



HSAPQ

High School Academic Pyramid Questions

2008-2009
NSC-Format Set #2

Round 7

Related Tossups &
Bonuses

1. The magnitude of one type of this phenomenon is governed by a namesake v -parameter given by the Cornu Spiral, and its Fraunhofer type occurs for Fresnel number less than one. Bragg's law explains how x-rays experience it when meeting crystals, and the Davisson-Germer experiment showed that electrons experience it. It can be explained by Huygens' Principle, and constructive interference illustrated that it happens to light in Young's double-slit experiment, showing its wave nature. For 10 points, name this phenomenon in which a wave bends around an obstacle.

ANSWER: diffraction [accept Fresnel diffraction before "Fraunhofer"]

Bonus: One novel application of these devices is in a namesake kind of "tweezers" that can move small molecules. For 10 points each:

[10] Name these devices that use population inversion to generate a beam of coherent light.

ANSWER: lasers [or Light Amplification by Stimulated Emission of Radiation, but do not reveal]

[10] Lasers work by this kind of emission, in which a photon causes an excited electron to transition to ground state, producing another photon. It is contrasted with spontaneous emission.

ANSWER: stimulated emission

2. This poet wrote "Pretty women wonder where my secret lies" in *Phenomenal Woman*, and the birth of her son and her drug addiction feature in her autobiography *Gather Together In My Name*. Her other poetry collections include *Now Sheba Sings the Song* and *Just Give Me a Cool Drink of Water 'Fore I Die*. She read her poem "On the Pulse of Morning" at Bill Clinton's inauguration, and another of her works was inspired by her recovery from childhood sexual abuse. For 10 points, name this poet of *I Know Why the Caged Bird Sings*.

ANSWER: Maya Angelou

Bonus: The chauffeur Henry Simpson has an affair with Albertine in her *Toys in the Attic*. For 10 points each:

[10] Name this playwright who wrote about Mary's accusations of lesbianism between two boarding school headmistresses in *The Children's Hour*.

ANSWER: Lillian Florence Hellman

[10] This poet also created a work titled "The Children's Hour," but is better known for "Evangeline," "The Song of Hiawatha," and "Paul Revere's Ride."

ANSWER: Henry Wadsworth Longfellow

3. According to some sources, the first man in this belief system was Gayomard, and its founder was first patronized by Vishtaspa. All souls must cross the Chinvat Bridge in this faith, and the dead are laid out on Dakhmas, or Towers of Silence, to keep earth and fire uncontaminated. This religion's Gathas tell of malevolent spirits called Daevas, who are opposed by the Amesha Spentas. Its main scripture is known as the Avesta. For 10 points, name this religion in which Ahriman is opposed by Ahura Mazda, a Persian religion founded by Zarathustra.

ANSWER: **Zoroastrianism**

Bonus: Male members of this religion are not allowed to cut their hair, and need to carry a dagger and wear a turban. For 10 points each:

[10] Name this Indian religion founded by Nanak, popular in the Punjab region, where you can find its Golden Temple at Amritsar.

ANSWER: **Sikhism**

[10] Nanak, along with Gobind Singh, is one of these people, wise teachers who reveal the Name, or Nam, and the Word, or Sabad, of God.

ANSWER: **gurus**

4. Engagements in this conflict included the Battle of Gravelotte, in which the losing side was led by Marshal François Bazaine, and a two month siege of Metz. The victorious side was marshaled throughout this conflict by the elder Helmuth von Moltke, who succeeded in capturing Napoleon III at the Battle of Sedan. Ended by the Treaty of Frankfurt, it prompted the cessation of Alsace-Lorraine as well as Wilhelm I's coronation as German Kaiser in the Palace of Versailles. For 10 points, name this 1870 to 1871 conflict, the final war of Otto von Bismarck.

ANSWER: **Franco-Prussian War** [or **Franco-German War**]

Bonus: He proposed to restructure his Empire as a triple monarchy, giving equal weight to the Germans, Magyars, and Slavs. For 10 points:

[10] Name this archduke, who exclaimed, "I come to Sarajevo...and I get bombs thrown at me. It is outrageous!" shortly before he and his wife Sophie were shot.

ANSWER: Archduke **Franz Ferdinand** [or **Francis Ferdinand**; prompt on **Franz**; prompt on **Francis**; prompt on **Ferdinand**]

[10] That bomb-thrower was Nedjelko Cabrinovic, a member of this secret society led by a colonel code-named Apis ("OP-ee").

ANSWER: **Black Hand** Society [or **Union or Death**; or **Ujedinjenje ili Smrt**]

5. This work opens with a pianissimo on A and E, and at the end of the movement that theme returns in a major key. The third movement in B flat major includes a solo horn and a fanfare in E flat, and the scherzo second movement of this work has a notable timpani solo and a D major trio using trombones. Premiered in Vienna in 1824, this work's final movement is a "symphony within a symphony," and that movement includes text from a Friedrich Schiller poem, "Ode to Joy." For 10 points, name this composition, the last of its kind by Beethoven.

ANSWER: Symphony No. **9** in D minor by Ludwig van Beethoven, "**Choral**," [accept any combination]

Bonus: This composer wrote the scores for such films as *Koyaanisqatsi* and *The Hours*. For 10 points each:

[10] Name this composer, who included several “knee plays” in his massive opera *Einstein on the Beach*.

ANSWER: Philip **Glass**

[10] Philip Glass primarily composes music of this genre. Steve Reich and Terry Riley also write music of this style, which is characterized by repetition of simple musical motifs.

ANSWER: **minimalism** [or word forms]

6. In International Relations Theory, this university is home to suicide bombing expert Robert Pape, as well as the founder of “Offensive Realism,” John J. Mearsheimer. This university’s law school lost Cass Sunstein to Harvard and is home to Richard Posner. One professor from this school developed capture theory, while another developed the concept of rational expectations. Apart from Robert Lucas and George Stigler, this school is associated with a man who pioneered the wealth effect and wrote *Free to Choose* to oppose government regulation. For 10 points, name this university best known for its namesake school of free market economics, located in the Windy City.

ANSWER: University of **Chicago**

Bonus: This language’s closest living relative is Frisian. For 10 points each:

[10] Name this Germanic language that underwent the Great Vowel Shift.

ANSWER: **English**

[10] Like all Germanic languages, English is subject to this Linguistic rule, which is named for a German linguist who also collected fairytales.

ANSWER: **Grimm’s Law**

7. Joseph Ritner's refusal to accept his defeat by David Porter led to this state's bloodless Buckshot War. Charles Willson Peale established the first American museum in this state, whose founder signed a treaty with the Lenape tribe. In this state's Conestoga Massacre, many Native Americans were murdered by the Paxton Boys. The Battles of Germantown and Brandywine occurred in this state, where George Washington led troops to put down the Whiskey Rebellion. For 10 points, name this state founded as a Quaker colony by William Penn.

ANSWER: **Pennsylvania**

Bonus: This president was advised by Colonel House. For 10 points each:

[10] Name this Democrat who asserted "the world must be made safe for democracy" and issued Fourteen Points after entering the United States into World War I.

ANSWER: Thomas Woodrow **Wilson**

[10] This Republican was the leading opponent of the League of Nations, and succeeded in preventing the United States from joining it.

ANSWER: Henry Cabot **Lodge**, Sr.

8. One of these compounds alternates between martensite and austenite phases and is the most widely used of the “shape-memory” variety. The Hume-Rothery rules state that these compounds can only form if its constituent elements are of similar size and electronegativity, though one involving cesium and aluminum was formed in violation of those rules. For 10 points, name these compounds that include Nitinol, pewter, brass, and bronze, which are all mixtures of multiple metals.

ANSWER: **alloys** [accept early **shape-memory alloys**; accept **Nitinol** or **Nickel-Titanium Naval Ordnance Laboratory** before “Hume-Rothery”]

Bonus: It is responsible for carbon's ability to form so many compounds, and it can be calculated using the Lewis electron dot structure. For 10 points each:

[10] Name this process in which atomic orbitals overlap to form the namesake type of orbitals; for instance, in carbon dioxide, this process produces two sp orbitals.

ANSWER: **hybridization**

[10] This common form of hybridization in carbon is found in methane and other compounds in which carbon forms four single bonds.

ANSWER: **sp³** ("s p three")



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Category Quiz
Bonus Choices

Arts
Current Events
Geography
History
Literature
Math Calculation
Mythology
Social Science

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Category Quiz Tossups

9. This author wrote about the simpleminded Sufiya, who beheads two hundred eighteen turkeys and turns into the Beast of violence against the backdrop of the Hyder and Harrapa families, in the novel *Shame*. In another of this author's works, Gibreel Farishta and Saladin Chamcha survive the terrorist attack on an Air India flight. He created a character who can read thoughts with his nose, and who was born at the moment of India's independence, in his novel *Midnight's Children*. For 10 points, name this author whose *The Satanic Verses* earned a fatwa from Ayatollah Khomeini.

ANSWER: Salmon **Rushdie**

10. A key point in this musical occurs when Lyman Hall switches allegiances, and this musical's song "Cool, Cool Considerate Men" was removed from the film version due to the objections of President Nixon. "Molasses to Rum" is sung by Edward Rutledge and describes the triangle trade, and John Dickinson leaves the Congress at the end of this musical to fight for the new nation despite not supporting the cause of independence. For 10 points, name this musical about the events leading up to the signing of the Declaration of Independence, named for the year in which that event occurred.

ANSWER: **1776**

11. The works of this artist inspired Rilke to write "thing-poems" such as "The Panther." He used a handyman as the model for his realistic *The Man with the Broken Nose*, and created an enormous statue of the novelist Balzac. Another of his works includes *The Three Shades* and a sculpture of Paolo embracing Francesca inspired by *The Divine Comedy*. That work, *The Gates of Hell*, includes *The Kiss*, as well as a sculpture of a seated man resting his head on his fist. For 10 points, name this French sculptor of *The Thinker*.

ANSWER: Auguste **Rodin**

12. Foster resonance energy transfer between fluorogenic dyes allows for quantification of the products of this technique in a real-time variant. This technique consists of denaturation, annealing, and elongation steps, and was developed by Kary Mullis. The bacterium *Thermus aquaticus* provides a necessary heat-stable DNA polymerase known as *Taq*. The presence of free primers and nucleotides is also necessarily in this technique. For 10 points, name this biological technique used to create numerous copies of segments of DNA.

ANSWER: **PCR** [or **polymerase chain reaction**]

13. Bays of this lake include Michipicoten Bay, and one national park on this bay is Pukaskwa. Islands in this lake include the Slate Islands and St. Ignace Island, and its waters surround the large Keweenaw Peninsula. Also the site of the Apostle Islands and Whitefish Bay, cities on this lake include Grand Marais, Munising, Thunder Bay, and Superior. For 10 points, name this lake to the north of Michigan's Upper Peninsula, the largest Great Lake.

ANSWER: Lake **Superior**

14. This empire conquered Takrur, and Wolof fought for independence from this polity. During this empire's reign by Mahmud III, Askia Ishaq sacked its capital at Niani. Growing out of the state of Kangaba as a revolt against Sumanguru, its creation was described in a namesake epic of its founder, Sundiata. Home to the trading city Timbuktu, it was ruled by a man who gave away vast amounts of gold while undertaking a hajj, Mansa Musa. For 10 points, name this West African empire whose peak followed the Ghana and preceded the Songhai.

ANSWER: **Mali** empire [or **Malinke** empire]



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Category Quiz
Bonuses

Arts: A Richard Dehmel poem provides the basis for this composition, in which a woman tells her lover that she is pregnant with someone else's child. For 15 points, name this string sextet by Arnold Schoenberg.

ANSWER: Transfigured Night [or Verklarte Nacht]

Current Events: In March 2008, the Federal Reserve Bank of New York provided this firm with an emergency loan, but that loan failed to prevent this firm's collapse. For 15 points, name this investment bank bought by JPMorgan Chase for two dollars a share thanks to the subprime mortgage crisis.

ANSWER: Bear Stearns

Geography: A suburb of this city, Sri Jayawendrapura Kotte, is its country's legislative and judicial capital, and old districts of this city are the Fort and the Pettah. For 15 points, name this administrative capital of the former Ceylon.

ANSWER: Colombo

History: He commissioned the African expedition of Henry Stanley, and in 1885 established the Congo Free State under his personal autocratic rule. For 15 points, name this king of Belgium, who ruled from 1865 to 1909.

ANSWER: Leopold II [prompt on Leopold]

Literature: This author adapted Sophocles' *Antigone* as *The Burial at Thebes*, and he wrote that "the great slime kings / were gathered there for vengeance" in "Death of a Naturalist." For 15 points, name this Irish Nobel laureate, who created a modern translation of *Beowulf*.

ANSWER: Seamus Heaney

Math Calculation: For 15 points, find the limit of the function quantity $x^2 - 1$, all over the natural log of x , as x approaches 1.

ANSWER: 2

Mythology: She consorted with her son Kingu after the death of her first consort Apsu, the embodiment of primordial fresh water. For 15 points, name this dragon killed by Marduk to create the world.

ANSWER: Tiamat

Social Science: He used the philosophy of Nietzsche to give root to his ideas on power dynamics. For 15 points, name this psychologist who broke from Freud and formulated the concept of the inferiority complex.

ANSWER: Alfred Adler



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Stretch Phase

15. D. S. Wilson divided this concept into strong and weak forms, and this concept may also explain the sterility of most female social insects. Hamilton's Rule, which governs the degree to which it occurs, has been generalized as "kin selection" theory. Richard Dawkins argued that it was subject to "subversion from within" in *The Selfish Gene*. For 10 points, name this activity in which an individual sacrifices its own reproductive success for that of others, exhibited by prairie dogs giving off a warning signal instead of running from predators.

ANSWER: **altruism** [accept word forms like **altruistic**]

Bonus: She was assassinated by two of her Sikh bodyguards in October 1984, after she ordered troops to storm the Sikh holy site of Amritsar. For 10 points each:

[10] Name this Indian prime minister, whose son Rajiv was also assassinated seven years later.

ANSWER: **Indira Gandhi** [prompt on **Gandhi**]

[10] Indira Gandhi was the daughter of this "pandit," the Congress Party leader who was the long-serving first prime minister of independent India.

ANSWER: Jawaharlal **Nehru**

[10] During this period from 1975 to 1977, Indira Gandhi ruled by decree and imprisoned political opponents, following an attempt to unseat her by court ruling.

ANSWER: The **Emergency**

16. Stribog is the god of this thing in Slavic mythology, while the antelope-riding father of Hanumna, Vayu, is the Hindu god of it. The Shinto god of this carries a large bag and has a brother named Raijin, who is the thunder god. Apart from Fujin, gods of this include the Anemoi of the Greeks and the Venti of the Romans. Another Greek god of it gave Odysseus a bag which, when opened, released it in all directions. For 10 points, name this phenomenon whose gods include Aeolus, Zephyrus, and Boreas.

ANSWER: **winds**

Bonus: He wrote about the dictator Sam in *Anthills of the Savannah*. For 10 points each:

[10] Name this author of a book in which Okonkwo helps kill Ikemefuna, *Things Fall Apart*.

ANSWER: Chinua **Achebe**

[10] Chinua Achebe is from this African nation, also home to authors like Christopher Okigbo and Wole Soyinka.

ANSWER: **Nigeria**

[10] In this sequel to *Things Fall Apart*, Okonkwo's grandson Obi is convicted of taking bribes in order to keep up his Western lifestyle.

ANSWER: **No Longer At Ease**

17. This man oversaw the execution of his son Crispus on adultery charges, and ordered the exile of St. Athanasius. He defeated Licinius at Chrysopolis, and his mother Helen was said to have found the location of the Holy Sepulcher. He defeated Maxentius in a 312 AD battle, and convened the First Council of Nicaea. For 10 points, name this victor at the Battle of Milvian Bridge, whose signing of the Edict of Milan made Christianity legal in the Roman Empire.

ANSWER: Constantine I [or Constantine the Great]

Bonus: George Santayana wrote about realms of it, and it is paired with nothingness in a work that discusses the concept of bad faith. For 10 points each:

[10] Name this concept, which along with “time” names a work that introduces the concept of *dasein*.

ANSWER: “being”

[10] This philosopher wrote *Being and Time*, as well as *Introduction to Metaphysics*.

ANSWER: Martin Heidegger

[10] *Being and Nothingness* is a work of this French author and philosopher. This existentialist also wrote fiction like *Nausea* and *No Exit*.

ANSWER: Jean-Paul Sartre

18. This work was written by the author of *Patience* and *Cleanness*. Its protagonist has a pentacle emblazoned upon his shield, and is forced to give his host multiple kisses as part of their bartering arrangement, for which he receives the spoils of the host's hunt. The host's wife gives that character a belt that will protect him from his opponent when he meets him in the Green Chapel. For 10 points, name this medieval British poem by the Pearl poet about a beheading contest between the title characters, named for a nephew of King Arthur and a colorful antagonist.

ANSWER: *Sir* Gawain and the Green Knight

Bonus: For 10 points each, name these things about DNA replication.

[10] One of the four bases found in DNA, this pyrimidine pairs with guanine.

ANSWER: cytosine

[10] These enzymes “unwind” DNA, breaking hydrogen bonds between bases so that replication can occur.

ANSWER: DNA helicase

[10] This is the structure formed when helicase separates DNA into two “tines,” known as the lagging and leading strands.

ANSWER: replication fork

19. A classification known as the Inuit Group contains five of these objects named for Inuit gods. One of these bodies is theorized by Kieffer to produce cryovolcanic effects via a clathrate mechanism, and another of these bodies has a giant crater that makes it look like the Death Star. The only irregular one of these objects is Phoebe. The largest of these bodies is the only moon known to have a dense atmosphere. For 10 points, name these objects including Enceladus, Mimas, and Titan, all of which orbit the second-largest planet in the solar system.

ANSWER: Saturn's moons [accept equivalents like Saturn's satellites; prompt on moons or similar answers that do not mention Saturn]

Bonus: Written in iambic pentameter with an a-b-a-b rhyme scheme, this poem describes a "mute inglorious Milton" buried in the title location. For 10 points each:

[10] Name this poem, which begins "the curfew tolls the knell of parting day."

ANSWER: "**Elegy Written in a Country Churchyard**"

[10] "Elegy Written in a Country Churchyard" was written by this British author of "Ode on the Death of a Favourite Cat Drowned in a Tub of Gold Fishes."

ANSWER: Thomas **Gray**

[10] Gray addresses "Father Thames" as having seen "full many a sprightly race" before claiming "where ignorance is bliss, 'tis folly to be wise" in an ode on a "distant prospect" of this place.

ANSWER: **Eton** College [accept "**Ode on a Distant Prospect of Eton College**"]

20. His pupil Egbert founded a school in York, and as a youth he was cared for by Benedict Biscop. The reckoning of Easter was the subject of this man's "Of Times" and "On the Reckoning of Time," and he wrote on the life of St. Cuthbert. His most noted work traced the history of a certain polity to the arrival of St. Augustine in Kent, and he originated the practice of dating events from the time of Christ's birth. For 10 points, name this Anglo-Saxon author of the *Ecclesiastical History of the English People*.

ANSWER: the Venerable **Bede**

Bonus: They were first discovered by Carl Anderson during cloud chamber studies of cosmic rays. For 10 points each:

[10] Name this class of subatomic particle which has the same mass and charge magnitude as the electron.

ANSWER: **positron** [or **positive electron**]

[10] The positron is an example of this type of matter, which annihilates when it comes into contact with ordinary matter.

ANSWER: **antimatter**

[10] In a type of decay that is the opposite of annihilation, a positron and electron can be created from this form of high energy radiation.

ANSWER: **gamma ray**

21. One character in this novel sports a monkey on his shoulder, and announces the performance of "The Tale of Melisendra." It opens with a dedication to the Duke of Bejar, and at one point the storytelling goatherd Peter is interrupted by the title character for poor use of grammar. Its title character is defeated by the Knight of the White Moon after becoming obsessed with chivalric romances. For 10 points, name this novel about a knight who rides Rocinante, loves Dulcinea, and is served by Sancho Panza, a work by Miguel de Cervantes.

ANSWER: *The Ingenious Hidalgo* **Don Quixote** of La Mancha [or *El ingenioso hidalgo* **Don Quijote** de la Mancha]

Bonus: His first symphony was nicknamed “Beethoven’s Tenth,” and he wrote twenty-four *Variations on a Theme by Paganini*. For 10 points each:

[10] Identify this composer of a notable Lullaby and some Hungarian Dances.

ANSWER: Johannes **Brahms**

[10] This Brahms piece commemorated his honorary degree from the University of Breslau. He also wrote a “Tragic” one of the same type of composition.

ANSWER: **Academic Festival Overture**

[10] After the death of his mother, Brahms wrote a “German” one of these. Verdi wrote one with a famous “Dies Irae,” and Mozart’s was completed after his death.

ANSWER: **requiem**

22. In an Edvard Munch painting of this name, a naked woman with red hair stands in front of a blue bed, which the title figure lies on. In another painting of this name, a green sheet appears behind a square wooden stool holding ink and a quill. That painting of this name includes a bloody knife in the lower left corner, as well as the dangling right arm of a corpse whose right hand grasps a petition from Charlotte Corday. For 10 points, name this Jean-Louis David painting of the assassination of a leader of the French Revolution.

ANSWER: *The* **Death of Marat**

Bonus: Much of our knowledge of his early reign comes from his biographer and uncle, Otto of Freising. For 10 points each:

[10] Name this Holy Roman Emperor who captured Rome after being excommunicated by Alexander III, and had a notably red beard.

ANSWER: **Frederick I** Hohenstaufen [or **Frederick Barbarossa**; prompt on **Frederick**; prompt on **Barbarossa**; prompt on **Frederick, Duke of Swabia**]

[10] Frederick gave this cousin of his and Duke of Saxony the Duchy of Bavaria, but later exiled him after a civil war.

ANSWER: **Henry the Lion** [prompt on **Henry**]

[10] Frederick allegedly died attempting to swim the Calycadmus River, thus impeding this event that saw several European kings face off against Saladin.

ANSWER: **Third Crusade** [prompt on **crusades**]



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Tiebreakers + Extras

1. The Stark-Einstein photochemical equivalence law uses this value to relate mass to the quanta of radiation it absorbs. The first attempt to calculate this value resulted in the similar Loschmidt constant, and it is multiplied by the elementary charge to produce the Faraday constant. The Boltzmann constant is a ratio of the universal gas constant to this other value, and inverting this number yields the atomic mass unit. For 10 points, name this number that represents the number of atoms or molecules present in a mole of a substance.

ANSWER: Avogadro's constant [prompt on mole before mentioned]

2. One character in this novel mocks another for having no front teeth in a chapter about his "inactivity." That female character had sold her teeth after being abandoned by Felix. Another sells his books to survive, and that man, Mabeuf, subsequently joins the Friends of the ABC. Later in the novel, Enjolras leads a June 5 revolt with a man who rejects a street girl. That character, Marius, is in love with Cosette, the adopted daughter of a man initially imprisoned for stealing a loaf of bread. For 10 points, name this work by Victor Hugo about former prisoner Jean Valjean.

ANSWER: *Les Miserables*

3. This event caused the cancellation of the "Peoples' Olympiad," and this conflict also saw the first racially integrated American battalion to be commanded by an African-American. In addition to that International Brigade, another group involved in this war was the German Condor Legion, which bombed a town of little military significance while attempting to subdue the Basques. For 10 points, name this conflict of the 1930's in which Francisco Franco overthrew his country's government, which saw the bombing of Guernica.

ANSWER: Spanish Civil War

Extra 20-point bonus:

This series culminates in the terrifying *Saturn Devouring His Sons*. For 10 points each:

[10] Name this series of paintings that includes *The Witches' Sabbath*, executed on the walls of the Quinta del Sordo.

ANSWER: the Black Paintings [or Las pinturas negras]

[10] The Black Paintings were created by this Spanish artist of *Los Caprichos* as well as the *Nude Maja* and *Clothed Maja*.

ANSWER: Francisco José de Goya y Lucientes

Extra 30-point bonus:

This layer is found above the Gutenberg Discontinuity. For 10 points each:

[10] Name this largest layer of the Earth, which can be found between the crust and the outer core.

ANSWER: **mantle**

[10] This is the uppermost part of the mantle. Because of the pressure of having to carry the crust, it is made out of liquid rock, and continental plates float on it.

ANSWER: **asthenosphere**

[10] This is the boundary between the crust and the asthenosphere. It is named for the Croatian seismologist who discovered it.

ANSWER: **Mohorovicic** Discontinuity