

#### Round 8 1st Section Toss-up Questions

#### **Question #1: Literature – British Literature**

10 points

One character in this novel justifies the title act as revenge for Daisy and other potential kidnapping victims. At this novel's conclusion, it is agreed that the Yugoslavian police will be told about a man who wore a Wagon Lit uniform to perform the title action. A character in this novel justifies not taking a case by saying, "I do not like your face, Mr. Ratchett." The sequence of events in which twelve different passengers had a hand in killing a man was revealed by Hercule Poirot [air-kyool pwah-roh]. Name this mystery, written by Agatha Christie, that takes place on a train.

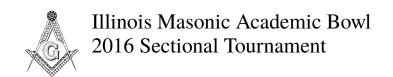
Murder on the Orient
Express [accept Murder on the Calais Coach]

#### **Question #2: Science – Physics**

10 points

Solutions to a quantum mechanical system of this type contain the Hermite [air-meet] polynomials. That system contains energy levels with equal spacing. Einstein's model of heat capacity treats atoms in a lattice as this kind of system. A dashpot can be used to "damp" this kind of system, and under the small-angle approximation, a pendulum can be treated as this type of system. The equations of motion for these systems consist of a linear combination of sine and cosine functions. Name this type of system exemplified by a mass on a spring.

simple <a href="harmonic">harmonic</a>
oscillator(s) [or simple
harmonic oscillation;
accept answers referring to
simple <a href="harmonic motion">harmonic motion</a>;
prompt on <a href="mailto:spring">spring</a>(s); prompt
on <a href="mailto:oscillator">oscillator</a>]



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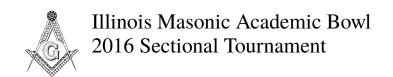
## **Question #3: Social Studies – U.S. History**

10 points

The public wing of the first version of this organization	(Knights of) the Ku Klux
was known as the Young Men's Democratic Clubs.	Klan or KKK
Following the murder of Mary Phagan [FAY-gun],	
William Simmons led the revival of this group at Stone	
Mountain. Its members plotted the bombing of the 16th	
Street Baptist Church in Birmingham. Politician David	
Duke used to be a Grand Wizard of this organization.	
Name this organization glorified in the film <i>The Birth</i>	
of a Nation, whose members often wear pointed hoods	
and white robes.	

## **Question #4: Mathematics – Math Concepts**

If the capacity type of this quantity for an object does	<u>dimension</u> (ality)
not equal the covering type, then the object is classified	
as a fractal. For a vector space, this quantity equals the	
number of vectors in the basis. When this value is $n$ , a	
simplex has <i>n</i> plus one vertices [VER-tih-seez].	
Tesseracts exist in a space where this quantity is four,	
while this value is zero for a single point. Name this	
quantity equal to the number of coordinates required to	
specify a point in a space, which is two for a plane.	



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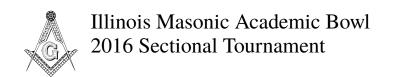
#### **Question #5: Literature – World Literature**

10 points

In this play, one character uses a scarf and parasol to	The <u>Birds</u> [or <u>Ornithes</u> ]
hide himself from Zeus. Iris has to remind this drama's	
protagonist of her immortality. During a negotiation in	
this play, one protagonist calls Heracles	
["HAIR"-uh-kleez] a bastard and gets Zeus's	
negotiators to agree to terms that involve a transfer of	
power. This play opens with a search for a Hoopoe	
[HOO-poh] by Euelpides [yoo-EL-pih-deez] and	
Pisthetaerus [piss-thuh-TAY-rus]. Name this	
Aristophanes [air-iss-TAH-fuh-neez] play in which	
avian creatures build Cloudcuckooland.	

## **Question #6: Fine Arts – Art History**

This architect designed a museum featuring the yellow	Frank (Owen) Gehry [or
prisms of Olafur Eliasson's [OH-luh-fur	Frank Owen <b>Goldberg</b> ]
uh-LEE-uh-sun's] Inside the Horizon, the Louis	
Vuitton [LOO-ee vwee-TAWN] Foundation. This	
architect also designed the Weisman Art Museum at the	
University of Minnesota. Another one of this architect's	
projects features the Sky Church and was based on a	
model he made out of sliced guitars. That building in	
Seattle is the Experience Music Project. Name this	
architect whose stainless steel designs include the Walt	
Disney Concert Hall in Los Angeles, and Chicago's BP	
Pedestrian Bridge and Jay Pritzker Pavilion.	



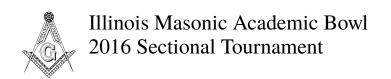
## **Question #7: Science – Biology**

10 points per part

This	technique typically uses an agarose	
[AH	[-guh-rose] matrix.	
1	Name this technique used to separate DNA according to size, by applying an electric field.	gel <u>electrophoresis</u>
2	The DNA in the gel can be visualized by staining it with this intercalating [in-TER-kuh-"late"-ing] agent, which fluoresces with an orange color.	ethidium bromide [accept EtBr]
3	Ethidium bromide is typically fluoresced using this kind of light. Overexposure to it may cause skin cancer.	ultraviolet light [or UV light; accept other answers containing ultraviolet or UV]

## **Question #8: Science – Biology**

This	s set of reactions requires NADPH [N-A-D-P-H]	
and	converts carbon dioxide to G3P [G "three" P].	
1	Name this set of reactions referred to as the "light-independent" reactions of photosynthesis.	Calvin(-Benson-Bassham) cycle [accept reductive pentose phosphate cycle; prompt on dark reactions or C3 or CBB]
2	The Calvin cycle uses this enzyme to carboxylate RuBP [kar-"BOX"-ih-"late" R-U-B-P]. It is the most abundant enzyme on Earth.	RuBisCO [accept ribulose-1,5-bisphosphate carboxylase/oxygenase]
3	This alternative form of carbon fixation is found in bundle sheath-containing plants like corn. It is named for the number of carbons in oxaloacetate ["OX"-uh-loh-"ASS"-ih-tayt].	C4 [accept longer answers that contain C4]



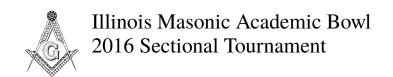
#### **Question #9: Literature – British Literature**

10 points per part

This	character is the elder daughter of Baptista, and	
her	marriage is a precondition for the marriage of	
Biar	nca.	
1	Name this protagonist who ends up being	Katherina Minola [prompt
	challenged by her husband, Petruchio	on <u>Kate</u> or <u>Minola</u> or
	[peh-TROO-kee-oh].	<u>shrew</u> ]
2	Petruchio traveled from this town to Padua to find a wife. In another Shakespearean play, Proteus and Valentine were <i>Two Gentlemen</i> from this city.	<u>Verona</u>
3	When trying to woo Bianca, both Lucretio [loo-KREE-shee-oh] and Hortensio pretended to	tutor [accept teacher]
	disguise themselves in this role in order to be in her	
	company.	

#### **Question #10: Literature – British Literature**

This	device became fully operational in the same lab	
that	the ILLIAC [ILL-ee-ak] computers were	
man	ufactured in Urbana, Illinois.	
1	Name this device that was Initially able to easily defeat Frank Poole in chess. It is eventually reduced to singing "Daisy Bell" as its modules are removed.	HAL 9000 [accept Heuristically programmed ALgorithmic computer 9000; prompt partial answers]
2	HAL 9000 is the primary antagonist of this novel, in which it attempts to kill the crew aboard the <i>Discovery One</i> .	2001: A Space Odyssey
3	2001: A Space Odyssey is by this author.	(Sir) Arthur C(harles) Clarke



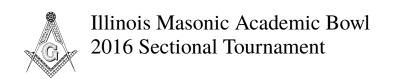
## **Question #11: Mathematics – Geometry**

10 points per part

Euc	lid's [YOO-klid's] fourth postulate states that all	
of th	nese geometric figures are congruent to each other.	
1	Name these angles that measure 90 degrees.	<u>right</u> angles
2	Find the length of the hypotenuse of a right triangle if one of the legs measures the square root of 6 units, and the other leg measures 3 units.	root 15 [or the square root of 15 or radical 15 or equivalents]
3	If one of the acute angles in a right triangle measures 12 degrees, 23 minutes, and 10 seconds, what is the measure of the other acute angle?	77 degrees and 36 minutes and 50 seconds

## **Question #12: Mathematics – Geometry**

This	s term refers to a section of a curve.	
1	Name this term, often used for part of the circumference of a circle.	arc
2	If a circle has a radius of 12 units, what is the length of an arc that subtends a 60-degree angle around the circle?	4 pi units [do not accept "4" or "pi"]
3	Find the area of the smaller circular sector in the same situation: a circle with a radius of 12 units, and a sector that includes a 60-degree central angle.	24 (times) pi square units [do not prompt on partial answer]



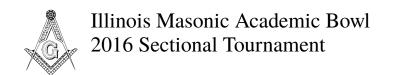
## **Question #13: Fine Arts – Classical Music & Opera**

10 points per part

This	s composer only wrote one opera: Fidelio.	
1	Name this composer whose nine symphonies include "Eroica".	Ludwig van <b>Beethoven</b>
2	This is the nickname of Beethoven's sonata "Quasi una fantasia". This nickname is based on Ludwig Rellstab's comparison of this piece to a view of Lake Lucerne at night.	Moonlight Sonata
3	This is the nickname of Beethoven's ninth violin sonata. It is named for a violinist who did not play	Kreutzer [KROYT-sur]
	it; a Leo Tolstoy novella is named for it.	bonutu

#### **Question #14: Fine Arts – Classical Music & Opera**

	wrote the operas <i>Così fan tutte</i> [KOH-zee fahn	
TOO	OT-tay] and <i>Don Giovanni</i> [dohn joh-VAH-nee].	
1	Name this composer from Salzburg ["SALTS"-burg] who started performing when he was six years old.	Wolfgang Amadeus <u>Mozart</u> [or Johannes Chrysostomus Wolfgangus Theophilus <u>Mozart</u> ]
2	This is the nickname of Mozart's 41st symphony, the last and the longest one that he wrote.	Jupiter symphony
3	Mozart wrote two pieces, a quintet and a concerto, for Anton Stadler to play on this instrument.	<u>clarinet</u>



#### Round 8 3rd Section Toss-up Questions

## **Question #15: Miscellaneous – Popular Culture**

10 points

This man portrayed the history teacher Chuck Noblet	Stephen Colbert
on Strangers with Candy, and he allegedly broke an arm	
stopping a civil union. This author of <i>I Am America</i> ,	
And So Can You spearheaded the "March to Keep Fear	
Alive." He hosted "This Week in God" when he was a	
Daily Show correspondent, and went on to portray a	
"high-status idiot" as a parody of conservative talk	
show hosts on his own show. Name this former	
Comedy Central host whose <i>Report</i> [reh-POR] used to	
follow The Daily Show, and who succeeded David	
Letterman as the host of <i>The Late Show</i> .	

## **Question #16: Science – Biology**

The amount of this substance in solution can be	<b>DNA</b> [or <b>deoxyribonucleic</b>
quantified by using an extinction coefficient of 40 and	<u>acid]</u>
observing UV-Vis absorption at 260 nanometers. This	
substance contains a major and minor groove, and it is	
typically found in the right-handed B conformation.	
Topoisomerases [TOH-poh-"EYE"-SAH-mur-"aces"]	
can increase or decrease the supercoiling of this	
molecule, which is synthesized during the S phase of	
mitosis. Unlike a similar molecule, this molecule	
typically exists in paired strands. Name this	
double-helical [HEE-luh-kul] molecule that contains	
human genetic information.	



#### Round 8 3rd Section Toss-up Questions

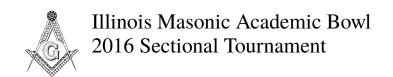
## **Question #17: Social Studies – World History**

10 points

At this meeting, it was agreed that control of Lauenberg	Congress of Vienna
[LAO-en-bairg] would be offered as compensation for	
the loss of Norway. Four of this meeting's attendees	
agreed to remain united per the Treaty of Chaumont	
[shao-mawn]; rifts within that group provided an	
opening for Charles-Maurice de Talleyrand. Organized	
by Klemens von Metternich, it was an attempt to strike	
a balance among the European powers following the	
fall of Napoleon. Name this 1814 gathering in the	
capital of Austria.	

#### **Question #18: Literature – U.S. Literature**

In one work, this author wrote of "the currents of the	Ralph Waldo <b>Emerson</b>
Universal Being circulating through me" and being	
"part or particle of God". In one essay, he wrote of an	
object that takes everything in as opposed to reflecting:	
the "transparent eyeball". In another essay, he advised	
the reader to "trust thyself" and that "a foolish	
consistency is the hobgoblin of little minds." This	
person used the line "the shot heard 'round the world"	
in his "Concord Hymn." Name this Transcendentalist	
who wrote "Nature" and "Self-Reliance".	



#### Round 8 3rd Section Toss-up Questions

#### **Question #19: Science – Astronomy**

10 points

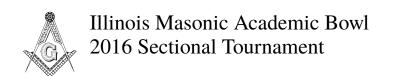
Following the Miller-Urey experiment, this person and	Carl <u>Sagan</u>
Bishun Khare used long-wavelength ultraviolet	
radiation to produce amino [uh-MEE-noh] acids. This	
person became the namesake of the Mars Pathfinder	
lander that released <i>Sojourner</i> . This person speculated	
about the origins of human intelligence in <i>The Dragons</i>	
of Eden. He worked with his wife Ann Druyan on	
projects explaining Earth's place in the universe, such	
as Pale Blue Dot. Name this popular scientist whose	
last book was Billions and Billions and who, before	
Neil deGrasse Tyson, made the original show <i>Cosmos</i> .	

#### Question #20: Social Studies – U.S. History

10 points

This person was the ambassador to China and then the director of the CIA under President Ford. This founder of the Points of Light Foundation was the first to publicly describe supply-side economics as "voodoo." This person uttered the slogan "Read my lips: no new taxes" during his defeat of Michael Dukakis; not being able to uphold that promise helped prevent his re-election against Bill Clinton in 1992. Name this leader, the 41st president of the United States and the father of the 43rd president.

George H(erbert) W(alker)
Bush [accept Bush 41 or
Bush the Elder or
equivalents; prompt on Bush
or George Bush; do not
accept or prompt on "George
W(alker) Bush"]



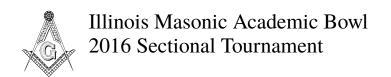
#### **Question #21: Literature – U.S. Literature**

10 points per part

Bill	Driscoll and the narrator, two "desperate men",	
atte	npt the title action in this story to raise money for	
a tov	vn-lot scheme in western Illinois.	
1	Name this story in which the son of Ebenezer	"The Ransom of Red
	Dorset is kidnapped, but annoys the kidnappers so	Chief"
	much they cannot keep him.	
2	This author of "The Gift of the Magi" wrote "The	O. Henry [or William
	Ransom of Red Chief."	Sydney <b>Porter</b> ]
3	Instead of paying \$1,500 as the kidnappers	\$ <u>250</u>
	demanded, they paid Ebenezer this amount to take	
	back the child.	

## **Question #22: Literature – U.S. Literature**

One	bartender in this novel supplies vagrants with	
alco	hol left in glasses by patrons of Ida's Bar.	
1	Name this novel featuring Dora Flood, a restaurant owner who also runs a brothel. The plot revolves around attempts to throw a party for the marine biologist Doc.	Cannery Row
2	Cannery Row and its sequel, Sweet Thursday, were written by this author. He wrote about the gentle giant Lennie in Of Mice and Men.	John (Ernst) <u>Steinbeck</u> (, Jr.)
3	Cannery Row, like most of Steinbeck's novels, is set in this state.	<u>California</u>



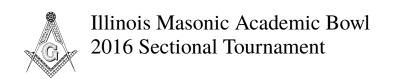
## **Question #23: Mathematics – Trigonometry**

10 points per part

It is	defined by the ratio of arc length to radius for a	
circ	e.	
1	Name this unit used to measure angles, especially	radian(s)
	in calculus where it is more convenient than	
	degrees.	
2	To the nearest degree, how many degrees make up	57 degrees
	one radian?	
3	Find the number of revolutions around a circle	50 revolutions
	equal to one hundred pi radians.	

## **Question #24: Mathematics – Trigonometry**

The	Pythagorean Theorem is a special case of this law.	
1	Name this law that can be used to find the length of one side of a triangle given the lengths of the other two sides and the measure of the angle between them.	law of <b>cos</b> ines
2	What is the cosine of 90 degrees?	zero [do not accept responses like "no answer" or "undefined"; do not accept answers that include units]
3	Find the length of the side of a triangle if the angle opposite that side measures 60 degrees, one of the sides measures 1 unit, and the other side measures 2 units.	root 3 units [or the square root of 3 or radical 3 or equivalents, do not accept "3"]



## **Question #25: Social Studies – World History**

10 points per part

This	s person's "Three Principles of the People"	
focu	ised on nationalism, democracy, and social reform.	
1	Name this founder of the Kuomintang [kwoh-min-TAYNG] who fled to Japan following the rise to power of Yuan Shikai [yoo-AHN shee-KAI].	Sun Yat-Sen [or Guofu, Sun Zhongshan, Sun Deming, or Sun Dixiang; prompt on Yat-sen]
2	This man was Sun Yat-sen's successor as the leader of the Kuomintang. He fled to Taiwan following his loss in a civil war.	Chiang Kaishek [or Jiang Jieshi, Chiang Chieh-shih, or Chiang Chung-cheng; prompt on Kaishek]
3	Chiang Kaishek's forces were unable to capture the Red Army during this retreat. At its conclusion, Mao Zedong and Zhou Enlai [zhoh en-"LIE"] rose to the Chinese Communist Party leadership.	Long March [accept Changzheng]

## **Question #26: Social Studies – World History**

This	s person's popularity sank due to his proposed	
poli	cy of "Trialism", which gave the Slavs an equal	
voic	e along with Germans and Magyars.	
1	Name this man who complained to Fehim Čurčić	Archduke Franz Ferdinand
	[feh-HEEM KUR-chik], the mayor of Sarajevo	
	[sar-uh-YAY-voh], about having a bomb thrown at	
	him shortly before his assassination.	
2	Franz Ferdinand was assassinated by this member	Gavrilo <b>Princip</b>
	of the Black Hand, who failed in two suicide	
	attempts immediately following the attack.	
3	The ultimate goal of the Black Hand was the	Serbians or Serbs
	liberation of members of this ethnic group from	
	being under Hapsburg or Ottoman rule.	



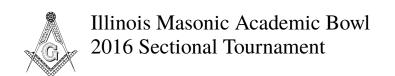
## **Question #27: Science – Physics**

10 points per part

The	se two statements can be derived from the laws of	
cons	servation of charge and conservation of energy.	
1	Name these rules used in circuit analysis. One is	Kirchhoff's
	known as the "junction rule" and the other is called	[KUR-kawff('z)] circuit laws
	the "loop rule".	
2	Kirchhoff's loop rule states that the sum of any	<u>zero</u>
	voltages around a closed loop must equal this value.	
3	The junction rule states that the sum of this	(electrical) <b>current</b>
	quantity entering a node must equal the sum	
	1	

## **Question #28: Science – Physics**

This	s hypothetical process consists of two isentropic	
["eye"-sin-TRAH-pik] and two isothermic		
["eye"-soh-THUR-mik] steps.		
1	Identify this thermodynamic cycle, named for a	Carnot [kar-noh] cycle or
	Frenchman, which extracts the maximum possible	<u>Carnot</u> engine
	amount of work from a heat engine.	
2	For the Carnot engine, this value is equal to one	thermodynamic efficiency
	minus the ratio of the temperatures of the cold and	
	hot reservoirs. This quantity is the work done by	
	the engine divided by the energy put into the	
	engine.	
3	According to the first law of thermodynamics,	one [or 100%]
	thermal efficiency cannot be greater than this	
	number, as otherwise energy would be created.	



#### Round 8 5th Section Toss-up Questions

#### **Question #29: Literature – World Literature**

10 points

When asked whether he has heard of another character,	<u>d'Artagnan</u>
this character responds by asking, "The world's biggest	
windbag?". This character's introduction to Treville	
[treh-VEEL] was stolen by the "Man from Meung	
[myoon]," who turned out to be the Comte de Rochefort	
[rosh-for]. After being insulted at a game of tennis by	
Bernajoux [bair-nah-zhoo], this Gascon won the	
ensuing duel. Brisemont [brees-mawn] drinks poisoned	
wine meant for this character, sent by his nemesis	
Milady de Winter. Name this swordsman who	
befriends Athos, Porthos, and Aramis [AIR-uh-miss] in	
Alexander Dumas' [doo-mahs'] The Three Musketeers.	

## **Question #30: Science – Chemistry**

	- <b>,</b>
Four equivalents of this compound are found in EDTA	acetic acid [or ethanoic acid;
[E-D-T-A]. This compound is formed from the activity	prompt on $\underline{HC_2H_3O_2}$ before
of acetaldehyde dehydrogenase	it is mentioned]
[uh-see-TAL-duh-"hide" dee-"high"-DRAH-juh-nayss]	
in the body. The simplest amino acid, glycine	
[GLY-seen], is an amino derivative of this compound.	
Industrial methods that form this compound involve	
reacting methanol with carbon monoxide, and include	
the Cativa and Monsanto processes. This compound is	
the second-smallest carboxylic ["car-box-ILL"-ik] acid	
after formic acid. Name this acid with formula	
HC <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ["H, C two, H three, O two"], responsible for	
the acidity of vinegar.	



#### Round 8 5th Section Toss-up Questions

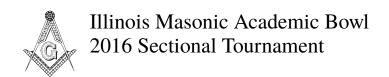
#### **Question #31: Social Studies – U.S. History**

10 points

As leader of this group, John Robinson Jr. lent	(Virginia) House of
members currency marked for destruction. Alexander	<u>Burgesses</u>
Spotswood hired many of this entity's members as	
tobacco inspectors. After it backed the Boston Tea	
Party, John Murray dissolved this group, whose secret	
meetings led to the First Continental Congress. George	
Washington, Thomas Jefferson, and Patrick Henry	
served in this legislature. It first met in Jamestown and	
later relocated to Williamsburg. Name this legislative	
body of colonial Virginia.	

#### **Question #32: Mathematics – Math Concepts**

Modular arithmetic and this function are used to test for	(n) <b>factorial</b> function
prime numbers using Wilson's theorem. If the "double"	
variant of this function is applied to an even number,	
the result equals two raised to half of the even number,	
end quantity, times this function applied to half the	
even number. This function can be calculated	
recursively by multiplying the input times the value of	
this function on the input minus one. If there are $n$	
people, this function of $n$ is the number of orders in	
which the people can be lined up. Name this function	
represented by an exclamation point.	
	1



# Round 8 Extra Section Toss-up Questions

#### Extra Question #1: Science - Biology

10 points

Stress and low levels of this quantity result in the adrenal [uh-DREE-nul] glands releasing cortisol ["COURT"-ih-sawl]. A pair of hormones that control this quantity are released by the alpha and beta cells of the islets of Langerhans. This measurement is higher in people after eating, which is why people typically fast before testing it. Glucagon [GLOO-kuh-gahn] increases this quantity by inducing the breakdown of glycogen [GLY-koh-jen]. Name this quantity lowered by insulin, which is often high in patients with diabetes.

**blood sugar**(s) level or **blood glucose** level

#### Extra Question #2: Social Studies - World History

10 points

Great Wall of China [or Wan Li Chang Cheng or 10,000-Li-Long Wall]



# Round 8 Extra Section Toss-up Questions

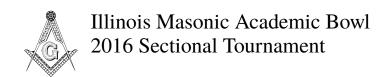
#### **Extra Question #3: Mathematics – Math Concepts**

10 points

If this value can only be achieved by the trivial solution	<u>zero</u>
of a linear combination of vectors, then the set of	
vectors is independent. This number is the constant	
term for each equation of a homogeneous system. If a	
matrix's determinant is this number, the matrix is	
called singular and cannot be inverted. This value is the	
cardinality of the empty set, and if a quadratic	
equation's discriminant has this value, then the	
equation has exactly one solution. This number is the	
additive identity. Name this real number that cannot be	
divided by.	

#### Extra Question #4: Fine Arts – Art History

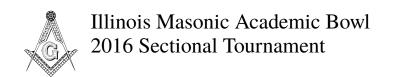
	, , , , , , , , , , , , , , , , , , ,
The engineers Émile Nouguier [ay-meel noog-yay] and	Eiffel Tower [or La tour
Maurice Koechlin ["COKE-lawn"] hired the architect	Eiffel]
Stephen Sauvestre [saw-vest-ray] to design this	
structure. This structure inspired the structures of the	
Long Ta, Funkturm Berlin, and the second tallest	
structure in Japan, but the one in Japan is painted	
orange and white. This structure's second floor has a	
restaurant, named for Jules Verne, that is still accessed	
by an Otis elevator. This structure is located at the end	
of the Champ de Mars [shawm day mar] near the Seine	
[sen] river. Name this tower built for the 1889 World's	
Fair on the centenary of the French Revolution in Paris.	



# Round 8 Extra Section Toss-up Questions

#### **Extra Question #5: Literature – World Literature**

The year before this play takes place, the protagonist	A <b>Doll's House</b> [or Et
spent three weeks making ornaments that were	<i>Dukkehjem</i> ; accept A <i>Doll</i>
destroyed by the family cat. One character in this	<i>House</i> ]
drama, fearing for her wife's teeth, tried to forbid her	
from having macaroons. A signature from the	
protagonist's dead father became leverage for Krogstad	
to blackmail this play's main character. Name this	
drama about the marriage between Torvald and Nora	
Helmer, written by Henrik Ibsen.	



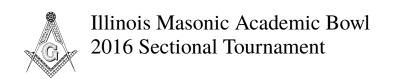
## Extra Question #6: Science - Physics

10 points per part

This	s physicist corrected Ampère's law by adding a	
term called the displacement current.		
1	Identify this Scottish physicist, the namesake of a	James Clerk ["Clark"]
	set of four equations used in electrodynamics.	<u>Maxwell</u>
2	Two of Maxwell's equations are named for this German scientist. The one pertaining to magnetism implies that magnetic monopoles cannot exist.	(Johann) Carl Friedrich  Gauss [rhymes with "house"]
3	Maxwell originally published 20 equations, which were reformulated by this man to the four by using the curl and divergence operators.	Oliver <b>Heaviside</b>

## Extra Question #7: Science - Physics

The	se particles are the gauge bosons for the	
electromagnetic interaction.		
1	Name these particles, the quanta of light.	<b>photon</b> s [FOH-tahnz]
2	Einstein won his Nobel Prize for explaining the photoelectric effect, in which photons striking a metal cause the metal to eject this particle.	<u>electron</u> s
3	Wave-particle duality was extended from just photons to all matter by this man's formula, which states that his namesake wavelength is equal to Planck's constant over the object's momentum.	Louis de Broglie [loo-ee duh broy]



## Extra Question #8: Social Studies - World History

10 points per part

This	s loser at the Battle of Châlons [shah-lawn] died of	
a nosebleed on the night of his wedding to Ildico		
[il-d	lee-KOH].	
1	Name this "Scourge of God" who owned a weapon	Attila the Hun [or Atli or
	known as the Sword of Mars.	<u>Etzel</u> ]
2	After receiving a letter from Honoria containing a	Western Roman Empire
	ring, Attila demanded half of this empire as a	[prompt on partial answer]
	dowry.	
3	Attila's loss at Châlons was the turning point of an	Gaul [accept Gallia; prompt
	invasion of this ancient region. Julius Caesar wrote	on answers mentioning the
	a commentary on a series of wars fought here	Gallic Wars]
	culminating in a defeat of Vercingetorix	
	[vur-sin-JEH-tuh-riks].	

## Extra Question #9: Social Studies - World History

This ringleader of Operation Condor was advised by		
the "Chicago Boys" on economic policy.		
1	Name this leader who was succeeded by Patricio Aylwin in 1990. He died in 2006 before a court could try him for the mass murder of political dissidents.	Augusto Pinochet [oh-GOO-stoh pee-noh-SHAY] (Ugarte)
2	Pinochet was the leader of this country, which is now headed by Michelle Bachelet [BA-shuh-lay]	(Republic of) Chile [CHEE-lay] [or República de Chile]
3	Pinochet maintained the policy, begun by Carlos Ibáñez [ee-BAHN-yez] del Campo and completed by Salvador Allende ["eye"-YEN-day], of nationalizing mines that produced this metal.	copper