Round 7

First Half

(Tossup 1) **In this organ, angiotensin II regulates aldosterone levels to affect homeostasis and blood pressure. Sections of this organ contain the glomerulus and Bowman's capsule, and the adrenal glands are above these organs. Ion flow in the (*)** loop of Henle maintains a concentration gradient in this organ. The renal arteries supply these organs with blood, and its functional unit is a nephron. Dialysis treats the failure of, for ten points, what abdominal organs that filter the blood to produce urine?

ANSWER: **kidneys** (accept **nephron** before it is read)

(Bonus 1) For ten points each, give the following about the equation y equals A times sine of open quantity, k times x minus omega times t, end quantity.

[Part A] That equation can be used to model the travelling variety of these phenomena, such as light and sound.

ANSWER: **wave** (accept **waveform**; accept sine **wave**)

[Part B] In the equation for a travelling sine wave, omega is equal to the angular variety of this property for a wave. It is defined as the inverse of the wave's period.

ANSWER: temporal **frequency** (accept angular **frequency**; do not accept or prompt on "spatial frequency")

[Part C] In the equation, A represents this quantity, which is modulated in AM radio transmission.

ANSWER: **amplitude** (accept **amplitude** modulation)

(Tossup 2) **In this novel, an ex-circus acrobat detaches a train engine from its cars to escape attacking Sioux warriors as he travels across the country. This novel's protagonist rescues the widow Aouda from committing (*)** sati, which loses him twelve hours, and after he returns to the Reform Club in London, he gives gifts of money to Detective Fix and his manservant, Passepartout [pass-par-too]. For ten points, name this adventure novel by Jules Verne in which Phileas Fogg circumnavigates the globe in the title period of time.

ANSWER: **Around the World in Eighty Days** (accept Le **tour du monde en quatre-vingts jours**)

(Bonus 2) At the end of this short story, it is revealed that an orangutan commit the title action. For ten points each,

[Part A] Name this short story, which is widely considered to be the first detective novel.

ANSWER: The **Murders in the Rue Morgue**

[Part B] This protagonist of *The Murders in the Rue Morgue* later appears in *The Purloined Letter* and used a technique called "Ratiocination" so solve crimes.

ANSWER: **C. Auguste Dupin** (Accept either part)

[Part C] This author of the *Murders in the Rue Morgue* and *The Purloined Letter* wrote many short horror stories, including "The Cask of Amontillado" and "The Pit and the Pendulum."

ANSWER: Edgar Allen **Poe**

(Tossup 3) **A "gang" named for this state met at the Little Green House on K Street. An 1890 act allowing the government to target trusts was formulated by a senator from this state. In 1920, a politician from this state promised a "return to (*)** normalcy" en route to defeating James Cox. While at the Temple of Music in Buffalo, a politician from this state was assassinated by Leon Czolgosz [chol-gosh]. Warren G. Harding was from, for ten points, what state where William McKinley governed from Columbus?

ANSWER: **Ohio**

(Bonus 3) This city was the site of a major revolt of wool workers, the Revolt of the Ciompi [CHOMP-ee]. For ten points each,

[Part A] Name this city on the Arno river, a rival of Venice that whose rulers included Lorenzo the Magnificent.

ANSWER: **Florence**

[Part B] Lorenzo the Magnificent was a member of this banking family whose members also included Popes Leo X and Clement VII.

ANSWER: House of **Medici** (accept Casa de' **Medici**)

[Part C] The Medici family was targeted by Girolamo Savonarola, a friar who held this 1497 event to destroy sinful items like art, books, and mirrors.

ANSWER: **Bonfire of the Vanities**

(Tossup 4) **This thinker argued that people build mental models of the world around them from schema. This leading figure in constructivist thought claimed that simple reflexes and first habits are developed up until the age of two as part of the (*)** sensorimotor stage, which precedes the preoperational stage. For ten points, name this Swiss psychologist who studied cognitive development in children, dividing it into four stages.

ANSWER: Jean **Piaget**

(Bonus 4) This philosopher first articulated his concept of eternal return in his work *The Gay Science*, in which he also proclaimed that "God is dead." For ten points each,

[Part A] Name this German philosopher who believed that a "will to power" drove human behavior. He criticized Judeo-Christian beliefs for elevating "slave morality" over "master morality."

ANSWER: Friedrich Wilhelm **Nietzsche**

[Part B] One of Nietzsche's most important concepts is this figure, a person who overcomes traditional notions of good and evil to create his or her own morality.

ANSWER: **Ubermensch** (accept **Overman**)

[Part C] After Nietzsche's death, his sister reworked his writings to support German nationalism, and it became an inspiration to this fascist political party led by Adolf Hitler.

ANSWER: **Nazi** Party (accept the **National Socialist** German Workers' Party; accept **NSDAP**)

(Tossup 5) **The cult of the Mnevis bull was often conflated with one form of this god. A daughter of this god made him laugh by dancing in front of him naked, and is associated with cows. A rival of this father of (*)** Hathor, who was burned in effigy during the *Banishing of Chaos* ritual, took the form of a giant serpent. That god, Apep, was defeated by this god every night. For ten points, name this hawk-headed Egyptian god, worshiped in Heliopolis as a sun god.

ANSWER: Atum-**Ra** or **Re**

(Bonus 5) The Rinzai school places particular emphasis on these sayings, whose study may lead to *kensho*, an insight into the nature of the Buddha. For ten points each,

[Part A] Name these statements or questions that are pondered to provoke doubt and understanding. A famous example is "What is the sound of one hand clapping?"

ANSWER: **koan**s

[Part B] Koans are contemplated in this school of Buddhism, which is prominent in Japan.

ANSWER: **Zen** Buddhism

[Part C] Another koan advises that, if you should meet the Buddha, you should perform this action.

ANSWER: **kill** him (accept equivalents like **murder** the Buddha)

(Tossup 6) **In a painting of this location parrots perch in the trees as a horse stands behind a nude man who reaches for a piece of fruit. A snake coils around a branch in Rubens' painting of this place *With the Fall of Man*. This location appears on the left of Hieronymus Bosch's *The* (*)** *Garden of Earthly Delights*, in which God presents a woman to the first man. For ten points, name this biblical location, the original home of Adam and Eve.

ANSWER: The **Garden of Eden** (prompt on "paradise")

(Bonus 6) This artist's New York studio was known as The Factory. For ten points each,

[Part A] Name this artist who is known for his images of Campbell's Soup Cans.

ANSWER: Andy **Warhol**

[Part B] Warhol was a member of this artistic movement, which used comic-like images from popular culture. Another member of this movement was Roy Lichtenstein, who showed a plane exploding in *Whaam!*

ANSWER: **Pop** Art

[Part C] Warhol also painted a silkscreen *Diptych* of this woman, which consisted of a tiled photo of her that was taken for the film *Niagara*

ANSWER: **Marilyn Monroe** (accept either underlined name; accept **Marilyn Diptych**; accept Norma Jean **Mortenson**; accept Norma Jean **Baker**)

(Tossup 7) **This literary character is cursed after a queen accuses him of murdering Time during a concert, and he complains when butter fails to fix his pocket-watch. After being threatened with beheading at a trial, this character bites off a piece of a (*)** teacup while describing a weeks-long social gathering where he asks "why is a raven like a writing desk?" For ten points, name this character from Lewis Carroll's *Alice* stories, who chats with the Dormouse and the March Hare at a "Mad Tea-Party."

ANSWER: The Mad **Hatter**

(Bonus 7) In the only remaining entry in a trilogy of Athenian plays about this figure, he is *Bound*. For ten points each,

[Part A] Name this Titan, who tells Io her future while he is chained to a rock on the order of Zeus for helping humans.

ANSWER: **Prometheus**

[Part B] The third of the *Prometheus* plays describes him as the "Bringer" of this substance. Prometheus was punished for bringing this substance to mankind.

ANSWER: **fire** (accept Prometheus, the **Fire-Bringer**)

[Part C] *Prometheus Bound* is thought to be the work of this Athenian playwright, who also wrote the *Oresteia* [oh-res-TYE-ah].

ANSWER: **Aeschylus**

(Tossup 8) **This kind of radiation's scattering through crystals can be predicted with Bragg's law. These waves are detected by the ESA's space observatory named for Newton, as well as NASA's Chandra Observatory. Images of (*)** DNA were taken by Rosalind Franklin using this kind of radiation, which was discovered by Wilhelm Roentgen. A wavelength between gamma rays and ultraviolet light is characteristic of, for ten points, what form of radiation used to image teeth and bones?

ANSWER: **X**-rays

(Bonus 8) Answer the following about space observation for ten points each.

[Part A] This optical instrument comes in refracting and reflecting types, and combines mirrors and lenses to magnify images.

ANSWER: **telescope**

[Part B] While Galileo was a pioneer of the refracting telescope, this other scientist is credited with the invention of the reflecting telescope. This scientist was also the first to study how a prism splits the colors of light.

ANSWER: Sir Isaac **Newton**

[Part C] This ancient device, from the Greek for a "star taker" or "star catcher," was a portable star chart that also calculated the angle between the horizon and certain celestial objects. The sextant is an advanced one of these objects used by sailors.

ANSWER: **astrolabe**

Sixty-Second Rounds

The categories are . . .

1. George Orwell and Pigs

2. Roman Emperors

3. Actinides and Lanthanides

GEORGE ORWELL AND PIGS

George Orwell wrote an allegorical novel about the Russian Revolution in which the major political figures involved are represented by power-hungry pigs. Who or what is...

(1) The title of the novel?

ANSWER: **Animal Farm**

(2) The pig who represents Stalin, who is named emperor and becomes a dictator?

ANSWER: **Napoleon**

(3) The dictator's opponent, who represents Trotsky and is blamed for several disasters after he disappears?

ANSWER: **Snowball**

(4) The workhorse whose loyalty to the dictator is betrayed when he is sold to a glue factory?

ANSWER: **Boxer**

(5) The propagandist pig who promotes the dictator's policies and subtly changes the Seven Commandments?

ANSWER: **Squealer**

(6) The patriotic song of the rebellion that gets replaced by songs written by a poet-pig named Minimus?

ANSWER: **Beasts of England**

Roman Emperors

Name the Roman Emperor who...

(1) Legendarily fiddled during the Great Fire of Rome.

ANSWER: **Nero** Claudius Caesar Augustus Germanicus (do not prompt on other names alone)

(2) Tried to name his horse consul and was assassinated in 41 AD.

ANSWER: **Caligula** (accept **Gaius** (Julius) **Caesar** Augustus Germanicus; do not prompt on other names alone)

(3) Saw a cross in the sky at the 312 AD Battle of Milvian Bridge.

ANSWER: **Constantine** the Great (accept **Constantine** I)

(4) Wrote the Stoic tract *Meditations* during the Marcomannic Wars.

ANSWER: **Marcus Aurelius** Antoninus Augustus

(5) Grew Rome to its largest extent and was the second of the Five Good Emperors.

ANSWER: **Trajan** (accept Imperator Caesar Nerva **Trajan**us Divi Nervae filius Augustus; do not prompt on other names alone)

(6) Put down the Great Jewish Revolt as a general, then was named emperor in 69 AD.

ANSWER: **Vespasian** (accept Titus Flavius **Vespasian**us; do not prompt on other names alone)

Actinides and Lanthanides

Name the...

(1) Element named after the formulator of two theories of relativity.

ANSWER: **Einsteinium**

(2) Heaviest naturally occurring element, with chemical symbol U and named for a celestial object

ANSWER: **Uranium**

(3) Element with atomic number 2 higher than the previous answer, also named for a celestial object.

ANSWER: **Plutonium**

(4) Common "rare earth" metal with symbol Nd, used in powerful magnets.

ANSWER: **Neodymium**

(5) Slightly radioactive element, used in fire detectors and named for a country.

ANSWER: **Americium**

(6) Block of the periodic table that the actinides and lanthanides comprise.

ANSWER: **F** Block

Second Half

(Tossup 9) **A safari Jeep was recently attacked by an elephant in this country's Yala National Park. The Eastern Fleet of the Royal Navy was once based at the port city of Trincomalee in what is now this country. The Rock Fortress of Sigiriya is a prominent tourist destination in this country, which is home to a (*)** Buddhist relic at the Temple of the Tooth in its former capital Kandy. The Tamil Tigers fought a civil war in, for ten points, what island nation south of India?

ANSWER: **Sri Lanka**

(Bonus 9) For ten points each, name these American Civil Rights leaders.

[Part A] This nonviolent preacher led the March on Washington and delivered the "I Have a Dream" speech.

ANSWER: Dr. Martin Luther **King**, Jr. (accept **MLK**)

[Part B] This one-time member of the Nation of Islam and orator of the "Ballot or the Bullet" speech called for violent protests until equality was achieved.

ANSWER: **Malcolm X** (accept Malcolm **Little**; accept el-hajj Malik el-**Shabazz**)

[Part C] This NAACP field secretary in Mississippi was assassinated by Byron de la Beckwith, a member of the KKK, in 1963.

ANSWER: Medgar **Evers**

(Tossup 10) **The timing of this ceremony is indicated by a biblical passage in which Levi and his brother Shimon take up swords to kill the residents of the city of Shechem. Monetary gifts during this ceremony are usually given in multiples of 18. After a participant (*)** undergoes this ceremony, they are counted as part of the minyan, or congregation, they may receive an aliyah, and they may wear tefillin bands. This ceremony is usually celebrated at age twelve or thirteen. For ten points, name this Jewish coming of age ceremony.

ANSWER: **b'nai mitzvah** (accept **bar mitzvah** or **bat mitzvah**)

(Bonus 10) Figures in Greek mythology swore oaths on this river because the goddess of this river sided with Zeus during the Titanomachy. For ten points each,

[Part A] Name this river. Achilles received his invulnerability after his mother dipped him in this river.

ANSWER: **Styx**

[Part B] This ferryman carried souls of the dead across the Styx and Acheron rivers. Grieving relatives would leave a coin in the mouth of a dead person to pay for this man's services.

ANSWER: **Charon**

[Part C] This other river of the Greek underworld, whose name translates to "oblivion," caused those who drank from it to experience total forgetfulness.

ANSWER: **Lethe**

(Tossup 11)   **Garate-Lopez's team concluded that the components of one of these events morphs every 2.2 days, creating a "twisting tube." The *Cassini* probe detected the Northern Electrostatic Disturbance, one of these events shaped like a white oval that occurs intermittently on (*)**   Saturn. One of these events is twice the size of the Earth and has lasted over 350 years. A "Dark" one of these in prominent on Neptune. For ten points, name this type of atmospheric disturbance, the most famous of which is the Great Red Spot on Jupiter.

ANSWER: planetary **storm**s (accept planetary **vortex**; accept plaentary **cyclone**; prompt on "Great Red Spot" before mentioned)

(Bonus 11)   Answer the following about colors in biology, for ten points each.

[Part A] Prokaryotic cyanobacteria are often called algae labelled blue and this color. The pigments chlorophyll A and B reflect light in this color range, giving most plants this color.

ANSWER: **green**

[Part B] Blood cells called this color are also known as leukocytes and all have cell nuclei. They are part of the immune system and circulate in lymph.

ANSWER: **white** blood cells

[Part C] Gram positive bacteria stain this color in a Gram test, as opposed to gram negative bacteria which stain pink. A stain of this color can also be an alternative to ethidium bromide in electrophoresis.

ANSWER: Crystal **violet** (accept **purple**)

(Tossup 12)   **After beginning in a state to its west, the Niobara River flows through this state. The Elkhorn River is a tributary of a major river passing through this state. "Equality before the law" is the motto of this state, which is the site of the (*)**   Ogallala Aquifer's largest reserves. Chimney Rock is a major landmark in, for ten points, what Plains state that is home to the Platte River and cities like Omaha and Lincoln?

ANSWER: **Nebraska**

(Bonus 12)   This region includes the nation-states of Dagestan, Artsakh, and Adjara. For ten points each,

[Part A] Name this region between the Black and Caspian Seas, forming a natural transition between Europe and Asia. A namesake mountain range stretches through this region.

ANSWER: The **Caucasus** (accept **Caucasus** Mountains)

[Part B] This capital of Georgia lies in the Caucasus. This city, located on the Kura River, was the site of an attempted assassination attempt on George W. Bush.

ANSWER: **Tbilisi**

[Part C] This other Caucasian capital city, which hosted the 2015 European Games, will host matches for the 2020 European football championship. This oil-rich city is known as the City of Winds and is located on the Caspian Sea.

ANSWER: **Baku**, Azerbaijan

(Tossup 13) **This musical term describes a difficult piece by Giuseppe Tartini nicknamed "Devil's Trill." The Mozart work with catalog number K. 545 is the known as the "easy" one of these pieces for piano, and Beethoven's 9th piece of this type for violin is nicknamed the (*)** "Kreutzer." Beethoven's piano pieces of this type include ones nicknamed "Waldstein" and "Appassionatta," For ten points, Beethoven's "Moonlight" is a piano piece of what genre, named for the Italian for "sound?"

ANSWER: violin and/or piano **sonata**

(Bonus 13) Famous players of this instrument include Jacqueline du Pre and Yo-Yo Ma. For ten points each,

[Part A] Name this large string instrument. The player of this instrument is almost always seated, unlike other string instruments, which can be played standing up.

ANSWER: **cello**

[Part B] This composer wrote a *Cello Concerto in E minor* that was popularized by Jacqueline du Pre. This composer also wrote the Enigma Variations and a march often heard at graduations, *Pomp and Circumstance.*

ANSWER: Sir Edward **Elgar**

[Part C] The viola and cello each have their highest strings tuned to this note, an octave apart. This note's minor key has no sharps or flats in its key signature.

ANSWER: **A** (accept **A minor**; do not accept A flat or sharp)

(Tossup 14) **An uprising in this modern day country was put down by troops under Jurgen Stroop. The re-creation of this country was urged by the 13th of Woodrow Wilson's Fourteen Points. The shipyards of (*)** Gdansk in this country were the birthplace of the Solidarity Labor Union. For ten points, name this country that was invaded by Germany to begin World War II and where a ghetto uprising was put down in its capital of Warsaw.

ANSWER: **Poland**

(Bonus 14)   This man outmaneuvered Hua Guofeng to reach his highest political office. For ten points each,

[Part A] Name this Chinese leader who said "It doesn't matter whether a cat is black or white, as long as it catches mice" when he opened up the Chinese economy to capitalist reform.

ANSWER: **Deng** Xiaoping

[Part B] Despite essentially being Mao's successor, Deng was never the de jure leader of this political party. This political party, despite not being the only one in China, exercises total control of the country.

ANSWER: Chinese **Communist** Party (accept **CCP**; accept **CPC**; accept Zhongguo **Gongchan**dang)

[Part C] Deng Xiaoping led a government crackdown in the aftermath of these 1989 protests in Beijing. During the protests, Stuart Franklin took a photograph of an unknown man standing in front of a line of tanks.

ANSWER: **Tiananmen** Square protests

(Tossup 15)   **A four-dimensional hypercube has this many two-dimensional faces. This is the largest number that can be divided by every positive integer less than this number's square root. This number is the smallest composite number that has a cubed prime factor; adding (*)**   3 to this number would make it a cube of a different prime number. There are this many ways to order 4 items, because this is the value of 4 factorial. For ten points, name this number, written in Roman numerals as XXIV.

ANSWER: **24**

(Bonus 15)   A common algebraic error is often called the "Freshman's Dream," based on how many freshmen seem to think it works. For ten points each,

[Part A] The Freshman's Dream deals with the expression "quantity x plus y, close quantity, squared." The correct, simplified expansion of the expression has how many terms?

ANSWER: **3** (accept **tri**nomial)

[Part B] The Freshman's Dream involves improper use of this algebraic property, which is usually carried out on binomials via the FOIL method.

ANSWER: **distributive** property (accept word forms like **distribution**)

[Part C] The Freshman's Dream expands "x plus y, quantity squared" into just "x squared plus y squared," forgetting the "2xy" term. The Freshman's Dream isn't always a problem; it will coincidentally give the correct computation if x and y have certain values. Describe those values.

ANSWER: at least **one of the variables is equal to 0** (accept **x is 0**; accept **y is 0**; accept either or **both equal 0**; accept equivalents)

(Tossup 16) **This poet wrote about passing "a Whip Lash / Unbraiding in the Sun" but notes that "When stooping to secure it / It wrinkled And was gone." The speaker of another poem by this author willed away her "Keepsakes - Signed away / What portion of me be / Assignable." This poet claimed it was dreary to be "public - like a Frog" and described a (*)** "Blue - uncertain - stumbling Buzz" in a deathroom. For ten points, name this American poet of "A Narrow Fellow in the Grass," "I'm Nobody! Who are you?" and "I Heard a Fly Buzz - when I died."

ANSWER: Emily Elizabeth **Dickinson**

(Bonus 16) Writers from this country include a playwright who wrote *Major Barbara* and *Pygmalion*. For ten points each,

[Part A] Name this European country, home to George Bernard Shaw and the setting of the short story collection *Dubliners*.

ANSWER: **Ireland** (accept **Eire**)

[Part B] *Dubliners* is by this Irish author of *A Portrait of the Artist as a Young Man* and a novel about Leopold Bloom.

ANSWER: James **Joyce**

[Part C] Leopold Bloom, his wife Molly, and Stephen Daedalus appear in this stream-of-consciousness novel by James Joyce.

ANSWER: **Ulysses**

Tiebreakers

(Tossup 17) **This President's Secretary of State, Cyrus Vance, resigned before Operation Eagle Claw, a botched rescue mission that would have resolved a crisis that finally ended on the day that this man left office. After leaving office, this man became the first former President to (*)** win the Nobel Peace Prize, in part for his work with Habitat for Humanity. For ten points, name this former peanut farmer and Governor of Georgia who was succeeded as President by Ronald Reagan.

ANSWER: James Earl "Jimmy" **Carter**

(Bonus 17) The area formula for this shape is pi times a times b, where a and b are the semi-minor and semi-major axes. For ten points each,

[Part A] Name this conic section. In the aforementioned formula, a and b are assumed to be different; if a and b are equal, then its major and minor axes are the same size and the shape is a circle instead.

ANSWER: **ellipse**

[Part B] An ellipse has a value for this property between 0 and 1; as this value approaches 0, the ellipse becomes more circular, and as it approaches 1, the ellipse stretches out to be less circular.

ANSWER: **eccentricity**

[Part C] When the eccentricity is exactly 1, the ellipse "breaks" and this conic section is formed instead.

ANSWER: **parabola**