Illinois Masonic Academic Bowl
2023 State Tournament

Round 6
1st Section
Toss-up Questions

Question #1: Social Studies

10 points

When this leader was not supported by the church, he had Bishop José Santiago Rodríguez Zorrilla [zoh-REE-yah] deported. This person's resignation as Supreme Director is considered the end of his country's Patria Nueva period. Before that period, this person led rebel forces that were badly defeated by Spanish forces led by Mariano Osorio at the Disaster of Rancagua [rahn-KAH-gwah]. This person was more successful when he fought with José de San Martín, forming the Army of the Andes and winning the Battle of Chacabuco [chah-kah-BOO-koh]. Name this leader who fought for Chilean independence and had some Irish ancestry.	Bernardo **O'Higgins** (Riquelme)

Question #2: Mathematics

10 points

The "uniform" variant of this property is stronger than the "pointwise" version. The "conditional" type of this property applies when repeatedly using absolute values makes this property *not* hold. This property can be verified by demonstrating that the limit of an nth root is less than 1 [pause] or the limit of a ratio of each term to the previous term is less than 1. This property exists for geometric series if and only if the common ratio is between -1 and 1. Name this property of infinite series that have a bounded sum.	**convergence** or **converging** [accept **converge**s]

Question #3: Literature

10 points

A novel by this author begins with a family going to see a Charlie Chaplin movie after the father prompted the mother to say "He's so *nasty*!". The father in that novel, who is based on this author's own father, dies in a car accident after visiting a relative who had a heart attack. *Fortune* magazine hired this writer and photographer Walker Evans to portray tenant farmers during the Great Depression, and their work was turned into the book *Let Us Now Praise Famous Men*. This author set his works in and around his hometown, Knoxville, Tennessee. Name this author of *A Death in the Family*.	James (Rufus) **Agee**

Question #4: Science

10 points

This disease can be detected by the heterophile [HET-ur-oh-"file"] antibody test, but that test is often avoided because of too many false negatives. This is the most common disease caused by human herpesvirus 4, which is commonly called Epstein–Barr virus. This disease usually goes away without treatment after a few weeks, though it can cause the spleen to rupture. This disease is most commonly symptomatic in teenagers and young adults, and patients with it are advised to drink fluids and rest. Name this disease that, because it is transmitted by saliva, is sometimes called the kissing disease.	(infectious) **mono**nucleosis [**MAH-noh**-noo-klee-OH-siss] [accept **IM** or **glandular fever**]

Question #5: Miscellaneous

10 points

One of the techniques used in this subfield of computer science uses B-splines and is called the Catmull–Clark algorithm. Several pipelines, including fixed-function pipelines, are used in this subfield. Some applications in this subfield use quaternions [kwuh-TER-nee-unz] instead of matrices to avoid gimbal locks. One open-source program that applies concepts from this subfield of computer science is GIMP. This subfield can be divided into working with vectors or rasters, the latter of which uses bitmaps and pixels. Name this subfield of computer science that develops rendering techniques and involves geometry to improve visual outputs.	computer **graphics** [accept **visualization** or **image**(ry) processing; prompt on **animation** or **animating**; accept answers that additionally specify 3D or raster or vector]

Question #6: Social Studies

10 points

Because of visions by Anne Catherine Emmerich [EM-uh-rik], some people believe this person's final home is on a hill near Ephesus [uh-FEE-suss] in present-day Turkey. The veneration given to this person is hyperdulia ["hyper"-DOO-lee-uh]. Some religions give this person the title "Theotokos" [thee-uh-TOH-kuss], and those religions celebrate this person's arrival in Heaven during the Dormition. This person told an angel "Let it be done unto me according to your word." There have been many claims of visions of this person in Guadalupe [gwah-dah-LOO-pay] and Lourdes [lurd]. Name this person who is the subject of the Catholic dogmas of the Assumption, Immaculate Conception, perpetual virginity, and Mother of God.	(Virgin) **Mary**(, mother of Jesus) [accept **Mariam** or **Maria**]

Question #7: Literature

10 points per part

In this play, Hally says "We need a definition of greatness, and I suppose that would be somebody who…somebody who benefited all mankind."		
1	Name this play that includes a long discussion with Hally, Sam, and Willie. Sam and Willie practice ballroom dancing.	***"Master Harold"…and the Boys***
2	This South African playwright wrote *"Master Harold"…and the Boys* as well as the novel *Tsotsi* [TSOHT-see].	Athol **Fugard**
3	In the play, the characters remember when Sam made one of these objects for Hally, but Hally used it while on a "Whites Only" bench.	**kite**s

Question #8: Literature

10 points per part

The protagonist of this novel is accused of abandoning his friend Kikuchiko and later has a discussion with him.		
1	Name this novel about Bird, who wants to go to Africa.	*A* ***Personal Matter*** [or ***Kojinteki na taiken***]
2	*A Personal Matter* was written by this Japanese author who, like many of his characters, has a brain-damaged son.	Kenzaburo **Oe** [**oh-ay**]
3	In *A Personal Matter*, a person unfortunately gives Bird a bottle of whisky. What is the relationship of that person to Bird?	**father-in-law** [or **wife's father** or **father of** his **wife**; accept non-gender-specific answers like **parent-in-law** or **spouse's parent**]

Question #9: Science

10 points per part

These organisms are sometimes categorized as primary, secondary, and tertiary consumers.		
1	Name these organisms which are often contrasted with autotrophs.	**heterotroph**s [**HET-uh-roh-trohff**s]
2	These heterotrophs are similar to detritivores [di-"TRY"-tuh-vorz] and scavengers in that they feed off of dead organisms, but these fungi and bacteria absorb nutrients instead of ingesting organism remains.	**decomposer**s
3	Though almost all plants are autotrophs ["auto"-trohffs], some are heterotrophs that survive due to this mutual symbiotic association between a fungus and a plant.	**mycorrhiza**e [**my-kor-HEE-zee**] [prompt on **myco-heterotroph**y or **mycotrophy**]

Question #10: Science

10 points per part

One example of this phenomenon is the movement of calcium out of cells.		
1	Name this movement that is against a concentration gradient, so it requires cellular energy.	**active** transport
2	This molecule is used in primary active transport, whereas an electrochemical gradient is used in secondary active transport.	**ATP** [accept **adenosine triphosphate**]
3	Give the name for an active transport mechanism that moves at least two molecules in the same direction.	**symporter**s [prompt on **cotransporter**]

Question #11: Fine Arts

10 points per part

Name these composers of famous marches:		
1	This American composer wrote "The Thunderer", "Semper Fidelis", and "Stars and Stripes Forever".	John Philip **Sousa**
2	This composer used a repetitious first-movement march in his 7th symphony. The symphony is nicknamed "Leningrad" because it premiered there during a World War II siege.	Dmitri (Dmitriyevich) **Shostakovich**
3	This English composer wrote the *Prince of Denmark's March*. For a time, the piece was called *Trumpet Voluntary* and wrongly attributed to Henry Purcell.	Jeremiah **Clarke**

Question #12: Fine Arts

10 points per part

This 1945 composition is sometimes called *Variations and Fugue on a Theme of Purcell*.		
1	Name this composition, written at the request of the BBC, that is often played with narration describing the families of instruments being played.	*The* ***Young Person's Guide to the Orchestra***(, Op. 34)
2	This composer wrote the opera *Peter Grimes* as well as *The Young Person's Guide to the Orchestra*.	(Edward) Benjamin **Britten**
3	The last solo instrument in *The Young Person's Guide to the Orchestra* is this type of clapper instrument sometimes called a slapstick.	**whip**

Question #13: Social Studies

10 points per part

Identify these cities in Australia:		
1	This city's Harbour Bridge is nicknamed "The Coathanger", and its opera house was designed by Jørn Utzon [yarn OOT-sun].	**Sydney**
2	This city on Tasmania features the Salamanca Market and the Museum of Old and New Art.	**Hobart**
3	This city's suburb of Fig Tree Pocket contains the Lone Pine Koala Sanctuary. This city's suburb of Mount Coot-tha contains its namesake mountain. The river that shares its name with this city empties into Moreton [MOR-tun] Bay.	**Brisbane**

Question #14: Social Studies

10 points per part

Several places in Beijing have widely used nicknames.		
1	This location near Tiananmen [tee-EN-un-mun] Square contains the Palace Museum. This place used to be the location of the Chinese imperial palace.	**Forbidden City** [or **Gugong**]
2	This nickname is used for the National Stadium that was built for the 2008 Summer Olympics.	The **Bird**'s **Nest** [or **Niaochao**; prompt on **Nest**]
3	This nickname, which is also based on exterior appearance, is used for the National Center for the Performing Arts.	The Giant **Egg** [or Ju **Dan**]

Question #15: Science

10 points

The equation used to define the Hammett acidity function is nearly identical to this equation. This equation makes imperfect assumptions about the ratio of activity coefficients being constant, and it ignores the self-ionization of water. This equation is used to explain the importance of the half-equivalence point on a titration curve. The original version of this equation was used for a bicarbonate buffer solution, and it was improved by the use of logarithms. Name this equation that uses an acid dissociation constant and the log of the ratio of concentrations to find the pH of a weak acid.	**Henderson–Hasselbalch** equation

Question #16: Literature

10 points

One character in this short story says, "I'd like to go to India myself just to look round a bit, you know." When that character asks about the title object of this story, he is told "Nothing, leastways, nothing worth hearing." In this story, the sergeant-major tells that man's wife "Well, it's just a bit of what you might call magic, perhaps." That couple has a son named Herbert White, who later in this story is caught in machinery, leading his employer to offer his parents 200 pounds. Mrs. White then uses this story's title object to wish Herbert back to life. Name this story by W. W. Jacobs about a cursed object that grants wishes.	"The **Monkey's Paw**"

Question #17: Social Studies

10 points

This person, who was not president, issued General Order Number 38, which made some war criticism illegal and led to the arrest of former congressman Clement Vallandigham. After the Civil War, this person was elected governor of Rhode Island and then U.S. senator. During the Civil War, this person had some troops removed from his command before the Battle of Antietam [an-TEE-tum], though a bridge where fighting took place is now named for him. After the battle, this person was given command of the Army of the Potomac when George McClellan was removed from command, but this person was unsuccessful at Fredericksburg. Name this major general with famous facial hair.	Ambrose **Burnside**

Question #18: Fine Arts

10 points

Several works by this artist have some variation of the word "Aopkhes" [AY-ahp-kus] written on them, which is a word without a known meaning. Two such works are this artist's *Cabeza* [kuh-BAY-zuh] and *Versus Medici*. Another work by this artist has words crossed out because he claimed that doing so made people want to read those words. One such work, which this artist made in Los Angeles to bring attention to certain film roles, is *Hollywood Africans*. Several works by this artist show heads or skulls. This artist and Al Diaz were known as "SAMO" [SAY-moh] when they worked in New York City during the 1970s and '80s. Name this American graffiti artist.	Jean-Michel **Basquiat** [zhahn mee-shell **bah-skee-ah**]

Question #19: Science

10 points

The thermomagnetic form of this phenomenon takes place using a ferrofluid ["FAIR-oh-fluid"]. So-called "cells" named for this phenomenon that form in fluids heated from below are also called Bènard [beh-nar] cells. This phenomenon occurs via currents that are used to explain the water cycle and wind. This phenomenon can be forced by a fan or pump. This type of energy transfer often involves thermal expansion and in general involves the movement of heated gases or liquids. Name this method of energy transfer that is different from conduction and radiation.	**convect**ion [accept **convect**ing]

Question #20: Literature

10 points

This god had his beard, fingernails, and toenails removed when he was banished from heaven, but he was allowed back in when he gave a sword as an apology. This god created other gods by chewing and spitting out beads from his sister's hair. This god transformed a child into a comb after that child's seven older siblings were devoured by an eight-headed dragon, and this god then killed the dragon. In some stories, this god came into existence when his father washed his own nose. Name this youngest of the Three Precious Children, after Amaterasu [ah-mah-teh-rah-soo] and Tsukuyomi [tsoo-koo-yoh-mee].	**Susanoo**-no-Mikoto [**soo-sah-noh-oh** noh mee-koh-toh]

Question #21: Mathematics

10 points per part

For a circle, each of these lines is perpendicular to a radius that touches it.		
1	Give this term for a line that touches a curve without crossing it, as opposed to a secant line.	**tangent** line(s)
2	Two concentric circles have radii measuring 3 units and 5 units. How long is a segment that is a chord for the larger circle and tangent to the smaller circle?	**8** units
3	Find the slope of the tangent line to the graph of the function "y equals the square root of x" at x equals 9.	**1/6**

Question #22: Mathematics

10 points per part

Instead of writing this prefix, some textbooks and calculators use a superscript -1.		
1	Give this three-letter prefix that indicates an inverse trigonometric function.	**arc**-
2	In radians, give the principal value of the arccosine of 1/2.	**pi over 3** or **1/3 pi** or **pi divided by 3**
3	If the arcsine of x is one-eighth pi, what is the arccosine of x?	**3/8 pi** or **3 pi over 8** or **3 pi divided by 8**

Question #23: Social Studies

10 points per part

Robert F. Wagner I ["the first"] was in the U.S. Senate from 1927 to 1949.		
1	In 1935, Wagner introduced the Senate bill that created this program that provides income for elderly people.	**Social Security**
2	Because Wagner wrote it, this other law is sometimes called the Wagner Act. This 1935 law encourages collective bargaining.	**National Labor Relations** Act or **NLRA**
3	Wagner introduced and sponsored the Housing Act of 1937. This numbered section in the Housing Act created a rental housing assistance program that is still in use.	Section **8**

Question #24: Social Studies

10 points per part

Identify these conflicts between the U.S. and the British Colony of Canada:		
1	This war, sometimes nicknamed "Mr. Madison's War", included the siege of Fort McHenry and the burning of Washington.	War of **1812**
2	This conflict, sometimes called the Pork and Beans War or the Madawaska War, ended with the Webster–Ashburton Treaty of 1842.	**Aroostook** War
3	After the Civil War, these raids were carried out by Irish–Americans in an attempt to pressure the British Empire to give independence to Ireland, but these raids instead increased support for Canadian independence.	**Fenian** raids

Question #25: Science

10 points per part

These events usually occur on March 20 and September 23, when for most of the Earth, there are about 12 hours of daylight.		
1	Name these events at which the rotational axis of the Earth is perpendicular to a line through the Earth and the Sun.	(vernal and autumnal) **equinox**es
2	This time system, which is measured with respect to fixed stars, is calculated by using the time of the vernal equinox.	**sidereal** [**sy-DEER-ee-ul**] time
3	This angular distance is also measured with respect to the vernal equinox. This measure is combined with declination to locate a point in space. Give a two-word answer.	**right ascension** [accept **RA** or **hour angle**]

Question #26: Science

10 points per part

This mission uses Orion spacecraft and launched its first uncrewed flight in 2022.		
1	Name this NASA program, supported by other countries, that has a goal of putting astronauts on the Moon in 2025.	**Artemis** program
2	After a Moon landing in 2025, NASA plans to send people to this planet during the 2030s.	**Mars**
3	Artemis 3, which should be the first Artemis craft to land on the Moon, is supposed to land at this region on the Moon.	(lunar) **South Pole** [accept **South Polar** region; prompt on **pole** or **polar**]

Question #27: Literature

10 points per part

The narrator of this short story says "John laughs at me, of course, but one expects that in marriage. John is practical in the extreme."		
1	Name this story that ends with a woman creeping around a room that her husband has fainted in after the woman has had a mental breakdown.	"The **Yellow Wallpaper**. A Story."
2	This author wrote "The Yellow Wallpaper" and the novel *Herland*.	Charlotte **Perkins Gilman** [accept either underlined name]
3	Blanche DuBois suffers a mental breakdown in this play by Tennessee Williams.	*A **Streetcar Named Desire***

Question #28: Literature

10 points per part

In this novel, a fictional drug called Dylar removes the fear of death.		
1	Name this novel about Jack Gladney, who is the chairman of Hitler studies at the College-on-the-Hill.	***White Noise***
2	This author wrote *White Noise*, *Mao II*, and *Underworld*.	Don(ald Richard) **DeLillo**
3	In this series of novels by Frank Herbert, the fictional drug melange [may-lahnj] is often called "spice".	***Dune***

Question #29: Mathematics

10 points

The most common application of this rule can be proven by subtracting zeroes from both parts of the input and then treating those zeroes as function values. When this rule is applied to a subtraction, the first step is to express the subtraction as a single fraction. When this rule is applied to a power, the first step is to change the power into multiplication by taking the log, then changing the multiplication into division. This rule is used when zero is raised to the zeroth power, when zero is multiplied by infinity, or when zero is divided by zero. Name this rule in which derivatives of indeterminate forms can be used to evaluate limits.	**L'Hôpital**'s [**loh-pee-tahl**'z] rule [prompt on **Bernoulli**'s rule]

Question #30: Social Studies

10 points

Though this country does not contain the town of Agartala [uh-gur-tuh-LAH], the founders of this country were accused of plotting for its independence there. Those leaders, who expanded on the Six Point Movement, included this country's first prime minister, Sheikh Mujibur Rahman ["shake" moo-JEE-bur RAH-mon]. This country's Liberation War in 1971 may have caused over 1 million deaths. During that war, the Mukti Bahini [MOOK-tee buh-HEE-nee] fought for this country's independence with the support of the Awami [uh-WAH-mee] League and India. Name this country that before its independence was East Pakistan and whose capital is Dhaka [DAH-kuh].	(People's Republic of) **Bangladesh** [or (Gonoprojatontri) **Bangladesh**]

Question #31: Science

10 points

Scientists have yet to determine a function of the subdistal appendages of these organelles, which also have distal appendages. Many cells contain two of these organelles, which are called the "mother" and "daughter" even though these organelles exist in sperm cells but not egg cells. Similar to some of the structures that these organelles are at the base of, these organelles are made of nine sets of short microtubule ["micro-TUBE"-yool] triplets. These organelles combine with proteins to form a basal body at the start of cilia [SILL-ee-uh] or flagella [fluh-JELL-uh]. Name these cylindrical organelles made of tubulin ["TUBE"-yoo-lin] that join at right angles to form a centrosome [SEN-troh-sohm].	**centriole**s [**SEN-tree-ohl**z]

Question #32: Literature

10 points

In this work, Archbishop Turpin convinces the protagonist to take a necessary action after Oliver's arguments are unsuccessful. The second stanza of this work begins "The King Marsile [mahr-seel] abides in Sarraguce [sar-uh-gooss]." The villain in this work is the protagonist's stepfather Ganelon, who is eventually pulled apart by four horses. This work's protagonist bursts his temples and dies while summoning his uncle and leader by blowing his horn. Name this oldest surviving major work of French literature that is set at the Battle of Roncevaux [rons-voh] Pass during the reign of Charlemagne.	*The* ***Song of Roland*** [or *La* ***Chanson de Roland***]

Extra Question #1: Mathematics

10 points

A method that uses modular arithmetic to create this property is named for D. H. Lehmer. This property can be tested for using the parking lot, minimum distance, and overlapping sums tests, which are among the Diehard tests. This property is sometimes created by taking advantage of clock drift, which is measured by the lack of alignment between two clocks. Older techniques for creating this property are sometimes called "shuffles" because they resemble shuffling a deck of cards. Name this property of numbers that, theoretically, are unpredictable and selected by chance.	pseudo**random**ness [pseudo**random** numbers; prompt on **stochastic**]

Extra Question #2: Social Studies

10 points

This person's work was publicized by his collaborator Robert Underwood Johnson in *The Century Magazine*. This person's book *A Thousand-Mile Walk to the Gulf* describes his walk to Florida. Some discussions that this person had with a U.S. president may have inspired the Antiquities Act. The president spent three days almost alone with this person after they met in Raymond, California. This person wrote *My First Summer in the Sierra*, and he was the first president of the Sierra Club. Name this environmentalist who convinced Teddy Roosevelt to have the federal government take control of Yosemite National Park.	John **Muir**

Extra Question #3: Fine Arts

10 points

One piece of music by this composer is a chant for the poem "O leafy branch". In a musical drama by this composer, there are 17 Virtues who together conquer the Devil. That drama, *Ordo Virtutum*, was written for the opening of Saint Rupertsberg church and was part of this composer's "Symphony of the Harmony of Celestial Revelations". Much of the music by this composer is in the form of monophonic [MAH-noh-FAH-nik] plainchant, and all of it was written during the 12th century. Name this resident of the Holy Roman Empire who was a mother superior in her convent.	**Hildegard** of Bingen

Extra Question #4: Science

10 points

This principle can be explained by the conservation of energy and can in turn be used to explain the Venturi effect. By assuming a steady state, a lack of rotation, and a lack of viscosity, this principle can be derived from a set of differential equations called the Navier–Stokes [nah-vee-ay "stokes"] equations. One way to express this principle is that the sum of 1/2 speed squared, plus gravitational field strength times height, plus pressure divided by density, must be constant. This principle states that an increase in speed occurs with a decrease in potential energy or a decrease in pressure. Name this principle of incompressible fluids that is named for a Swiss scientist.	**Bernoulli**'s principle [accept **Bernoulli**'s equation]

Extra Question #5: Literature

10 points

One novel by this author is narrated by a girl born in 1963, whose family starts coming apart after an attack against the narrator's sister Marianne in 1976. This author named that narrator Judson, though the narrator is often called Judd or Baby while growing up near Mount Ephraim in upstate New York. Another novel by this author is based in part on letters written to this author by a college student whom this author gave a failing grade. That novel by this author is about Loretta, whose apartment is burned in the 1967 Detroit riots after she divorces her second husband. Name this author of *We Were the Mulvaneys* and *them*.	Joyce Carol **Oates**

Extra Question #6: Science

10 points per part

Identify these cells named after people:		
1	These cells, also called neurilemma [noor-ih-LEH-muh] cells, create the myelin ["MY"-uh-lin] sheath.	**Schwann** cells
2	These neurons, located in the cerebellar cortex, have many branches and are important for motor coordination. They are named after the same person as conducting fibers in the heart.	**Purkinje** cells [accept **Purkinje** neurons or **Purkinje** fibers]
3	These skin cells are also called tactile epithelial cells.	**Merkel**–Ranvier cells

Extra Question #7: Science

10 points per part

In many lists of biomes [BY-ohmz], this term describes a type of forest.		
1	Give this term that describes trees that shed their leaves for part of the year.	**deciduous**
2	Most trees in deciduous forests are in this group of plants. It contains flowering plants and hardwoods and is contrasted with the gymnosperms [JIM-noh-"sperms"].	**angiosperm**s [or **Angiospermae**]
3	This process is the shedding of a body part, including the shedding of leaves at the end of senescence [suh-NEH-senss].	**abscissi**on

Extra Question #8: Social Studies

10 points per part

This failed effort—sometimes called the Jesuit Treason—was led by Robert Catesby ["KATES-bee"], who was shot when the plan was foiled.		
1	Name this assassination attempt against King James I.	**Gunpowder Plot**
2	Commemorations of the Gunpowder Plot, which take place on November 5, traditionally include burning effigies of this person who was in charge of the gunpowder.	Guy **Fawkes**
3	Over 200 years later, just after the death of George III, this conspiracy was an attempt to murder Prime Minister Lord Liverpool and his cabinet.	**Cato Street** Conspiracy

Extra Question #9: Social Studies

10 points per part

A word that means the same thing as "referendum" is based on the term for these people.		
1	Name these common citizens in ancient Rome who did not have as much power as the patricians.	**pleb**eians [**pleh-B**EE-unz] [accept **pleb**s]
2	People with this political position represented plebeians and had the power to veto the execution of official orders.	plebeian **tribune**s
3	This person was the plebeian tribune in 62 BCE. He supported Pompey in Caesar's civil war and committed suicide in Utica. This person's great-grandfather was a very early Classical Roman historian.	**Cato the Younger** [accept Marcus **Cato Uticensis**; prompt on **Cato**]