

Bergen Academies Spring Quizbowl Tournament 2016

Written by Zachary Stier, Rebecca Rosenthal, David Song, Alon Millet, Ryan Murphy, Michael Gleyzer, **Bergen Academies Quizbowl Team**; Trent Kannegieter, **Bayside Academy**; Alex Katz, **Massachusetts Institute of Technology**.
Special thanks to Alex Dzurick, Ben Zhang and Jon Pinyan.

Round 2: Tossups

1. **The public referred to this figure by the name “L’Autrichienne” [“law-tree-shen”]. Count Axel von Fersen and the Baron de Breteuil [“breh-TOY”] helped this person’s family flee their home, but their escape was halted at Varennes [“vah-REN”]. The last person to depict her was Jacques-Louis David, who drew her confidently being (*) led to her death. Thomas Paine argued that this ‘Widow Capet’ should be sent into exile as a result of her crimes against her adopted home country. The Directory beheaded this woman in October 1793. For ten points, name this wife of King Louis XVI of France.**

ANSWER: Marie Antoinette or Maria Antonia Josepha Johanna

2. **Greedy monks bury the pretender to the Crown of England, Lord Aethelstane, alive for funeral money in this work. In this work, the title character disguises himself after returning from the Third Crusade as “Desdichado”, which is incorrectly translated as (*) “The Disinherited One” to participate in a tournament. His love interest is mistaken for another woman who he defends in a joust with Brian de Bois-Guilbert. That character is the daughter of Isaac of York, the Jewish healer, Rebecca. For ten points, name this work in which the title knight, the son of Cedric the Saxon, marries Rowena, a historical novel by Sir Walter Scott.**

ANSWER: Ivanhoe

3. **Two heykal are on the Ringstone symbol of this religion, in which the Universe is separated into five realms: the first is God, and the rest are associated with the colors white, yellow, green, and crimson. One central figure of this religion was the Mahdi-claimant (*) Báb, who taught the founder of this religion in Tehran. Today, the Universal House of Justice governs this religion from Haifa, Israel. For ten points, name this modern Persian religion that considers Muhammad, Moses, and Jesus to be among its prophets, and which was founded by Bahá’u’lláh.**

ANSWER: Bahá’í

4. **One of this man’s pieces inspired *Das Lied der Deutschen*, a melody which later was adapted into the German national anthem. That piece is his most famous string quartet, nicknamed the “Emperor”. One of his works calls for members to leave the stage one by one, and his most notable work in that form has a (*) quiet section that ends abruptly with loud timpani hits which were allegedly included to wake up any sleeping audience members. For ten points, name this German “father of the symphony”, the composer of ones including “Farewell” and “Surprise”.**

ANSWER: Joseph Haydn

5. **Operation Flush targeted this group, which was founded in Borno. This organization freed 105 of its members from a prison in Maiduguri, and was responsible for a hostage situation involving 10 Chinese workers in 2014. This body took part in an uprising in 2009, during which its founder, (*) Mohammed Yusuf, was killed. This group, currently led by Abubakar Shekau, kidnapped 276 schoolgirls from Chibok in April 2014. The self-proclaimed West African Province of Islamic State is – for ten points – what extremist group based in Nigeria?**

ANSWER: Boko Haram (accept Islamic State West African Province before mentioned)

6. **One proof in this work demonstrates that a uniform spherical object gravitationally acts on other bodies as if it is a point mass, and is known as the Shell Theorem. Book Two of this work concerns actions on fluids, and *On the system of the world* considers space and three-dimensional extensions of earlier topics. The Law of (*) Universal Gravitation was introduced in this work, which includes a theorem that states that constant velocity implies zero net force. For ten points, name this 17th century work that introduced the three Laws of Motion, written by Sir Isaac Newton.**

ANSWER: (*Philosophiæ Naturalis*) Principia Mathematica

7. **This son of Xanthippus and sponsor of plays like *The Persians* by Aeschylus [“ESS-ki-lus”] first rose to political prominence by exiling Cimon [“SI-mon”]. He commissioned the sculptor Phidias [“fih-dee-us”] as part of his renovation of the Acropolis. As a leader during the early years of the (*) Peloponnesian War, Thucydides called this man “one of the ten great generals” of his city, and described this man’s “funeral orations”. For ten points, name this statesman and general of Golden Age era Athens who died in a plague.**

ANSWER: Pericles

8. **The reproductive cycle of one subclade of these organisms involves an ascus where plasmogamy occurs, while members of another group produce a clamp connection between their basidia. Many of these organisms form symbiotic (*) mycorrhizal relationships with plants and are called endophytic, while others like *Aspergillus* may produce toxins. Still others are important in baking due to their ability to ferment sugars. These organisms have bodies composed of hyphae and have cell walls composed of chitin. For ten points, name this kingdom that includes yeasts, molds, and mushrooms.**

ANSWER: fungi

9. **In a story by this author, a lawyer’s solitary confinement for fifteen years is the subject of a 2-million ruble bet made by a banker. In another of his short stories, a shepherd warns Meliton of the impending demise of nature. That story is “The Reed Pipe”. Act II in one of this man’s plays ends with Konstantin giving a gift of the title (*) bird to Nina. In his last written play, Gayev and Lyubov Ranevskaya watch as their estate is acquired by the industrialist Lopakhin. A principle named for him states that a gun “hanging on the wall...must go off”. For ten points, name this Russian author of *The Seagull* and *The Cherry Orchard*.**

ANSWER: Anton Chekhov

10. **This character caused the stripes on chipmunks, the curled tails of squirrels, and the lack of a tail in frogs after he stole fire from the Gods and gave it to humans. He suffered after a god caught his tail, turning its tip white. After getting drunk, this figure (*) tricked American soldiers into buying a money tree and a coin-producing burro. He was feared by the twin brothers, who were told that this figure had been following the Navajo since the beginning of time. For ten points, name this Southwestern trickster god who occasionally takes the form of a canine.**

ANSWER: Coyote

11. **In this work, one character earns money by playing his violin to a parrot until it dies. One character attempts to make another jealous by forming a relationship with the minister Alcindoro. She sings the aria “Quando men vo” to Marcello, which is known as (*) “Musetta’s Waltz”. A rock-musical adaptation of this opera by Jonathan Larson includes the songs “Light My Candle”, sung by Roger, the analog of Rodolfo, and Mimi, and “Seasons of Love”. For ten points, name this Giacomo Puccini opera about the denizens of Latin quarter of Paris, including Colline and Schaunard, that was the inspiration for *Rent*.**

ANSWER: *La Bohème*

12. **The primary antagonist of this work is found “squat like a toad” whispering words of discontent in a woman’s ear before being dispersed by a spear of Ithuriel. That antagonist commanded the character Mulciber to construct his abode, later named (*) Pandemonium. This poem was one of the most commonly illustrated by William Blake. The antagonist of this poem expresses his desire to “justify the ways of God to man” before revealing that he is Lucifer. For ten points, name this 1667 epic poem centered around Adam and Eve’s expulsion from the Garden of Eden which was written by John Milton.**

ANSWER: “Paradise Lost”

13. **The matrix $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$ [“one one one zero”] can be exponentiated to obtain these values, and they are concisely written as a difference of powers in Binet’s [“bin-NAYS”] formula. Consecutive ones are the slowest input for Euclid’s algorithm, and the (*) n th represents the total number of sequences of 1’s and 2’s that sum to n . They were first introduced to Europe in *Liber Abaci*, wherein Leonardo of Pisa described them using rabbit repopulation. Their consecutive ratio approaches the golden ratio, and different sources begin this sequence with either 0, 1, 1 or 1, 1, 2. For ten points, name this naturally-occurring recursive sequence of integers where the sum of any two consecutive ones yields the next.**

ANSWER: Fibonacci sequence or Fibonacci numbers

14. **This author's children's book *The It-Doesn't Matter Suit* was published posthumously. Her marriage to Ted Hughes inspired many of her poems, published in the collection *Ariel*. During a summer break while at Smith College, she held a guest editorship at *Mademoiselle* like the protagonist in her (*) only novel. She wrote to the title character that "I've always been scared of you / With your luftwaffe, your gobbledygoo" and that "Every woman adores a fascist" in her confessional poem "Daddy". For ten points, name this poet who created a semi-autobiographical novel about Esther Greenwood's time in a mental hospital, *The Bell Jar*.**

ANSWER: Sylvia Plath

15. **This value can be found for chelating agents such as EDTA through the competition method, and its negative is the slope of any line in a Scatchard plot. The change in Gibbs free energy in a system is equal to negative RT times the logarithm of this value. The Van't Hoff equation was the first definitive relation between it and thermodynamics and it is equal to the rate of the (*) forward reaction divided by the rate of the reverse reaction. For ten points, name this constant that is the product of reactants and products to the power of their stoichiometric coefficients, often symbolized K_{eq} ["K-sub-E-Q"].**

ANSWER: equilibrium constant, prompt on, but do not accept " K_{eq} " before mentioned

16. **As Minister of Labor, this man instituted his nation's first social insurance system, the INPS. He helped overthrow Ramón Castillo, and served in Pedro Ramírez's government before reaching his highest post. He was forced to resign and was arrested, but was freed after demonstrations led by the (*) CGT union. His *aguinaldo* policy helped support the lower class of his country, also known as the *descamisados*. His second wife was the actress Eva Duarte. His third wife was also politically active, eventually becoming this man's vice president. For ten points, name this President of Argentina who was succeeded by his wife, Isabel.**

ANSWER: Juan Perón

17. **In one musical work, this man is depicted calling Arnold Cunningham a "Fibbing Fran". This man appointed the Three Witnesses to corroborate a revelation he received in the Sacred Grove. Those findings were translated from "Reformed Egyptian" using seer stones to decode objects he found (*) buried on a hill in Manchester, New York. Those golden plates contain the story told by Moroni to the namesake prophet. He and his followers were attacked in Nauvoo, Illinois, where he was fatally shot in prison. For ten points, name this translator of the Book of Mormon and founder of the LDS Church.**

ANSWER: Joseph Smith

18. **This person was painted with a rabbit, a symbol of purity, and a fruit basket by Titian, and Titian also created a portrayal of this figure encircled by arches with a red flag and members of the Pesaro family. In one Mannerist painting, this figure was shown with an (*) elongated spinal column by the artist Parmigianino. The most famous depiction of this figure shows her in front of the title stony structure with an angel and infants John the Baptist and Jesus. For ten points, name this Biblical woman painted "of the Rocks" by Leonardo da Vinci, an Italian term for the Virgin Mary.**

ANSWER: Madonna (accept Mary before mention)

19. **In one role, this actor taught students at the Welton Academy to "seize the day," and as Adrian Cronauer he befriended Viet Cong agent Tuan in *Good Morning, Vietnam*. In one role, in order to be with his children, this actor dressed as a female British housekeeper, and he portrayed Theodore (*) Roosevelt in 2006's *Night at the Museum*. He won an Oscar for his performance as Sean Maguire opposite Matt Damon's Will Hunting, and he sang the song "Friend Like Me" while voicing the Genie in *Aladdin*. For ten points, name this American actor who starred in *Dead Poets Society* and *Mrs. Doubtfire*, and who committed suicide in 2014.**

ANSWER: Robin Williams

20. A 1921 George H. Earle, Jr. treatise asks “Is *this* income?” and one recent book discusses the disparity between r and g , where r has to do with this concept. Charles Wheelan describes one form of this concept by comparing the abilities of Bill Gates and Bubba the Meth Addict. Neoclassical (*) economists view this as a factor of production, while another school believes that its types are Constant, Variable, and Fictitious. A 2013 bestseller titled for it by Thomas Piketty has the subtitle “In the Twenty-First Century.” For ten points, name this term for economic goods that may be used in production, and which titles a book by Karl Marx and Frederich Engels.

ANSWER: Capital (*in the Twenty-First Century*) or *Das Kapital*

Tiebreaker Question:

Oregonian Bob Packwood and a senator from this state originally co-named a retirement plan once known as the IRA Plus; that politician was William Roth. Another politician from this state was the subject of a 2010 scandal regarding her past dabbling in witchcraft; that politician was Christine (*) O’Donnell. One family from this state names both a highway and an explosives manufacturing company, that family is the DuPonts. Politicians from this state have included former Attorney General Beau and Vice President Joe Biden. For ten points, name this first state to ratify the Constitution, with capital at Dover.

ANSWER: Delaware

Round 2: Bonuses

1. Much of our knowledge of Mayan mythology comes from this text. For ten points each:

[10] Give this narrative, which in part describes the Mayan creation myth.

ANSWER: **Popol Vuh**

[10] The Popol Vuh also tells of these figures, who are considered to be the ancestors of Mayan rulers. These Mesoamerican ballgame players defeated Vucub-Caquix and his spawn.

ANSWER: Maya **Hero Twins** or **Hunahpu** and **Xbalanque** (in either order; do not accept or prompt on partial answers)

[10] Not to be confused with the Calendar Round, the Mayans used this to measure lengths of time longer than 52 years; one misinterpretation of it said that the world would end on December 21, 2012.

ANSWER: Mayan/Mesoamerican **long count** calendar

2. This 1943 children's book was not published in its author's home nation until after World War II. For ten points each:

[10] Name this novel by French author Antoine Saint-Exupéry.

ANSWER: **Le Petit Prince** or **The Little Prince**

[10] One early image in *Le Petit Prince* is a drawing of an elephant in the stomach of one of these animals, which presumably unhinged its jaw in order to eat the elephant.

ANSWER: **snake** or **serpent** or **boa** or any combination thereof

[10] The prince asks the narrator if sheep eat these plants. He advises removing them from the ground as soon as they can be distinguished from rose bushes.

ANSWER: **baobab** trees

3. This event typically occurs around age 12 or 13 in Jewish youths. For ten points each:

[10] Name this event, wherein the youth reads from the Torah and dons a tallit for the first time.

ANSWER: **Bar Mitzvah** or **Bat Mitzvah**

[10] Bar and Bat Mitzvah ceremonies are led by the teen, the cantor, and this figure; literally meaning "My Master", this person in the synagogue leads Friday and Saturday services.

ANSWER: **Rabbi**

[10] This reading may follow the Torah reading. These are chanted selections from the Tanach, and correspond to the *aliyot* read in the service.

ANSWER: **haftarah** (note: NOT "half-torah")

4. This musician recorded the best-selling jazz album of all time. For ten points each:

[10] Name this trumpeter who composed such tunes as "So What" and "Freddie Freeloader". He composed "Night in Tunisia" while in an alleyway after a gig.

ANSWER: Miles **Davis**

[10] Davis' most notable album was this 1959 one which included "So What" and "Freddie Freeloader." Personnel included John Coltrane and Paul "Mr. P.C." Chambers.

ANSWER: **Kind of Blue**

[10] Bill Evans played this instrument on *Kind of Blue*. Other jazz players of this instrument include Thelonius Monk and Herbie Hancock.

ANSWER: **piano**forte

5. This African empire fought the British in a namesake war. For ten points each:

[10] Name this empire that won the Battle of Isandlwana and was located primarily in South Africa. They used such weapons as the *iklwa*, a special type of spear.

ANSWER: **Zulu** Empire/Kingdom

[10] This Zulu king, the first of the Zulu Royal Family, introduced the *iklwa*. His revolutions in military strategy were perhaps best displayed at Isandlwana, though the commander at that battle was his half-nephew Cetshwayo.

ANSWER: **Shaka** Zulu or **Shaka** kaSenzangakhona

[10] Shaka's most notable strategic invention was this military formation. It came in three parts, two of which were the chest and loins, and focuses on pinning enemy troops and preventing their escape.

ANSWER **bull-horn** or **buffalo-horn** or **ox-horn** formation

6. Four American presidents have been killed on the job. However, these are not those presidents. For ten points each:

[10] "Squeaky" Fromme dressed in a red nun's robe and attempted to shoot this 38th president.

ANSWER: Gerald R. **Ford** (or Leslie Lynch **King, Jr.**)

[10] A man named Richard Lawrence hid behind a pillar on Capitol Hill and attempted to shoot this president. The plot failed, and this president beat Lawrence with a hickory cane.

ANSWER: Andrew **Jackson**

[10] Francisco Duran shot at who he believed to be this President. He claimed that he was trying to destroy an alien "mist" surrounding the White House that controlled the U.S. Government.

ANSWER: William Jefferson "Bill" **Clinton**

7. This orchestral suite has 7 movements, each based on an astrological entity. For ten points each:

[10] Name this group of works with movements like *Neptune, the Mystic* and *Mars, Bringer of War*.

ANSWER: *The **Planets*** or **Opus 32**

[10] Even though Pluto was discovered four years before the death of this composer of *The Planets*, he refused to write an additional movement. He is known for teaching at St. Pauls' Music School.

ANSWER: Gustav **Holst**

[10] Holst was a composer from this nation, the home of other composers such as Ralph Vaughan Williams.

ANSWER: United **Kingdom (UK)**; accept **England**

8. This poem takes place "Once upon a midnight dreary" while the speaker "pondered weak and weary". For ten points each:

[10] The speaker of this poem calls the title bird "a thing of evil". That bird repeats the word "Nevermore" throughout this poem.

ANSWER: "The **Raven**"

[10] This Edgar Allan Poe short story tells of C. Auguste Dupin's investigation of the death of a mother and daughter on the title street. It may be the first story of the "detective" genre.

ANSWER: "The **Murders in the Rue Morgue**"

[10] This other short story tells of the narrator duping his enemy into drinking some wine. The title liquor is supposedly hidden deep inside a cellar, but is actually a ruse to enact a revenge scheme.

ANSWER: "The **Cask of Amontillado**"

9. This wheelchair-bound physicist's most famous book is *A Brief History of Time*. For ten points each:

[10] Name this British scientist, who names the blackbody radiation emanating from black holes.

ANSWER: Stephen **Hawking**

[10] Once this border of a black hole is passed, its gravity is inescapable, even by light.

ANSWER: event horizon

[10] This distance is the radius of a sphere from which a mass cannot escape without passing the speed of light.

ANSWER: Schwarzschild radius

10. This man was told that he would sooner ride across the Bay of Naples then become emperor. He did both. For ten points each:

[10] Name this Roman emperor and successor to Tiberius who was known for his decadence and possible insanity.

ANSWER: **Caligula** or **Gaius** Julius Caesar Augustus Germanicus

[10] Many stories of Caligula's escapades, like alleged incest and placing Incitatus into the Senate, come from this historian who chronicled the lives of Caligula and other Julio-Claudians in *The Twelve Caesars*.

ANSWER: **Suetonius**

[10] Incitatus was this type of animal. Other ancient ones include Bucephalus and the winged Pegasus.

ANSWER: horse

11. This Russian author created the character Akaky Akakievich. For ten points each:

[10] Name this author of the novels *Dead Souls* and *Taras Bulba* and the short story “The Nose,” wherein the title character develops a life of its own.

ANSWER: Nikolai **Gogol**

[10] Akaky visits a “Very Important Person” to discuss the theft of his title prized possession in this Gogol short story.

ANSWER: “The **Overcoat**”

[10] The 2003 novel *The Namesake* features a character named for Gogol and was written by what Indian-American author of *Interpreter of Maladies*?

ANSWER: Jhumpa **Lahiri**

12. This subsidiary of ABC and Disney was founded in 1978 in Bristol, Connecticut. For ten points each:

[10] Name this sports news channel whose programs include SportsCenter.

ANSWER: **Entertainment and Sports Programming Network (ESPN)**

[10] In 2012, this basketball player of Asian descent reconciled with Max Bretos, one of two ESPN employees accused of using an ethnic slur.

ANSWER: Jeremy **Lin**

[10] This former editor-in-chief of Grantland.com was suspended by ESPN for three weeks because of his combative comments on Roger Goodell’s handling of the Ray Rice scandal. He is now employed by HBO.

ANSWER: Bill **Simmons**

13. The cell is home to a host of organelles, each one serving a distinct task. For ten points each:

[10] Name this organelle made up of numerous folds called cristae. It is the site of ATP synthesis and is often called the “powerhouse of the cell”.

ANSWER: **mitochondria**

[10] The cell membrane that surrounds cells can be thought of using this model created by Nicholson and Sanger that describes the non-rigidity of the structure and the floating molecules embedded within.

ANSWER: **fluid mosaic** model

[10] The Golgi apparatus tags recently synthesized proteins with sugars or other molecules, one of which might be this tag that sends the protein to the lysosome.

ANSWER: **mannose-6-phosphate** (prompt on “mannose-phosphate”)

14. In this play, Garcin tells how he was shot 12 times in the chest for leading an anti-war newspaper. For ten points each:

[10] Name this play in which Garcin, Inez, and Estelle are locked in a room together for eternity, leading to the realization that “hell is other people”.

ANSWER: **No Exit**

[10] This French playwright wrote *No Exit*, which later inspired many existentialist works.

ANSWER: Jean-Paul **Sartre** [“SAHR-treh”]

[10] One of the more famous quotes attributed to Sartre asserts that “man is condemned to be” this, because “once thrown into the world, he is responsible for everything he does.”

ANSWER: **free** (accept word forms)

15. For ten points each, answer the following about David Ricardo, an English economic philosopher of Portuguese descent:

[10] Ricardo used wool and wine to demonstrate this economic concept, which says that in a two-country system, each nation should specialize based on relative efficiency of production.

ANSWER: **comparative advantage**

[10] Ricardo lived comfortably after making a fortune betting on this 1815 battle. This battle saw a rout by Arthur Wellesley in present-day Belgium, marking the end of the Hundred Days.

ANSWER: Battle of **Waterloo**

[10] Ricardo feuded with Thomas Malthus regarding these pieces of British legislation. Enacted in 1815 and intended to support domestic grain manufacturing, Robert Peel repealed them in 1846.

ANSWER: **Corn Laws**

16. Chernenko preceded this man in his most notable role. For ten points each:

[10] Name this last General Secretary of the Soviet Communist Party. He is known for his unique birthmark, and Ronald Reagan instructed him to “tear down this wall.”

ANSWER: Mikhail **Gorbachev**

[10] Gorbachev’s time as General Secretary was defined by its wide-reaching reforms, which include this one which translates most directly as “restructuring.” Its objective was to make the command economy more efficient for Soviet consumers.

ANSWER: **perestroika**

[10] As General Secretary, Gorbachev served as the head of this body, selected by the Central Committee. It was once known as the Presidium.

ANSWER: **Politburo** or **Political Bureau** of the Central Committee of the Communist Party of the Soviet Union

17. This artist painted a tax collector being inspired to join Christ and *Judith Beheading Holofernes* which shares aspects with a version by his student Artemisia Gentileschia. For ten points each:

[10] Name this Baroque artist of *The Calling of Saint Matthew* and *Amor Vincit Omnia*.

ANSWER: Michelangelo Merisi da **Caravaggio**

[10] Caravaggio used this artistic technique in *The Calling of Saint Matthew* and many other paintings. Its name comes from the Italian for “light-dark” and it is characterized by high contrast between the two.

ANSWER: **chiaroscuro** (prompt on “tenebrism”)

[10] Caravaggio also painted one of these objects being held by a young boy, as well as another alone against a beige background. Paul Cézanne also painted several iterations of this still-life subject, “with a cherub” and “with an open drawer”.

ANSWER: **fruit basket** (accept equivalents for basket).

18. Gamal Abdel Nasser was involved in a 1956 crisis named for this location. For ten points each:

[10] Napoleon discovered a predecessor of this Egyptian waterway connecting the Mediterranean and Red Seas, which is protected by the Convention of Constantinople.

ANSWER: **Suez Canal**

[10] Gouverneur Morris proposed to build this canal off of the Mohawk River. It is connected to Lake Oneida and the Finger Lakes on the way to its terminus at its namesake body of water.

ANSWER: **Erie Canal**

[10] Before purchasing the Panama Canal Zone from France, the United States planned on constructing a canal in this country. A Hong Kongese firm has revived plans for a canal here.

ANSWER: **Nicaragua**

19. For ten points each, name the following about computers and computing:

[10] This machine is regarded as the first electronic digital computer. It was completed in 1946 at the University of Pennsylvania, and was operational until 1955.

ANSWER: **ENIAC** (or **E**lectronic **N**umerical **I**ntegrator **A**nd **C**omputer)

[10] ENIAC had this designation, which means that given enough time, it can perform any computation. This term is named for a British computer scientist who decoded the Enigma.

ANSWER: **Turing-complete**

[10] While computers like ENIAC are equipped with binary logic, some computers can instead have this type of logic, where truth values can be thought of as -1, 0, and 1.

ANSWER: **ternary** or **base three**, do not accept or prompt on “trinary”

20. This quantity is often described as the amount of “disorder” in a system. For ten points each:

[10] Name this quantity that, according to the Second Law of Thermodynamics, is always strictly increasing in the universe.

ANSWER: **entropy**

[10] The Third Law of Thermodynamics states that a perfect crystal with zero entropy has what temperature?

ANSWER: **absolute zero** or **0 Kelvin** or **-273.15 degrees Celsius** or **-459.67 degrees Fahrenheit**, do not accept or prompt on “0 degrees Kelvin”

[10] This Law of Thermodynamics states that two temperatures at equilibrium with a different, third system are at equilibrium with each other. Maxwell described this law as “all heat is of the same kind.”

ANSWER: **Zeroth** Law of Thermodynamics

21. This artist painted several views of the Parthenon and the volcano Cotopaxi. For ten points each:

[10] Name this student of Thomas Cole, an American landscape painter.

ANSWER: Frederic Edwin **Church**

[10] Church painted “the heart” of this mountain range in Western South America, where Cotopaxi is located. Church’s painting is based on his two trips to Ecuador and Columbia, which contain part of this range.

ANSWER: **Andes**

[10] Church and Cole were both members of this “school”, named after a New York river. Members of this group often painted romanticized scenes of the Northeastern United States.

ANSWER: The **Hudson River** School