Illinois Masonic Academic Bowl
2016 State Tournament

Round 4
1st Section
Toss-up Questions

Question #1: Literature – British Literature

10 points

This author wrote of two women named Mrs. Dai Bread, who lived with nostalgic and blind Captain Cat in the village of Llareggub [LAR-eg-ub]. He wrote of a boy who was "prince of the apple towns", "famous among the farms", and sang in his chains like the sea, in "Fern Hill". In another poem, which this author dedicated to his father, the speaker claims that "old age should burn and rave at close of day." That poem advises the listener to "Rage, rage against the dying of the light." Name this Welshman who wrote "Do Not Go Gentle into That Good Night."	Dylan (Marlais) **Thomas**

Question #2: Science – Biology

10 points

An organism from this phylum was studied to learn about a system that uses the proteins Argonaute [ar-goh-NOHT] and dicer ["DICE"-ur]. This phylum contains a 959-cell model organism that was studied by Craig Mello and Andrew Fire. Organisms in this phylum do not have respiratory systems or excretory organs. RNAi [R-N-A-I] was studied in a model organism from this pseudocoelomate [soo-doh-SEE-luh-"mate"] phylum. This phylum includes *C. elegans* and hookworms. Name this phylum of roundworms.	**nematoda** or **nematode**s [accept **roundworm**s before the end; prompt on **worm**s before "hookworms"; do not accept "flatworms" or "segmented worms"]

Question #3: Social Studies – World History

10 points

A 16th- and 17th-century dynasty in this country shared its name with its current city Taungoo. In this country, the resignation of Ne Win in 1988 resulted in the creation of the State Law and Order Restoration Council, led by General Saw Maung. Its Union Solidarity and Development Party was defeated in 2015 elections, leading to a promise of a smooth transition by President Thein Sein [THAYN sayn]. That election went well for the National League Democracy party, which is headed by Aung San Suu Kyi [awn sawn soo chee]. Name this southeast Asian nation that in the 2000s moved its capital to Nay Pyi Taw from Rangoon.	(Union of) **Burma** or (Republic of the Union of) **Myanmar** [mee-YAHN-mar] [or Pyidaungzu **Myanma** Naingngandaw]

Question #4: Miscellaneous – Industrial Arts

10 points

A strike in this industry was the subject of Ken Kesey's novel *Sometimes a Great Notion*. Independent workers in this industry are called "gyppos" [rhymes with "hippos"], in contrast to members of the "Four L". Stem-only harvesting and cut-to-length are among the methods for operating in this industry, which is one aspect of silviculture [SIL-vih-"culture"]. Workers in this industry often use chainsaws, and in excess this industry can cause deforestation. Name this industry in which trees are cut by lumberjacks.	**logging** [accept **lumber**jacking; prompt on answers relating to **forestry** or **tree**s or **wood**]

Question #5: Mathematics – Math Concepts

10 points

Each of these numbers is a hexagonal number, meaning that it can be written in the form 2 *n* squared minus *n*. Euclid proved that adding consecutive powers of two until you get a prime number, then multiplying that sum by the last power of two in the series, gives one of these numbers. That theorem relates these numbers to Mersenne [mur-sen] primes. These numbers are neither abundant nor deficient, and the first few of them are 6, 28, and 496. Name these numbers equal to the sum of all of their proper divisors.	**perfect** number

Question #6: Science – Earth Science

10 points

Granules of plasma in the Sun's photosphere are known as "cells" named for this process. Arthur Holmes explained plate tectonic movement using "currents" named for this process inside the Earth's mantle. This process explains cloud formation, which occurs when warm moist air rises. The cells named for this process have warm rising centers balanced by cool peripheries. This process involves advection and diffusion in fluids with temperature gradients. Name this method of heat transfer that can only take place in a fluid and is often compared to radiation and conduction.	**convect**ion [or **convective** heat transfer or **convecting**]

Question #7: Literature – World Literature

10 points per part

In *The Mysterious Island*, Union soldiers discover the hideout of this man.		
1	Name this captain born as Prince Dakkar. He utilized a Bunsen cell that required sodium instead of zinc to power his all-electrical ship.	Captain **Nemo**
2	Nemo was created by this author of *Twenty Thousand Leagues Under the Sea*.	Jules (Gabriel) **Verne** [zhool vairn]
3	The United States military believes the *Nautilus* to be a monster, which resulted in it being attacked by this ship. Pierre Arronax, Ned Land, and Conseil [kone-say] were aboard when it was sunk.	USS ***Abraham Lincoln***

Question #8: Literature – World Literature

10 points per part

In this author's *The Stone Raft*, an entire peninsula breaks off from mainland Europe.		
1	Name this author who does not use quotations or hyphens in his writing. He wrote about a place where nobody dies in *Death with Interruptions*.	José (de Sousa) **Saramago**
2	Saramago is from this country, whose national epic is *The Lusiads [LOO-see-ads]*. One of Saramago's novels concerns an elephant traveling from Lisbon in this country to Vienna.	**Portugal** [or **Portuguese Republic** or **República Portuguesa**]
3	In another novel by Saramago, the only character not afflicted with this condition—also called "white sickness"—is the wife of an ophthalmologist. John Milton wrote a sonnet about living with this condition.	**blind**ness [accept variations like being **blind**; prompt on answers referring to **impair**ed **vision**]

Question #9: Social Studies – Current Events

10 points per part

This son of a former Canadian Prime Minister led his Liberal Party to a major sweep in October 2015 elections.		
1	Name this leader who entered politics following the death of his brother Michel [mee-shel]. He served as an MP from Montreal prior to heading the Liberals.	Justin (Pierre James) **Trudeau**
2	This incumbent Conservative Prime Minister stepped down following the resounding defeat.	Stephen (Joseph) **Harper**
3	Trudeau is attempting to reform the way Canadians elect members of this body, the lower house of the Canadian Parliament. Canada's upper house, like ours, is called the Senate.	**House of Commons** [prompt partial answer]

Question #10: Social Studies – Current Events

10 points per part

A supporter of this foreign leader filed a lawsuit in the United States against Fethullah Gulen [feh-too-LAH goo-LEN].		
1	Name this Turkish leader who was the target of the 2013 Ergenekon [air-GEN-uh-kahn] coup. He was criticized for referring to the Gezi [geh-zee] Park protesters as "looters".	Recep Tayyip **Erdogan** [AIR-doh-wahn, but be lenient]
2	Turkish leaders publicly complained about planes from this country flying over Turkish airspace en route to the conflict in Syria. Turkey shot down one of its planes in November 2015.	**Russia** [or **Russian Federation** or **Rossiya** or **Rossiyskaya Federatsiya**]
3	Turkey also drew criticism for arresting lawyer Tahir Elçi [TAH-heer EL-chee], who said that a political party representing this group of people "is not a terrorist group."	**Kurd**s [or **Kurdistan Workers' Party** or **Partiya Karkeren Kurdistane**]

Question #11: Science – Physics

10 points per part

These systems are sometimes described using a hydraulic analogy that compares voltage to pressure and resistance to pipe constriction.		
1	Name these electrical systems in which current may flow. These systems typically have a voltage source and components like resistors, inductors, and capacitors.	electrical **circuit**s [accept electrical **network**s]
2	This man's loop and junction rules are useful for analyzing electric circuits.	Gustav **Kirchhoff**
3	Thévenin's [TEV-nin'z] theorem states that any part of a circuit can be replaced by a series circuit. This complementary theorem states that any part of a circuit can be replaced by a parallel circuit.	**Norton**'s theorem

Question #12: Science – Physics

10 points per part

This theory explained the anomalous precession of the perihelion [per-uh-HEE-lee-un] of Mercury.		
1	Name this theory of Einstein's that characterizes gravity as the warping of spacetime.	**general relativity** [prompt on partial answer; do not accept "special relativity"]
2	In this 1959 experiment, general relativity was tested by measuring the gravitational redshift of Mössbauer ["MOSS"-bao-ur] gamma rays sent between two iron-57 samples.	**Pound-Rebka** experiment
3	Gravitational redshift is similar to this effect in which the frequency of a wave changes when an observer and the source of the wave are moving with respect to each other.	**Doppler** effect or **Doppler** shift

Question #13: Mathematics – Trigonometry

10 points per part

These identities are named for the fact that they can be demonstrated using a theorem about right triangles.		
1	Name these three identities, one of which is that the sine squared of x plus the cosine squared of x equals one, for any x.	**Pythagorean** identities
2	If the sine of x equals twelve thirteenths, what is the only possible positive value for the cosine of x?	$5/13$
3	If the tangent of x equals three fourths, what is the only possible positive value for the secant of x?	$5/4$ [or 1.25 or $1 + 1/4$]

Question #14: Mathematics – Trigonometry

10 points per part

In a right triangle, this function of an acute angle gives the ratio of the hypotenuse length to the length of the side opposite the angle.		
1	Name this function, the reciprocal [reh-SIP-ruh-kul] of the sine function.	**cosecant** [or **csc**; accept answers that additionally mention a variable; do not prompt on "secant"]
2	What is the cosecant of the quantity seven pi divided by four?	**negative root 2** [or **negative square root of 2** or **negative radical 2**; accept the **opposite** of in place of **negative**]
3	Find the smallest positive input value in radians for which the cosecant function is undefined.	(one) **pi** radians

Question #15: Social Studies – U.S. History

10 points

On account of non-payment, Hugh Forbes told Senator Henry Wilson about this man's activities. Years before bailing out Jefferson Davis, Gerrit Smith financially supported this man as part of the Secret Six. To protect escaped slaves in Springfield, Massachusetts, this person founded the League of Gilead [GIL-ee-ad]. After the sacking of Lawrence, his followers responded with force at Pottawatomie. Robert E. Lee led marines to stop this man's raid. Name this abolitionist who attacked the arsenal at Harpers Ferry.	John **Brown**

Question #16: Literature – Mythology

10 points

During the creation of the world, Tezcatlipoca [TEZ-kaht-lee-POH-kah] sacrificed one of these body parts. These parts of Njord [nee-YORD] were elegant, which led to his marriage to Skadi. While fighting the Hydra, Heracles had one of these body parts trapped, then attacked by a crab. Orion was stung here by a scorpion. Sciron ["SKY"-rahn] forced passersby to wash these parts as a toll. Oedipus' name stems from the fact that his were swollen. The number of these objects changes in the riddle of the Sphinx. Name these body parts that, for the Hippopodes ["hippo"-pohdz], resembled horse hooves.	**feet** [or **foot**]

Question #17: Fine Arts – Classical Music & Opera

10 points

This composer's *Roman Carnival Overture* borrows heavily from his opera about Benvenuto Cellini [ben-vay-NOO-toh chay-LEE-nee]. This composer had a close friendship with Théophile Gautier [tay-oh-feel goht-yay], setting six of Gautier's poems to music in *Summer Nights*. Another of this composer's works, which he classified as a dramatic legend, includes *Hungarian March* and *Dance of the Sylphes*. Like Tchaikovsky, this composer wrote a piece based on *Romeo and Juliet*. Name this French composer of *La damnation de Faust* who included the section "March to the Scaffold" in his *Symphonie fantastique*.	(Louis-)Hector **Berlioz**

Question #18: Science – Chemistry

10 points

The Tolman cone angle was developed to characterize ligands whose central atom is this element. A pentaoxide [pent-uh-"oxide"] of this element is a dessicating agent with an adamantane [ad-uh-MAN-tayn] structure. This atom is bound to three benzene rings in a reagent used in the Appel reaction. An atom of this element is the central one in an ion that forms a triprotic ["try-PRO-tick"] acid, and its white allotrope [AL-oh-"trope"] combusts in air. This element is immediately above arsenic on the periodic table, and can form amine [AM-een]-like compounds because it is below nitrogen. This element was discovered by Hennig Brand in urine. Name this element whose atomic symbol is P.	**phosphorus** [prompt on **P** before the end]

Question #19: Social Studies – Geography

10 points

Mario Pani designed this city's Plaza de las Tres Culturas ["trace" kool-TOOR-ahss], which is near the end of a wide avenue designed by Ferdinand von Rosenzweig, the Paseo de la Reforma. Its large urban park, Alameda Central [ah-lah-MAY-dah sen-TRAHL], is near its large central open square, Zócalo [ZOH-kah-loh]. This city is the home of the official residence called Los Pinos, which several decades ago replaced its Chapultepec Castle. By population, it is the largest city in the Western Hemisphere. Name this capital of a nation bordering the U.S.	**Mexico City** [or **Ciudad México**; accept **México, D**istrito **F**ederal]

Question #20: Literature – World Literature

10 points

In one collection, this writer relates the story of Aristaeus ["air"-iss-TAY-us] and his bees. That work was dedicated to Maecenas [may-SEN-us]. In another collection, this person wrote of a boy whose birth would be heralded as a "great increase of Jove". This person wrote a work in which the Cumaean Sibyl [kyoo-MAY-un SI-bul] allowed the protagonist to speak to the dead. That work begins with the line "I sing of arms and the man." Name this ancient Roman author of *Georgics*, *Eclogues*, and *The Aeneid [uh-NEE-id]*.	**Virgil** [or Publius **Vergil**ius Maro]

Question #21: Mathematics – Algebra

10 points per part

This person developed the type of algebra named for him in the books *The Mathematical Analysis of Logic* and *An Investigation of the Laws of Thought*.		
1	Name this mathematician whose algebra uses variables that are either true or false, sometimes written as one or zero.	George **Boole** [prompt on **Boolean** algebra]
2	Boole used the word 'conjunction' to represent the concept of 'and'. What corresponding word did he use to represent the concept of 'or'?	**disjunction**
3	If a truth table is made for an expression in Boolean algebra with three variables, how many possible scenarios should be considered? Each possibility should be represented by a row in the truth table.	**8**

Question #22: Mathematics – Algebra

10 points per part

This type of mathematical structure is a ring in which every element other than zero has a multiplicative inverse.		
1	Name this kind of structure, in which there are two operations, often called multiplication and addition, with multiplication "distributing" over addition.	**field**(s)
2	This field axiom says that the quantity x plus y, end quantity, plus z, is equal to x plus the quantity y plus z.	**associative** property of addition [or **associative** axiom]
3	Perhaps using the fact that multiplication is also associative, multiply eighty-three times five times two.	**830**

Question #23: Fine Arts – Art History

10 points per part

Identify these artists whose paintings are displayed at the National Gallery in London:		
1	The museum recently displayed both versions of this painter's *Virgin of the Rocks*, though one of them usually is in the Louvre [loov].	**Leonardo** [di ser Piero] **da Vinci** [accept either underlined portion]
2	The museum displays this painter's *The Hay Wain* but recently sold his *Salisbury Cathedral from the Meadows* to the Tate Gallery.	John **Constable**
3	The Gallery closed temporarily in 1914 after five works by this painter were attacked by a suffragist. His paintings include *Portrait of Doge [dohj] Leonardo Loredan* and *Agony in the Garden*.	Giovanni **Bellini**

Question #24: Fine Arts – Art History

10 points per part

This painter showed Amor, or Cupid, gleefully trouncing on symbols of several human endeavors in *Amor Vincit [VIN-cheet] Omnia*.		
1	Name this late-16th- and early-17th-century Italian artist who also painted *Conversion on the Way to Damascus*.	**Caravaggio** [kar-uh-VAH-jee-oh] [or Michelangelo (da) **Merisi** [muh-REE-zee]; do not accept "Michelangelo"]
2	Some of Caravaggio's most famous works show the *Calling*, *Inspiration*, and *Martyrdom* of this saint, the writer of the first gospel.	Saint **Matthew** [or **Matityahu** or **Matai**; prompt on **Levi**]
3	Caravaggio made a "young sick" painting of this god and another painting showing him half covered with a robe and with leaves in his hair.	**Bacchus** [or **Dionysus**]

Question #25: Social Studies – U.S. History

10 points per part

He had permission from the Massachusetts Committee of Safety to capture Fort Ticonderoga ["tie-CON"-dur-OH-guh], but begrudgingly ceded the command to Ethan Allen.		
1	Name this man whose wife introduced him to Major John André, with whom he almost transferred control of West Point to the British.	Benedict **Arnold**
2	Richard Montgomery provided reinforcements for Arnold's attempt to take this Canadian city. Daniel Morgan had some success, but Guy Carleton's release of civilians infected with smallpox rendered the siege ineffective.	**Quebec** City [or Ville de **Québec**]
3	A monument to Benedict Arnold in this New York town shows his boot. General John Burgoyne surrendered to Horatio Gates after a battle here.	**Saratoga**

Question #26: Social Studies – U.S. History

10 points per part

In 1998, former professional wrestler and Reform Party candidate Jesse Ventura was elected this state's governor over Norm Coleman and Skip Humphrey.		
1	Name this state where Norm Coleman became a senator but then lost his re-election bid to former *SNL* writer and comedian Al Franken.	**Minnesota**
2	In this presidential election, Skip's father Hubert Humphrey won the Democratic nomination after the assassination of Robert Kennedy.	Election of **1968** [prompt on **'68**]
3	This Minnesota senator was the first Democrat to challenge Lyndon Johnson in 1968. He was succeeded by Hubert Humphrey in the Senate after declining to run for re-election in 1970.	Eugene (Joseph) **McCarthy**

Question #27: Literature – British Literature

10 points per part

During this play, Dogberry often makes ridiculous statements like "You speak like an ancient and most quiet watchman."		
1	Name this play in which Conrade and Borachio were pawns of Don John, who ultimately failed in his attempt to prevent the marriage of Hero and Claudio.	***Much Ado About Nothing***
2	These two characters carry on a battle of wits throughout *Much Ado About Nothing*, but in the end are wed alongside Hero and Claudio.	**Beatrice** and **Benedick** [either order]
3	*Much Ado About Nothing* is set in this Sicilian town, also the namesake of the strait separating Sicily from Italy.	**Messina**

Question #28: Literature – British Literature

10 points per part

Eugene Onegin is compared twice to the this poem's title fictional traveler.		
1	Name this poem whose speaker describes a "pleasure in the pathless woods" and a "rapture on the lonely shore". Its first canto contains a vivid description of a Spanish bullfight.	"**Childe Harold's Pilgrimage**"
2	This English romantic poet wrote "Childe Harold's Pilgrimage" as well as "She Walks in Beauty."	Lord **Byron** [or George **Gordon** (**Noel**); accept any underlined name]
3	The last canto of "Childe Harold's Pilgrimage" opens on this city's Bridge of Sighs, and described it as "a palace and a prison on each hand."	**Venice**, Italy [or **Venezia**]

Question #29: Science – Physics

10 points

Events caused by this force are encoded in the CKM matrix. The gauge bosons carrying this force are more massive than others because of the Higgs mechanism. Madame Wu's experiment involving cobalt-60 atoms demonstrated that this force violates parity conservation. This force can change the flavor of quarks, and is carried by the W and Z bosons. Glashow, Salam, and Weinberg were awarded the 1979 Nobel Prize in Physics for unifying this force with electromagnetism. This force is responsible for beta decay. Identify this fundamental force named for not being as strong as the strong force.	**weak** nuclear force [or **weak interaction**; prompt on answers containing **electroweak**]

Question #30: Social Studies – World History

10 points

This ruler's army lost to Stephen Báthory's [BAH-tor-ee'z] at the Siege of Pskov [p'SKOHF], and he was forced to give up Lithuanian territory conquered during the Livonian War. This ruler sent his fourth wife, Anna Koltovskaya [kol-tof-SKAH-yah], to a convent, and his last wife was Maria Nagaya [nah-GAH-yah]. After conquering the region of Kazan, this leader ordered the construction of St. Basil's Cathedral. To counter dissenting boyars, this leader set up the Oprichniki [o-PREECH-nee-kee], though he later outlawed any mention of them. The false Dmitris all claimed to be the son of this ruler. Name this Russian czar known for many acts of cruelty.	**Ivan the Terrible** [or **Ivan IV** Vasilyevich or **Ivan Grozny**; prompt on **Ivan**]

Question #31: Mathematics – Math Concepts

10 points

This word can mean the splitting of a binary tree before reconnection in order to find the most efficient tree. This process can be performed repeatedly to intervals to find roots in an application of the Intermediate Value Theorem. If this process is performed on a triangle angle, you can set up a proportion with the parts of the divided triangle side and the other two sides. A radius of a circle does this to any chord it is perpendicular to, and the diagonals of a parallelogram do this to each other. Name this splitting of a segment or angle into two congruent parts.	**bisect**ion or **bisect**ing [prompt on answers that involve **halving**; prompt on answers indicating sub**dividing** or sub**division**]

Question #32: Literature – U.S. Literature

10 points

Near the end of this novel, Dallas is allowed to say that his dad is old-fashioned but may not say that his dad does not like elevators. The second half of this novel begins with a wedding at Grace Church, a three-month honeymoon in Europe, and a competition at the Newport Archery Club. In this novel, Manson Mingott's granddaughter has been in an abusive marriage with a Polish count. Name this novel about the marriage between May Welland and Newland Archer, by Edith Wharton.	*The **Age of Innocence***

Extra Question #1: Fine Arts – Art History

10 points

This painter showed a woman in a dark robe carrying a sword over her shoulder, and a woman in a yellow robe carrying a basket with a severed head in it, in *Judith and her Maidservant*. This painter showed a nearly nude woman turning away from two robed men leaning towards her in *Susanna and The Elders*. This painter of *Self-Portrait as the Allegory of Painting* showed a woman in blue being assisted by a woman in red in the act of decapitation in the work *Judith Slaying Holofernes*. Name this 17th-century female artist.	Artemisia **Gentileschi** [ar-tem-EE-zee-ah jen-teel-ESS-kee]

Extra Question #2: Science – Physics

10 points

This quantity transitions from zero to nonzero when entering the boundary layer. Newtonian fluids are defined by having a constant value for this quantity, which comes in dynamic and kinematic varieties. For a spherical object, drag is given as 6 pi times radius times velocity times this quantity, according to Stokes' law. This quantity is measured in poise [pwahz]. The ratio of inertial forces to the forces caused by this quantity defines the Reynolds number. Name this resistance to fluid flow.	**viscosity**

Extra Question #3: Social Studies – U.S. History

10 points

In this state, Lon Horiuchi was charged with involuntary manslaughter over the death of Vicki Weaver. Big Bill Haywood was tried for the murder of a former governor of this state, Frank Steunenberg [STOY-nen-burg]. Before being charged with solicitation in an airport restroom, Larry Craig was a congressman from this state. Randy Weaver was killed by the FBI in the Ruby Ridge incident in this state. This state has recently been governed by Butch Otter, and its U.S. Senators are Jim Risch and Mike Crapo [KRAY-poh]. Name this state known for its potato crop.	**Idaho**

Extra Question #4: Mathematics – Math Concepts

10 points

Dividing several prime numbers by four demonstrates the example of this phenomenon named for Chebyshev [CHEH-bee-shef]. The omitted variable type of this phenomenon can lead to either its upward or downward type. For an estimator, this value equals the expected value of the error. Careful experimental design tries to minimize the sampling type of this phenomenon, which is an example of its selection type. Name this term for a systematic measurement error which, in common English, is a synonym of prejudice or favoritism.	**bias**

Extra Question #5: Literature – U.S. Literature

10 points

The setting of this work is near the Fitchburg Railway. This book features an illiterate man who lives an "animal life", Alex Therien. It states "A man is rich in proportion to the number of things which he can afford to let alone." The writer of this book said he "wished to live deliberately, to front only the essential facts of life". Its first chapter, which outlines the 28 dollars spent on materials to build a house, is titled "Economy". Name this book set on a pond in rural Massachusetts, by Henry David Thoreau.	***Walden****(, or Life in the Woods)*

Extra Question #6: Literature – U.S. Literature

10 points per part

Its name comes from the Chickasaw words for "split land".		
1	Name this fictional place that includes part of the Tallahatchie River. Lee Goodwin was tried and lynched in it.	**Yoknapatawpha** [yawk-nuh-puh-TAW-fuh] County
2	This author included a map of Yoknapatawpha County in the novel *Absalom, Absalom!*	William (Cuthbert) **Faulkner** [or William Cuthbert **Falkner**]
3	This family's "Mile" is located near the middle of Yoknapatawpha County. A golf course was built on a partition that was sold to pay for Quentin's tuition at Harvard.	**Compson** family or the **Compson**s

Extra Question #7: Literature – U.S. Literature

10 points per part

Miss Van Campen accused the protagonist of this novel of trying to become sick by drinking.		
1	Name this novel in which the nurse Catherine Barkley fall in love with Frederic Henry.	*A **Farewell to Arms***
2	*A Farwell to Arms* was penned by this author. He wrote of a fisherman who admired Joe DiMaggio in *The Old Man and the Sea*.	Ernest (Miller) **Hemingway**
3	After deserting at the Battle of Caporetto, Frederic Henry fled to this country. Catherine Barkley eventually died giving birth to a stillborn child there.	**Switzerland** [or **Swiss Confederation** or **Schweiz** or **Schweiz**erische Eidgenossenschaft or Confederation **Suisse** or Confederazione **Svizzera** or Confederaziun **Svizra**]

Extra Question #8: Science – Biology

10 points per part

The amount of this ion surges in the egg upon fertilization in the cortical reaction.		
1	Name this ion which, like diacylglycerol [“die”-uh-sil-GLISS-ur-awl], can activate protein kinase C [KYE-nayss “C”].	**calcium** [or **Ca^{2+}**]
2	Parathyroid hormone increases blood calcium by inducing these cells to break down nearby bone tissue.	**osteoclast**s [AH-stee-oh-klasts]
3	Protein kinase C acts when phospholipase C [FAHSS-foh-“LIE-pace C”] cleaves one of the phospholipids from this cellular structure, which consists of a lipid bilayer.	cell(ular) **membrane** [do not accept “cell wall”]

Extra Question #9: Science – Biology

10 points per part

These hormones typically oppose the action of auxins.		
1	Name these hormones whose effects were discovered by Folke Skoog [FOHL-keh SKOOG]. They promote cell division in plants.	**cytokinin**s [“SITE”-oh-KYE-nin(z)] [do not accept “cytokines”]
2	This other plant hormone was initially believed to cause leaves to fall. It does induce bud dormancy.	**abscisic acid** [or **abscisin**; prompt on **ABA** or **dormin**]
3	This gaseous plant hormone causes fruits to ripen. This compound is the simplest alkene [AL-keen].	**ethylene** [or **ethene**; prompt on **C_2H_2**]