Illinois Masonic Academic Bowl
2020 State Tournament

Round 2
1st Section
Toss-up Questions

Question #1: Miscellaneous

10 points

Tinkers used to carry around lightweight versions of these objects that could be wedged into the ground. These objects typically have hardie holes that are square and pritchel holes near the corner that are small and round. The flat face on top of these objects typically has rounded edges. Farriers use versions of these objects with most of the mass in the horn. These objects must be both heavy and fastened to a sturdy base to be used properly. Giuseppe Verdi's opera *Il trovatore* ["eel trove"-ah-TOH-ray] has a chorus sung by gypsies that is named for these objects. Name this iron block on top of which metal is placed to be hammered.	**anvil**s

Question #2: Literature

10 points

This writer's poem about a game of euchre [YOO-kur] that turns into a fight [pause] was used politically by people who opposed Chinese immigration into the United States. That poem, "Plain Language from Truthful James", led to a collaboration between this writer and Mark Twain on the play *Ah Sin*. In a short story by this writer, Piney Woods and Tom Simson join up with four people. One of those four people is Uncle Billy, who takes all of the horses and mules in this writer's story. Name this writer who wrote about an honorable gambler named John Oakhurst in his story about people kicked out of a town, "The Outcasts of Poker Flat".	(Francis) Bret **Harte**

Question #3: Mathematics

10 points

The smallest one of these shapes to circumscribe a given triangle is named for Jakob Steiner and is centered at the triangle's centroid. A two-variable quadratic expression generates this shape if the xy coefficient squared, minus 4 times the x-squared coefficient times the y-squared coefficient, gives a negative value. This shape is formed by all the points that are half as far from a fixed point as they are from a fixed line. It is also formed by all the points for which the *sum* of the distance to two fixed points is constant; those points are called foci ["FOE-sigh"]. Name this conic section that can be formed by stretching a circle.	**ellipse**

Question #4: Social Studies

10 points

Shortly after this state increased vehicle license fees in 2003 and had an electricity crisis that drove up rates in 2001, it had a recall election that ended the political career of Governor Gray Davis. A person nicknamed "Governor Moonbeam" served two terms as this state's governor twice, from 1975 to 1983 and from 2011 to 2019. Before becoming Chief Justice, Earl Warren was this state's governor, and Ronald Reagan was this state's governor before becoming president. In this state, Gray Davis was replaced as governor by Arnold Schwarzenegger. Name this state whose immediate past governor was Jerry Brown and whose current governor is Gavin Newsom.	**California**

Question #5: Science

10 points

This person and Hendrik Lorentz are the namesakes of a pendulum that is shortened as it swings. This person and James Jeans proposed a model of radiation that predicted the emission of too much energy, which was called the ultraviolet catastrophe. Another phenomenon named for this person occurs when the ratio 2 pi r over lambda is very small, where r represents the size of particles. The extent of that phenomenon is inversely proportional to the fourth power of the wavelength, and it is used to explain the color of the sky. Name this British scientist who, like C. V. Raman [RAH-mun], is the namesake of a kind of scattering.	(John William **Strutt**, 3rd Baron) Lord **Rayleigh** [accept either underlined name]

Question #6: Literature

10 points

This adjective is used to describe the reporting of speech when the reporting has the exact words that were spoken. This adjective is also used to describe most questions that end with a question mark, though it generally does not apply to questions that begin with the words "could you tell me" or "would it be possible". The accusative case in many languages is used for "objects" that are described by this adjective when analyzing English sentences. Give this adjective that can mean the "object" that is acted upon by the verb in a sentence.	**direct** [accept **direct speech** or **direct question** or **direct object**]

Question #7: Social Studies

10 points per part

This country unified with England when its King James VI became James I of England.		
1	Name this part of the United Kingdom whose rulers have included Macbeth and Robert the Bruce.	**Scotland** [accept **Alba**]
2	This person was the Guardian of Scotland until he was defeated at the Battle of Falkirk in 1298 while fighting for Scottish independence. He was later hanged, drawn, and quartered.	William **Wallace**
3	Four months before his victory at the Battle of Stirling Bridge, Wallace killed William Heselrig, who was the sheriff of this town.	**Lanark**shire

Question #8: Social Studies

10 points per part

The name of this party means "China's National People's Party", and they are sometimes called Nationalists.		
1	Name this political party that was headed by Chiang Kai-shek and which ruled China before it ruled Taiwan.	**Kuomintang** [kwoh-min-tahng]
2	The Kuomintang was founded by this doctor who was briefly the Provisional President of the Republic of China during 1912.	**Sun** Yat-sen [prompt on **Yat-sen**]
3	Sun Yat-sen gained power when this emperor, who was six years old at the time, abdicated the throne.	**Puyi** [or the **Xuantong** Emperor]

Question #9: Fine Arts

10 points per part

One example of this type of music is George Frideric Handel's *Messiah*.		
1	Name this type of piece that is similar to an opera, but does not have staging.	**oratorio**(s)
2	This composer's *La damnation de Faust* was written as a dramatic legend. It has been performed as an opera, an oratorio, and something in between.	(Louis)-Hector **Berlioz** ["BARELY"-ohzz]
3	This 20th-century English composer wrote the oratorio *A Child of Our Time*.	Michael **Tippett**

Question #10: Fine Arts

10 points per part

This composer's *Octet in E-flat major for Strings*, which he wrote at age 16, is still performed.		
1	Name this German composer whose tour of Europe resulted in his 3rd Symphony being nicknamed *Scottish* and his 4th Symphony being nicknamed *Italian*.	(Jakob Felix) **Mendelssohn**(-Bartholdy)
2	Mendelssohn's "Wedding March" comes from incidental music he wrote for this play.	*A* ***Midsummer Night's Dream***
3	Give the first name of Felix Mendelssohn's older sister, who composed *Das Jahr* [dahss yar] and sometimes published works under his name.	**Fanny** Mendelssohn Hensel

Question #11: Science

10 points per part

This category includes conifers and the ginkgo [GEENK-oh] plant.		
1	Identify this category of plant whose name means "naked seeds".	**gymnosperm**s ["**GYM-no-sperm**s"] [or **Acrogymnosperm**ae]
2	These plants are the closest living relatives of gymnosperms and angiosperms that do not fit into either category. They reproduce by spores, and their leaves are called fronds.	**fern**s [or **Polypodiopsida**]
3	Ferns and early gymnosperms developed during this geologic period, about 400 million years ago. It is sometimes called the Age of Fishes.	**Devonian** Period

Question #12: Science

10 points per part

All cells have these structures; some also have a cell wall.		
1	Name this structure that separates the cell interior from the world outside the cell.	cell **membrane** [or plasma **membrane** or cytoplasmic **membrane**]
2	Much of the cell membrane comprises this "bilayer".	phospho**lipid** bilayer
3	This term refers to proteins that are embedded in the phospholipid bilayer.	**integral** membrane proteins [or **IMP**s or **intrinsic** proteins]

Question #13: Literature

10 points per part

The title character of this novel has two amulets, one of which has his father's *ne varietur* [neh var-ee-eh-tur], and the other of which is from Babu [BA-boo].		
1	Name this novel in which the title character helps a Tibetan lama find the River of the Arrow.	***Kim***
2	This author wrote *Kim*, *The Jungle Book*, and "The White Man's Burden".	(Joseph) Rudyard **Kipling**
3	In this Rudyard Kipling poem, the narrator talks about being on the road to the title location, where the flying-fishes play.	**"Mandalay"**

Question #14: Literature

10 points per part

The protagonist of this novel ends up in a small village in South America, where he is asked to read Charles Dickens novels to the leader.		
1	Name this novel about Tony Last, whose wife Brenda has an affair.	*A **Handful of Dust***
2	This author of *Brideshead Revisited* wrote *A Handful of Dust*.	(Arthur) Evelyn (St. John) **Waugh** [EEV-uh-lin **waw**]
3	In *A Handful of Dust*, Tony Last grew up while staying at Hetton Abbey in a bedroom named for this supposed enchantress who lived on Avalon.	**Morgan** Le Fay [or **Morganna** or **Morgain**; prompt on Le **Fay**]

Question #15: Science

10 points

These chemicals are transported between cells by PIN proteins. A synthetic counterpart to these natural chemicals is Quinclorac. One of these chemicals can be called "2,4-D" and was used in the herbicide Agent Orange. Fritz Went discovered these chemicals, explaining Charles Darwin's studies of coleoptiles [koh-lee-AHP-"tiles"]. The most common form of these chemicals is indole-3-acetic [in-dohl "three" uh-SEE-tik] acid. These chemicals regulate cell elongation and are more effective in the presence of cytokinins ["sight-oh-KINE-inz] and gibberellins [jib-ur-ELL-inz]. Name these chemicals that play a major role in tropisms ["TROPE"-izmz] and which are a class of plant hormones.	**auxin**s [prompt on plant **hormone**s]

Question #16: Social Studies

10 points

This person criticized Arthur Pigou's [pig-oo'z] theory of a lack of connection between employment and prices by saying "We are, as I have said, one equation short." This person then stood up for his profession by saying that practical men "are usually the slaves of some defunct economist." Those quotes are from a book in which this person introduced the consumption function and used it to develop the government spending multiplier. This person then showed how to increase aggregate demand by increasing government spending. Name this English economist who wrote *The General Theory of Employment, Interest and Money.*	John Maynard **Keynes** ["canes"]

Question #17: Literature

10 points

In one novel set in this country, a woman poisons her husband, but her son Jaja takes responsibility for it. The same author wrote a novel about people who re·unite in this country. In that novel, a man marries Kosi after returning from England, and a woman starts a blog called "Raceteenth". Another writer from this country wrote a play about a westernized teacher and a traditional village chief, both of whom are interested in a woman named Sidi [SEE-dee]. Name this country that is the setting for *Purple Hibiscus* and *Americanah* by Chimamanda Ngozi Adichie [chim-ah-MAN-duh en-GOH-zee ah-DEE-chee] [pause] and *The Lion and the Jewel* by Wole Soyinka [woh-LAY soh-YEEN-kuh].	(Federal Republic of) **Nigeria**

Question #18: Science

10 points

This mineral is the most common crystal to occur in a twisted form called a gwindel, which is often found in alpine-type fissures. This crystal has several polymorphs, including stishovite [STISH-oh-vyt] and moganite [MOH-guh-"night"], the latter of which often forms with a form of this crystal called chalcedony [kal-SED-uh-nee]. Agate [AG-uht] and flint are forms of this mineral. Halogen lamps often use this mineral for their bulb. After feldspar, this is the most abundant mineral on Earth. This mineral's piezoelectricity [pee-AE-zoh-"electricity"] is the reason that crystals of it are used in watches. Name this mineral that comprises sand and glass.	**quartz** or **silicon dioxide** [or **silica** or **SiO_2**]

Question #19: Social Studies

10 points

According to legend, this person said "Count no man happy until he be dead" to a person who did not appreciate the statement until years later. This person's laws forbade the export of everything except olive oil. This person also set up a *boule* [bool] of 400 people that could rule on appeals. This person's policy known as "shaking off of burdens" ended debt slavery. This person's laws, which were passed in the early 6th century BCE, used levels of property ownership to determine who could belong to the Areopagus [ar-ee-AHP-uh-guss]. Name this Athenian who, other than laws dealing with homicide, eliminated the Draconian constitution.	**Solon** [SOH-lahn]

Question #20: Fine Arts

10 points

There has been controversy over whether a museum should be named after Heidi Weber or this architect, who designed the museum. This architect designed the Sanskar Kendra, a city museum in Ahmedabad [UH-muh-dah-bahd], India. That work, considered the first modernist building in India, was nicknamed by this person the Museum of Knowledge. Ribbon windows and roof terraces are among this architect's five points of modern architecture, which also include putting buildings on pilotis [pee-LOH-teez] to lift them above ground. The five points are used in this architect's Villa Savoye [sahv-wah]. Name this Swiss-French architect.	Le **Corbusier** [leh **kor-boo-see-yay**] [or Charles-Édouard **Jeanneret**]

Question #21: Mathematics

10 points per part

The "countable" version of this concept is represented by the symbol "aleph-null".		
1	Name this concept which is not a number but is larger than any number.	**infinity** or **infinite** or **infinitude**
2	This statement claims that there is no set with a cardinality larger than aleph-null, but smaller than the cardinality of the set of real numbers.	**continuum hypothesis**
3	Evaluate the limit, as k approaches infinity, of the integral of 1 over x cubed, dx, as x goes from 1 to k.	**1/2** or 0**.5**

Question #22: Mathematics

10 points per part

The Weierstrass [VY-ur-shtrahss] function notably lacks this property at every point.		
1	Name this function quality sometimes defined as having a unique tangent line to a point on a graph.	**differentiability** or being **differentiable** [prompt on having a **derivative**]
2	The mean value theorem requires a function to be continuous over an interval including the endpoints, but it only requires a function to be differentiable over this type of interval that does not include the endpoints.	**open** interval
3	Consider the function "f of x equals the square root of x". What value of x does the mean value theorem guarantee exist in the interval from 1 to 49?	**16**

Question #23: Literature

10 points per part

In the second chapter of this novel, the protagonist describes the hair of each of her family members, saying that her mom's "is the warm smell of bread before you bake it".		
1	Name this novel in which the narrator says "In English my name means hope. In Spanish it means too many letters."	*The* ***House on Mango Street***
2	In *The House on Mango Street*, Darius says that one of these objects looks like God. During a discussion about naming these objects, a girl tells Esperanza that she has an ugly fat face.	**cloud**s
3	This Mexican-American author wrote *The House on Mango Street* as well as "Woman Hollering Creek".	Sandra **Cisneros**

Question #24: Literature

10 points per part

Some of this novel is set in Doc's poolroom, where the protagonist plans a robbery with Gus, G. H., and Jack.		
1	Name this novel in which the protagonist kills and decapitates Mary Dalton.	***Native Son***
2	In *Native Son*, what object does Bigger Thomas use to kill Mary Dalton?	a **pillow**
3	This author wrote *Native Son* and the collection *Uncle Tom's Children*.	Richard (Nathaniel) **Wright**

Question #25: Social Studies

10 points per part

Answer the following about Chinese folk religions:		
1	This phrase, which means "wind water", refers to the belief that architecture and furniture arrangements can bring harmony by balancing *yin* and *yang*.	**feng shui**
2	Many Chinese folk religions believe that this vital energy is important for living things to be healthy.	**qi** or **chi**
3	In early April, many Chinese people celebrate the Ching Ming Festival, during which these places are cleaned.	**tomb**s or **grave**yards or **cemeteries**

Question #26: Social Studies

10 points per part

Hindus refer to this process as *dhyana* [dee-YAH-nuh] and sometimes practice it during yoga.		
1	Name this process that can consist of developing mindfulness or the ceasing of thought.	**meditation** or **meditating**
2	Some meditation, such as transcendental meditation, involves repeating this type of word or sound either silently or out loud. The sound "om" can serve this purpose.	**mantra**(s)
3	This term taken from the Sanskrit word for "sitting" refers to body postures that are useful for meditation and yoga.	**asana**

Question #27: Science

10 points per part

In SI units, this law uses a constant equal to approximately 9 times 10 to the 9th power.		
1	Name this inverse-square law that gives the force caused by static electric charges.	**Coulomb**'s law
2	Electric measurements are often made inside this type of container covered with conducting material. Inside this type of container, the electric field is zero.	**Faraday**('s) **cage** [accept **Faraday**('s) **shield**]
3	This constant, used to measure some electromagnetic interactions, equals Coulomb's constant times elementary charge squared divided by the quantity h-bar times c. It is approximately 1 over 137.	**fine-structure** constant [or **Sommerfeld**'s constant]

Question #28: Science

10 points per part

This quantity is evaluated using an integral of the dot product of a vector field with surface area.		
1	Give this general term for a measure of how much of something, often an electric or magnetic field, passes through a surface.	**flux**
2	This SI unit of luminous flux equals one candela-steradian. One of these units per square meter is a lux.	**lumen**s
3	According to a theorem sometimes named for Carl Gauss, the total flux through a closed surface equals the total sum of this operation on the field everywhere inside the surface.	**div**ergence [prompt on "del dot" but not on "del"]

Question #29: Social Studies

10 points

This place was the site of two battles that took place three weeks apart, the second of which was just after the British captured Forts Clinton and Montgomery and just before the burning of what was then a state capital at Kingston. That second battle in this location was Bemis [BEH-mis] Heights, which followed Freeman's Farm. After those battles, John Burgoyne surrendered to General Horatio Gates. Both battles in this location were fought well by Benedict Arnold, though he was relieved of his command anyway. Name this location that was the site of a major American victory in 1777 in New York.	**Saratoga** [prompt on **New York** before the end]

Question #30: Mathematics

10 points

When the graph of this function is shifted 1 to the right, it is approximated by the Mercator series, which begins "x, minus $\frac{1}{2}$ x squared, plus $\frac{1}{3}$ x cubed". The limit as k approaches 0 of the quantity x to the k [pause] minus 1, end quantity, over k pause [e]quals this function of x. For large numbers x, the probability that an integer between 1 and x is a prime [pause] is approximately 1 over this function of x. An antiderivative of this function of x equals x times this function minus x. This function's derivative is 1 over x. Name this inverse of e to the x.	**natural log**arithm of x or **ln** x or **log base *e*** of x [prompt on **log**arithm of x]

Question #31: Literature

10 points

This character is shown a cane and asked what he thinks about it as a tooth, and whether it is a sharp tooth or a double tooth. That occurs after Tungay leaves the room. Those words are spoken to this character by Mr. Creakle, who used the cane to punish this boy for biting the hand of someone who was beating him. One of the only adults who treats this boy well is his nanny Clara Peggotty. When he grows up, this character's first wife Dora Spenlow dies, and he then marries Agnes Wickfield. Edward Murdstone's hand is bitten by what Charles Dickens title character?	**David Copperfield** [accept either]

Question #32: Science

10 points

A controversial study that credited this molecule for doubling lifespan is called the Baati [BAH-tee] Rat Study. Though this molecule is extremely rare in nature, it does occur in small trace amounts in the mineraloid shungite. Sumio Ijima [soo-mee-oh ee-jee-mah] discovered multi-shelled varieties of this molecule, which are called "onion-like". This molecule has over 12,000 resonance structures. This molecule consists of pentagonal rings surrounded by hexagonal rings. Name this allotrope [AL-oh-"trope"] of carbon with 60 atoms per molecule and whose name reflects its similarity to geodesic domes.	buckminster**fullerene** [accept **buckyball**s]

Extra Question #1: Social Studies

10 points

Akilu [uh-KEE-loo] took many people from this city to Walata [wuh-LAH-tuh] to avoid the repressive rule of Sonni Ali. After that, Askia Mohammad I helped bring this city back to prominence by using many of its people as advisers. The first European person to reach this city was Gordon Laing, who died soon after leaving it. A chief judge of this city, Al-Qadi Aqib ibn Mahmud ibn Umar [ahl KAH-dee ah-KEEB ee-bin MAH-mood ee-bin OO-mar], used the dimensions of Mecca's Kaaba to design this city's Sankore [SAHN-kor-ay] Madrassah. That building was further developed by a leader who may have been the richest man in history, Mansa Musa. Name this city that was a center of learning and is in what is now Mali.	**Timbuktu**, Mali

Extra Question #2: Mathematics

10 points

This number appears in the Ramanujan-Nagell [rah-mah-NOO-jun nug-EL] equation because it is the only number that can be represented more than one way as the difference between a power of 2 and a perfect square. This is the fewest number of sides for a regular polygon that *cannot* be constructed with straightedge and compass, and it's also the fewest number of sides of a regular polygon whose internal angles are not a whole number of degrees. This is the smallest positive integer whose reciprocal's decimal expansion has a six-digit repeating pattern. If two standard dice are rolled, this is the most likely sum. Give this number of sides of a heptagon.	**7**

Extra Question #3: Literature

10 points

This mythological feature has two suns circling it, one of which is best seen from the Salt Ocean. In another myth tradition, the color of this location is gold due to a blessing it received after the axle of the sun-chariot was placed on it. Garuda tried to protect this feature, but part of it was broken by the wind god Vayu. On some mandalas, this geographic feature is placed at the center of the universe. This feature is protected from the Asuras, and it is the home of the Devas and prominent gods such as Indra. Name this mythological mountain that is supposedly the same shape as many temples, including Angkor Wat.	Mount **Meru** [or **Sumeru** or **Sineru** or **Mahameru**; prompt on **mount**ain]

Extra Question #4: Fine Arts

10 points

One character in this opera sings "Viva, il vino spumeggiante [VEE-NOH spoo-med-JAHN-tay]" while drinking, then sings "Mamma, quell vino" after drinking too much. During this opera, that character bites Alfio's ear, signifying that their duel will be a fight to the death. Early in this opera, that character returns home from soldiering to learn that his fiancée Lola has married Alfio. This opera is seen during the movie *The Godfather Part III*, whose soundtrack includes this opera's *Intermezzo*. Name this opera about Turiddu [too-REED-doo] that was written by Pietro Mascagni [mah-SKAHN-yee] and which is often performed just before Ruggero Leoncavallo's *Pagliacci [pah-lee-AH-chee]*.	***Cavalleria rusticana*** [kah-vah-leh-REE-ah roo-stee-KAH-nah]

Extra Question #5: Science

10 points

This moon has several large impact craters, including Anzu and Epigeus [eh-PIJ-ee-uss]. Much of the surface of this moon has grooves in areas such as Mysia Sulci [MY-see-uh SUL-"sigh"] and Uruk Sulcus [OO-rook SUL-kuss]. In the 1990s, this moon and Europa became the first two moons to have oxygen atmospheres detected. This moon has a metallic core and became the first moon to have a magnetic field detected thanks to the *Galileo* spacecraft. After orbiting this moon's planet, the JUICE spacecraft will orbit this moon. This moon is slightly larger than Titan, making it the largest moon in the solar system. Name this largest moon of Jupiter.	**Ganymede** [GAN-ih-meed]

Extra Question #6: Mathematics

10 points per part

When this type of series is centered at x equals 0, it is called a Maclaurin [mak-LAW-rin] series.		
1	Give this term for a power series that uses a sum of monomials to approximate a differentiable function.	**Taylor** series
2	One way to bound the error from a Taylor-series approximation uses a formula named for Augustin-Louis Cauchy [koh-shee]. Another error bound, which uses the maximum of the absolute value of the next omitted derivative, is named for this other mathematician.	Joseph-Louis **Lagrange** [zhoh-seff loo-ee **luh-grahnzh**]
3	When writing a Taylor series for the sine or cosine function in radians, this number is the maximum of the absolute value of the next omitted derivative.	**1**

Extra Question #7: Mathematics

10 points per part

This law was historically called Bernoulli's theorem, though it is not about fluid dynamics.		
1	What law states that when an experiment is repeated many times, the sample mean tends to approach the expected value?	(strong or weak) law of **large numbers**
2	This inequality is used to prove the weak law of large numbers. In it, a particular probability is said to be less than or equal to the reciprocal of the number of standard deviations squared.	**Chebyshev**'s [**CHEB-ee-sheff**'z] inequality
3	If 1,000 standard dice are rolled, what is the expected value of the sum of the numbers that come up on top?	**3,500**

Extra Question #8: Social Studies

10 points per part

One of these clergymen was the President of Harvard during the Salem Witch Trials, and the other wrote the book *Memorable Providences* that may have inspired the trials.		
1	Give the shared last name of a father and son named Increase and Cotton.	**Mather** [accept **Mather**s or **Mather** family]
2	Cotton Mather controversially supported inoculation against this disease, which killed hundreds of people during an outbreak in 1721 in Massachusetts.	**smallpox**
3	A major controversy during the Salem Witch Trials was whether to accept this type of evidence, in which a person describes a dream or vision. Cotton Mather said this evidence should be admitted but not used alone.	**spectral** evidence or **spectre** evidence

Extra Question #9: Social Studies

10 points per part

Answer these questions about women who served in presidential Cabinets:		
1	This first female Cabinet member was Franklin Roosevelt's secretary of labor starting in 1933.	Frances **Perkins**
2	This woman served as secretary of transportation under Ronald Reagan and secretary of labor under George H. W. Bush. She was also a U.S. senator and head of the American Red Cross.	(Mary) Elizabeth "Liddy" **Dole**
3	Janet Napolitano and Kirstjen Nielsen were two of the first six leaders of this cabinet-level department.	Department of **Homeland Security** [accept secretary of **homeland security**; prompt on **DHS**]