

# Round 5 1st Section Toss-up Questions

#### **Question #1: Science – Health**

10 points

Difficulty with this activity is rated on the Athens Scale. One of the disorders associated with this activity is exploding head syndrome, which may be caused by seizures and which involves loud imaginary noises. Circadian [sur-KAY-dee-un] rhythm disorders generally interrupt this activity first. Electrooculography ["elect"-roh-ah-kyoo-LAH-gruh-fee] shows how different stages of this activity involve different levels of eye movement. People with atathrenia [at-uh-THREE-nee-uh] groan while doing this activity and likely have apnea that worsens breathing. Name this activity that includes a rapid eye movement stage and which is done at night by diurnal animals.

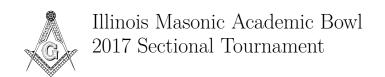
sleep [accept falling
asleep or similar answers;
accept REM sleep or
rapid eye movement
sleep before "eye
movement"]

#### **Question #2: Literature – World Literature**

10 points

Two of the characters that this author based on himself were Blavdak Vinomori in King, Queen, Knave, and Vivian Darkbloom in Ada or Ardor. This author wrote about a 999-line poem written by John Shade in Pale Fire. This author of the autobiography Speak, Memory created a narrator whose marriage to Valeria falls apart after she has an affair with a taxi driver. That character uses the phrase "light of my life, fire of my loins" to describe Dolores Haze, his 12-year-old stepdaughter. Name this author who created Humbert Humbert, the narrator of Lolita.

Vladimir (Vladimirovich)
Nabokov [nah-BOH-kawf]
[accept Vladimir Sirin]



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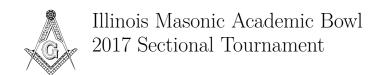
### **Question #3: Social Studies – U.S. History**

10 points

| This person chaired the Pageantry Committee for      | Walt(er Elias) <b>Disney</b> |
|--|------------------------------|
| the 1960 Winter Olympics in Squaw Valley. Some       |                              |
| of the attractions he is known for debuted at the    |                              |
| 1964 New York World's Fair. This person discussed    |                              |
| with Treasury Secretary Henry Morgenthau how he      |                              |
| could support the war effort, which led to the short |                              |
| film Der Fuehrer's Face. For the 1959 American       |                              |
| National Exhibition in Moscow, his company made      |                              |
| America the Beautiful, a film in Circle-Vision 360.  |                              |
| His dream was to create the Experimental             |                              |
| Prototype Community of Tomorrow, which               |                              |
| eventually got partly implemented as EPCOT           |                              |
| Center. Name this cartoonist who set up theme        |                              |
| parks in California and Florida.                     |                              |

## **Question #4: Fine Arts – Composers of the Modern Era**

| This person's second symphony, which premiered          | Leonard <u>Bernstein</u> |
|---|--------------------------|
| with him playing piano and Serge Koussevitzky           |                          |
| [SAIR-gay koo-seh-VIT-skee] conducting, is based        |                          |
| on the W. H. Auden poem The Age of Anxiety.             |                          |
| Using a libretto by Lillian Hellman, he wrote the       |                          |
| songs "Oh, Happy We" and "Make Our Garden               |                          |
| Grow" for an operetta based on Candide [kan-deed].      |                          |
| One of the songs he originally wrote for <i>Candide</i> |                          |
| was "One Hand, One Heart," which was moved to           |                          |
| another musical he wrote, in which it is sung by        |                          |
| Tony and the Puerto Rican immigrant Maria.              |                          |
| Name this composer who used lyrics by Stephen           |                          |
| Sondheim to write the musical West Side Story.          |                          |



#### Round 5 1st Section Toss-up Questions

## **Question #5: Science – Physics**

10 points

| This quantity is converted from CGS units to MKS      | electric <b>charge</b> [prompt on |
|---|-----------------------------------|
| units by multiplying by the square root of the        | $\mid m{q}  vert$                 |
| quantity 4 pi times the vacuum permittivity.          |                                   |
| Kirchhoff's [KEER-kawff's] junction law is due to     |                                   |
| the conservation of this quantity. The strength of    |                                   |
| an electric field equals force divided by this        |                                   |
| quantity. Capacitance equals this quantity divided    |                                   |
| by electric potential difference. Two values of this  |                                   |
| quantity are multiplied together in the numerator     |                                   |
| to calculate the electric force between them in       |                                   |
| Coulomb's [KOO-lumb'z] law. The amount of this        |                                   |
| quantity transferred per unit time is called current. |                                   |
| Name this quantity measured in coulombs.              |                                   |

## **Question #6: Literature – Mythology**

| This object was pulled by Alsvid and Arvak, and      | the <u>sun</u> [accept <u>Sol</u> before |
|--|--|
| the daughter of Mundilfari [moon-dil-FAR-ee] was     | "Sol"]                                   |
| named after it. Svalin wields a shield on behalf of  |  |
| this thing, which is pursued by Skoll. It was called |  |
| the "deceiver of Dvalin" in the <i>Alvissmol</i>     |  |
| [ahl-VEESS-mol], in which Thor defeated Alvis via    |  |
| its petrification of dwarves. In Shintoism, the      |  |
| goddess of this object oversees the High Celestial   |  |
| Plain and the universe. Because that goddess,        |  |
| Amaterasu, controlled this object, the world went    |  |
| dark when she hid in a cave. Name this celestial     |  |
| object guided in Roman mythology by Sol Invictus.    |  |



### **Question #7: Social Studies – World History**

10 points per part

| The  | Nazis killed six million Jews and five million  |                                 |
|------|---|---------------------------------|
| othe | er people, including homosexuals and            |                                 |
| Free | emasons.  |                                 |
| 1    | Name the leader of the Nazi Party, who was the  | Adolf <u><b>Hitler</b></u>      |
|      | Führer [FYUR-ur] of Germany during the          |                                 |
|      | Holocaust.                                      |                                 |
| 2    | Though one of the death camps used by the       | (Republic of) <b>Poland</b> [or |
|      | Nazis is in what is now Belarus [BEH-luh-rooss] | Rzeczpospolita <b>Polska</b> ]  |
|      | and another was in Serbia, the vast majority of |                                 |
|      | mass exterminations took place in what is now   |                                 |
|      | this country.                                   |                                 |
| 3    | This person oversaw the SS and the Gestapo      | Heinrich (Luitpold)             |
|      | [gesh-TAH-poh] during the Holocaust. His        | <u>Himmler</u>                  |
|      | speeches at Posen demonstrate that the German   |                                 |
|      | government is responsible for the Holocaust.    |                                 |

## **Question #8: Social Studies – World History**

| This | s war was fought from 431 to 404 BCE.   |                                    |
|------|---|------------------------------------|
| 1    | Identify this war named for the league led by Sparta that defeated the Delian [DEE-lee-un]  | Peloponnesian [PEL-oh-pun-EE-zhun] |
|      | League led by Athens.   | War                                |
| 2    | The History of the Peloponnesian War was written by this historian. In contrast with Herodotus [huh-RAH-dih-tuss], he did not have the gods play an active role in his work.        | Thucydides [thoo-SID-uh-deez]      |
| 3    | A peace treaty signed during the middle of the Peloponnesian War was supposed to last for 50 years, but only lasted for six. That peace treaty was named for this Athenian general. | Nicias [NISH-ee-uss]               |



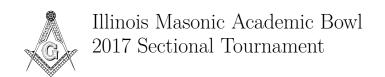
### **Question #9: Fine Arts – Art History**

10 points per part

| A b  | lock away from the Rijksmuseum                     |                                  |
|------|--|----------------------------------|
| [RY  | KES-"museum"] in Amsterdam, there is a             |                                  |
| mus  | seum dedicated to this artist, from which his      |                                  |
| pair | nting The Potato Eaters was stolen in 1991.        |                                  |
| 1    | Name this late-19th-century painter. Some of       | Vincent (Willem) <u>van</u>      |
|      | his self-portraits show him with a bandaged ear.   | $\underline{\mathbf{Gogh}}$      |
|      |  |                                  |
| 2    | This van Gogh painting shows Joseph-Michel         | The <b>Night Café</b> [or Le     |
|      | Ginoux [zhoh-sef mee-shel zhee-noo], the owner     | $\underline{Caf\'e \ de \ nuit}$ |
|      | of the place where the painting is set, dressed in | -                                |
|      | white standing next to a pool table.               |                                  |
| 3    | The Night Café was painted in this city, to        | Arles [AR-ul], France            |
|      | which van Gogh moved in 1888. Another of his       |                                  |
|      | paintings shows his bedroom in this city.          |                                  |

### **Question #10: Fine Arts – Art History**

| Thi  | s family made a lot of money in the mining     |                               |
|------|--|-------------------------------|
| indu | stry, and they used much of that money to      |                               |
| sup  | port modern art.                               |                               |
| 1    | Name this family whose members are the         | Guggenheim family or          |
|      | namesakes of a museum in Bilbao, Spain         | Guggenheims [accept           |
|      | designed by Frank Gehry, and a cylindrical     | Solomon <b>Guggenheim</b> or  |
|      | museum in New York City.                       | Peggy <u>Guggenheim</u> ]     |
|      |  | -                             |
| 2    | The Guggenheim in New York City was            | Frank Lloyd <u>Wright</u> [or |
|      | designed by this architect. He is mostly known | Frank Lincoln <u>Wright</u> ] |
|      | for residential homes, including Fallingwater. |                               |
| 3    | This art museum in Washington, D.C. was not    | (Joseph H.) <b>Hirshhorn</b>  |
|      | designed by Wright but is also cylindrical. It | Museum and Sculpture          |
|      | and its sculpture garden are part of the       | Garden                        |
|      | Smithsonian Institution.                       |                               |



## **Question #11: Science – Biology**

10 points per part

| The  | primary glands that produce this substance        |                         |
|------|---|-------------------------|
| are  | the parotid [puh-RAH-tid], submandibular          |                         |
| ["SU | JB-man"-DIB-yoo-lur], and sublingual              |                         |
| [sub | p-LIN-gwul] glands.                               |                         |
| 1    | Name this liquid in the mouth that aids in        | saliva [prompt on spit] |
|      | digestion.  |                         |
| 2    | Saliva contains amylase ["AM-uh-lace"], which     | <u>starch</u> es        |
|      | breaks down these complex carbohydrates into      |                         |
|      | sugars.   |                         |
| 3    | Much of the starch is broken down by amylase      | maltose [MAWL-tohss]    |
|      | into this type of sugar. This sugar, like sucrose |                         |
|      | and lactose, is a disaccharide                    |                         |
|      | ["die-SACK-uh-ride"].                             |                         |

### **Question #12: Science – Biology**

| One  | e of the folds in this organ is called the central |                                  |
|------|--|----------------------------------|
| sulc | us, central fissure, or fissure of Rolando.        |                                  |
| 1    | Name this organ whose largest part has frontal,    | <u>brain</u>                     |
|      | parietal, occipital, and temporal lobes, and is    |                                  |
|      | called the cerebrum [suh-REE-brum].                |                                  |
| 2    | This part of the brain is located behind the       | <u>cerebellum</u>                |
|      | brain stem and plays a major role in controlling   | [sair-uh-BEL-um]                 |
|      | muscles.   |                                  |
| 3    | The middle of three layers of the cerebellum is    | Purkinje [pur-KIN-jee]           |
|      | named for these cells that release GABA. These     | cells [or <b>Purkinje</b> layer] |
|      | cells are named for the Czech scientist who        |                                  |
|      | discovered them.                                   |                                  |



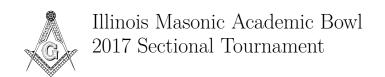
#### **Question #13: Literature – U.S. Literature**

10 points per part

| Ар    | oem called "Harlem" asks if this thing stinks     |                           |
|-------|---|---------------------------|
| "like | e rotted meat" or whether it "crust[s] and        |                           |
| suga  | ar[s] over like a syrupy sweet".                  |                           |
| 1     | Name this thing that may also "sag like a heavy   | a <u>dream deferred</u>   |
|       | load" or "explode".                               | [prompt on <u>dream</u> ] |
| 2     | "Harlem" is by this poet.                         | (James Mercer) Langston   |
|       |   | <u>Hughes</u>             |
| 3     | "Harlem" asks whether a dream deferred may        | Lorraine (Vivian)         |
|       | "dry up like a raisin in the sun," which inspired | Hansberry                 |
|       | the title of a 1959 play by this author.          |                           |

#### **Question #14: Literature – U.S. Literature**

| This  | s novel sparked an entire sub-genre [JON-ruh]  |                              |
|-------|--|------------------------------|
| of li | terature written in response to it, such as    |                              |
| Car   | oline Lee Hentz's The Planter's Northern       |                              |
| Brie  | de.  |                              |
| 1     | Name this novel in which a Quaker named        | Uncle Tom's Cabin            |
|       | Phineas Fletcher helps George and Eliza escape |                              |
|       | to Canada.                                     |                              |
| 2     | Uncle Tom's Cabin was written by this          | Harriet Beecher <b>Stowe</b> |
|       | abolitionist, whom Abraham Lincoln called      |                              |
|       | "the little lady who started this great war".  |                              |
| 3     | Name the plantation owner who murders Uncle    | Simon Legree [accept         |
|       | Tom.   | either                       |
|       |  | -                            |



# Round 5 3rd Section Toss-up Questions

#### **Question #15: Mathematics – Math Concepts**

10 points

This symbol, which does not have a fancy name, is often placed between an expected value and the standard deviation, and it is often written before half the confidence interval. When writing the cosine angle addition formula, this symbol is often written the normal way on one side of the equation and upside down on the other side. When solving an equation for a quantity that is squared, you can take the square root of both sides and then put this symbol in front of the other side of the equation. Name this symbol that goes before the square root in the quadratic formula, and which shows that two results with opposite signs are possible.

plus-or-minus sign
[accept minus-or-plus
sign]

#### Question #16: Social Studies - Religion

10 points

A group that helps observe this holiday uses the slogan "Taking worship to the streets". Eastern Orthodox Christians usually celebrate a holiday with "Clean" in its name instead of this day. The palms from previous Palm Sundays are used on this day, and it is common to quote from the third chapter of Genesis, saying "Remember that you are dust, and to dust you shall return." This holiday is always 46 days before Easter. The name of this day comes from the material that is used to mark crosses on people's foreheads. Name this day that starts Lent and which immediately follows Mardi Gras [grah], or Fat Tuesday.

Ash Wednesday [prompt on Wednesday]



#### Round 5 3rd Section Toss-up Questions

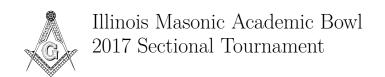
## **Question #17: Literature – Grammar/Usage**

10 points

| One example of this part of speech is the word        | preposition |
|---|-------------|
| "qua", spelled Q-U-A, while another example of this   |             |
| part of speech — often used between competing         |             |
| teams — is "versus". Though the word "concerning"     |             |
| can be used as an adjective, it is more commonly      |             |
| used as this part of speech. The word "during" is     |             |
| one of several examples of this type of speech used   |             |
| to show how two events are related in time. Several   |             |
| common three-word phrases place a noun between        |             |
| two of these words, and collectively function as this |             |
| part of speech, including "with respect to" and "in   |             |
| spite of". Name this part of speech that is not an    |             |
| adjective but that is often placed before nouns or    |             |
| pronouns.   |             |

## **Question #18: Science – Chemistry**

| This alloy is sometimes marked with a 'K' to        | <u>steel</u> |
|---|--------------|
| denote that it is "killed", meaning that its oxygen |              |
| was removed. One process for making this alloy,     |              |
| sometimes called Linz-Donawitz ["lints"             |              |
| DOH-nuh-vits] because it was developed in those     |              |
| towns in Austria, is also known as the basic oxygen |              |
| process because it uses oxygen to remove carbon. A  |              |
| particularly abrasion-resistant type of this alloy  |              |
| contains carbides and is named for the fact that it |              |
| is used to make tools. This alloy became much       |              |
| cheaper to make in the 19th century with the        |              |
| development of the Bessemer process. Name this      |              |
| alloy of carbon and iron.                           |              |



# Round 5 3rd Section Toss-up Questions

#### **Question #19: Social Studies – U.S. History**

10 points

This person said "Hate is too great a burden to bear" in his speech "Where Do We Go From Here?" This person led a group that he started along with Joseph Lowery, Fred Shuttlesworth, and Ralph Abernathy. His speech "How Long? Not Long" was delivered after a march that crossed the Edmund Pettus Bridge, and he then led a group that tried to deliver a petition to Governor George Wallace of Alabama. This person led the Montgomery bus boycott after Rosa Parks refused to give up her seat. Name this person assassinated by James Earl Ray, and who delivered the "I Have A Dream" speech.

Martin Luther  $\underline{\mathbf{King}}$  Jr. [or  $\underline{\mathbf{MLK}}$ ]

#### Question #20: Miscellaneous – Journalism

10 points

Yosri Fouda was the only journalist to interview the masterminds behind this event, which was referred to by the perpetrators as "Holy Tuesday." This event prompted Fox News, MSNBC, and CNN to roll out a permanent news ticker. The day after this event, the French newspaper *Le Monde [mond]* ran the headline "Nous sommes tous Americains," [noo sohm too ah-mair-ee-kayn], meaning "We Are All Americans". Khalid Sheikh Mohammad masterminded what early 21st-century terrorist attack on US soil?

September 11, 2001 attacks or 9/11 attacks [prompt on answers referring to the World Trade Center or Twin Towers or WTC or Pentagon]



## **Question #21: Literature – Mythology**

10 points per part

| This | s goddess was the first born of her siblings,     |                                 |
|------|---|---------------------------------|
| and  | thus the last regurgitated by Cronos.             |                                 |
| 1    | Name this goddess of the hearth. Priapus          | Hestia [accept Vesta]           |
|      | [PREE-uh-puss] tried to rape her, but was         |                                 |
|      | undone by the braying of a donkey.                |                                 |
| 2    | Hestia gave up her throne so this god of wine     | Dionysus [accept                |
|      | and drama could assume his rightful place on      | Bacchus]                        |
|      | Mount Olympus.                                    |                                 |
| 3    | After these two gods tried to marry Hestia,       | Apollo and Poseidon             |
|      | Zeus allowed her to remain a virgin for eternity. | [either order; or <b>Apollo</b> |
|      |   | and <u>Neptune</u> ]            |
|      |   |                                 |

## **Question #22: Literature – Mythology**

| Rid  | ing Sleipnir ["SLY"-p'-neer] through nine        |                               |
|------|--|-------------------------------|
| nigh | nts, Hermod ventured to the underworld in        |                               |
| orde | er to procure the return of this god.            |                               |
| 1    | Name this Norse god of light. Loki refused to    | Baldur ["balder"]             |
|      | weep in order to ensure this god did not return. |                               |
| 2    | Following the death of her father, Thiazi        | <u>feet</u> [or <u>foot</u> ] |
|      | [thee-AH-zee], Skadi [SKAH-dee] was allowed to   |                               |
|      | marry a god, but could only look at these parts  |                               |
|      | of candidates to help her decide. She convinced  |                               |
|      | herself the best ones belonged to Baldur, but    |                               |
|      | ended up choosing those of Njord [nee-YORD].     |                               |
| 3    | Thiazi's death was a result of his abduction of  | golden <b>apple</b> s         |
|      | Idun, the custodian of these objects that the    |                               |
|      | Aesir [AY-seer] used to maintain their youth. In |                               |
|      | Greek myth, Melanion [mih-LAN-ee-un] used        |                               |
|      | three of them to defeat Atalanta in a foot race. |                               |



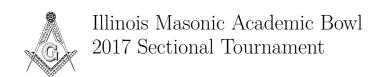
### **Question #23: Mathematics – Algebra**

10 points per part

| All  | of the exponents applied to variables in these  |                     |
|------|---|---------------------|
| exp  | ressions must be non-negative integers, and the |                     |
| only | other allowed operations on variables are       |                     |
| add  | ition, subtraction, and multiplication.         |                     |
| 1    | Name these expressions, which might be further  | <b>polynomial</b> s |
|      | classified as quadratic, cubic, or quartic.     |                     |
| 2    | Evaluate the polynomial $4x^2 + 8x + 10$ ["4 x  | 22                  |
|      | squared plus 8 $x$ plus 10"] when $x = 1$ .     |                     |
| 3    | Find the remainder when $4x^2 + 8x + 10$ is     | <u>6</u>            |
|      | divided by $x + 1$ .                            |                     |

## **Question #24: Mathematics – Algebra**

| The  | e composition of this type of function, with the  |   |
|------|---|---|
| orig | inal function that it corresponds to, equals the  |   |
| ider | atity function.                                   |   |
| 1    | Name this type of function that, in effect,       | inverse function [accept                    |
|      | "undoes" another function. This word can also     | $\underline{\mathbf{invert}}]$              |
|      | refer to a matrix that, when multiplied by        |   |
|      | another matrix, gives the identity matrix.        |   |
| 2    | If $f$ of $x$ equals $4x - 1$ , find the value of | <u>8</u>                                    |
|      | f-inverse of 31.                                  |   |
| 3    | If a matrix has a top row of 3 and 2, and a       | <u><b>3/4</b></u> [or 0. <u><b>75</b></u> ] |
|      | bottom row of 5 and 6, find the value in the top  |   |
|      | left corner of the <i>inverse</i> of the matrix.  |   |



### Question #25: Social Studies - U.S. Government

10 points per part

| The   | e head of this branch of government is required  |                                |
|-------|--|--------------------------------|
| to b  | be at least 35 years old, to be a natural-born   |                                |
| citiz | zen of the U.S., and to have lived in the U.S.   |                                |
| for a | at least 14 years.                               |                                |
| 1     | Name this branch of government that is the       | executive branch               |
|       | focus of Article II of the Constitution.         |                                |
| 2     | Article II describes the Electoral College.      | 12th Amendment                 |
|       | Electors were originally given two votes, but    |                                |
|       | that was changed to one vote by this             |                                |
|       | amendment.                                       |                                |
| 3     | Article II also gives the oath of office for the | preserve, protect, and         |
|       | President. In that oath, the President promises  | <u>defend</u> the Constitution |
|       | to perform these three actions toward the        | [any order]                    |
|       | Constitution to the best of his or her ability.  |                                |

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

| This | s agency was created by an executive order      |                                  |
|------|---|----------------------------------|
| sign | ed by Richard Nixon                             |                                  |
| 1    | Name this agency that administers the Clean     | EPA or Environmental             |
|      | Air Act and Clean Water Act.                    | <b>Protection</b> Agency         |
|      |   |                                  |
| 2    | The EPA also oversees the Comprehensive         | $\underline{\mathbf{Superfund}}$ |
|      | Environmental Response, Compensation, and       |                                  |
|      | Liability Act, which is commonly referred to by |                                  |
|      | this name.                                      |                                  |
| 3    | Because the EPA is supposed to oversee clean    | <u>lead</u> [or Pb]              |
|      | water, it was criticized when high              | -<br>-                           |
|      | concentrations of this heavy metal were found   |                                  |
|      | in Flint, Michigan's drinking water.            |                                  |



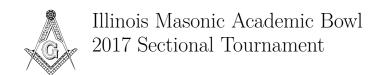
## **Question #27: Science – Physics**

10 points per part

| This | s phenomenon is produced by vibrations   |   |
|------|--|---|
| bety | ween 20 and 20,000 hertz ["hurts"].  |   |
| 1    | Name this phenomenon whose intensity is often measured on the decibel scale.   | sound [accept noise;<br>accept music or similar<br>answers] |
| 2    | The disturbances that make up sound waves move in the same direction as the overall waves, making them this kind of wave. On the other hand, transverse waves oscillate perpendicular to the direction they travel in. | longitudinal waves  |
| 3    | Longitudinal waves consist of cycles of compression and this process, in which low   | rarefaction [accept<br>rarefying]                           |
|      | pressure occurs.   |   |

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

| This | s term refers to a place where light appears to |                                       |
|------|---|---------------------------------------|
| com  | e from.   |                                       |
| 1    | Give this term. It may be modified by the       | $\underline{\mathbf{image}}(s)$       |
|      | words "real" or "virtual" depending on whether  |                                       |
|      | light rays actually converge at this place.     |                                       |
| 2    | An image formed by this type of curved mirror   | concave mirror [or                    |
|      | will be virtual if the object is closer to the  | <b>converging</b> mirror]             |
|      | mirror than the focus, or real if the object is |                                       |
|      | farther away.                                   |                                       |
| 3    | The real images created by concave mirrors      | inverted [or                          |
|      | have this orientation compared to the original  | <b>upside-down</b> or <b>flip</b> ped |
|      | object.   | or equivalents]                       |
|      |   |                                       |



# Round 5 5th Section Toss-up Questions

#### **Question #29: Social Studies – World History**

10 points

One of this emperor's sons was killed by supporters of Magnentius [mag-NEN-shus]. This emperor's three sons fought with each other after dividing the Roman Empire. When Diocletian's ["die"-oh-KLEE-shun'z] tetrarchy [TET-rark-ee] ended, this person controlled the western half of the Empire, and he increased his power by ordering the assassination of Licinius [lih-SIN-ee-uss]. The tetrarchy ended after this person defeated Maxentius [mak-SEN-shus] at the Battle of the Milvian Bridge. Name this co-author of the Edict of Milan, which granted toleration to Christians in the year 313 CE.

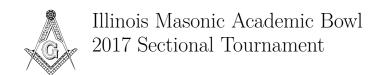
<u>Constantine</u> the Great [or <u>Constantine</u> I]

#### **Question #30: Mathematics – Math Concepts**

10 points

This shape is not a circle, but the tangent and normal vectors determine one of these shapes that just touches a curve in space, which is called the osculating [AHSS-kyoo-lay-ting] type. In general, these shapes can be defined by two independent vectors, or by a point and a normal vector, or by three non-co-linear points, or by two lines that either intersect or are parallel. If two of these things intersect but aren't the same, the intersection must be a line. The geometry of two dimensions is named for these entities. Name these infinite flat surfaces.

planes [accept planar
surfaces; accept osculating
plane]



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

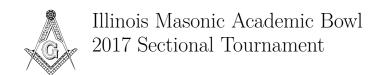
## **Question #31: Science – Biology**

10 points

| A form of this protein used to monitor glucose         | <u>hemoglobin</u> |
|--|-------------------|
| levels is known as A1c. This protein is regulated      |                   |
| allosterically [al-oh-"STARE"-ik-lee] by 2,3-BPG.      |                   |
| The Bohr shift consists of this protein's affinity for |                   |
| its primary substrate decreasing at low pH values.     |                   |
| This protein's breakdown results in bilirubin          |                   |
| [BIL-ih-roo-bin], which causes jaundice. A             |                   |
| glutamate [GLOO-tuh-"mate"]-to-valine [VAY-leen]       |                   |
| mutation in the genes encoding this protein causes     |                   |
| sickle-cell anemia. This protein contains a            |                   |
| porphyrin [POR-fuh-rin] cofactor with a central        |                   |
| iron known as heme [heem]. Name this protein that      |                   |
| red blood cells use to transport oxygen.               |                   |

### **Question #32: Literature – U.S. Literature**

| This character's wife "broke a blood-vessel in a fit | Rip Van Winkle [accept     |
|--|----------------------------|
| of passion at a New England peddler". Long after     | either underlined portion] |
| his wife's death, this man moves in with his         |                            |
| daughter, Judith Gardenier [gahr-DEE-nee-ur].        |                            |
| This man's companion in idleness was his dog Wolf.   |                            |
| Near the end of the story about this person, he is   |                            |
| surprised to see a picture of George III replaced    |                            |
| with a picture of George Washington. This person     |                            |
| became enraptured by a group of ninepins players     |                            |
| in an amphitheater in the Catskill Mountains.        |                            |
| Name this Washington Irving character who had        |                            |
| some drinks, then fell asleep for 20 years.          |                            |



# Round 5 Extra Section Toss-up Questions

#### Extra Question #1: Fine Arts - Classical Music & Opera

10 points

In one opera by this composer, Konstanze sings "Martern aller Arten", which means "Tortures of all kinds", after a threat from Bassa Selim [BAH-suh seh-LEEM]. In another opera by this composer, "Der Hölle Rache" [dair HUR-luh RAH-kuh] is a very high aria in which Pamina [pah-MEE-nuh] is ordered to kill the sorcerer Sarastro by her mother, the Queen of the Night. Another opera by this composer is based on the same main character as Rossini's The Barber of Seville. Name this rival of Antonio Salieri who wrote The Abduction from the Seraglio [sair-AHL-yoh], The Marriage of Figaro, and The Magic Flute.

Wolfgang Amadeus  $\underline{\mathbf{Mozart}}$ 

### Extra Question #2: Mathematics – Math Concepts

10 points

This name is given to the original statement by Joseph Bertrand that for every integer n greater than 3, there is a prime between n and 2n-2. A controversial statement with this name is equivalent to both Proclus' [PROE-klus'z] axiom and Playfair's axiom. The first of a group of these statements says that you can draw a straight line through any two points. Absolute geometry, also known as neutral geometry, uses only four of the original statements of this type rather than the original five. The fifth statement of this type, which states that lines intersect on the side of a transversal that has two acute angles, is called the parallel one. Name these statements, similar to axioms, that were used by Euclid without proof.

**postulate**s [accept more specific answers]



# Round 5 Extra Section Toss-up Questions

#### Extra Question #3: Social Studies – World History

10 points

| This country's parliament elected Prince Frederick  | (R |
|---|----|
| Charles of Hesse [HESS-uh] as its king in 1918, but | Su |
| he renounced the throne and this country became a   |    |
| republic. That offer was made after several German  |    |
| military leaders helped C. G. E. Mannerheim lead    |    |
| the Whites to victory in this country's civil war.  |    |
| Before its independence, this country was a grand   |    |
| duchy [DUCH-ee] belonging to the Russian Empire.    |    |
| This country and Russia each control parts of       |    |
| Karelia [kuh-REEL-yuh]. Name this country           |    |
| between Russia and Sweden, whose capital is         |    |
| Helsinki.   |    |
|   |    |

Republic of) **Finland** [or **Suomen** (tasavalta)]

### Extra Question #4: Science – Chemistry

10 points

| The ratio named for this quantity is found by       | (mass) <u>de</u> r |
|---|--------------------|
| dividing the impacts of temperature and salinity by |                    |
| this quantity for sea water. This quantity for a    |                    |
| substance is divided by a standard value of this    |                    |
| quantity to calculate specific gravity. Osmium and  |                    |
| iridium [ih-RID-ee-um] are the elements with the    |                    |
| highest value of this quantity. An object floats if |                    |
| this property for the object is lower than this     |                    |
| property for the fluid it is in. Name this quantity |                    |
| calculated as mass divided by volume.               |                    |
|   |                    |

(mass) density



### Round 5 Extra Section Toss-up Questions

### Extra Question #5: Literature - British Literature

| In this character's last appearance, he calls up               | Hercule Poirot [accept |
|--|------------------------|
| Captain Hastings to provide him with information               | either]                |
| at his residence at Styles. In <i>Curtain</i> , this character | -                      |
| refused to take his heart medicine after killing               |                        |
| Norton. His assistant, Dr. James Sheppard,                     |                        |
| confessed to The Murder of Roger Ackroyd. In one               |                        |
| tale, this character deduced that a dozen people all           |                        |
| acted to murder Ratchett, solving the Murder on                |                        |
| the Orient Express. Name this Belgian detective                |                        |
| who, like Miss Marple, was created by Agatha                   |                        |
| Christie.  |                        |



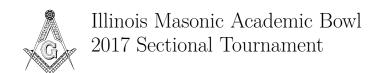
### Extra Question #6: Science - Chemistry

10 points per part

| This | s woman is the only person to win Nobel   |   |
|------|---|---|
| Priz | zes in both chemistry and physics.  |   |
| 1    | Name this person who shared her physics Nobel with Henri Becquerel [awn-ree bek-er-el] and her husband Pierre for their research on radioactivity.              | (Madame) Marie <u>Curie</u><br>[or Maria Salomea<br><u>Skłodowska</u> ] |
| 2    | Marie and Pierre Curie isolated two new elements: radium and this element, which was named in honor of Marie Curie's native country.                            | polonium [accept Po;<br>prompt on Poland or<br>Polska]                  |
| 3    | During World War I, a group of factory workers dubbed the Radium Girls were exposed to fatal amounts of radiation when they used radium to paint these objects. | watches or watch dials [accept timepieces or clock faces]               |

## Extra Question #7: Science - Chemistry

| Ider              | ntify these pieces of lab equipment named after |                            |
|-------------------|---|----------------------------|
| people or places. |   |                            |
| 1                 | This equipment that produces a gas flame is     | Bunsen burner [prompt      |
|                   | named for the 19th-century scientist who        | on partial answer]         |
|                   | helped design it when he was a professor at the |                            |
|                   | University of Heidelberg ["HI"-dul-burg].       |                            |
| 2                 | This container with a conical bottom is named   | Erlenmeyer flask           |
|                   | for a chemist who worked with Robert Bunsen     | [prompt on partial answer] |
|                   | in Heidelberg.                                  |                            |
| 3                 | This flask with a round bottom is named for a   | Florence flask             |
|                   | city where similar containers were used to hold |                            |
|                   | wine.   |                            |



### Extra Question #8: Literature – World Literature

10 points per part

| In o  | ne story, this person wrote of a Prussian        |                               |
|-------|--|-------------------------------|
| offic | er who was stabbed in the throat with a          |                               |
| dess  | sert knife.                                      |                               |
| 1     | Name this author of "Mademoiselle Fifi". In      | (Henri René Albert) Guy       |
|       | another story, he wrote about a character        | de <b>Maupassant</b> [gee day |
|       | nicknamed "Ball of Fat".                         | maw-paw-sawn]                 |
|       |  |                               |
| 2     | In this Maupassant short story, Mathilde Loisel  | "The (Diamond)                |
|       | [mah-teeld lwah-sel] and her husband work for    | Necklace" [or La parure]      |
|       | years to pay off loans they used to replace a    |                               |
|       | piece of jewelry they thought was valuable.      |                               |
| 3     | The title characters of both "Mademoiselle Fifi" | <b>prostitution</b> [accept   |
|       | and "Ball of Fat" have this occupation.          | <b>prostitute</b> s or        |
|       |  | <u>prostituée</u> ]           |
|       |  |                               |

#### **Extra Question #9: Literature – World Literature**

| Kav  | vai Sora traveled with this author on a journey  |  |
|--|--|--|
| chronicled in The Narrow Road to the Deep North. |  |  |
| 1  | Name this Japanese poet.   | Matsuo Basho [accept either; accept either order; prompt on Kinsaku, |
|  |  | Chuemon, Toshichiro,<br>Chuemon Munefusa,<br>Sobo, or Tosei          |
| 2  | Much of Matsuo Basho's work is in this poetic form which has three lines of five, seven, and five syllables. | haiku [prompt on hokku]  |
| 3  | Basho took his pseudonym from this type of plant, which grew near his hut.                                   | banana tree [prompt on answers containing Musa]                      |