

Round 4

First Half

(Tossup 1) **Baily's beads may be observed during these events. Scientists observed gravitational lensing for the first time during one of these events in 1919, while the timing of one of these events in 1715 was correctly (*) predicted by Edmund Halley. These events can only occur during the new moon. The corona is visible during the "total" type of, for ten points, what event where the moon passes in front of, and blocks the light from, the Sun?**

ANSWER: solar eclipse (prompt on eclipse)

(Bonus 1) The most commonly produced type of this organic compound is a psychoactive drug, legal in the United States for those above a certain age. For ten points each,

[Part A] Give this term for an organic compound that contains a hydroxyl group, or an oxygen bonded to a hydrogen atom.

ANSWER: alcohols

[Part B] Fermentation of glucose by yeast will produce this two-carbon alcohol, known as drinking alcohol.

ANSWER: ethanol (or ethyl alcohol)

[Part C] The Williamson synthesis generates one of these other organic compounds from an alcohol and a halogenated carbon. These compounds feature an oxygen atom single bonded between two carbon atoms, and its diethyl variety was once a common anesthetic.

ANSWER: ether

(Tossup 2) **In a painting by this artist, an infant rests on a green pillow in the hollow torso of the *Madonna of Port Lligat*, who was modeled after this man's wife, Gala. This artist painted a *Disintegration* of another of his works, in which a dead tree breaks apart, a flat surface divides into separate bricks, and several (*) soft-textured clocks seem to float away. For ten points, name this Spanish surrealist who painted *The Persistence of Memory*.**

ANSWER: Salvador Dalí

(Bonus 2) After hearing it just twice, this child prodigy wrote out Gregorio Allegri's legendary *Miserere*, an illegal act usually punishable by excommunication. For ten points,

[Part A] Name this Austrian composer of forty-one symphonies and the operas *The Magic Flute* and *Don Giovanni*.

ANSWER: Wolfgang Amadeus Mozart

[Part B] As Allegri's *Miserere* was the property of the Catholic Church, it was to be played only in this chapel in Vatican City, sponsored by and named for Pope Sixtus IV.

ANSWER: Sistine Chapel

[Part C] The *Miserere*, which begins "Have mercy on me, O God," is a setting of the fifty-first of these sacred hymns. The 23rd of these begins "The Lord is my shepherd."

ANSWER: Psalms

(Tossup 3) **A quick way to find this value exploits the fact that this value for A and B is the same as this value for A and "B minus A;" that method is called the Euclidean algorithm. If this value for two integers is one, those two numbers are relatively (*) prime.** Finding this value can be done by listing all the prime factors of the given numbers, then multiplying the shared factors together. For ten points, name this value, the largest positive integer that divides both of two input integers.

ANSWER: greatest common divisor (or greatest common factor; accept GCD or GCF)

(Bonus 3) For ten points each, give the following about drawing Sierpinski triangles.

[Part A] A Sierpinski triangle is, like the Mandelbrot set, one of these self-similar images.

ANSWER: fractal

[Part B] To draw a classic Sierpinski triangle, you start by taking an equilateral triangle and connecting the midpoints of the three sides by drawing three new line segments within the original triangle. Shade in the area bounded by those three new line segments. What fraction of the original triangle is now shaded in?

ANSWER: one-fourth (accept 25 percent, one quarter, etc.)

[Part C] Drawing a Sierpinski triangle is an iterative process; making that first shaded triangle created three new, smaller triangles that you can subject to the same process. If Part B of this bonus took a Sierpinski triangle from Level 0 to Level 1, how many more line segments do you have to draw to take the Sierpinski triangle to Level 2?

ANSWER: 9

(Tossup 4) **This character is painted blue and is labeled a “Sick Arab” by the performers of the Royal Nonesuch, and he uses a hairball to tell the future. This man’s travel partner throws away a letter telling Miss (*) Watson where this man is before he discovers that this man has been sold by the Duke and Dauphin. Tom Sawyer helps free, for ten points, what former slave who rafts down the Mississippi River with Huckleberry Finn?**

ANSWER: Jim

(Bonus 4) In this story, one animal ends up losing a competition because he gets overconfident and takes a nap during it. For ten points each,

[Part A] Name this tale, in which a fast creature loses a race to a much slower one and learns the lesson “slow and steady wins the race.”

ANSWER: The Tortoise and the Hare

[Part B] “The Tortoise and the Hare” is an example of one of these types of stories. These stories often include anthropomorphic animals and convey a moral at the end.

ANSWER: fables

[Part C] This ancient Greek author wrote many fables, including “The Tortoise and the Hare,” “The Fox and the Grapes,” and “The Boy who Cried Wolf.”

ANSWER: Aesop

(Tossup 5) **One commander from this city had his head severed and thrown into his brother’s camp after a loss at the Metaurus River. In another conflict, this city’s troops were victorious utilizing a double envelopment at (*) Cannae but were later defeated by Scipio Africanus at the battle of Zama. Salt was sown in the ruins of this city, which Cato the Elder repeatedly insisted must be destroyed. For ten points, name this ancient North African city that fought three Punic Wars with Rome and was led by Hannibal.**

ANSWER: Carthage

(Bonus 5) This man often intimidated his opponents in a move of physical intimidation nicknamed “the treatment”. For ten points each,

[Part A] Name this politician who became President at Love Field in 1963.

ANSWER: Lyndon Baines Johnson (accept LBJ; prompt on Johnson)

[Part B] Lyndon Johnson was sworn in aboard this presidential aircraft due to the sudden death of his predecessor, leading to accusations that he seized power before the body was even cold.

ANSWER: Air Force One

[Part C] A key part of Johnson’s presidency was this set of domestic programs. This program included Medicare and the War on Poverty..

ANSWER: Great Society

(Tossup 6) **A politician in this country was rumored to have given his wife a lucrative, fictitious position in his office in the Penelopegate scandal. That scandal cost the Republicans support in a 2017 (*) election in this country; as a result, the two leading parties were the Forward party and the National Front, led by runner-up Marine Le Pen. For ten points, name this European country that, in May 2017, elected Emmanuel Macron as the successor to François Hollande [fran-swa oh-lahnd].**

ANSWER: France

(Bonus 6) For ten points, answer the following about monumental American Ferris wheels.

[Part A] As of 2016, the world's tallest Ferris Wheel requires 30 minutes for one rotation and provides views of this Nevada city's "Strip," a four-mile stretch of road featuring dozens of hotels and casinos.

ANSWER: Las Vegas (accept Paradise, Nevada, where the actual wheel and much of the strip actually is)

[Part B] A "Great Wheel" looks over this city's Elliott Bay in Puget Sound, just south of Pike Place Market and a bit further south from the Space Needle.

ANSWER: Seattle

[Part C] The original Ferris Wheel was the key attraction of this city's 1893 Columbian Exposition. Today, a newer wheel attracts tourists to this city's Navy Pier.

ANSWER: Chicago

(Tossup 7) **In one poem, this poet asks "do I wake or sleep?" while contemplating an "immortal Bird" who "wast not born for death." In another poem, this author addresses an object as a "foster-child of silence and slow time" and a "still unravish'd bride of quietness," and concludes that (*) "beauty is truth, truth beauty." For ten points, name this English Romantic poet whose odes include ones "to a Nightingale" and "on a Grecian Urn."**

ANSWER: John Keats

(Bonus 7) Edward Albee was a playwright who was active from the 1950s until his death in 2016, and revised his 1959 play *The Zoo Story* as recently as 2004. For ten points each,

[Part A] Edward Albee was from this country, where many of his plays premiered on Broadway.

ANSWER: United States of America (accept either underlined portion; accept USA)

[Part B] In 2004, Albee added a first act to his 1959 play *The Zoo Story* to create the play *At Home at the Zoo*, in which Peter is tricked into killing Jerry on a bench in this public park in Manhattan.

ANSWER: Central Park

[Part C] In another Albee play, George and Martha invite Nick and Honey to their home and play "Get the Guests." The title of that play asks *Who's Afraid of* this female English author.

ANSWER: (Adeline) Virginia Stephen Woolf (accept *Who's Afraid of* Virginia Woolf)

Sixty Second Rounds

The categories are . . .

1. A Novel by Hawthorne
2. Ancient Egypt
3. Circuit Boards
4. A Mythical Greek Inventor

A NOVEL BY HAWTHORNE

In a novel by Nathaniel Hawthorne, Roger Chillingworth pursues his wife to Puritan America, where she has been charged with adultery. Who or what is the...

(1) Title of the novel, which refers to the letter “A” that the protagonist is forced to wear?

ANSWER: The **Scarlet Letter**

(2) Novel’s protagonist, who stitches the letter “A” into her clothing?

ANSWER: **Hester Prynne** (accept either underlined name)

(3) Name of the protagonist’s illegitimate daughter?

ANSWER: **Pearl**

(4) Reverend who is the father of the protagonist’s illegitimate daughter?

ANSWER: Reverend **Arthur Dimmesdale** (accept either underlined name)

(5) Medical nickname given to Roger Chillingworth when he pretends to help Dimmesdale treat a heart condition?

ANSWER: the **Leech**

(6) Woman who invites the novel’s protagonist to a witches’ sabbath in the forest?

ANSWER: Mistress **Hibbins**

ANCIENT EGYPT

Name the...

(1) Massive structures built as tombs for ancient Egyptian rulers, most famously at Giza.

ANSWER: pyramids

(2) Term for ancient Egyptian rulers who were buried in those structures.

ANSWER: pharaoh

(3) Boy king whose tomb was rediscovered by Howard Carter's team in 1922.

ANSWER: King Tutankhamen (or Tutankhaten)

(4) Region across from Thebes on the west bank of the Nile where that tomb, and many others, are found.

ANSWER: Valley of the Kings (or Wadi al Muluk)

(5) Father of that boy king, a ruler of the 18th dynasty who built a city at Amarna for worship of a Sun god.

ANSWER: Akhenaten (or Amenhotep IV; prompt on Amenhotep)

(6) Wife of that Sun worshiper, who may have ruled on her own after his death. A famous bust of this woman is held in Berlin.

ANSWER: Nefertiti (accept Neferneferuaten)

CIRCUIT BOARDS

Name the...

(1) Phenomenon that takes place on circuit boards, due to the presence of charged particles and seen in lightning bolts.

ANSWER: electricity (accept word forms and clear equivalents)

(2) Conductive material through which the charged particles move. It is part of alloys like brass and bronze.

ANSWER: copper

(3) Technique used to join two components of a circuit board with a special material. It takes advantage of a difference in melting point and uses flux to help create a connection.

ANSWER: soldering (accept word forms)

(4) Type of operation performed by the chips on circuit boards. They are joined together into a boolean function and include AND, OR, and NOT.

ANSWER: logical operation (or logic gate)

(5) Devices that reduce the current in a circuit. Their strength is indicated by a set of four colored bands.

ANSWER: resistor

(6) Device that stores energy in a circuit. A simple version of these consists of two parallel plates.

ANSWER: capacitor

A MYTHICAL GREEK INVENTOR

Concerning a particular mythical inventor, give the...

(1) Maze-like structure that he built to contain the Minotaur.

ANSWER: labyrinth

(2) Animal that the inventor helped Queen Pasiphaë mate with to produce the Minotaur.

ANSWER: bull (accept cattle)

(3) Name of the inventor, who built wings of feathers and honey to escape King Minos.

ANSWER: Daedalus

(4) Name of the inventor's son, who died after flying too close to the sun.

ANSWER: Icarus

(5) Princess who eventually helped Theseus navigate the inventor's maze.

ANSWER: Ariadne

(6) Island where the inventor built many wonders for Minos and Pasiphaë.

ANSWER: Crete

Second Half

(Tossup 8) **A player for this city's NBA team endorsed the video game *Bill Laimbeer's Combat Basketball*. Fans of this city's hockey team throw octopi onto the rink. This city's baseball team employs the last batting Triple Crown winner, (*) Miguel Cabrera. In 2008, this city's NFL team lost all 16 games, but then drafted quarterback Matthew Stafford. For ten points, name this city home to the NHL's Red Wings, MLB's Tigers, and NFL's Lions.**

ANSWER: Detroit

(Bonus 8) One of this activity's most famous games was won by Paul Morphy in a private box at the opera, as his opponents showed both abysmal concert etiquette and poor development of major pieces. For ten points each,

[Part A] Name this board game. In the Opera Game, Morphy was able to deliver checkmate despite being down a queen and a knight.

ANSWER: chess

[Part B] In 1964, this American grandmaster named Morphy one of the ten greatest chess masters in history. This prodigy became a grandmaster at age 15, but was forced to avoid the U.S. after competing in an illegal match in 1992 in Yugoslavia.

ANSWER: Bobby Fischer

[Part C] The queen sacrifice opened the D file for Morphy's queenside rook to deliver checkmate; the rook was in position because, on move 12, Morphy carried out this move.

ANSWER: queenside castle (accept word forms like castling; accept descriptions of O-O-O, but do not accept or prompt O-O)

(Tossup 9) **This deity provided Tydeus, one of the Seven Against Thebes, with an elixir of immortality, and supported Diomedes during the Trojan War. This goddess of crafts was challenged to a weaving competition by Arachne, whom she later turned to stone. This goddess was born from the (*) head of her father and became the patron of a namesake city-state when her gift of an olive tree won out over Poseidon's spring. For ten points, name this daughter of Zeus and goddess of wisdom.**

ANSWER: Pallas Athena (prompt on Minerva)

(Bonus 9) This apostle was nicknamed Didymus or “the Twin” and inspired Jesus’s statement “blessed are those who believe without seeing me.” For ten points each,

[Part A] Name this disciple of Jesus, who declared his faith after the risen Jesus let this man touch the wounds on his hands and side.

ANSWER: Saint Thomas the Apostle (accept Doubting Thomas)

[Part B] When the marks that Jesus showed to Thomas appear on believers’ hands, wrists, feet, ankles, side, or head, they are known by this term.

ANSWER: stigmata

[Part C] The first person to report stigmata was this Italian saint, who was known for his meager lifestyle and love of animals.

ANSWER: Saint Francis of Assisi

(Tossup 10) **In a constant electric field, this quantity is defined as the product of the electric field and distance. In a circuit, this quantity is provided by an electromotive force, and it sums to zero in a loop by Kirchoff’s loop rule. It is the product of (*) current and resistance in Ohm’s Law.** For ten points, name this measure of the difference in electric potential per unit charge between two points, which is usually 1.5 between the ends of a AAA battery and 9 in a slightly larger battery.

ANSWER: voltage (or difference in electric potential per unit charge before “difference” is said)

(Bonus 10) These cells have nuclei, unlike platelets and other cells suspended in the plasma. For ten points each,

[Part A] Name these cells, also called leukocytes, that play an important role in the immune system. A subgroup of these cells is divided into B and T types.

ANSWER: white blood cells (accept lymphocytes; prompt on blood cells)

[Part B] The number of white blood cells in the body normally rises in response to infection. Patients suffering from this syndrome, caused by HIV, may suffer from a low T cell count and struggle to fight infection.

ANSWER: AIDS (or acquired immune deficiency syndrome)

[Part C] Another type of white blood cell, when stationed in this large organ, becomes known as a Kupffer cell and breaks down old red blood cells, thus allowing this organ to detoxify the blood.

ANSWER: liver

(Tossup 11) **This character's daughter guides him to Colonus so his death can be a blessing to another king. Creon is the uncle of this character, who was exposed on Mount Cithaeron as a youth. This character correctly answers the Riddle of the (*) Sphinx and marries Jocasta, who turns out to be his own mother. For ten points, name this king of Thebes, the subject of a Sophocles trilogy.**

ANSWER: Oedipus

(Bonus 11) This novel opens with Billy Bones paying Jim Hawkins for lodging at the Admiral Benbow Inn. For ten points each,

[Part A] Name this adventure novel featuring such characters as Long John Silver and Squire Trelawney.

ANSWER: Treasure Island

[Part B] This author of *Kidnapped* and *Dr Jekyll and Mr Hyde* wrote *Treasure Island*.

ANSWER: Robert Louis Stevenson

[Part C] Robert Louis Stevenson wrote a short story collection containing the story "The Rajah's Diamond" and called it the "New" version of this series of stories. This ancient collection includes stories about giant birds called rocs and the slave-girl Morgiana.

ANSWER: Arabian Nights (accept One Thousand and One Nights; accept New Arabian Nights; accept The Arabian Nights' Entertainment; accept Kitab alf laylah wa-laylah)

(Tossup 12) **The losing side in this battle suffered when an engagement at Yellow Tavern diverted cavalry forces under Jeb Stuart. The winning side in this battle was bolstered by the appointment of George Meade as commander 3 days prior. The (*) "high water mark" of the Confederacy was notched at this battle's most famous action, a failed charge led by George Pickett. For ten points, name this bloody 1863 battle in Pennsylvania commemorated by a namesake "Address" given later by Abraham Lincoln.**

ANSWER: Battle of Gettysburg

(Bonus 12) This man condemned the behavior of Johann Tetzel in a work nailed to a church door in Wittenberg. For ten points each,

[Part A] Name this author of the 95 Theses.

ANSWER: Martin Luther

[Part B] The issuing of the 95 Theses started this religious movement, a break from the Catholic Church. John Calvin and Ulrich Zwingli also contributed to this movement.

ANSWER: Protestant Reformation

[Part C] Luther attacked Tetzel and others who sold these things, which may also be given for saying a prayer or performing a good deed and which promise to lessen the temporal punishment for sin.

ANSWER: indulgences

(Tossup 13) **Intrinsic factor is secreted by this organ’s parietal cells. This organ also secretes pepsinogen, a proenzyme that is converted to pepsin by this organ’s low (*) pH environment. Bolus is turned to chyme in this organ, then passed through the pyloric sphincter into the duodenum; that part of digestion is aided by gastric acid. For ten points, name this digestive organ between the esophagus and small intestine.**

ANSWER: stomach

(Bonus 13) The magnitude of these phenomena is measured using the Richter scale. For ten points each, [Part A] Name these events that can cause massive devastation along geological faults.

ANSWER: earthquakes

[Part B] Earthquakes most often occur when these moving pieces of Earth’s lithosphere suddenly release built up stress against each other.

ANSWER: tectonic plates (prompt on plate)

[Part C] In this geologic process, one tectonic plate moves under another. The namesake “zones” where this process occurs are hot spots for earthquakes.

ANSWER: subduction (zone)

(Tossup 14) **In a literary depiction of this war, the “Band of Brothers” speech is given before a battle in which muddy ground and stakes hampered the effectiveness of knights. This war’s Battle of Crecy helped confirm the strength of the (*) longbow, which was later used to great effect at Agincourt. A peasant girl inspired by visions, Joan of Arc, helped lift the siege of Orleans in this conflict. For ten points, name this lengthy war between England and France.**

ANSWER: Hundred Years War

(Bonus 14) In the 1940s, lawyer Raphael Lemkin coined a term to describe “acts committed with intent to destroy, in whole or in part, a national, ethnical, racial, or religious group.” For ten points each,

[Part A] Give this term for the mass killing of an entire group of people. The Holocaust inspired the need for this term, which has since been applied to earlier tragedies.

ANSWER: genocide

[Part B] Lemkin coined the term in a book about the policies of this government, which perpetrated the Holocaust.

ANSWER: Nazi Germany (accept either or both; accept the Third Reich; accept the National Socialist German Workers’ Party)

[Part C] Lemkin’s work on genocide began by observing this tragedy. Discussion of this event is criminalized in Turkey, which refuses to call it a genocide.

ANSWER: Armenian genocide (accept the Armenian Holocaust)

Extra Question

Only read if you need a backup or tiebreaker!

(Tossup 15) **This novel's protagonist finds his own way to Tahlequah after mail-ordering a pair of animals. In this novel, a fight breaks out during the search for a ghost in which Old Blue is hurt and Rubin falls on his own axe. This novel follows (*) Billy Colman as he raises the hounds Old Dan and Little Ann. For ten points, name this novel by Wilson Rawls titled after the plant that blossoms over the dogs' graves.**

ANSWER: Where the Red Fern Grows

(Bonus 15) One of these processes occurs when dry ice is exposed to standard temperature and pressure. For ten points each,

[Part A] Give this general term for a transition between states of matter, such as between solid and gas or between solid and liquid.

ANSWER: phase change or phase transition

[Part B] A solid changes into a gas, as in the aforementioned dry ice example, in this specific phase change.

ANSWER: sublimation

[Part C] A phase diagram plots the temperatures and pressures at which a substance will undergo specific phase changes. On a phase diagram, the boundary between the liquid and gaseous sections ends at this point, where it is impossible to determine whether a substance is liquid or gas.

ANSWER: critical point