

## RTO 2016

### Round 4

Tossups:

1. **Over 4 thousand of these objects are used in "Dream Big", a tribute to Martin Luther King Jr. Feliks Zemdeg has held the world record for solving this puzzle for several years. Roux, Petrus, ZZ, (\*) and the Friedrich method are all viable solutions for this puzzle. The proclaimed God's Number is set at 20 moves for this puzzle since it will not take any more than 20 moves to solve any orientation of this puzzle. FTP, name this 3x3x3 puzzle which is named after its Hungarian inventor.**

#### Rubik's Cube

2. **This substance is in layers in butterfly-wing scales, causing them to produce a rainbow due to thin-film interference. It's not cellulose, but its structure is nanofibrillated meaning it is in crystalline whiskers. It can be used to increase crop yields and also to strengthen paper. (\*)** This derivative of glucose is found in radulae of mollusks and in the two-part beaks of all extant cephalopods. It is essentially cellulose where each hydroxyl group is replaced with an acetyl amine group and hydrogen bonding makes this molecule even stronger than cellulose. FTP, name this structural polymer that is most commonly seen in exoskeletons and the cell walls of fungi.

#### Chitin

3. **In this TV series, a character is taken by a probe to Kataan, where he spends a fictional life as Kamin on a dying planet. In the intro of this show, the "five-year mission" was changed to a "continuing mission." Its pilot episode, (\*) "Encounter at Farpoint," premiered September 28, 1987. New species introduced in this series include the Borg and the Q. FTP, name this TV series that follows the adventures of the NCC-1701 D, a spin off of Star Trek.**

Star Trek: The Next Generation or TNG (prompt on Star Trek before mentioned)

4. **In Aboriginal mythology, this bird was believed to have been involved with the theft of fire, the beginning of death, and the killing of Eagle's son. In Hinduism, these birds are thought to be messengers of omens about people's present situations. In Celtic mythology, these birds are associated with the (\*) Morrigan, while in Chinese mythology, 3 legged ones were shot down along with the sun by Hou Yi (Ho-Yee). FTP, name this carrion bird, sometimes confused with ravens.**

Crows (do not accept ravens)

5. **This man was a son of Amittai, and appears as a prophet from the town of Gath-Hepher. He convinces the people of Nineveh that their city is doomed, and gets them to wear sackcloth and sit in ashes. Later, he sits in the shade of a (\*) plant that God had grown for him, only for it to die, greatly annoying him. Earlier before this, he had been identified by lots as the cause of a great storm at sea. FTP, name this Biblical prophet, who attempted to flee from God's command and ended up swallowed by a big fish.**

#### Jonah

6. **This element sometimes exists in a gamma phase allotrope known as austenite. The pigment Prussian blue ideally contains seven ions of this element combined with eighteen cyanide ions. Its**

**pentacarbonyl is commonly seen because this element has eight valence electrons. The impure forms of this element undergo the (\*) Bessemer process to form an alloy of this metal and carbon. In humans, atoms of this element complex with the proteins myoglobin and hemoglobin. FTP, name this element, a metal that forms steel with carbon and whose other oxide is rust.**

**Iron** (accept **Fe**)

**7. It received both the Pulitzer for Drama and the Tony for Best Play in 1949. In this play, the main character gets test answers for his son from a neighborhood nerd. The main character's brother, (\*) Uncle Ben, became rich through diamonds in South Africa. Linda is the first to realize her husband is contemplating suicide. Their son was a football star in high school, but he flunked math his senior year and dropped out of summer school when he went to Boston. For ten points, name this Arthur Miller play in which the main character, Willy Loman, experiences schizophrenic flashbacks.**

**Death of a Salesman**

**8. Woodrow Wilson is the only president buried in this city, and the letter "E" was carved instead of the letter "F" here. Alexander Shepherd, a political boss, is considered the "father of" this city, after he repaired roads, canals, sewers, and gas mains here. In a (\*) 2011 earthquake, many of this city's monuments were damaged, including the stones of one of its most iconic monuments, which earlier had its construction paused in 1848 due to budget cuts. A monument was opened in 2011, which depicts the namesake man partially carved out of block of stone. FTP, name this city, the home of the Smithsonian, the Treasury, and the White House.**

Washington **D.C.** (Prompt on Washington, accept **District of Columbia**)

**9. One of its isotopes is usually produced by bombarding bismuth-209 with neutrons in a nuclear reactor and waiting for beta decay. That isotope is the so-called "Perfect (\*) Poison" because it is so lethal when ingested or inhaled, as now-deceased FSB agent Alexander Litvinenko found out. This element has the second lowest electronegativity in the chalcogens group. It was discovered during study of pitchblende, or uraninite, and was originally called "radium F." All of its 33 isotopes are radioactive. This element has atomic mass 209 and atomic mass 84. FTP, name this element discovered by Marie and Pierre Curie named for Marie's home country.**

**Polonium**

**10. The last chapters of this novel follow two characters. One of those characters is an imperial prince and they both compete over the affection from daughters of a different prince. The novel ends mid-sentence which has led to some theories that the novel is not finished. One chapter is intentionally left blank which symbolizes the titular character's death. That chapter is called (\*) "Vanished into the Clouds." The protagonist has a son with a concubine named Lady Fujitsubo named Reizei who later becomes the emperor. FTP, name this Japanese book, sometimes called the world's first novel, by Murasaki Shikibu.**

**The Tale of Genji**

**11. The setting of the second half of this novel is the poorest country on Earth. The people practice a postmodern religion based on telling harmless lies, in which an important ritual is touching the (\*) bare soles of two people's feet. That religion is Bokonomism (boh-cuh-non-ism), which is ironically illegal on San Lorenzo. The island was led by "Papa" Monzano, who often threatened to impale people on a hook. The protagonist of this novel becomes president when Monzano dies and he marries Mona. A substance in this novel was made to help the military. When that substance touches liquid water, it acts as a seed crystal; however, the real-life substance with the same name only forms at extreme temperatures or pressures and is not that dangerous. FTP, name this novel about John in which a plane crash causes all life to be frozen by ice-nine, written by Kurt Vonnegut.**

### Cat's Cradle

12. **The fiat form of this is regulated by the government though it has no intrinsic value. The velocity of it refers to how fast it moves from (\*) one holder to the next.** Its quantity can be calculated as price level times real value divided by velocity. A liquidity trap occurs when consumers keep it to themselves, waiting for interest rates to rise. Its commodity form is regulated by Gresham's Law. FTP, name this keystone in economics that has never grown on trees, and includes coins and dollar bills.

### Money

13. **A coin gives evidence that this country is the second to officially adopt Christianity, after Armenia. The silver baton is considered to have magical properties and is used as the emblem for the (\*) Sultanate of Aussa of this country.** It is considered the emerging place of today's *Homo sapiens*. Some of this country's ancient history is written down in the Book of Aksum. The Walwal incident occurred in this country when Italy encroached on its borders: the second time Italy invaded. Italy later used chemical weapons and were hardly punished for attacking this country. Rastafarians revere former emperor Haile Selassie who hails from this country. FTP, name this country whose capital is Addis Ababa, the home country of Aida.

### Ethiopia

14. **It's not Uzbekistan, but this country is one of the two doubly landlocked countries in the world, meaning that this country is completely landlocked by other landlocked countries. The largest city in this country is (\*) Schaan, and regions in this country include the Oberland and the Unterland.** This country is bordered by Switzerland to the west and Austria to the east and north. For ten points, name this German-speaking microstate in Eastern Europe with capital Vaduz.

### Liechtenstein

15. **The Dutch, lured by this story, created a fort in Guyana in 1616. Gonzalo Pizarro, lured by this myth, went on an expedition in Ecuador to find this. Lake Guatavita, in current Colombia, was believed to be the site of this (\*) mythical city which lured many Spanish conquistadors, such as Hernando de Soto, to their ruin.** For ten points, name this mythical city said to be made out of gold.

### El Dorado

16. **During the years in which this man worked in advertising, he became famous for popularizing the "coffee break" in an ad for Maxwell Coffee. He was asked to leave his teaching position when rumor arose that he was having an (\*) affair with his graduate student-assistant, Rosalie Rayner.** One of this man's experiments in which a rat follows a maze to get the cheese is called the Kerplunk Experiment. With his mistress, this man created an experiment to test whether or not a fearful response to loud noise is an innate, unconditioned response, and he accomplished this by making a baby fear furry objects. FTP, name this man, the conductor of the controversial Little Albert Experiment.

### John B. Watson

17. **The peninsula where this man died is named after him and is just north of Uvkusigssat, Greenland. This German scientist made expeditions to Greenland to study polar air circulation before the existence of the (\*) jet stream was accepted.** Paleomagnetism studies at Cambridge and Imperial College helped prove this man's most famous theory. After World War I, he pioneered paleoclimatology with Milutin Milankovic and studied the physics and optics of the atmosphere while studying tornados. While working for the army's weather service he managed to complete the first version of his major work "The Origin of Continents and Oceans". For ten points name this geophysicist and meteorologist who proposed the theory of plate tectonics.

Alfred Wegener

18. **This number is the Super Bowl number in which the Pittsburgh Steelers, led by Terry Bradshaw, beat the Dallas Cowboys, led by Roger Staubach. This number is the number of episodes in Season 5 of White Collar. This number is also a name of a Black Sabbath (\*) album.** In Judaism, this number is the age at which a boy matures and has a Bar Mitzvah. This number is worn by Odell Beckham Junior. FTP name the 6th prime number, which is considered bad luck when amalgamated with Friday.

13

19. **This character was the first animated character to have a lead role in Star Wars. His dialogue in the third episode was cut, but he can be seen in Padme's funeral procession. In the second episode, he gave a speech in support of giving Palpatine (\*) emergency powers and brought Obi-Wan and Anakin back to Coruscant.** He was banished by Boss Nass for his clumsiness, and was nearly killed by a transport when he was saved by Qui-gon Jinn. FTP, name this Gungan, first seen in episode one, who is arguably the most hated character in the series.

Jar Jar Binks

20. **One of this piece's later movements alludes to an earlier work by the composer. The fifth movement has the double bass play Mendelssohn's "A Midsummer Night's Dream" while the fourth movement of this work features a slowed down version of the 'Galop Infernal'(\*).** Two violins play in "Personages with Long Ears" which is supposed to replicate a donkey's bray. "Twinkle Twinkle Little Star" is played in the "Fossils" movement and two pianos and cello play "The Swan." FTP, name this famous work by Camille Saint-Saëns that is pretty much a zoo in 14 movements.

The Carnival of the Animals

21. **Child of Timothy Carlton and Wanda Ventham, this actor first performed in Shakespearean works at the Open Air Theater, Regent's Park. He first appeared on television in *Heartbeat* in 2000, and later starred as Stephen Hawking in the series *Hawking*. He voiced Severus Snape (\*) and the British Prime Minister in *The Simpson's*, and appeared in films such as *To Kill a King*, *Atonement*, and *War Horse*.** It fairly recently came out that he named his newborn son Christopher Carlton, the child of this actor and his wife, Sophie Hunter. FTP, name this British actor that played Khan in *Star Trek Into Darkness*, and Sherlock Holmes in the British crime drama, *Sherlock*.

Benedict Cumberbatch

**Bonuses Round 4:**

1. This molecule can be added to cell membranes to moderate their fluidity.

A.

Name this steroid molecule that can crystallize to form stones in the gallbladder. This molecule is transported by LDL in human blood.

**Cholesterol**

B. This steroid of the androgen group is derived from cholesterol and secreted by Leydig cells in the testes. This principal male sex hormone promotes the development of secondary sex characteristics.

**Testosterone**

C. This hormone is secreted by the posterior pituitary gland, and it triggers contractions in the uterus.

**Oxytocin**

2. FTPE, name these encryption techniques.

A.

This is one of the most basic techniques and is named after a Roman general who may have used it to encode his messages.

**Caesar** Shift

B. This method builds off of the Caesar shift and is a simple polyalphabetic substitution based around a keyword.

**Vigenere** cipher

C. This public-key asymmetric encryption technique has 3 creators and centers around the fact that large numbers are hard to factor.

**RSA**

3. In this religion priests are called houngans and priestesses are called mambos. FTPE

A.

Name this religion that isn't really associated with dolls of the same name.

**Voodoo**

B. The creator god of Voodoo is this entity who doesn't intercede in human affairs. The name comes from the words for "good god" in French.

**Bondye**

C. Spirits in Voodoo go by this name. These spirits are the entities worshipped, and they are each representative of a different aspect of life.

**Loa**

4. For ten points each, answer these questions about North Carolina.

A. North Carolina's present governor is the former mayor of this city.

**Charlotte**

A. This mountain in North Carolina is the highest point in North America east of the Mississippi River.

Mount **Mitchell**

B. This North Carolinian fort near Wilmington was the last major coastal stronghold for the Confederacy.

Fort **Fisher**

5. FTPE, answer these questions about gold.

A.

The saying "all that glitters is not gold" originated in part from this Shakespeare play. The line comes from riddles about boxes, which are picked in an effort to win Portia's hand.

**The Merchant of Venice**

B. Gold was the code name for part of a beach during this event. It was one of the only two parts of the beach that was captured during the first day of this large amphibious landing during World War II.

**D-Day** or the **Invasion of Normandy**

C. Fool's gold, or pyrite, is made up of an iron atom bonded to two atoms of this element.

**Sulfur**

6. For ten points each, answer these questions about *Frozen*.

A.

*Frozen* was inspired by this fairy tale by Hans Christian Andersen about the devil, Gerda, and Kay.

**The Snow Queen**

B. This actress, who voiced Elsa, also won a Tony Award for her performance in the musical *Wicked*. She may be best known for the song "Let It Go."

Idina **Menzel**

C. Elsa is the queen of this kingdom, which at one point is in "deep deep deep deep snow."

**Arendelle**

7. FTPE, answer these questions about invasions of other nations.

A.

In 2010, a Nicaraguan military commander crossed this nation's borders and replaced its flag with the Nicaraguan flag.

**Costa Rica**

B. The commander claimed that this company's map software displayed national borders incorrectly, which led to the accidental invasion.

**Google**

C. All the way over in Europe, Lichtenstein was accidentally invaded when 170 of this nation's troops got lost in the rain.

### Switzerland

8. FTPE name these martyr-related questions.

A.

Many early Christians were martyred by these animals, which didn't kill Daniel.

lions

B. This man is considered to be the first martyr, and his feast day is the day after Christmas, December 26. He was stoned after giving a speech.

Saint Stephen

C. This object is a symbol of martyrdom and is associated with victory, in this case the victory of the soul over the body.

Palm branch (accept obvious alternatives like palm frond, don't prompt on branch)

9. FTPE Answer these questions about holy books

A.

This holy book of Christianity begins with the book of Genesis

Bible

B. The most sacred texts from this book help guide people in their daily life, it was originally written in Sanskrit.

Vedas

C. One of the holy texts of Islam, these are collections of verbatim quotes from Muhammad on various matters. The most famous one grants Muslim martyrs 72 virgins.

Hadith (accept plural)

10. FTPE, give the letter given the set they represent

A.

This letter represents the set of all real numbers.

R

B. This letter represents the set of all numbers that have a real and imaginary part.

C

C. This letter represents the set of all numbers that can be expressed as a ratio of two integers (with one extra caveat)

Q

11. FTPE, name these sea battles.

A.

This battle between Themistocles and Xerxes I resulted in a victory for the outnumbered Greeks in 480 BC.

Battle of Salamis

B. This Roman battle resulted in the formation of the Roman Empire. Lucius Arruntius and Marcus Agrippa were leaders on the winning side.

Battle of **Actium**

C. This battle was won by the Spartans after the city was nearly completely invested. The Athenians, despite having the upper-hand, made disastrous mistakes, leaving the victory to Gylippus.

Battle of **Syracuse** (accept Sicilian Expedition)

12. FTPE, name these eye structures.

A.

This covers the outside of the eye and protects it while bending light to provide better focus.

**Cornea**

B. This is mostly made up of a network of ganglion cells and carries neural impulses from the eye to the brain

**Optic Nerve**

C. This is the central focal point in the retina where cones are packed tightly together.

**Fovea** centralis

13. This pope reportedly said to his cousin and eventual successor, "God has given us the papacy; let us enjoy it." For ten points each:

A.

Name this Medici pope, who succeeded Julius II as pope and excommunicated Martin Luther with the papal bull Exsurge Domine.

**Leo X** (accept **Giovanni di Lorenzo de Medici**; prompt on "Leo")

B. The Medici family hailed from this Italian city, where the Medici financed such construction projects as the Uffizi Gallery, the Church of San Lorenzo and the dome of the Florence Cathedral, which was designed by Brunelleschi.

**Florence**

C. Catherine de Medici supposedly instigated this event after the marriage of her daughter to the future Henry IV of France. It may have begun with the attempted murder of Gaspard de Coligny, the leader of the targets of this event.

**Saint Bartholomew's Day Massacre**

14. FTPE answer the following questions about the Odyssey.

A.

This man travels to Sparta looking for news of his father.

**Telemakhos**

B. This cyclops was blinded by Odysseus.

**Polyphemus**



C. This man persuaded the crew of Odysseus' ship to eat the sacred cattle on the island of Thinakia.

**Eurylochus**

15. This man once designed a house for a relative, and near the end of construction asked to have the ceiling raised by 30 mm in order to maintain the ratios he desired. For ten points each, answer these questions about Ludwig Wittgenstein.

A.

Name this central concept of Wittgenstein's thought whose everyday application can be seen in how people use language that is simpler than everyday language and in how people use language to teach very young children about language.

**Language-game(s)** (Do not accept any other answer)

B. Name this posthumous work by Wittgenstein in which the idea of language-games is first introduced.

**Philosophical Investigations**

C. Name this book by Wittgenstein whose title is an homage to a work by Baruch Spinoza. This book greatly influenced an essay by Bertrand Russell titled "The Philosophy of Logical Atomism".

**Tractatus Logico-Philosophicus**

16. FTPE, answer these Bob related questions.

A.

In cryptography, game theory, and physics problems, Bob and this female are used as placeholder characters.

**Alice**

B. This comic book company created a villain named Bob, who is the sidekick of Deadpool and originally worked for Hydra.

**Marvel**

C. The Almighty Bob is a deity worshiped by the people of Lamuella in the book *Mostly Harmless*, which was written by this author.

Douglas **Adams**

17. On January 13th, 2016, this news channel announced that it would be shut down on April 30th.

A.

Name this cable news channel, whose name means "The Peninsula" in Arabic.

**Al Jazeera America**

B. In December 2015, the Al Jazeera media network created a documentary linking this Denver Broncos quarterback to HGH.

**Peyton Manning**

C. The Al Jazeera media network is based in and is owned by the government of this country. This country's capital is Doha.

**Qatar**

18. For ten points each, answer these questions about global climate patterns.

A.

This phenomenon leads to warmer weather and elevated rainfall along the coast of South America. It's part of a namesake "Southern Oscillation," and is one of the reasons why North Carolina got seventy-degree weather at the end of December.

**El Niño** (accept **ENSO**)

B. During El Niño, these winds diminish or blow in the opposite direction. These winds are named from the cardinal direction from where they originate, and blow near the equator.

**Easterlies**

C. During El Niño, this abiotic layer stays flat and parallel to the surface of the ocean. This is the layer where temperature changes the fastest in a lake, and is between the epilimnion and hypolimnion.

**Thermocline**

19. FTPE, name these Walt Whitman poems given a line from them.

A.

"barbaric yawp over the roofs of the world,"

**Song of Myself**

B. "the great star early droop'd in the western sky,"

**When Lilacs In The Dooryard Bloom'd**

C. "if the body were not the Soul, what is the Soul?"

**I Sing the Body Electric**

20. FTPE Answer these questions about the US Constitution

A.

The first amendment grants five rights, name three of them.

**Freedom of Religion, Speech,** and the **Press**. The **right of Assembly**, and **Right of Petition**.

B. This Article lists the powers of the Judicial Branch.

Article **III**

C. James Madison originally wrote 12 amendments in the Constitution. This Amendment was one of those twelve and took 202 years to ratify

**27th** Amendment

21. FTPE, Answer these questions about Tesla.

A.

This CEO of Tesla Motors recently unveiled the new Model X and his hyperloop transportation system.

Elon **Musk**

**B.** This inventor was a supporter of Direct Current and mentored Nikola Tesla for a few years.

Thomas **Edison**

**C.** One tesla is equal to this unit of magnetic flux divided by one meter-squared. It is named after the scientist who worked with Gauss to create one of the first working telegraphs.

**Weber**