**2016 VHSL Regionals - Round 03 - First Period, Fifteen Tossups**

1. This president consistently opposed the McNaury-Haugen Farm Relief Bill. As governor, he denounced as illegitimate a strike of policemen in Boston. This man's chief foreign policy accomplishment was having his Secretary of State, Frank Kellogg, negotiate a pact with Aristide Briand **(ar-ih-STEED bree-OND)** denouncing war. This president declared that "the chief business of the American people is business" and supported laissez-faire **(LEH-zay FAIR)** policies after succeeding Warren Harding. For 10 points, name this famously silent president from 1923 to 1929.
ANSWER: Calvin **Coolidge** [or John Calvin **Coolidge**, Jr.]

2. Pipe radius is raised to this positive power in the denominator of the Hagen-Poiseuille **(HAH-gen PWAH-zoo-EE)** equation. Including the unknown resistor, a Wheatstone bridge uses this number of resistors. The Otto and Carnot cycles consist of this many steps. Coulomb's constant, k, is equal to one over this number times pi times the permittivity of free space. Electromagnetism is defined by a set of this many equations, which were collected by James Maxwell. For 10 points, give this number of fundamental forces.
ANSWER: **four**th

3. In 2005, this system introduced women-only cars during the morning rush hour. This rail system is run by two separate operators, the smaller of which is the four-line Toei **(TOE-ay)** Subway, and its oldest section, opened in 1927, is the Ginza line. The Yamanote loop line is not technically part of this system despite running entirely within the twenty-three special wards. In 1995 a sarin gas attack was carried out here by the Aum Shinrikyo **(OWM shin-RICK-yo)** cult. For 10 points, name this metro system which serves the capital of Japan.
ANSWER: **Tokyo Subway**

4. Artifacts from this island include statues identified as the Poppy Goddess and the Snake Goddess. Settlers from this island built the town of Akrotiri **(ah-kro-TEER-ee)** on a smaller island to the north which was decimated by the Theran eruption. Frescos depicting the sport of bull-leaping have been discovered on this island. The undeciphered Linear A script was used on this island, where Arthur Evans excavated the palace of Knossos. This island was the center of pre-Mycenaean Greek civilization. For 10 points, name this island where the Minoan civilization flourished.
ANSWER: **Crete**

5. This song, which critics noted is very similar to "Cha Cha" by D.R.A.M, samples Timmy Thomas's "Why Can't We Live Together." Rashida Jones noted that the dance moves which this song's performer does while singing it are essentially "the Carlton." This song addresses someone who is "running out of pages in your passport" and is known to "call me on my cell phone, late night when you need my love." For 10 points, name this song about a call "that can only mean one thing," released in July 2015 by Drake.
ANSWER: "**Hotline Bling**"

6. This is the color of a protein gel stain named Coomassie **(koo-MASS-ee)**. Dissolving alkali metals in ammonia produces a solution of this color due to a solvated electron. In the NFPA diamond, health hazards are in the section with this color. A dye of this color consists of six cyanides surrounding an iron three center, and is prefixed with "Prussian." Solutions containing copper ions typically appear this color. In the presence of a base, litmus paper turns this color. For 10 points, identify this color of dyes containing cobalt, which lies between violet and green on the visible spectrum.
ANSWER: **blue**

7. This language uses the infixes "si" **(SHEE)** and "eusi" **(UH-shee)** as honorifics within verbs. This is the most widely spoken language in a namesake family that also includes Jeju. It is Romanized via the Yale or McCune-Reischauer systems. This language is sometimes grouped with Turkic and Japanese languages in a family called Altaic **(all-TAY-ick)**. It was once written in the idu **(EE-doo)** and gugyeol **(GOOG-yul)** systems, but is now written with an alphabet devised by Sejong the Great called hangul **(HAHN-gool)**. For 10 points, name this language spoken on a peninsula around Seoul.
ANSWER: **Korean** language [or **Hangungmal**; or **Hangug-eo**; or **Chosŏnmal**]

8. The presence of this element is used to differentiate brown dwarfs from low-mass stars. WMAP's helium data for the early universe shows a discrepancy between the observed abundance of this element and its predicted abundance from Big Bang nucleosynthesis. This element is rapidly depleted in young stars because it fuses with a proton and splits into two helium atoms. Producing tritium is commonly done by bombarding its 6 amu **(a m u)** isotope with neutrons. For 10 points, name this third lightest element, which has chemical symbol Li.
ANSWER: **lithium** [or **Li** until it is read]

9. Writers from this country developed a genre of play to be performed on Corpus Christi called an *auto sacramental*. In a play from this country, Prince Segismundo is locked in a tower over fears he will overthrow his father Basilio. In another play from this country, angry villagers murder a rapist Commander and blame the crime on the mysterious "Fuenteovejuna" **(foo-EN-tay oh-vay-HOO-nuh)**, sparking an investigation by Ferdinand and Isabella. For 10 points, name this country, the home of playwrights Pedro Calderon **(cal-der-OWN)** de la Barca and Lope de Vega **(LO-pay duh VAY-guh)**.
ANSWER: **Spain** [or **Espana**]

10. During this condition, the probability of an electron having energy less than the Fermi energy is one. In a method to nearly achieve this condition, blueshifted photons transfer their momentum onto atoms, but that method only works until the Doppler limit. The third law of thermodynamics states that it is impossible to achieve this condition in a finite number of steps. The Rankine scale begins at this point, at which substances are defined to have zero enthalpy and entropy. For 10 points, name this condition during which all matter classically stops moving, which occurs at zero kelvin.
ANSWER: **absolute zero** [prompt on **zero kelvin** until it is read; prompt on **−273.15 C**elcius or **−459.67 F**ahrenheit]

11. This god sends the dragon Campe **("campy")** to guard the Hecatonchires **(HEH-cah-ton-KYE-reez)** and the Cyclopes during his reign over the Golden Age. Under instructions from his grandmother Gaia, this god uses a sickle to castrate his father and throw his genitals into the sea. This god swallows a stone wrapped in sheets after being tricked by his wife Rhea. Later, he vomits out Hestia, Demeter, Hera, Poseidon, and Hades, and fights with his fellow Titans in a war against the younger gods of Olympus. For 10 points, name this father of Zeus.
ANSWER: **Cronus** [or **Kronos**]

12. A composer from this country wrote an unfinished opera whose most popular orchestral excerpt is the *Polovtsian* **(POL-uh-VET-see-un)** *Dances*. In the late 1800s, this country was home to a group of composers called “the Five,” one of whose members depicted "The Great Gate of Kiev" in his *Pictures at an Exhibition*. A composer from this country wrote the suite *Scheherazade* **(sheh-HAIR-uh-ZOD)** and depicted a prince's transformation into an insect in a fast-paced orchestral interlude. For 10 points, name this country in which "The Flight of the Bumblebee" was written by Nikolai Rimsky-Korsakov.
ANSWER: **Russia** [or **Rossiya**; or the **Russian Federation**; or **Rossiyskaya Federatsiya**]

13. At the end of this battle's first day, the words "if practicable" led Richard Ewell to change plans. During this battle, a bayonet charge by the 20th Maine was led by Joshua Chamberlain to protect Little Round Top. Robert E. Lee's plan of attack during this battle's second day was based on faulty intelligence resulting from the absence of J.E.B. Stuart. This battle, the "high water mark of the Confederacy," ended after a failed assault on Cemetery Ridge led by George Pickett. For 10 points, name this 1863 Civil War battle in Pennsylvania.
ANSWER: Battle of **Gettysburg**

14. This man showed an enormous blue bow on the back of the dress of a girl touching the black hat of a woman holding a small dog in *The Railway*. His depiction of the shooting of Paris Commune members in *The Barricade* uses poses reminiscent of his *The Execution of Emperor Maximilian*. This painter used a large mirror to reflect a trapeze artist behind a woman with a bowl of oranges in his *A Bar at the Folies-Bergère* **(FOH-lee bair-ZHAIR)**. For 10 points, name this French painter who showed nude women cavorting with clothed men in his controversial *Luncheon on the Grass*.
ANSWER: Édouard **Manet**

15. In a play by this author, a murderer attempts to lure people to their deaths in the "radiant city" by offering to show them "a picture of the colonel." This author of *The Killer* wrote a play in which Mr. Boeuf **(BUFF)** destroys the staircase to the protagonist's newspaper office, whose employees include Mr. Papillon **(pap-ee-YON)** and his love interest Daisy. The Smiths invite the Martins over to a party which is interrupted by the Fire Chief in his play *The Bald Soprano*. For 10 points, name this absurdist Romanian playwright who included Berenger **(BAIR-en-zhay)** in his play *Rhinoceros*.
ANSWER: Eugene **Ionesco** **(ee-uh-NESS-ko)**

 **2016 VHSL Regionals - Round 03 - Directed Period**

1A. What was the country of origin for both the Metrojet passenger plane which exploded over Egypt in October 2015, and the Su-24 fighter jet shot down by Turkey less than a month later?
ANSWER: **Russia** [or **Russian Federation**; or **Rossiyskaya Federatsiya**; or **Rossiya**]

1B. What American novelist wrote adventure novels about Natty Bumppo including *The Deerslayer* and *The Last of the Mohicans*?
ANSWER: James Fenimore **Cooper**

2A. What parameter for polar coordinates is commonly represented as phi or theta?
ANSWER: **angle** from the x-axis [or obvious equivalents]

2B. A "Presto in moto perpetuo" finale ends the violin concerto by what American composer of *Adagio for Strings*?
ANSWER: Samuel **Barber** [or Samuel Osmond **Barber** II]

3A. This is a 20-second calculation question. If theta is an angle in the second quadrant, and the sine of theta is three-fifths, what is the cosine of theta?
ANSWER: **-4/5** [or **-0.8**]

3B. This is a 20-second calculation question. What number do you get when you add the number of faces and vertices of an octahedron and subtract the number of its edges?
ANSWER: **2**

4A. The Bacchiadae were an early ruling house of what ancient Greek city-state, which hosted the Isthmian Games and lent its name to the last order of column developed in Classical architecture?
ANSWER: **Corinth** [or **Corinthian** columns]

4B. The followers of what Thracian gladiator and slave were crucified along the Appian Way after being defeated by Crassus in the Third Servile War?
ANSWER: **Spartacus**

5A. What poetic foot, which is used to create blank verse, consists of two syllables, the first unstressed and the second stressed?
ANSWER: **iamb** [or **iamb**ic]

5B. What friend of Ernest Hemingway wrote from the perspective of her lover in *The Autobiography of Alice B. Toklas*?
ANSWER: Gertrude **Stein**

6A. A monument to the boll weevil in Enterprise and NASA's Marshall Space Flight Center in Huntsville are both located in what state?
ANSWER: **Alabama**

6B. What branch of philosophy deals with the concept of beauty and the perspective from which examples of beauty, such as art, are evaluated?
ANSWER: **aesthetics**

7A. What auto manufacturer makes Motorrad motorcycles, owns Rolls-Royce, and currently offers car models such as the Z4 roadster, i3 electric car, and 1 Series hatchbacks?
ANSWER: **BMW** [or **Bayerische Motoren Werke** AG; or **Bavarian Motor Works**]

7B. The con artists Face and Subtle appear in what Ben Jonson play, which includes Sir Epicure Mammon's search for the philosopher's stone?
ANSWER: *The* ***Alchemist***

8A. This is a 30-second calculation question. What is the product of the two complex roots of the quadratic x-squared minus 7x plus 14 equals zero?
ANSWER: **14**

8B. This is a 30-second calculation question. Suppose that in a two-by-two contingency table, the diagonal entries are both 6 and the off-diagonal entries are both 4. What is the test statistic for the chi-squared test of independence?
ANSWER: **4/5** [or **0.8**]

9A. What adjective describes an oscillation in which the displacement of the medium is parallel to the direction of the wave, which is contrasted with transverse oscillation?
ANSWER: **longitudinal** [or **compression**al; or **L**]

9B. In Latin, nominative first declension nouns that end in "a" have what number?
ANSWER: **singular**

10A. Name the leader of the Christian Democratic Union who was both the last Chancellor of West Germany and first Chancellor of a post-war united Germany, from 1982 to 1998.
ANSWER: Helmut **Kohl** [or Helmut Josef Michael **Kohl**]

10B. What founder of modern anatomy wrote *De humani corporis fabrica*?
ANSWER: Andreas **Vesalius** [or Andries **van Wesel**]

 **2016 VHSL Regionals - Round 03 - Third Period, Fifteen Tossups**

1. Shortly before dying, this character asks, "why should a dog, a horse, a rat have life, and thou no breath at all?" This character arranges a retinue of one hundred knights for his protection and is enraged when it is divided in half. This character shouts, "Blow, winds, and crack your cheeks! rage! blow!" after wandering out into a storm alongside his Fool. The Earl of Gloucester has his eyes gouged out by this character's evil daughter Regan. For 10 points, Cordelia is the virtuous daughter of what monarch, the title character of a Shakespeare tragedy?
ANSWER: King **Lear**

2. This god is the younger of two gods who turn into hippos and see who can stay underwater the longest. This god wins a race by riding in a wooden boat painted to look like stone, which can float, unlike his opponent's actual stone boat. Hathor is identified as either the mother or the wife of this god. He is conceived using some of his father's fourteen dismembered body parts, and feuds with the malicious god Set to avenge his father Osiris. For 10 points, name this falcon-headed Egyptian god, the divine manifestation of the pharaoh.
ANSWER: **Horus**

3. At the end of this novella, the protagonist's family go on a trolley ride out into the countryside and discuss the marriageability of his sister. The protagonist of this novella attempts to save a picture of a woman in a hat when his relatives attempt to remove the furniture from his room. The protagonist of this novella dreams of sending Greta to a conservatory to study violin and is injured when his father throws apples at him. At the beginning of this novella, the salesman Gregor Samsa awakes to find that he has turned into a giant vermin. For 10 points, name this novella by Franz Kafka.
ANSWER: *The* ***Metamorphosis*** [or *Die* ***Verwandlung***]

4. This method provides the best linear unbiased estimator in the case where the error's mean is zero, errors are uncorrelated, and errors have equal variance. Developed by Carl Gauss **(GOWSS)**, this method finds a curve that minimizes the sums of the squared residuals. This is the method that Excel uses for linear trend lines, yielding an equation of *y* equals *a* plus *b x* on a scatterplot. For 10 points, name this method in regression analysis which is used to find best fit curves, and which is sometimes prefixed by "ordinary" when the curve is a line.
ANSWER: method of **least square**s fitting [or ordinary **least squares**; or **OLS**]

5. This man names a body of water to the west of the Kenai **(KEE-nye)** Peninsula, on which Anchorage, Alaska is located. This man also names a group of islands centered on Rarotonga **(RAR-oh-TAWN-guh)** that lies directly west of French Polynesia. Both the highest point in the Southern Alps and the strait that separates the North and South Islands of New Zealand were named for this man. This explorer named Sydney's Botany Bay during his voyage to find Terra Australis. For 10 points, name this captain of the HMS *Endeavour* who was killed by native Hawaiians.
ANSWER: James **Cook**

6. A performer of this instrument used the unusual 9/8 **("nine eight")** time to write the opening track of an album that includes "Three to Get Ready" and "Kathy's Waltz." A musician on this instrument wrote an album whose best-known track was written by saxophonist Paul Desmond using 5/4 **("five four")** time and titled "Take Five." *Time Out* was an album written by a performer on this instrument named Dave Brubeck. A ragtime composer wrote "The Entertainer" for this instrument. Scott Joplin played, for 10 points, what instrument with 88 black and white keys?
ANSWER: **piano** [prompt on **keyboard**]

7. A U.S.-brokered agreement in this country called for a Joint Integrated Police to take over patrolling its capital during a mandatory thirty-day confinement of soldiers to barracks. This country, which prints money with John Garang's face on it, was gripped by a civil war between Riek Machar's Nuer **(REEK MAH-chars “newer”)** loyalists and forces of the only president this country has ever had, the Dinka leader Salva Kiir **(KEER)**. This country is governed from Juba and became independent in 2011. For 10 points, name this country which formerly fought a regime based in Khartoum.
ANSWER: **South Sudan** [or Republic of **South Sudan**; do not prompt on "Sudan"]

8. This organization blew up Louis Mountbatten's fishing boat. Prisoners from this group did not receive POW status in the Maze Prison, prompting Bobby Sands's hunger strike. This group was founded by Michael Collins during its country's 1919-1921 war of independence. The disarming of this group began with the 1998 Good Friday Agreement. This group's paramilitary "provisional" wing conducted terrorist attacks during a period called "the Troubles." For 10 points, name this "Army" which seeks the union and independence of all of Ireland.
ANSWER: **IRA** [or **I**rish **R**epublican **A**rmy; or **P**rovisional **I**rish **R**epublic **A**rmy]

9. A goddess of this domain floats into the sky after consuming an elixir of life. In East Asian tradition, treats such as mochi or rice cakes are prepared by a rabbit who lives in this domain with the Chinese goddess Chang'e **(CHONG-uh)**. The belief that this body caused erratic behavior is the origin of the word "lunatic." In Greek mythology, it was represented by Artemis, in contrast to her brother Apollo, who took on elements of Helios. For 10 points, name this celestial object which, when fully visible, causes a bitten individual to transform into a werewolf.
ANSWER: the **moon** [or the **full moon**; or **Luna**; or **yue**; or **Selene**]

10. People advocating this ideology fought in the "Battle of Cable Street." A regime often described as being part of this political ideology withdrew from Diu **(DEE-oo)** before being ended by the Carnation Revolution, shortly after the death of Antonio Salazar, in Portugal. The Belgian Rexists and the Hungarian Arrow Cross followed this ideology. Propounded by Oswald Mosely in Britain, this ideology takes its name from an axe and bundle of sticks from ancient Rome. For 10 points, name this militarist, nationalist political ideology advocated by far-rightists across Europe in the 1930s.
ANSWER: **fascism** [or **fascist**; prompt on **national socialism** or equivalents; prompt on **anti-Semitism** until "Diu" is read]

11. A distribution denoted by this term has a mean of the number of trials times probability of success. That discrete probability distribution denoted by this term describes experiments composed of a number of independent Bernoulli trials. The rows of Pascal's triangle correspond to a coefficient sequence denoted by this term, which is found with the formula n choose k, for k from zero to n. The order of multiplication when taking the product of two of these things is given by the “FOIL” mnemonic. For 10 points, name these polynomials that are the sum of two monomials.
ANSWER: **binomial**s

12. This ruler ordered the execution of both his son Crispus and his wife Fausta. His mother's discoveries of religious icons led to this man ordering the construction of the Church of the Holy Sepulchre **(SEP-ull-ker)**. This son of Helena thrashed Licinius **(lie-SIN-ee-us)** at the Battle of Adrianople **(AY-dree-uh-NOH-pull)** and drafted the Edict of Milan. Before defeating Maxentius at the Battle of the Milvian Bridge, he had a vision of the message "with this sign, you will conquer" and the image of a cross. For 10 points, name this first Roman emperor to convert to Christianity.
ANSWER: **Constantine the Great** [or **Constantine I**; or **Saint Constantine**; prompt on **Constantine**]

13. This band performed at the 2014 League of Legends World Championship in Seoul, South Korea, and made a cameo appearance in the pilot episode of 2015's *The Muppets*. This band recalls "I gave you hell through all the years" in a single from their 2014 album *Smoke + Mirrors*. This band behind "Warriors" and "I Bet My Life" begins a 2014 Grammy-winning song with the line "I'm waking up to ash and dust" and repeats the lyrics "Welcome to the new age." For 10 points, name this band who performed "Demons" and "Radioactive."
ANSWER: **Imagine Dragons**

14. The author of this play wrote the essay "What Happened Afterwards" explaining that the two leads could not get married. This non-musical play begins when a note-taker disturbs people hiding from the rain at Covent Garden. This play ends with Freddy Eynsford-Hill about to marry the female lead. In this play, a phonetics scholar tries to transform a Cockney flower girl into a lady. This play inspired the musical *My Fair Lady*. For 10 points, Professor Henry Higgins and Eliza Doolittle appear in what comedy by George Bernard Shaw?
ANSWER: ***Pygmalion*** [do not accept "*My Fair Lady*"]

15. These substances can form a double layer, in which positively and negatively charged layers are separated by a Debye **(duh-BIE)** sheath. The Birkeland **(BERK-lind)** currents which form inside these kinds of substances can form filament phenomena such as solar flares, the aurora borealis, and lightning. Most ordinary matter in the universe is in this state. For 10 points, name these substances in which molecular bonds cease to exist and particles become highly ionized, the so-called "fourth" state of matter.
ANSWER: **plasma**s

 **2016 VHSL Regionals - Round 03 - Tiebreaker Questions**

1. This people believed that their dead were ferried to the underworld by a dog-headed skeleton god. These people depicted two of their gods as a left-handed hummingbird and as an obsidian mirror. After breaking his vow of celibacy in a drunken stupor, a god of these people sails away to the east on a raft of snakes. This people’s feathered serpent god spurned human sacrifices, unlike the rain god Tlaloc **(TLAH-lock)**. For 10 points, name this Mesoamerican civilization, which allegedly believed that their god Quetzalcoatl **(KET-zull-koh-OT-ull)** had returned as the conquistador Hernán Cortés.
ANSWER: **Aztec**s

2. Several historians believe this man was indebted for his most famous creation to a general’s widow named Catherine Littlefield Greene. Litigation surrounding this man’s drum-like creation bankrupted him, prompting him to turn to arms manufacturing. In 1798, he was commissioned to deliver thousands of muskets, which eventually led to him popularizing the use of interchangeable parts. This man's best known invention removed seeds from a cash crop, making slavery more sustainable. For 10 points, name this man credited with inventing the cotton gin.
ANSWER: Eli **Whitney**

3. This hero tries to feign madness by sewing some fields with salt, but is forced to break character when his infant son is placed in front of his plough. He encounters a group of lethargic island people who eat nothing but lotus plants, and later escapes from a race of giant cannibals called the Laestrygonians **(LESS-trih-GO-nee-ins)**. After this hero drives a wooden stake through the eye of the cyclops Polyphemus **(pol-ee-FEE-mus)**, he is cursed by Poseidon to spend ten years wandering the seas before he can arrive home at Ithaca. For 10 points, name this title hero of an epic poem by Homer.
ANSWER: **Odysseus**

4. This object can be drawn using a trammel of Archimedes or by tying a string around two pushpins and tracing the path around which the string is taut. The eccentricity of this figure is between 0 and 1, non-inclusive. The area of this figure is the product of pi, the semimajor axis, and the semiminor axis. The standard equation for this figure centered at the origin is x squared over a squared plus y squared over b squared is equal to c squared. For 10 points, name this conic section formed by the intersection of a cone and a plane oblique to the base of the cone, and which resembles a flattened circle.
ANSWER: **ellipse**

5. This poet described a "rafter of satin and roof of stone" in a poem about the sleep of "the meek members of the resurrection." In another poem, she described a phenomenon that gives us "heavenly hurt" and "oppresses, like the heft of cathedral tunes." This poet of "Safe in their Alabaster Chambers" and "There's a certain Slant of light" also wrote about a carriage ride with a personification who "kindly stopped for me." For 10 points, name this reclusive "Belle of Amherst" who wrote "Because I could not stop for Death."
ANSWER: Emily **Dickinson**

Algernon Moncrieff and Jack Worthing both impersonate the title character of what Oscar Wilde play, which also features the governess Miss Prism?
ANSWER: *The* ***Importance of Being Earnest***

This is a calculation question. Find the standard deviation of a binomial random variable measuring the number of successes in 21 independent trials, given a probability of success of 0.7 on each trial.
ANSWER: **2.1** [or **21/10**]