electricity and magnetism form half of Maxwell's equations.

ANSWER: Carl Friedrich **Gauss**

5. In this city, a gang of Parabolani led by Cyril murdered the female philosopher Hypatia. The temple of Serapion and the Mouseion were located in this city. The inventor of the aelopile, Hero, was from this city, as was Euclid. This city was home to a Wonder of the World built by Sostratus on its island of Pharos. For 10 points, name this city where a lighthouse and a library were located in antiquity.

ANSWER: **Alexandria**

6. The compressibility factor equals one for substances obeying this rule. A cubic polynomial modifying this law considers an excluded volume "b" term and an attractive "a" term. This law can be proven from kinetic theory assuming elastic collisions, which is a valid assumption only at high temperatures and low pressures. Its namesake constant is about 8.314 Joules per Kelvin mole. For 10 points, name this law often abbreviated "PV = nRT."

ANSWER: **ideal gas** law

7. This man was shot while hiding in a tobacco barn by a soldier named Boston Corbett. His injured leg was treated by Dr. Samuel Mudd. This man was the only member of a group also featuring Lewis Powell and George Atzerodt to successfully carry out a scheme, as the other two men failed to kill William Seward and Ulysses Grant. This man shouted "Sic semper tyrannis!" while at Ford's Theater. For 10 points, name this actor who assassinated Abraham Lincoln in 1865.

ANSWER: John Wilkes **Booth**

8. These places are the subject of the most prominent photo collection by Bill Owens, and they are criticized in James Howard Kunstler's *The Geography of Nowhere.* The postwar archetype of these places was Levittown. Theorists such as Jane Jacobs generally advocated for limiting the growth of these places, which are blamed for causing "sprawl." For 10 points, identify these communities in which middle-class commuters stereotypically live.

ANSWER: **suburb**s

9. A famous one of these buildings known as the “farthest” one is said to be the arrival point for a journey made on the winged steed Buraq. 20,000 ceramic tiles decorate the interior of one of these buildings in Constantinople commissioned by Ahmed I and known for its blue color. The walls of these buildings contain a mihrab, a niche that denotes the qibla, or direction. Muezzins issue calls to prayer from the minarets that often adjoin these buildings. For 10 points, name these sites of worship in Islam.

ANSWER: **Mosque**s [or **Masjid**s]

10. In a short story by this man, a computer repeatedly states that there is “insufficient data for a meaningful answer” before declaring, “Let there be light.” This author of “The Last Question” wrote about Hari Seldon’s development of psychohistory in his *Foundation* series. Another of his series revolves around machines who are required not to injure human beings and obey all their orders. For 10 points, name this science fiction author of *I, Robot.*

ANSWER: Isaac **Asimov** [or Isaak Yudovich **Osimov**]

11. IG Farben established a factory at this location. Many people died on the way from this location to Bergen-Belsen in the “death marches.” Elie Wiesel wrote the book *Night* about his experiences at this location. Joseph Mengele performed his experiments at this location, above whose gates hung the slogan “arbeit macht frei.” For 10 points, name this concentration camp in Poland which was led by Rudolf Hoss, and at which more than one million people were killed.

ANSWER: **Auschwitz** [Konsentrationslager **Auschwitz**]

12. This composer scored a ballet for only thirteen instruments due to the small orchestra pit available to him at the premiere. A song from one of his ballets transitions into "McLeod's Reel" following an adaptation of the tune "Bonaparte's Retreat." The Champion Roper kisses the Cowgirl in the "Hoe-Down" section of a ballet by this composer, who worked with Martha Graham on a ballet that features a set of variations on the Shaker tune "Simple Gifts." For 10 points, name this composer of *Rodeo* and *Appalachian Spring.*

ANSWER: Aaron **Copland**

13. Friedrich Schiller wrote about the use of chorus in this literary genre in the prologue to a controversial revival of it titled *The Bride of Messina.* The iconic study of this genre named place, time, and action as its “three unities” and defined its core element as catharsis, the releasing of emotion. Aristotle's *Poetics* focuses on this genre. For 10 points, name this dramatic genre exemplified by the surviving plays of Sophocles, often contrasted with comedy.

ANSWER: Greek **tragedy** [or obvious equivalents; prompt on **drama**]

14. The goddess Idunn watched over some of these objects that kept the Norse gods from growing old. Aphrodite gave three of these objects to Hippomenes to help win a race with Atalanta. Eris wrote the phrase “to the fairest” on one of these objects to cause discord at Thetis’ wedding. For 10 points, name the type of fruit that Adam and Eve mythically ate in the Garden of Eden.

ANSWER: **apple**s [or golden **apple**s]

15. This island’s capital was founded after a landing at Sullivans Cove, near the River Derwent. This island is found south of the Boundary Islet, an island in the Bass Strait, which separates it from the state of Victoria. An animal named for this island, whose capital is at Hobart, is the world’s largest carnivorous marsupial. For 10 points, name this island off the southern coast of Australia, home to a namesake “devil.”

ANSWER: **Tasmania**

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl****Regular Season 2014****Round 4****Tiebreaker/replacement questions** |

1. This novel begins at the Admiral Benbow Inn, where the protagonist acquires a journal from the chest of Billy Bones. Cheese is used to bribe Ben Gunn in this novel, and a black spot is given to the one-legged cook aboard the Walrus. This novel is narrated by the teenager Jim Hawkins. For 10 points, name this adventure novel by Robert Louis Stevenson featuring the pirate Long John Silver.

ANSWER: ***Treasure Island***

2. This architect included a quarter mile-long continous spiral ramp in a building whose design resembles an inverted ziggurat, wider at the top than at the bottom. This architect's use of reinforced concrete for a cantilevered structure worried the building's patron, Edgar Kaufman. This planner of Guggenheim New York designed a residence atop a waterfall in rural Pennsylvania. For 10 points, name this American architect who designed Fallingwater.

ANSWER: Frank Lloyd **Wright**

3. A Hartree equals this SI unit times 4.4 times 10 to the minus 18. This unit equals exactly 10 million ergs. A farad times a volt, squared, is half of this SI unit. An electron-volt is equal to this unit times 1.6 times 10 to the minus 19. Four of these units is approximately equal to a calorie. This unit equals a kilogram times a meter squared, divided by a second squared. For 10 points, name this SI unit of energy.

ANSWER: **Joule**s [or **J**]

4. Many of this religion’s early doctrines were outlined by “Judge” Rutherford. Getting removed from this religion’s community is termed “disfellowship.” This sect’s members believe that 144,000 people are in heaven and that blood transfusions are against God. Their newsletter is called The Watch Tower. For 10 points, name this Christian sect founded by Charles Taze Russell, whose members meet in Kingdom Halls and are known for knocking on doors.

ANSWER: **Jehovah’s Witness**es

5. As Secretary of State, this person advocated the idea of “Transformational Diplomacy,” and in the first Bush administration, they served as an expert on Soviet affairs. This person published an editorial called “Why We Know Iraq Is Lying,” in January 2003. This person was the first woman to hold the post of National Security Advisor. For 10 points, name this woman, who replaced Colin Powell as Secretary of State in George W. Bush’s administration.

ANSWER: Condoleezza **Rice**

 What colonial African-American poet wrote “On Being Brought from Africa to America” and “To His Excellency General Washington?”

ANSWER: Phillis **Wheatley**

Find all points of intersection of the graphs of *y* equals *x* squared plus 4 *x* plus 4 and *y* equals *x* squared plus 6 *x* minus 6.

ANSWER: **(5,49)** [or ***x* = 5** and ***y* = 49**; do not accept additional answers]