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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **Regular Season 2014**  **Round 5**  **First Period, Fifteen Tossups** |

1. Concurrency for lines drawn these structures can be determined by Ceva's Theorem. A nine-point circle can be constructed around these shapes, through which the Euler line passes its center. A method for calculating their area is Heron's formula, and the Pythagorean Theorem is applied to the "right" variety of these. Types of them include also include scalene, isosceles, and equilateral. For 10 points, name these three-sided polygons.

ANSWER: **triangle**s

2. Rebellious slaves in this nation were resettled at Accompong and Trelawny Town after fighting a guerrilla war from its rugged Cockpit Country under Queen Nanny. This home to the Dry Harbour and Blue Mountains and site of the Maroon Wars lies across a namesake channel from the western tip of Haiti. The third-largest island in the Greater Antilles, for 10 points, name this Caribbean country lying south of Cuba, a former British colony whose capital is Kingston.

ANSWER: **Jamaica**

3. This composer's son-in-law Maximilian Steinberg finished his book on orchestration.Two movements titled "Alborada" are found in his *Capriccio Espagnol.* This composer’s symphonic poem about the *Arabian Nights* begins with the movement "The Sea and Sinbad’s Ship." He is best known for a frantic piece from his opera *The Tale of Tsar Saltan,* that depicts a prince's transformation into an insect. For 10 points, name this Russian composer of *Scheherazade* and the "Flight of the Bumblebee."

ANSWER: Nikolai **Rimsky-Korsakov** [Nikolai Andreyevich **Rimsky-Korsakov**]

4. A character in this novel is told that the Yankees have "the great DiMaggio" by the protagonist, who engages in an arm-wrestling match with a black man from Cienfuegos. The protagonist of this novel, whose apprentice is Manolin, is given the name "salao" to represent unluckiness due to the fact that he has gone eighty-four days without catching a fish. For 10 points, identify this novel about the Cuban fisherman Santiago's battle with a marlin, written by Ernest Hemingway.

ANSWER: *The* ***Old Man and the Sea***

5. This structure's namesake "dots" or "domains" are called PML bodies. The membrane which surrounds this structure has importins and exportins, which are used for transport. Support for this organelle is provided by a fibrillar network known as its "lamina". This organelle is where ribosomes are produced, and it is only found in eukaryotes. For 10 points, name this organelle that contains a cell's genetic material and often functions as the "control center" of a cell.

ANSWER: **nucleus**

6. This empire sent an expedition to "Fire Island" in boats called balsas. This empire's system of forced labor, the mit'a, was adopted into the Spanish encomienda system. A ruler of this empire threw a bible on the ground at the Battle of Cajamarca and was executed despite filling a room with gold for his captors. Atahualpa ruled this empire, which also built Machu Picchu. For 10 points, name this empire that was conquered by Pizarro and existed in modern day Peru.

ANSWER: **Inca** Empire [or **Tawantinsuyu**]

7. An officer of this ship named Peter Heywood later escaped the wreck of the Pandora. A captain of this ship was found hiding under a bed by participants in the Rum Rebellion. While on this ship, a man yelled "I am in hell!" before taking this ship to Pitcairn island. This ship's captain, William Bligh, embarked on a 4,000 mile journey in a launch boat after Fletcher Christian seized command of this ship. For 10 points, identify this British ship where a famous mutiny occurred in the south Pacific.

ANSWER: *HMS* ***Bounty***

8. A steel or tungsten carbide ball is used to measure this property in the Brinell test while a square pyramid is used in the Vickers test; both tests measure the "indentation" form of this property. A sclerometer is often used to measure the "scratch" form of this property. A scale for this property for minerals gives talc a value of 1 and diamond a value of 10. For 10 points, name this property of materials that can be measured, relatively, on the Mohs scale.

ANSWER: **hardness** [or scratch **hardness**; or indentation **hardness**]

9. This election’s losing candidate injured his knee on a car door, which left him sidelined for two weeks. That losing candidate declined to investigate the mass reports of voting fraud that took place under the Chicago machine of Richard Daley. This election was marked by the first use of televised debates in a presidential election, which helped the physically charismatic winner. For 10 points, name this presidential election in which John F. Kennedy defeated Richard Nixon.

ANSWER: Election of **1960**

10. Affinity laws relate the impeller velocity in the centrifugal class of these devices to the head gain. These devices are primed before use by filling the tube with fluid. Air conditioners and refrigerators act as the "heat" type of these devices since they move heat opposite the normal flow of energy. These devices use an energy input to move fluid against gravity or to provide pressure for flow. For 10 points, name these devices that can be used to inflate bike tires.

ANSWER: **pump**s [or air **pump**s; or heat **pump**s]

11. This language is not Latin nor Greek, but it was used to write the first philosophical novel, *Philosophicus Autodidactus.*. A philosopher who wrote primarily in this language created the "floating man" thought experiment and wrote the encyclopedia *The Canon of Medicine.* *The Incoherence of the Philosophers* was written in this language by Al-Ghazali. For 10 points, name this language used by Ibn Tufail and Ibn Sina, two Islamic philosophers.

ANSWER: **Arabic** [or **al-Arabiyah**]

12. The book *Bringing Down The House* is about students at MIT who play this game. Pontoon is a variation on this game. This game served as John Pershing’s nickname. Dustin Hoffman’s character in *Rain Man* won at this game by counting cards, which is a popular strategy. In this game, the ace can be worth either one or eleven points. For 10 points, name this card game often played in casinos, in which the player attempts to hit a score of twenty-one.

ANSWER: **blackjack** [or **twenty-one** until it is read]

13. Aaron Beck developed the "cognitive-behavioral" form of this process, which aimed to change self-defeating thoughts. Carl Rogers encouraged "active listening" and empathy in his "client-centered" form of this process. For 10 points, name this process of treating psychological problems which can involve a client on a couch talking with a psychologist.

ANSWER: **therapy** [or **counsel**ing]

14. This object had the power of prophecy because part of it was constructed from Zeus's grove at Dodona. As this object lay rotting, a piece of it fell off and killed its sleeping owner. This object's stern was damaged while passing through the Clashing Rocks. This ship's destination was Colchis, where King Aeetes's daughter Medea helped steal an object that hung on a branch. For 10 points, name this ship in which Jason sailed on the quest for the Golden Fleece.

ANSWER: ***Argo*** [or **Argo**nauts]

15. In a novel by this author, Nancy Lammeter refuses the request to adopt a child from her husband, Godfrey Cass. This author wrote about Eppie, who is adopted by the title weaver of Raveloe, in that novel. She also wrote a “Study of Provincial Life” in which the mythology scholar Edward Casaubon marries Dorothea Brooke. For 10 points, name this author of *Silas Marner* and *Middlemarch.*

ANSWER: George **Eliot** [or Mary Ann **Evans**]

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **Regular Season 2014**  **Round 5**  **Directed Round** |

1A. Name the Eighteenth Dynasty pharaoh who defeated Canaanite forces at the Battle of Megiddo and defaced the monuments of his stepmother Hatshepsut.

ANSWER: **Thutmose III** [or **Thutmosis III**; or **Tuthmosis III**; prompt on **Thutmose** or **Thutmosis** or **Tuthmosis**]

1B. What kind of logical statement occurs when the conclusion is equivalent to the premise and is thus always true?

ANSWER: **tautology**

2A. What lesions in the stomach or small intestine were shown to be caused by the *H. Pylori* bacterium by researchers who the 2005 Nobel in Physiology or Medicine?

ANSWER: peptic **ulcer**s [or gastric **ulcer**s]

2B. Name the Robert Penn Warren novel in which Jack Burden narrates the rise and fall of Governor Willie Stark.

ANSWER: ***All the King’s Men***

3A. This is a 20-second calculation question. For what values of *x* does the inverse sine of quantity one-half *x* plus 3 exist?

ANSWER: *x* is **between negative pi minus six, and pi minus six, inclusive** [or **[-pi-6,pi-6]**; prompt on *x* is **between negative pi minus six and pi minus six**]

3B. This is a 20-second calculation question. What are the two binomial factors of the expression "*x* squared plus 6 *xy* plus 5 *y* squared"?

ANSWER: (***x*+y**) and (***x*+5*y***) ("x plus y and x plus 5 y")

4A. Name the Czech author who described the intellectuals Tomas and Tereza in his novel *The Unbearable Lightness of Being*.

ANSWER: Milan **Kundera**

4B. What Northern Irish golfer broke off his engagement to Caroline Wozniacki a few months before winning the 2014 British Open?

ANSWER: Rory **McIlroy**

5A. What Jane Austen novel follows the sisters Marianne and Elinor Dashwood?

ANSWER: ***Sense and Sensibility***

5B. What adjective beginning with the letter “s” refers both to someone who is optimistic and to something that has a blood-red color?

ANSWER: **sanguine**

6A. What Attorney General under Wilson was prompted by an Anarchist bombing of his porch to launch a series of namesake reds during the first Red Scare?

ANSWER: Alexander Mitchell **Palmer**

6B. What Mayor of Toronto admitted in November of 2013, after months of denials, that he smoked crack cocaine “in a drunken stupor”?

ANSWER: Rob **Ford**

7A. What type of star is composed of electron-degenerate matter and forms when a red giant sheds its outer layers?

ANSWER: **white dwarf**

7B. Give the term for the Ancient Greek military formation that took its name from the Greek word for "finger" and consisted of several spear-wielding hoplites moving as one unit.

ANSWER: **phalanx**

8A. This is a 30-second calculation question. Line AB is tangent to circle O at point C. If segments AC, BC, and OC all have the same length, then what is the measure of angle AOB?

ANSWER: **90** degrees

8B. This is a 30-second calculation question. What is the absolute value of the difference between the arithmetic mean and the median of the following set of numbers: 2, 4, -2, 4, -2, -3, 1, 4, -4?

ANSWER: **5/9**

9A. What Australian landmark with an iconic series of layered shells was designed by Jorn Utzon?

ANSWER: **Sydney Opera House**

9B. What square mile-sized region, next to the City of Westminster, contains the stock exchange and much of the financial industry of a major world city?

ANSWER: the **City of London** [prompt on “the City”; do not accept “London”]

10A. The words "sum" (SOOM), "eram" (EH-rom), and "fui" (FWEE) are all forms of the irregular Latin verb meaning "to be," and are all in what grammatical person?

ANSWER: **first** person

10B. What Old Testament prophet saw a “valley of dry bones” and a wheel in the air in a namesake book immediately after the Book of Lamentations?

ANSWER: **Ezekiel**

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **Regular Season 2014**  **Round 5**  **Third Period, Fifteen Tossups** |

1. A holder of this position carried two swords symbolizing "miri" and "piri" and built the Akal Takht, or Timeless Throne. The current holder of this position is not a man but a text compiled by the fifth one of these, Arjun Dev. Its final human holder created the Khalsa, whose members practice the 5 Ks and do not cut their hair, and left this office to the Granth Sahib. For 10 points, name this position held by Nanak and other leaders of Sikhism, a Sanskrit word for “teacher” or “master.”

ANSWER: **guru**

2. The only major source of this metal in Roman Britain was the mines at Dolaucothi. Vast amounts of this metal have been extracted from Witwatersrand in South Africa, which supplied much of the material for Krugerrand coins. Spanish explorers were tempted by the legends of Cibola, the “seven cities” of this metal, which was sought by prospectors after an 1848 discovery at Sutter's Mill in California. For 10 points, name this precious metal whose chemical symbol is Au.

ANSWER: **Gold**

3. This chemist mentored Harold Urey and was the first to produce heavy water by electrolysis. This scientist died of cyanide poisoning in his lab, a suicide often blamed on his infamous failure to win the Nobel Prize. This chemist described a cubical atom in an early formulation of the octet rule, which was part of his valence bond theory. This man's namesake bases donate electron pairs. For 10 points, name this chemist who introduced dot structures to represent compounds.

ANSWER: Gilbert Newton **Lewis**

4. This man levelled an embargo on the city of Megara after his herald was murdered in a sacred field. This lover of Aspasia succeeded his mentor Ephialtes and won the Samian war. The Gettysburg Address may have been based on this man's Funeral Oration. This leader died in a mysterious plague that ravaged his city and commissioned Phidias to build a statue on the Acropolis. For 10 points, name this leader who presided over Athen's Golden Age.

ANSWER: **Pericles**

5. At the center of this painting, several people crawl from a stream into an oversized egg. A dagger pierces a disembodied hand next to a pig in a nun's outfit, featured on this painting's bottom right corner. This painting's leftmost panel, representing paradise, is dominated by a pink fountain. It depicts scenes from hell on its right side. For 10 points, identify this triptych created by Hieronymus Bosch.

ANSWER: *The* ***Garden of Earthly Delights***

6. Dick Cheney was the last person to hold this position under President Ford. Leon Panetta took on this role in the Clinton administration after Mack McLarty was fired. The first man to hold this position for President Obama quit in 2010 to run for Mayor of Chicago. Jack Lew left this role in 2013 to become Secretary of the Treasury and was replaced by Denis McDonough. For 10 points, name this White House position that has been held by men like Rahm Emmanuel.

ANSWER: White House **Chief of Staff**

7. This man killed John Sheets out of revenge for the death of his former boss, "Bloody Bill" Anderson, a Confederate bushwhacker. That murder came when he and an older relative were teamed up with Cole Younger. The leader of the gang that tried to perpetrate a raid on Northfield, Minnesota, this man was ultimately killed when he was shot in the back by Robert Ford. For 10 points, name this western outlaw who robbed banks with his brother, Frank.

ANSWER: Jesse Woodson **James**

8. In one of this man’s plays, Lord Byron is an unseen character. That play of his is about the mathematical prodigy Thomasina Coverley. In another play by this author, a coin comes up heads ninety-two times in a row when flipped by the title characters. That play of his focuses on two minor characters from *Hamlet.* For 10 points, name this British playwright of *Arcadia* and *Rosencrantz and Guildenstern Are Dead.*

ANSWER: Tom **Stoppard** [or Tomas **Straussler**]

9. An antagonist on this show is Malcolm Merlyn, who killed the protagonist’s father by sabotaging his boat, and is played by John Barrowman. Deadshot kills Andy Diggle on this show, and later teams up with his brother John on Amanda Waller’s Suicide Squad. The protagonist of this series returns to Starling City after being trapped on the island of Lian Yu for five years, and is played by Steven Amell. For 10 points, name this series on the CW about the exploits of Oliver Queen.

ANSWER: ***Arrow*** [do not accept "Green Arrow"]

10. A group in this poem is said to be “burning for the ancient heavenly connection” and “smoking in the supernatural darkness.” The second part of this poem makes frequent reference to the ancient god Moloch. It was dedicated to Carl Solomon and published through the City Lights bookstore. This poem begins, “I saw the best minds of my generation destroyed by madness.” For 10 points, name this seminal poem by the Beat Generation poet Allen Ginsberg.

ANSWER: ***Howl***

11. An iron-sulfur protein called aconitase is active in this pathway. Succinate dehydrogenase reduces FAD to FADH2 in this metabolic process. In its first step, template oxaloacetate reacts with acetyl-CoA to form a six-carbon tricarboxylic acid. This pathway makes two ATP and evolves four carbon dioxide molecules per glucose molecule. For 10 points, name this cycle which takes place in the mitochondrial matrix during respiration.

ANSWER: **Krebs** cycle [or **citric acid** cycle; or **tricarboxylic acid** cycle; or **TCA** cycle]

12. This nation’s government has a majority share in Statoil. It narrowly rejected joining the European Union in 1972 and 1994. This nation’s Ekofisk oil field was the first to be discovered in the North Sea. Its language is written using the competing standards of Bokmål and Nynorsk. In 2011, a youth camp associated with this nation’s Labor Party was the victim of a mass shooting by Anders Breivik. For 10 points, name this Scandinavian nation whose capital is Oslo.

ANSWER: **Norway** [or Kingdom of **Norway**] [or Kongeriket **Norge**] [or Kongeriket **Noreg**]

13. Doctor Pascal is the title physician of a novel by this author. Jacques Lantier is at the center of another novel by this author, who also described Lantier's half-sister playing the lead role in a performance of *The Blonde Venus.* Those works, *The Human Beast* and *Nana,* appear alongside *Germinal* in this author's twenty-novel cycle called *Les Rougon-Macquart.* For 10 points, name this French author who wrote a letter defending Alfred Dreyfus entitled "J'accuse."

ANSWER: Emile **Zola**

14. This opera called for a now-lost “instrument of steel” to represent bells carried by a character originally sung by the librettist Emmanuel Schickander. That character from this opera is a birdcatcher who functions as comic relief. This opera’s primary antagonist is a coloratura soprano, the Queen of the Night. This opera employs Masonic symbolism in depicting the journey of Papageno and Tamino. For 10 points, name this singspiel, the final opera of Wolfgang Mozart.

ANSWER: *The* ***Magic Flute*** [or *Die* ***Zauberflöte***]

15. The existence of this quantity was proven when Stern and Gerlach fired silver atoms through an inhomogeneous magnetic field. The fourth quantum number describes this property, which for electrons can be either plus or minus one-half. A consequence of the Pauli exclusion principle is that two electrons in the same orbital cannot have the same value for this quantity. For 10 points, give the term for the intrinsic angular momentum of a particle, which is either "up" or "down."

ANSWER: **spin** [or **intrinsic angular momentum** until it is read]

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **Regular Season 2014**  **Round 5**  **Tiebreaker/replacement questions** |

1. This number is the bond order of a compound with 6 bonding electrons and 2 antibonding electrons. This value is the most common oxidation state of zinc and nickel ions. Nitrogen gas contains this many pi bonds. Ordinally, radium and barium are in this group on the Periodic Table: the alkaline earth metals. Every atomic orbital holds at most this many electrons. For 10 points, give this number of hydrogen atoms in a water molecule.

ANSWER: **two** [or positive **two**]

2. Throughout this woman’s career, she was rivals with the Italian Elsa Schiaparelli. Her affair with “Boy” Capel influenced her design of men’s blazers. Credited with popularizing the design of the little black dress, this woman worked with perfume maker Ernst Beaux in creating her trademark “No. 5” scent. For 10 points, name this French fashion designer who popularized a liberation in women’s styles in the twentieth century.

ANSWER: Coco **Chanel** [or Gabrielle Bonheur **Chanel**]

3. Though he did not live to see it, this Amendment was the main focus of Wayne Wheeler's political group. It indirectly helped Bugs Moran to make millions, and the opposing sides regarding its passage were known as the "drys" and the "wets." This Amendment was enforced by the Volstead Act, and it was reversed by the Twenty-First Amendment. For 10 points, name this Constitutional Amendment that established a prohibition on alcohol.

ANSWER: **Eighteenth** Amendment [prompt on **Prohibition**]

4. The protagonist of this novel dresses as a ham for a Halloween pageant. The narrator of this novel begins by remarking that when her brother was thirteen, he got his arm badly broken at the elbow. When the central characters of this novel are attacked by Bob Ewell, they are rescued by the reclusive Boo Radley. For 10 points, name this novel about Scout and Atticus Finch by Harper Lee.

ANSWER: ***To Kill a Mockingbird***

5. In Zoroastrianism, Angra Mainyu is blamed for introducing this substance to King Zohak. This substance must be "jhatka" and not "kutha" for Shaivites and other Hindu sects that use it. In Islam, the process of acquiring this substance is known as "dhabihah," and in Judaism, it is called "shechita;" both of those methods involve severing the carotid and jugular with a sharp knife. For 10 points, identify this substance which is completely avoided by Jains and other vegetarians.

ANSWER: **meat**

What lab technique, often used following PCR, separates macromolecules based on their size and charge by using a matrix of agarose?

ANSWER: **gel electrophoresis** [prompt on **electrophoresis**]

In degrees, what is the inverse cosine of negative one half?

ANSWER: **120** degrees