

2022 Medium RaNge Academic, a Vanderbilt and Company

Collaboration vIa Network (MRNA VACCINE)

Edited by: Eric Mukherjee (head), Erik Christensen, Chandler West, Conor Thompson, Ganon Evans, Henry Atkins, Jaimie Carlson, Sam Bailey, Chris Sims, Jacob O'Rourke, and William Grossman

Written by: The Editors, Gerhardt Hinkle, Vikshar Athreya, Andrew Hanna, David Bass, Owen Riley, Lia Rathburn, Beni Keown, Vishal Puppala, Aidan Fein, Jacob Augelli, Liam Thompson, Will Alston, Michael Borecki, Sharath Narayan, Zachary Beickman, Rebecca Thomas, Bryanna Shao, and Willie Chen

Packet 10: "Detective Faulkner Star Wars is my favourite anime protagonist"

1. In a short story, a character with this profession is described as another character's "witness that deep water and drowning were not the same thing." In a novel, a character with this profession named Rufus Scott jumps off of the George Washington Bridge. In a short story, a heroin-addicted character with this profession is taken in by his algebra-teaching brother. In another novel, a character who aspires to this occupation tells everyone to call her (*) Mary Agnes and moves to live in the house of another woman with this occupation in Memphis. In a novel, Celie engages in a homosexual affair with a character with this job named Shug Avery. For 10 points, give this occupation of several characters in Alice Walker's *The Color Purple*, many of whom perform at "juke" joints.

ANSWER: jazz musician [or blues musician; or singer; accept words for performing on specific instruments such as drummer or pianist; prompt on performer] (The first and third sentences are from James Baldwin's story "Sonny's Blues"; the second is from his novel *Another Country*.)

<Andrew Hanna, American Literature>

2. In a film by this director, a woman writhes on the ground in front of a window overlooking the sea after hearing voices coming from the wallpaper. At the end of that film by this director, a writer stands by the same window at sunset as he tells his son that love and God might be one and the same. A film by this director ends with its cast parading in silhouette on a hill, pulled along by a shrouded (*) figure. A film by this director of *Through a Glass Darkly* literally used smoke and mirrors for a shot that blurs the faces of two women; in that film by this director, a nurse attends to an actress who has suddenly stopped speaking. In another film by this director, the knight Antonius Block plays chess with Death. For 10 points, name this director of *Persona* and *The Seventh Seal*.

ANSWER: Ingmar Bergman

<Erik Christensen, Other Fine Arts>

3. For an ideal gas, this quantity minus one is directly proportional to density. The anisotropy of this quantity can be depicted using a namesake ellipsoid, whose degree of rotational symmetry distinguishes between materials that are isotropic, uniaxial, and biaxial. This quantity has a complex form whose imaginary part is the extinction coefficient. This quantity is the square root of the product of (*) relative permittivity and relative permeability. The arctangent of a ratio between two instances of these quantities gives the Brewster angle. For birefringent materials, this quantity is different along different axes. For 10 points, name this quantity that multiplies the sine of an angle on each side of Snell's law, the ratio of the speed of light in vacuum to the speed of light in a medium.

ANSWER: index of refraction [or refractive index; prompt on n; do NOT accept or prompt on "refractivity"]
<Gerhardt Hinkle, Physics>

4. Applications of this non-religious discipline to religious ritual are described in the Śulba Sūtras and the Śatapatha Brāhmaṇa ["shuh-tuh-puh-tuh brah-muh-nuh"]. Major texts on this discipline like the Yuktibhāṣā ["youk-tih-bah-sah"] and the Tantra Samgraha ["tun-truh sum-gruh-huh"] were written by members of an influential school of it founded by Madhava ["MOD-uh-vuh"] in Kerala. A term in this discipline arose when a translator mistook a word for "bow" ["boh"] as "breast." Poetry and this other discipline brought fame to (*) Omar Khayyam. Brahmagupta redefined a term known as the "empty place" in this discipline. This discipline's Islamic form was promoted in Western Europe by the book *Liber Abaci*, sparking a conflict between "algorists" and "abacists." For 10 points, name this discipline practiced by al-Khwarizmi ["KWAH-riz-mi"] which uses Hindu-Arabic numerals.

ANSWER: mathematics [or arithmetic; or calculation; or computation; or algebra; or geometry, or trigonometry; or astronomy]
<Gerhardt Hinkle, World History>

5. In some dialects of English, this sound will come between the schwa of two vowel sounds at the end and start of two words in its "intrusive" variety. In a phenomenon found in Mandarin and North American English, this sound will lower the frequency of vowels that come before it. This sound was the focus of an experiment in which (*) William Labov asked for directions at different parts of a department store, which found that its use varied by class in New York English. A "hook" diacritic is put on vowels in IPA to indicate they are "colored" by this sound. The absence of this sound in one accent is often illustrated with a phrase about parking at a school in Cambridge, Massachusetts. For 10 points, rhoticity describes the use of what sound, which some British dialects will place at the end of words like drama?

ANSWER: r-sound [accept pronunciations involving the letter r; before "rhoticity", accept rhotic]
<Erik Christensen, Social Science>

6. One animal's use of this non-eye-related faculty causes it to gradually develop cataracts. Sexual dimorphism in this faculty is hypothesized to make it easier for females than males to locate potential mates by causing a difference in the size of the active space. In one genus, this faculty uses organs named for Sachs and Hunter alongside a main organ that is just called the main organ. This faculty's organs use the medullary command nucleus, or pacemaker (*) nucleus, to synchronize their cells' firing and consist of numerous stacked flat disk-shaped cells formed from modified muscle tissue. This faculty is used by a namesake catfish and the torpedo ray, though the most famous example is an inaccurately-named knifefish. For 10 points, name this faculty used to stun prey by a namesake "eel."

ANSWER: bioelectrogenesis [or being electrogenic; or being electric; or any answer indicating the ability to generate electricity, electric fields, or electric shocks or any clear equivalents; do NOT accept or prompt on "electroreception", "electroception," or answers describing sensing electricity]
<Gerhardt Hinkle, Biology>

7. **This author wrote a novel which consists of essays by the protagonist interspersed with letters by both him and the much younger woman he hires as a typist named Anya. A novel by this author ends with the protagonist saying “Yes, I am giving him up” to a woman he had an affair with despite not finding attractive. This author of *Diary of a Bad Year* created a fictional author who wrote a retelling of *Ulysses* from (*) Molly’s point of view. The protagonist of a novel by this author believes he has “solved the problem of sex rather well” through his weekly meetings with the prostitute Soraya. In that novel by this author, the protagonist works at Bev Shaw’s animal clinic after moving to his daughter Lucy’s farm. Melanie Isaacs is seduced by the professor David Lurie in a novel by this author. For 10 points, name this South African author who wrote *Elizabeth Costello* and *Disgrace*.**

ANSWER: J(ames) M(axwell) Coetzee
<Chandler West, World Literature>

8. **It’s not in Europe, but nearly half the world’s dolmen tombs were constructed in this region, often in the *takcha* or *paduk* styles in concentrations called cemeteries. In 194 BCE, this region’s first kingdom was usurped by a foreign general fleeing his homeland named Wiman. In this region, an organization for educating makeup-wearing aristocratic youths was called the Flowering Knights. This region’s southern coast was the location of six small states collectively called the (*) Gaya Confederacy. A kingdom in this region’s southeast was led by a hierarchy of noble families under its bone-rank system. This non-Chinese region’s Three Kingdoms period ended when Baekje [“bek-jeh”] and Goguryeo [“goh-gur-yuh”] were conquered by their neighbor Silla. For 10 points, name this peninsula whose legendary first king Dan’gun founded a state named Joseon.**

ANSWER: Korean Peninsula [or Hanguk]
<Lia Rathburn, Other History>

9. **A two-movement work in this genre begins with a strictly classical minuet parodying bad composers that repetitively uses a C-E-F motif. The unusual structure of Prokofiev’s second symphony was based on a work in this genre that opens with a descending leap from E flat to F sharp. A theme and variations from that work in this genre heavily uses swing-like rhythms that led Jeremy Denk to call it (*) “proto-jazz”; that Arietta concludes one composer’s C minor opus 111 piece in this genre. A lengthy B flat major piece in this genre is named after the “hammer” type of one instrument. Ascending triplet arpeggios in C sharp minor open a piece in this genre marked *quasi una fantasia*. For 10 points, name this genre of Beethoven’s *Hammerklavier* and *Moonlight*.**

ANSWER: piano sonatas [prompt on sonatas]
<Gerhardt Hinkle, Classical Music>

10. **In this religion, menstruation incurs a mandatory four-day period of not being allowed to visit places of worship. Discourse in this faith argues whether “acts of deception” turn men into women and “acts of faith” turn women into men. One sect in this religion believes that women are unable to achieve salvation because their menstrual blood kills living beings. Sects of this faith disagree whether the figure Mallinatha was a man or a woman, with one sect believing that Mallinatha was the sole female member of a set of (*) 24 holy figures of this religion. This faith’s idea of a “third sex” or *napumsakas* has debated whether women can completely forego clothes and objects except for the broom-like *picchi* which pushes insects. For 10 points, name this faith whose Svetambara and Digambara sects debate where women can achieve *moksha* by practicing *ahimsa*.**

ANSWER: Jainism [or Jain Dharma; prompt on Svetambara or Digambara before mention with “What larger faith is that sect a part of?”]
<Ganon Evans, Religion>

11. In a poem by this author, a character shaves while ignoring “the epileptic on the bed.” This author references the murder of Agamemnon in a poem where two women in a pub try to seduce a “maculate” and “apeneck” character. An incomplete verse drama by this author puns on Milton’s *Samson Agonistes* and features a protagonist who in earlier poems is “Erect” and (*) “Among the Nightingales.” This author quotes Baudelaire’s “hypocrite lecteur!—mon semblable,—mon frère” in a poem partly narrated by Tiresias. This author’s recurring character Sweeney briefly appears in a poem that repeats “burning burning burning burning” as part of a “Fire Sermon.” For 10 points, name this poet who wrote “April is the cruelest month” to begin “The Waste Land.”

ANSWER: T.S. Eliot [or Thomas Stearns Eliot]

<Henry Atkins, British Literature>

12. Kenneth Bianchi and Angelo Buono committed a string of murders in this state that led them to be known as the Hillside Stranglers. Detective Frank Salerno was a key investigator in this state on both that case and the case for a serial killer who was captured by a mob shortly after returning from a trip to visit his brother. Patton Oswalt’s deceased wife, Michelle McNamara, helped complete a long unsolved case of a serial killer in this state as described in her book *I’ll Be Gone in the Dark*, which was turned into an HBO docuseries.

Richard (*) Ramirez, known as the Night Stalker, committed a string of murders in this state. A serial killer from this state claimed to be collecting souls for the afterlife in a cryptogram published in newspapers. For 10 points, identify this state where the unsolved Zodiac Killer murders occurred in the 1960s and 70s.

ANSWER: California [or CA] (Michelle McNamara helped solve the case of the Golden State Killer.)

<Chandler West, Other>

13. One of these compounds catalyzes the dimerization of an alpha-oxy-aldehyde as the first step of a two-step synthesis of hexoses. That one of these compounds became the first significant organocatalyst when it was found to enantio-selectively catalyze the aldol reaction by Benjamin List; it also catalyzes the Hajos-Parrish [“hay-josh parish”] reaction. Reducing sugars react with these compounds in the Maillard reaction. An aldehyde reacts with cyanide in the first step of a (*) synthesis of these compounds named for Strecker. These zwitterionic compounds have a variable side-chain that in one unusual case has selenium. An electric spark in a flask of simple molecules notably made several of these compounds in the Miller-Urey experiment. For 10 points, name these compounds that are joined by peptide bonds to form proteins.

ANSWER: alpha-amino acids [prompt on amines or carboxylic acids; do NOT accept or prompt on "proteins," "polypeptides," or "peptides"]

<Gerhardt Hinkle, Chemistry>

14. Suetonius criticized Tiberius for hanging a sexually explicit painting of this hero in his bedroom. This hero supposedly created a spring near Cyphanta by striking a rock with a spear. This hero’s fate is possibly explained by a Greek belief that certain animals could not mate with their own species. At the funeral games of Jason’s uncle, this hero defeated Peleus in a wrestling match. An argument over whether this figure should receive spoils led to Althea throwing a brand into a fire. This hero killed two (*) centaurs when they tried to rape her, and was turned into a lion for having sex in a temple. This woman, who wounded the Calydonian boar with Meleager, was abandoned by her father and raised by a she-bear, and eventually married Hippomenes. For 10 points, name this fleet-footed huntress who was defeated in a race when she was distracted by golden apples.

ANSWER: Atalanta [accept Meleager before “created a spring”] (The ancient Greeks may have believed lions could only mate with leopards, thus making Atalanta and Hippomenes’ turning into lions a fitting punishment.)

<Jaimie Carlson, Mythology>

15. **Soldiers and citizens upset over French soldiers passing through this country to invade its neighbor forced their king to abdicate in a “Tumult” uprising. A king of this country and his son were both forced to renounce their claim to the throne at Bayonne. The chaos that ensued during a war in this country led to several military groups who called themselves “Supreme (*) Juntas.”** The leader of the losing side of a war in this country called it an “ulcer” for its slow drain of resources and manpower. After being replaced by Joachim Murat as King of Naples, Joseph Bonaparte became king of this country, where thousands of rebellious citizens were killed in the Second of May Uprising. For 10 points, name this country that was the main battleground of the grueling Peninsular War.

ANSWER: Kingdom of Spain

<Erik Christensen, European History>

16. **A Louis Masur essay compares an umbilical cord to an object in this painting which is held by a man by a man whose face was inspired by Charles Le Brun’s idea of “Compassion.” Upon seeing this painting in Christ’s Hospital, a mayor of London redrew his coat of arms to depict a severed leg with the Latin phrase “Under God’s Protection.” Inspired by a Vatican tour, this painting’s artist placed the head of Laocoön on the body of the *Borghese Gladiator* for its central subject. The towers of Morro (*) Castle appear over the right shoulder of a slave in this painting throwing a rope. An animal drawn based on jawbone studies lunges towards a nude man in this painting, who is being defended by a harpooner on the brow of a ship.** For 10 points, name this chaotic depiction of a sea rescue in Havana Bay by John Singleton Copley.

ANSWER: *Watson and the Shark*

<Ganon Evans, Painting/Sculpture>

17. **The SpaceFORM apparatus is capable of manufacturing one type of these devices in microgravity. The entire sample is surrounded by one of these devices in a type of immunoassay called SOFIA. On Earth, these devices are manufactured by multi-story draw towers. One type of these devices can be manufactured in either graded or step index configurations, the former of which has a parabolic profile. One type of these devices is made from ZBLAN, which allows these devices to operate at long ranges without (*) the need for repeaters. The multi-mode type of these devices has a larger diameter than their single-mode type, making it preferable for short-range communication. The cladding of these devices has a lower index of refraction than their core, causing total internal reflection.** For 10 points, name these devices, tubes of glass which transmit light.

Answer: optical fibers [or fiber optic cables]

<Beni Keown, Other Science>

18. **While at war, this tribe abandoned log cabins in favor of thatch-roofed, bald cypress-based houses called *chickees*. A Muscogee Creek refugee who joined this tribe used a rifle gifted to him by Wiley Thompson to kill Thompson outside of Fort King. Thomas Jesup used a white flag to trick this tribe’s leader Micanopy [“MIK-ih-NOH-pee”] into surrendering. The Negro Fort was a settlement of Gullah people and maroons who are known as this tribe’s (*) “Black” members. This tribe signed the treaties of Moultrie Creek and Payne’s Landing and later committed a massacre of Francis Dade’s troops during the longest Indian war fought by the U.S. government. Osceola [“OSS-ee-OH-luh”] once led, for 10 points, what Native American tribe who fought three 19th century wars in Florida?**

ANSWER: Seminoles [or Yat’Siminoli; or Black Seminoles; or the Seminole Wars]

<Owen Riley, American History>

19. A yearly feast named for these people was one of the major occasions in which Goliard poets presented their works. Alexander Barclay made the first English adaptation of a verse novel in which a number of these people are met on an island by Saint Grobian. Christ is given as an example of these people because he “became sin in order to redeem sinners” in an essay which begins with an address to the author’s friend Thomas (*) More. These title people are taken to the paradise of Narragonia by boat in a novel by Sebastian Brant. These people’s activity names the title goddess of an *encomium* written in 1509 which savages superstition and the practices of the priesthood. For 10 points, name these ridiculous people who inspired the title of a satire of Catholicism by Erasmus.

ANSWER: **fools** [or **stultus**; or **stulti**; or **folly**; or *In Praise of **Folly***; or *The Ship of **Fools***; prompt on jesters or clowns or idiots]

<Will Alston, European Literature>

20. Roger Penrose expanded on Hilary Putnam’s work on this concept with the Andromeda paradox, which involves two people passing each other on the street. Over the course of his career, J. J. C. Smart switched from linguistic to psychological arguments for denying distinctions made with this concept, arguing for its B-theory. This is the second title concept of a book that argues humans find themselves (*) “thrown” into the world. That book argues that ready-to-hand objects like a hammer merely exist through this concept, while humans or *Dasein* are aware of it through the possibility of their own death. For 10 points, name this concept, the subject of contrasting theories like presentism and eternalism, which Martin Heidegger paired with *Being*.

ANSWER: **time** [or **Zeit**; or *Being and **Time***; or the **present**; prompt on being or death and ask “what concept do humans understand which affects their being and death?”]

<Erik Christensen, Philosophy>

1. The variance of an unbiased one of these functions for a given parameter is greater than or equal to that parameter's Cramér–Rao lower bound. For 10 points each:

[10m] Name these statistics, often denoted with a circumflex “hat,” that approximate a given parameter.

ANSWER: **estimator**s [or minimum variance unbiased **estimator**s; prompt on **MVUEs**]

[10e] A minimum-variance unbiased estimator for this parameter is the sum of observations divided by sample size. Like median and mode, this parameter is a measure of the centrality of a distribution.

ANSWER: **mean** [prompt on **average**]

[10h] An arbitrary estimator can often be idempotently improved by conditioning it on a sufficient statistic according to a theorem named for C. R. Rao and this mathematician. Infinite games of imperfect information are named for this mathematician, who proved that some such games are determined.

ANSWER: David (Harold) **Blackwell**

<David Bass, Other Science>

2. In 1982, FDIC chairman William Isaac issued a policy statement that gave foreign firms a loophole in this law. For 10 points each:

[10h] Name this law, which was repealed by a bill named for Phil Gramm, Jim Leach, and Thomas J. Bliley.

ANSWER: **Glass-Steagall** Act [prompt on the **Banking Act of 1933** with “What Act in the Banking Act?”]

[10e] Glass-Steagall was mostly repealed under this president. This president signed the Defense of Marriage Act and the Omnibus Crime Bill and faced a scandal for an affair with Monica Lewinsky.

ANSWER: Bill **Clinton** [or William Jefferson **Clinton**]

[10m] Unlike his successor Alan Greenspan, this chairman of the Federal Reserve was hesitant to fully repeal Glass-Steagall. This chairman's policy of disinflation raised interest rates to curb 1970s stagflation and names a “rule” preventing speculative investments as part of the Dodd-Frank Bill.

ANSWER: Paul **Volcker** [or **Volcker** disinflation; or the **Volcker** Rule]

<Erik Christensen, American History>

3. A female fifteenth century artist depicted the *Maid of* this city petting a lion for its flag. For 10 points each:

[10m] Name this city, which Agnes van den Bossche painted in. Two brothers painted an altarpiece in this city that depicts the *Adoration of the Mystic Lamb* in its lower register.

ANSWER: **Ghent** [or **Gaunt**; or *The **Ghent** Altarpiece*; or *Maid of **Ghent***]

[10e] Hans Memling featured van der Bossche's *Maid of Ghent* as a background figure of the Moreel Family in one of these artworks. These artworks contain a central scene with two foldable wings and are frequently used as altarpieces.

ANSWER: **triptych**

[10h] van der Bossche studied in the painter's guild of Ghent under this artist. Domenico Ghirlandaio's depiction of the *Adoration of the Shepherds* in the Sassetti Chapel was inspired by viewing this artist's Portinari Altarpiece, which was the largest Flemish work in Florence.

ANSWER: Hugo van der **Goes** [or **Hugo of Antwerp**; or **Ugo d'Anversa**]

<Ganon Evans, Painting/Sculpture>

4. A character in this play resolves to be neither one of the “people who ate the earth” nor “other people who stood around and watched them do it.” For 10 points each:

[10m] Name this play, in which Alexandra Hubbard refuses to go to Chicago with her mother when she realizes the suspiciousness of her father’s death.

ANSWER: *The Little Foxes* (by Lillian Hellman)

[10e] The title of *The Little Foxes* compares the Hubbard family to animals who “ruin the vineyards” in this biblical book. A Toni Morrison novel which follows the life of Macon “Milkman” Dead shares its name with this book of the Bible.

ANSWER: The Song of Solomon [or Song of Songs]

[10h] Regina Hubbard had wanted to move to Chicago for at least twenty years, as depicted in this prequel play to *The Little Foxes*. Regina’s father Marcus confronts her love interest John Bagtry over his desire to fight anti-slavery rebels in Brazil in this play.

ANSWER: *Another Part of the Forest*

<Lia Rathburn, American Literature>

5. In A Theory of Migration, Everett Lee coined these two alliterative terms to describe the factors that encourage migration. For 10 points each:

[10m] Give these two terms, one of which describes factors that encourage people to leave a country like unemployment, while the other term describes factors that attract people to a specific country like better healthcare.

ANSWER: push and pull

[10e] Lee argues that people primarily leaving for push or pull factors follow this kind of distribution, as people are equally likely to leave for negative or positive reasons. Distributions of this kind will have two distinct peaks.

ANSWER: bimodal

[10h] A “reverse distance” law named for this person models a decrease in migration with distance. City populations follow a Pareto distribution with an exponent near one, in line with another empirical law named for this person.

ANSWER: George Kingsley Zipf

<Erik Christensen, Social Science>

6. In Bantu folktales, death exists because this animal was sent to deliver the message that humans could come back to life, but was beaten by the quicker lizard. For 10 points each:

[10h] Name this animal, which is the messenger of Unkulunkulu. In Yoruba stories, Olorun sends this animal to compete with the weaver Olokun.

ANSWER: chameleon

[10m] In Hausa folktales, death exists because this animal messenger forgot the moon’s message that humans will be reborn. In African-American folklore, a non-spider animal of this type gets stuck to a doll covered in tar.

ANSWER: rabbit [or hare; or Brother Rabbit; or Bre’r Rabbit]

[10e] In multiple Native American traditions, this canine trickster god introduced the concept of permanent death, because there would be too many people if humans were reborn. This god created the world by kicking a mud ball.

ANSWER: Coyote

<Jaimie Carlson, Mythology>

7. A “floral dip” method may be used to induce this process in *A. thaliana*. For 10 points each:

[10e] Name this process in which a cell takes up genetic material from its surroundings. Electroporation can make bacteria more susceptible to this process, which is often performed using plasmids.

ANSWER: **transformation**

[10h] *A. thaliana* is often transformed using bacteria from *Agrobacterium*, which can transfer these plasmids. These plasmids also contain genes for opine production.

ANSWER: **Ti** (“tee-eye”) plasmid

[10m] Ti plasmids can induce the formation of these structures within plants. In humans, cells within these structures favor fermentation over aerobic respiration in the Warburg effect.

ANSWER: **tumors** [or **neoplasms** or crown **gall**, prompt on **cancer** cells]

<Vikshar Athreya, Biology>

8. This instrument plays a C-low F-C (*pause*) B flat-low E flat-B flat theme throughout “Seven Steps to Heaven.”

For 10 points each:

[10m] Name this instrument played by Ron Carter. Paul Chambers played this instrument on “Kind of Blue.”

ANSWER: **bass**

[10h] Chet Baker soloed for three minutes on a version of “Seven Steps to Heaven” in an album titled for *Chet Baker in [this city]*. Miles Davis decided he didn’t like Sam Rivers after recording an album titled *Miles in [this city]*, replacing him with Wayne Shorter.

ANSWER: **Tokyo**, Japan

[10e] Davis went through a number of saxophonists after this man left the group. This musician recorded the albums *Giant Steps*, *A Love Supreme*, and *My Favorite Things*.

ANSWER: John **Coltrane**

<Owen Riley, Other Fine Arts>

9. In an essay by this author, the narrator ensures that no men are present before discussing how “Chloe liked Olivia.” For 10 points each:

[10e] Name this author who discussed the historical challenges that female authors have faced in her essay *A Room of One’s Own*. This author also wrote the novels *Mrs. Dalloway* and *To the Lighthouse*.

ANSWER: Virginia **Woolf** [or Adeline Virginia **Woolf**; or Adeline Virginia **Stephen**]

[10m] In *A Room of One’s Own*, Woolf uses a fictional sister of this author with the same talents but not the opportunity to develop them as an example of why there have been so few successful female authors.

ANSWER: William **Shakespeare** [or Judith **Shakespeare**]

[10h] This historical fiction novel by Maggie O’Farrell explores how the death of Shakespeare’s son affected his marriage and his writing. It won the 2020 Women’s Prize for Fiction.

ANSWER: **Hamnet** [do NOT accept or prompt on “Hamlet”]

<Chandler West, British Literature>

10. Organized in 1541, this city's Consistory enforced harsh rules around nearly all aspects of life, including gambling, the color of clothing, and even how much food was permitted on tables. For 10 points each:

[10m] Name this city, whose theocratic government was informed by the Ecclesiastical Ordinances. Michael Servetus was burned at the stake in this city.

ANSWER: **Geneva** [or **Genève**]

[10e] Geneva's theocratic government during this period was headed by this French theologian. This author of *Institutes of the Christian Religion* founded a namesake branch of the Reformed church.

ANSWER: John **Calvin** [accept **Calvinism**]

[10h] Before moving to Geneva, Calvin was invited to lead a congregation in this city by Martin Bucer, who fled there after his excommunication. Johannes Sturm founded a Lutheran gymnasium in this Imperial Free City.

ANSWER: **Strasbourg**

<Erik Christensen, European History>

11. Backlund transformations can be used to obtain these solutions to the Sine-Gordon and Korteweg-De Vries equations. For 10 points each:

[10m] Name these waves which maintain their shape during propagation at constant velocity. They can arise when dispersive effects are canceled out by the nonlinear Kerr effect.

ANSWER: **solitons**

[10h] Solitons are often solutions to the scattering type of this general class of problems concerned with determining the model parameters that produce observable data. Tomographic reconstruction is a notable one of these problems.

ANSWER: **inverse** problems

[10e] There exist soliton solutions to the nonlinear variant of this equation named after an Austrian physicist. The time-independent version of this central equation of quantum mechanics is written $H\psi = E\psi$.

ANSWER: **Schrodinger** equation

<Vishal Puppala, Physics>

12. Colin McGinn champions a position called new mysterianism which posits that human cognitive faculties are not equipped to solve this problem. For 10 points each:

[10h] Name this problem posited by David Chalmers that may be solved bridging the "explanatory gap."

ANSWER: **hard** problem of consciousness [reject other problems of consciousness]

[10m] Chalmers's definition of consciousness borrows from this NYU philosopher's "what it is like" criteria which posits that accessing a being's consciousness requires also accessing their subjective experiences. This philosopher argued in favor of teleological explanation in his book *Mind and Cosmos*.

ANSWER: Thomas **Nagel**

[10e] Another philosopher addressing consciousness, John Searle, used the Chinese room argument to refute the "strong" form of this concept. Turing tests evaluate whether a machine possesses this phenomenon.

ANSWER: **artificial intelligence** [or **AI**]

<Vishal Puppala, Philosophy>

Note to moderator: Do NOT give the key as part of the answer if not given by the player.

13. In the second section of this symphony, the oboe introduces a theme in the Dorian mode, contrasting with the ascending scale which opens it. For 10 points each:

[10h] Name this symphony. A trombone solo in the first section of this symphony announces the main theme, which is named after its composer's wife.

ANSWER: Jean **Sibelius**'s Symphony no. **7** in C major [or **Sibelius's 7th** Symphony; prompt on composer or number alone]

[10e] Peter Franklin called the finale of Sibelius's 7th "the grandest celebration of [this key] there ever was." In response to the symphony, Vaughan Williams said that only Sibelius could make this major key sound fresh, since it has no flats or sharps.

ANSWER: **C** major

[10m] This composer was inspired by Sibelius's one-movement 7th symphony to compose his *Symphony in One Movement*. He is better known for *Knoxville: Summer of 1915* and a piece for strings based on Virgil's *Georgics*.

ANSWER: Samuel **Barber** (The unnamed piece is *Adagio for Strings*.)

<Aidan Fein, Classical Music>

14. A series of collected Rilke letters describe going to view this artist's paintings every day in the fall of 1907. For 10 points each:

[10h] Name this artist, whose depiction as Claude Lantier in *The Masterpiece* led to a break with childhood friend Émile Zola.

ANSWER: Paul **Cézanne**

[10m] Claude Lantier and his family are recurring characters in this twenty novel series by Zola. Titled for its two major families, this series follows contemporary events like the Franco-Prussian War and the renovation of Paris.

ANSWER: *Les **Rougon-Macquart*** [or the **Rougon-Macquart** cycle]

[10e] In *The Masterpiece*, Claude Lantier becomes obsessed with painting a view of Paris that prominently features this building. Quasimodo is this building's bell-ringer in a Victor Hugo novel that spurred its conservation.

ANSWER: **Notre-Dame** de Paris [or *The Hunchback of **Notre Dame***]

<Henry Atkins, European Literature>

15. The Hōkūle'a ["hoe-koo-lay-ah"] is an accurate replica of one of these boats that sailed from Hawaii to Tahiti using only historical Polynesian methods. For 10 points each:

[10e] Name these ships, models of which like the kalia and the "double-ender" carried Polynesians to settle the Pacific. These smaller boats move with the help of paddles.

ANSWER: **canoes** [or **kayaks**; or **outriggers**]

[10h] Stick charts created in this Micronesian island chain documented ocean swells and helped Polynesians mark land masses. Many people from this island chain relocated to Arkansas in the 1980s for radiation treatment due to U.S. nuclear tests on one of its islands.

ANSWER: **Marshall Islands** [or the Republic of the **Marshall Islands**]

[10m] Another untraditional wooden map is the Ammassalik carving of this non-Polynesian island's coast by Kunit, a member of its indigenous Tunumitt people. Successors of the Dorset culture on this island were labeled as skrælings ["skray-lings"] by colonizers.

ANSWER: **Greenland**

<Ganon Evans, World History>

16. A reagent containing a bond between this heteroatom and oxygen is a starting point for the Michaelis-Arbuzov reaction. For 10 points each:

[10m] Name this heteroatom which is bonded to three phenyl groups in the key reagent used in the Wittig reaction

ANSWER: **phosphorous** [or **P**]

[10e] The Wittig reaction is used to transform this functional group into alkenes using a phosphonium ylide [“YEE-
lied”]. This functional group, which occurs in aldehydes and ketones, has a carbon double bonded to oxygen.

ANSWER: **carbonyl**

[10h] A key intermediate in the Wittig reaction has a phosphorous with a positive charge and a non-adjacent oxygen with a negative charge. That species is given this name.

ANSWER: **betaine** (“beta-een”) [prompt on **zwitterion**, do not accept “ylide”, which has the positive and negative charges adjacent to each other]

<Eric Mukherjee, Chemistry>

17. This person’s observation of falling water levels in Venezuela’s Lake Valencia may have been the first recognition of anthropogenic climate change. For 10 points each:

[10m] Name this German naturalist, the author of *Kosmos*. Andrea Wulf’s book *The Invention of Nature* claims that this person founded the modern environmental movement.

ANSWER: Friedrich Wilhelm Heinrich Alexander von **Humboldt**

[10h] Humboldt explained his idea of the interconnectedness of nature through a piece of data visualization showing this place. Humboldt’s cross-sectional illustration of this place matches hundreds of plant species to their elevation.

ANSWER: Mount **Chimborazo** [prompt on the **Andes**]

[10e] Humboldt was an admirer of a natural philosopher from this family, the author of *Zoonomia*. A scientist from this family carried a collection of Humboldt’s writings while traveling on the *Beagle*.

ANSWER: **Darwin** [or Erasmus **Darwin**; or Charles **Darwin**; or **Darwin**-Wedgwood]

<Henry Atkins, Other>

18. The chief formulator of this concept may have adopted it from the neoplatonism of Philo, who saw it as a neither uncreated nor created mediator. For 10 points each:

[10m] Give this concept that “was with God” and “was God” according to a difficult-to-translate “Hymn” to this concept in the New Testament, which echoes Genesis 1:1.

ANSWER: **logos** [or the **word**; or **verbum**]

[10e] This gospel’s identification of Jesus as *logos* figured heavily into Christological debates before the establishment of Trinitarian orthodoxy. The Hymn to the Word begins this last and only non-synoptic gospel.

ANSWER: **John**

[10h] This much later Christian thinker emphasized Christianity as the religion of *logos*, translating it as “creative reason.” This pope drew on John to distinguish between *eros* and *agape* in the encyclical *Deus Caritas Est*.

ANSWER: Pope **Benedict XVI** [or Cardinal Joseph Aloisius **Ratzinger**; prompt on **Benedict**]

<Henry Atkins, Religion>

19. The lyrics of this song often repeat an author's common theme of "[cultivating] a white rose / in June and January" for "the sincere friend." For 10 points each:

[10m] Name this patriotic song which often features lyrics from José Martí's *Versos Sencillos*, such as one describing "a truthful man from the land of palm."

ANSWER: "**Guantanamera**"

[10e] The poet José Martí died fighting for this island nation's independence from Spain.

ANSWER: Republic of **Cuba** [or República de **Cuba**]

[10h] The speaker of the standard version of "Guantanamera" says he would still "cultivate a white rose" for "the cruel one who would" kill him by performing this specific action.

ANSWER: **ripping** out his **heart** [accept obvious descriptions]

<Ganon Evans, World Literature>

20. Answer the following about the ancient city of Ebla, where Paolo Matthiae discovered thousands of namesake "tablets." For 10 points each:

[10h] Those tablets recount diplomatic relations between Ebla and the neighboring city-state of Mari, both of which were located in this modern-day country. Another set of tablets found in this country revealed the Ugaritic language.

ANSWER: **Syria** [or **Syrian** Arab Republic; or al-Jumhūrīyah al-'Arabīyah as-**Sūrīyah**]

[10e] The Ebla tablets were written in this writing system developed in Sumeria, which uses wedge-shaped symbols that are pressed into clay tablets.

ANSWER: **cuneiform**

[10m] Paleographer Giovanni Pettinato referred to the Semitic language of the Ebla tablets as a 'Paleo' form of those spoken by this group in the southern Levant. Phoenicians, Moabites, and Ammonites are branches of this broad group of people.

ANSWER: **Canaanites** [or **Kan'anim**]

<Lia Rathburn, Other History>