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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **Regular Season 2014**  **Round 22**  **First Period, Fifteen Tossups** |

1. One of these animals, Hofvarpnir, helps Gna run errands for Frigg. Another of these animals, given to Magni after he lifted the dead Hrungnir off of Thor, was named Gullfaxi after its golden hair. One of these animals helped build a wall until being led away by Loki, who was disguised in this form. That example, Svadilfari, became the father of the most famous of these creatures, the eight-legged Sleipnir. For 10 points, name these animals often saddled and ridden in Norse myth.  
ANSWER: **Horse**s

2. A method for finding these numbers is the Sieve of Eratosthenes. Their "Mersenne" varieties are one less than a power of two. The infiniteness of these numbers was proven by considering the multiplication of all known numbers and adding one by Euclid. The fundamental theorem of arithmetic defines every integer greater than one to be a product of these numbers. For 10 points, name these numbers of which two is the only even example and whose only divisors are one and themselves.  
ANSWER: **prime** numbers [or **prime**s]

3. The alphabet of these people added the letter “hwair” to Greek script and is preserved in the Skeirems commentary a bible compiled by Ulfilas. The Amali and Balti dynasties led the Greuthungi and Thervingi branches of this people, whose story is told in Jordanes's Getica. Cassiodorus and Boethius served a king of this people who established his capital at Ravenna after slaughtering Odoacer at a feast. Theodoric was a great ruler of, for 10 points, what Germanic tribe with prominent “Visi-” and “Ostro-” branches?  
ANSWER: **Goths** [or Visi**goth**s until "Visi" is read; or Osto**goth**s until "Ostro" is read]

4. This man asked people in Boston and Omaha to mail out letters in order to study social links between individuals in his small-world experiment. He observed that people were more likely to deliver lost letters to medical researchers than to the fictitious "Friends of the Nazi Party." In another experiment he designed, a subject read out word pairs to a learner and administered electric shocks after incorrect answers. For 10 points, name this American psychologist who conducted an experiment on obedience.  
ANSWER: Stanley **Milgram**

5. Militia from this state massacred Comanche peace representatives at the Council House Fight. It isn't Wyoming, but this state's “Ma” Ferguson was the first elected female governor in U.S. history. A massive 1900 hurricane destroyed this state's port city of Galveston. Its governor John Connally was shot in an assassination that left the presidency in the hands of another native of this state, Lyndon Johnson. For 10 points, name this state where JFK was assassinated in Dallas.  
ANSWER: **Texas**

6. Shortly before dying, this person issued an anti-nuclear manifesto with Bertrand Russell that called for the Pugwash Conference. This person collaborated with Leo Szilard on a letter to FDR explaining the atomic bomb and authored the *Annus Mirabilis* papers. In a theory due to him, spacetime is curved by the presence of mass. He expressed mass-energy equivalence with the equation E equals m c squared. For 10 points, name this man who developed the general theory of relativity.  
ANSWER: Albert **Einstein**

7. In the wake of the *Itata* Incident, two American sailors from the USS *Baltimore* were stabbed in this country during an 1891 civil war that toppled Jose Manuel Balmaceda. The Rettig report detailed abuses in this country by the Caravan of Death and DINA secret police under a man who overthrew Salvador Allende in 1973. For 10 points, name this South American nation led by Augusto Pinoche, a long, slender country whose capital is Santiago.  
ANSWER: **Chile**

8. The fourth stanza of this poem describes a group as they “plunged in the battery-smoke,” at which “all the world wonder’d.” As it ends, the speaker asks “When can their glory fade?’ of the title group, who rode “half a league, half a league…into the valley of Death.” For 10 points, name this poem by Alfred, Lord Tennyson about a cavalry charge in the Crimean War.  
ANSWER: “The **Charge of the Light Brigade**”

9. Some members of this phylum use snapping structures called pedicellaria against smaller organisms. Classes of this phylum include Crinoidea and Holothuroidea. Some members of this phylum use Tiedemann's bodies for ceolomocyte production, whereas the madreporite is used for food intake. These organisms exhibit pentaradial symmetry, and their water vascular system includes stone canals. The name of this phylum means "spiny skinned." For 10 points, name this phylum of sea urchins and starfish.  
ANSWER: **echinoderm**s [or **Echinodermata**]

10. Although both a bard and a priest worked for these people unwillingly, only the bard Phemius was spared. The maid Melantho was hanged for sleeping with this group of people. One of them named Antinous violated xenia by throwing a chair at a disguised old beggar, and they were killed after failing to string a bow and shoot an arrow through twelve axe heads. For 10 points, identify these men who attempted to marry Odysseus's wife during his absence.  
ANSWER: **suitor**s of **Penelope** [or obvious equivalents mentioning **Penelope**; or **Proci**]

11. A huge dark region on this object that consists of four-billion-year-old rock is called Galileo Regio. This object's magnetic field is strong enough to support a magnetosphere, the only such among satellites in the Solar System. This object is in an orbital resonance with Europa and Io. The largest member of the Galilean moons, it and Titan are the only moons bigger than Mercury. For 10 points, name this largest moon of both Jupiter and the Solar System.  
ANSWER: **Ganymede** [or **Jupiter III**]

12. A member of this family frequently shouted the word "OMAHA" during a game against the San Diego Chargers. Another member of this family completed a miraculous pass to David Tyree in a Super Bowl against the Patriots. The patriarch of this family was a New Orleans Saints player named Archie, and its most successful member was the quarterback of the 2013 Denver Broncos. For 10 points, name this family of NFL quarterbacks that includes Eli and Peyton.  
ANSWER: **Manning**

13. This poet wrote about how “the sea grows old” in a chasm in a poem in which the title creatures “wade through black jade.” She also noted, “there are things that are important beyond all this fiddle,” in a poem about a type of writing in which “one discovers…after all, a place for the genuine.” This poet began that poem with the observation, “I, too, dislike it.” For 10 points, name this American poet whose poems in syllabic verse include “The Fish” and “Poetry.”  
ANSWER: Marianne **Moore**

14. Most tourists to this city stay in its affluent Garden City district. Its namesake tower, shaped like a lotus plant, is found in the Zamalek district on Gezira Island, which sits in this city’s major river. This city, sometimes called the “city of a thousand minarets,” is home to one of the world’s oldest universities, al-Azhar. The Great Pyramids of Giza are near this city. For 10 points, name this capital of Egypt.  
ANSWER: **Cairo**, Egypt

15. Robert Schumann exclaimed "Hats off, gentlemen, a genius!" after hearing this composer's variations on "La ci darem la mano." This composer’s second piano sonata is often nicknamed "the Funeral March." This composer’s etudes include the "Black Key" and the "Revolutionary." A waltz by this composer was inspired by the sight of a dog chasing its own tail. This composer wrote many nationalistic polonaises and mazurkas evoking his native Poland. For 10 points, name this composer of the *Minute Waltz.*  
ANSWER: Frederic **Chopin** [or Frederic Francois **Chopin**; or Fryderyk Franciszek **Chopin**]

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **Regular Season 2014**  **Round 22**  **Directed Round** |

1A. What Argentinean author wrote about Yu Tsun's murder of Dr Albert as a secret message in his short story "The Garden of Forking Paths"?  
ANSWER: Jorge Luis **Borges**

1B. If a graph of a curve is already known to be a function, what test is used to see whether it is one-to-one, or injective?  
ANSWER: **horizontal line** test [do not accept "vertical line test"]

2A. What animal is called "Hund" in German, "chien" in French and "perro" in Spanish?  
ANSWER: **dog**

2B. What literary term identifies an emotional address to an absent person or an inanimate object?  
ANSWER: **apostrophe**

3A. This is a 20-second calculation question. A die is weighted such that a "6" appears with probability 0.4. What is the mean number of times a "6" appears in a set of 40 rolls?  
ANSWER: **16**

3B. This is a 20-second calculation question. What is the inverse of the function given by "f of *x* equals base 10 logarithm of quantity *x* plus 6"?  
ANSWER: **10 to the *x*, minus 6** [do not accept "10 to the quantity *x* minus 6"]

4A. What norther Italian city, the capital of Lombardy, was led by Ludovico “Il Moro” and other members of the Sforza family?  
ANSWER: **Milan**

4B. What city was Saul of Tarses traveling on the road to when he was blinded by a great light?  
ANSWER: **Damascus**

5A. What compound consists of two N–H 2 group bound to the carbon of a carbonyl and is the main nitrogen-containing waste product in mammalian urine?  
ANSWER: **urea** [or **carbamide**]

5B. In what song, the lead single from the upcoming album *1989,* does Taylor Swift claim that "Heartbreakers gonna break" and "Haters gonna hate?"  
ANSWER: "**Shake It Off**"

6A. What element is bound to sulfur in cinnabar and is the only metallic element that is liquid at room temperature?  
ANSWER: **mercury** [or **Hg**]

6B. What city northeast of Hamilton, the most populous in the Golden Horseshoe, lies on the northern banks of Lake Ontario?  
ANSWER: **Toronto**

7A. Robert Smithson's 1970 earthwork sculpture *Spiral Jetty* is sometimes submerged for years at a time by what lake?  
ANSWER: **Great Salt** Lake

7B. Name the principle of internet usage that critics have alleged the FCC’s Open Internet proposal would violate.  
ANSWER: **net neutrality**

8A. This is a 30-second calculation question. If sine of *x* equals *y*, then what, in terms of *y*, is secant squared *x*?  
ANSWER: **one over** quantity **one minus *y* squared** [or **1/(1-*y*2)**]

8B. This is a 30-second calculation question. Quadrilateral ABCD is drawn such that angles ABC and ADC each measure 90 degrees. Line segments AB, BC, CD, and DA measure 7, 24, 20, and 15 units, respectively. What is the area of quadrilateral ABCD?  
ANSWER: **234** square units

9A. What Scottish novelist used her experience at a girls’ school as the basis for *The Prime of Miss Jean Brodie.*  
ANSWER: Muriel **Spark**

9B. What character from American literature tricks his friends into whitewashing a fence for him?  
ANSWER: **Tom** Sawyer [or Tom **Sawyer**]

10A. What now-defunct political party did Henry Clay belong to when he ran for President in 1844 against Democrat James K. Polk?  
ANSWER: **Whig** Party

10B. What peace agreement came to encompass the later treaties of Rastatt and Baden, and ended the War of the Spanish Succession?  
ANSWER: Peace of **Utrecht** [or Treaty of **Utrecht**]

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **Regular Season 2014**  **Round 22**  **Third Period, Fifteen Tossups** |

1. The LCAO method considers constructive and destructive interference of these wavefunctions. The energy difference between these objects gives the wavelength of bands in emission spectra. Valence bond theory proposes that these objects hybridize. They are specified by three quantum numbers, corresponding to their energy, shape, and orientation. For 10 points, name these regions outside an atom where you're likely to find an electron, which have s, p, d, and f forms.  
ANSWER: atomic **orbital**s [or **s orbital**s; or **p orbital**s; do not accept atomic "orbits"; do not accept "molecular orbitals" or "MOs"]

2. The cytochrome bc1 complex and cytochrome c oxidase are later steps in this process. After succinate goes through Complex II, it enters this process via coenzyme Q thus being parallel to complex I, which turns NADH into NAD+. This process couples with oxidative phosphorylation by creating a proton gradient that can turn ATP synthase to generate ATP. For 10 points, name this process in which the namesake negatively charged particles are shuttled between molecules by redox reactions.  
ANSWER: **electron transport** chain [or **ETC**; or **electron transfer** chain]

3. This poet quipped, “Malt does more than Milton can to justify God’s ways to man.” Another of his poems notes that “silence sounds no worse than cheers after earth has stopped the ears” and begins by recalling “the time you won your town the race” to the addressee. For 10 points, name this British poet whose collection *A Shropshire Lad* includes “Terence, This Is Stupid Stuff” and “To an Athlete Dying Young.”  
ANSWER: A. E. **Housman** [or Alfred Edward **Housman**]

4. This character is exposed to the drug ALZ-112 in the womb and raised by Will, who hopes to cure his Alzheimer's-afflicted father. In a 2014 sequel, this character is betrayed by Koba, and leads a forest community across Golden Gate Bridge after a plague has wiped out most humans. For 10 points, identify this chimpanzee protagonist of the rebooted *Planet of the Apes* franchise, who is named for a Roman conqueror.  
ANSWER: **Caesar**

5. This physicist's namesake principle, first described by Einstein, explains that the inertia of any object is caused by all other mass in the universe. A dimensionless number named for this scientist relates the derivative of a fluid's density to its velocity and is used to determine if flow is incompressible. A bow shock occurs above that number named for him. For 10 points, name this Austrian namesake of the ratio between the velocity of an object in a fluid and that fluid's speed of sound.  
ANSWER: Ernst **Mach**

6. This agreement marked the end of the Little Entente. Edvard Benes was not invited to the negotiations for this agreement, despite leading the country whose territory was being divided. One of the chief negotiators of this agreement declared that it would bring “peace for our time.” For 10 points, name this 1938 agreement championed by Neville Chamberlain, a prime example of appeasement which allowed Germany to annex a part of Czechoslovakia.  
ANSWER: **Munich** Agreement

7. In the top left corner of this painting, a half-hidden silver crucifix can be found. The table in the back of this painting is covered with a Turkish rug, and on the shelf below, a Lutheran hymnbook can be seen next to a lute with a broken string. Jean de Dinteville and Bishop Georges de Selve stand in front of a green curtain in this painting, which features an anamorphic skull on the floor. For 10 points, name this painting by Hans Holbein the Younger.  
ANSWER: *The* ***Ambassadors***

8. In this story, three lodgers with the protagonist’s family refuse to pay their rent after seeing him. Its main character dies after suffering an infection caused by an apple lodged into his back. In this story, Grete takes care of her brother, whose appetite changes from that of a human. For 10 points, name this story in which Gregor Samsa wakes up and finds he has turned into an insect, a story by Franz Kafka.  
ANSWER: *The* ***Metamorphosis*** [or *Die* ***Verwandlung***]

9. Prince Hall founded a branch of this organization for free African-Americans. A member of this organization, William Wirt, ironically won the 1832 nomination of a party which opposed it due to the Morgan affair and Andrew Jackson’s membership. George Washington was a Worshipful Master in this organization, which requires belief in a “Supreme Being.” For 10 points, name this fraternal organization which consists of “lodges” and whose symbol is the square and compasses.  
ANSWER: **Freemason**ry [prompt on **Mason**ry]

10. In April 2014, this organization provided a seventeen billion-dollar bailout to Ukraine. This organization’s 2010 bailout of Greece was its first to a eurozone country. This organization was led by Dominique Strauss-Kahn until 2011, and in August 2014, the French Court of Justice opened a negligence investigation against Strauss-Kahn’s replacement, Christine Lagarde. For 10 points, name this organization founded alongside the World Bank at Bretton Woods.  
ANSWER: **International Monetary Fund** [or **IMF**]

11. This religion's leaders reported that a chihuahua named Lulu was heard to roar “like a lion” on the inaugural Grounation day. Leaders of this religion have included Leonard Howell and Robert Athlyi Rogers, who respectively authored two of its central texts, The Promise Key and The Holy Piby. This faith's third major text is the Kebra Negast, the national epic of Ethiopia, whose king Haile Selassie it reveres. For 10 points, name this Jamaican religion often associated with dreadlocks and cannabis.  
ANSWER: **Rastafarianism**

12. This country’s only stock exchange is called the Tadawul. A mining area called the Cradle of Gold is found in this country’s western Hejaz Region. This country’s Red Sea port of Jeddah is a frequent stop for pilgrims on their way to cities in this country’s north. Much of the southern part of this country is covered by the Empty Quarter, or Rub’ al Khali. For 10 points, name this largest country in the Arabian Peninsula.  
ANSWER: **Saudi Arabia** [Kingdom of **Saudi Arabia**]

13. In this opera, a saucer is passed around to collect for Robbins’ funeral in “Overflow.” A protagonist of this opera sings “the things that I prize, like the stars in the skies, are all free,” in “I Got Plenty of Nothing.” Its other title character is taken to New York by a pusher who sings “It Ain’t Necessarily So,”named Sportin’ Life. It was based on a DuBose Heyward novel and is set on Catfish Row. For 10 points, name this opera featuring the song “Summertime,” by George Gershwin.  
ANSWER: ***Porgy and Bess***

14. This country declared independence via the Declaration of Arbroath. A leader from this country is the subject of an epic poem by Blind Harry. Soldiers from this country used the schiltron formation to win the Battle of Bannockburn. A man from this country was drawn and quartered after losing the Battle of Falkirk, but had earlier won the Battle of Stirling Bridge. For 10 points, name this country which fought for independence from England under Robert the Bruce and William Wallace.  
ANSWER: **Scotland** [or **Alba**]

15. In this novel, a tattletale named Jenny informs Mr. Davis about another character’s possession of pickled limes. A character in this novel dies of scarlet fever that she contracts while nursing the Hummel family. This novel begins with Marmee March suggesting that her daughters give their breakfast to a poor neighbor as a Christmas present. For 10 points, name this novel about Meg, Jo, Beth, and Amy written by Louisa May Alcott.  
ANSWER: ***Little Women***

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **Regular Season 2014**  **Round 22**  **Tiebreaker/replacement questions** |

1. One of this philosopher's books begins with an essay titled "Search for a Method"; that book which relates Marxism to a certain school of philosophy is his *Critique of Dialectical Reason*. He discusses the gaze of a mannequin in a chapter titled "The Look," and also discusses "bad faith" in his best-known philosophical text. For 10 points, name this French existentialist who wrote *Being and Nothingness*.  
ANSWER: Jean-Paul **Sartre**

2. This author influentially defined and popularized the term “mythopoeia,” which now has wide circulation in literary criticism. His shorter stories include the fable “Farmer Giles of Ham.” One of his most famous novels opens by describing a hole in a hill, “not a nasty, dirty, wet hole, filled with the ends of worms and an oozy smell,” but the residence of Bag End. For 10 points, name this English author and philologist who wrote *The Hobbit* and *The Lord of the Rings.*  
ANSWER: J. R. R. **Tolkien** [or John Ronald Reuel **Tolkien**]

3. This opera was based on a short story by John Luther Long, who was inspired by his sister’s missionary trips. The female lead of this opera imagines a day when her lover will return to her in “Un bel di.” This opera's baritone role is the consul Sharpless. The protagonist of this opera, Cio-Cio San, marries an American soldier named Pinkerton, whose betrayal drives her to commit seppuku. For 10 points, name this Giacomo Puccini opera named for a Japanese woman.  
ANSWER: ***Madama Butterfly*** [or ***Madame Butterfly***]

4. France sent Charles de Lorencez (LOO-ron-see) to invade this country in an effort that was temporarily repelled by Ignacio Zaragoza (ig-NAH-see-oh sah-rah-GO-suh). This country's Hill of the Bells became the execution site of French-backed emperor Maximilian in 1867, five years after its victory at the Battle of Puebla. For 10 points, name this country which also fought France in the Pastry War, and recalls Puebla each year on Cinco de Mayo.  
ANSWER: **Mexico**

5. The suffix "-onium" refers to systems in which this type of substance is bound and stable. This substance is usually stored in Penning traps. The Dirac equation first predicted its existence. It is represented using a bar, which symbolizes charge conjugation. This material is rapidly destroyed in annihilation, when it collides with its much more common counterpart. For 10 points, name this type of material that includes positrons and is the unstable counterpart of matter.  
ANSWER: **antimatter** [or **antiparticle**s]

What African-American athlete won four gold medals at the 1936 Olympics in Berlin?  
ANSWER: James "Jesse" **Owens**

A class is arranged in four rows of eight students. A class lottery is rigged so that the students in the front row collectively have a 40% chance of winning. Assuming that each student in a given row has an equal chance of winning, what is the probability that either Laney, in the front row, or her friend Janey, in the third row, wins?  
ANSWER: **0.075** [or **7.5%**; or **3/40**]