

**2022 Medium RaNge Academic, a Vanderbilt and Company
Collaboration vIa Network (MRNA VACCINE)**

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Packet 13: "i ' m not a chemsit"

1. The second theme of this symphony's second movement opens with staccato F minor chords played by the flutes under a rising minor 9th, descending minor 2nd "sighing" motif. This symphony's slow movement, which opens with the theme C, D, E, long E, F, was claimed by Willem Mengelberg to be a declaration of love for the composer's wife. The Scherzo and Rondo-Finale of this symphony are both in D major. A three eighth-note triplet, half note rhythm on (*) C sharp played by solo trumpet opens this symphony's first movement funeral march. This symphony's fourth movement is marked "Sehr langsam" or "Very slowly" and is scored for only strings and harp. For 10 points, an Adagietto is included in what Gustav Mahler symphony, which preceded his *Tragic Symphony*?

ANSWER: Gustav **Mahler**'s Symphony no. **5** [or **Mahler's Fifth** Symphony or **Mahler 5**, accept Symphony no. **5** or **Fifth** Symphony after "Mahler"; prompt on Symphony no. 5 or Fifth Symphony before "Mahler"]
<Aidan Fein, Classical Music>

2. In a novel by this author, three unnamed characters burn a child in the same site where they hang a character known as the Tinker. After losing his family land, a character created by this author moves into a mountainous cave, where he begins keeping the bodies of women he murders. This author, who set their first four novels in Appalachia, created a serial killer "much like yourself perhaps" named Lester Ballard. A character created by this author claims he will never (*) die while dancing in a bar under a meteor shower. In a novel by this author alternately titled "The Evening Redness of the West," a giant hairless man accompanies the bloodthirsty Glanton Gang. For 10 points, name this author of *Child of God* who created the Kid and the Judge in *Blood Meridian*.

ANSWER: Cormac **McCarthy** (The first novel clued is *Outer Dark*.)
<Andrew Hanna, American Literature>

3. **One approach to this discipline rests on four axioms, including impartiality to success or failure, causality, reflexivity, and symmetry; that approach to this discipline was advanced by the Edinburgh school of Barry Barnes and David Bloor [“Blure”] and is called the Strong Program. An approach to this discipline contrasts the “Table of Essence and Presence” and “Table of Absence in Proximity.” Ludwig Fleck’s cultural history of this discipline argued that different “thoughts collectives” have trouble reconciling their difference; that work introduced the principle of (*) incommensurability. A book about this discipline which describes how special periods of change produce dramatic “paradigm shifts” in understanding was written by Thomas Kuhn. For 10 points, name this discipline whose namesake method was developed by Francis Bacon and Isaac Newton.**

ANSWER: philosophy of science [or the history of science or knowledge]

<Erik Christensen, Philosophy>

4. **Squamata have independently evolved away from the production of these structures approximately 115 times, though several species have reverted to using them in a notable exception to Dollo’s law.**

Altricial [“all-TRISH-ee-ul”] organisms often develop with temporary appendages for pipping these structures. Many organisms that produce these structures can be related by shared genes for vitellogenin [“vai-TELL-oh-jen-in”], which acts as a precursor to the formation of these structures. Tossing may be performed in order to coordinate (*) clutches of these structures. Anamniotic organisms release these structures into water. Turtles uniquely use aragonite instead of calcite in the shells of these structures. Oviparous organisms like monotremes reproduce by laying, for 10 points, what reproductive structures that store embryos and yolks?

ANSWER: eggs [anti-prompt (ask, “can you be less specific?”) on eggshells or yolks]

<David Bass, Biology>

5. **A general native to this Greek city survived an assassination attempt ordered by Hicetas of Lentini and successfully ambushed a much larger enemy force at Crimissus, forcing Carthage to sue for peace. Herodotus writes that Melissa, the wife of a tyrant of this city, came back as a ghost after her husband killed her and defiled her corpse. This home of the general Timoleon was ruled by one of the Seven Sages named Periander, who was born in its colony of (*) Corcyra [“CORE-kur-ah”]. Its strategic importance came from the *diolkos*, a trackway which ships could be dragged across, until Lucius Mummius sacked it in 146 B.C.E. To unite the Greek city-states, Philip II established a League named for this chief city of Boeotia [“bee-OH-shuh”]. For 10 points, what city names an isthmus between the Peloponnese and mainland Greece?**

ANSWER: Corinth [or Korinthos; or Isthmus of Corinth]

<Owen Riley, Other History>

6. **The BBC has created a “Great” calculator of this concept based on the results of a 2013 survey that polled 160,000 Britons. Teenage boys grew aware of this concept in their rebelling against school discipline according to a 1977 book by Paul Willis. A book which claims that this concept in England “made itself, as much as it was made” was written by (*) E.P. Thompson. This concept titles an 1845 book that notes the unusually high death rates in Carlisle, Liverpool, and Manchester compared to nearby rural areas. That book, which describes the condition of one group defined by this concept in England, was written by Frederick Engels. For 10 points, the conflict theory of sociology analyzes struggles between different people separated by what concept into the bourgeoisie and proletariat?**

ANSWER: working class

<Erik Christensen, Social Science>

7. **Dr. Charles Eastman supported Grace Raymond Hebard's claim that this person was buried near Wind River and Fort Washakie. Glenna Goodacre created an obverse of this person to replace an image of Susan B. Anthony. Donald Jackson corrected Nicholas Biddle's mistranslation of this person's name as "boat-launcher." After encountering their brother Cameahwait ["come-EE-wait"], this person was allowed to vote alongside (*) York on where to settle Fort Clatsop. Toussaint Charbonneau ["TOO-sahn shar-buh-NO"] married this person, who is often depicted carrying their son Jean in a cradleboard as part of a group in which they used sign language to secure horses to cross the Rocky Mountains. For 10 points, name this Shoshone translator who helped guide the Lewis and Clark expedition.**

ANSWER: **Sacagawea** [or **Sagagawea**; or **Sakakawea**; prompt on Eagle Woman; prompt on Bird Woman]
<Ganon Evans, American History>

8. **A story written in this language features a love-triangle between a woman, a king, and a sculptor, who is sent to carve a set of stairs into a mountainside. In another story written in this language, a commander is defeated in a wrestling match by a woman whose helmet he later rips off. In that story written in this language, a man is forced to complete seven labors during which he is accompanied by only his horse. An (*) epic poem written in this language tells the story of a man who kills his son during a wrestling match and has a title that is commonly translated to the "Book of Kings." A collection of poetry written in this language and translated by Edward Fitzgerald features the line "the moving finger writes / and having writ / moves on." For 10 points, name this language that Omar Khayyam used to write the *Rubaiyyat*.**

ANSWER: **Persian** [or **Farsi**] (The first sentence refers to the story of Khosrow and Shirin; the second and third are about the seven labors of Rostam.)
<Andrew Hanna, World Literature>

9. **This scientist used chemical means to partially unroll twenty three of the Herculaneum papyri by placing them in a chlorine atmosphere. Protectors invented by this scientist to prevent the corrosion of copper plating on ships' hulls were removed because they led to severe biofouling. This scientist discovered that so-called "solid chlorine" was not the pure element but actually also contained water; that was the first known clathrate hydrate. This scientist showed that (*) chlorine and iodine are elements rather than compounds. This scientist invented a device in which a mesh screen prevents a flame from igniting methane, a namesake lamp for use in coal mines. For 10 points, name this scientist who pioneered electrolysis, which he used to discover many new elements, including magnesium, sodium, and potassium.**

ANSWER: Sir Humphry **Davy**
<Gerhardt Hinkle, Other Science>

10. **A photographer from this country created a diptych depicting four women striking the same poses in trench coats on the left and nude on the right. Husband and wife photographers from this country depicted industrial structures in *Anonymous Sculptures*. The first *SUMO* book of photography is by an artist from this country, with one of his *Big Nudes* on the cover. American artist Lee Miller was photographed in a leader of this country's (*) bathtub. A photograph from this country depicting a river flowing between two green fields is the most expensive ever sold. Yevgeny Khaldei took a photograph of a flag raised over a building in this country after a World War II battle. For 10 points, Andreas Gursky was from what country home to the Düsseldorf School?**

ANSWER: **Germany** [or **Deutschland**; accept Federal Republic of **Germany** or answers like Nazi **Germany** etc.]
(The husband and wife duo are Bernd and Hilla Becher; the photograph of a river described is *Rhein II* by Gursky.)
<Chandler West, Other Fine Arts>

11. Many gas-phase systems with hydroxyl radicals unusually display a negative value for this quantity. The Zeldovich number is directly proportional to the heat release parameter and this quantity, which is large in namesake asymptotics developed by Zeldovich and Frank-Kamenetskii to study combustion. This quantity equals the square of the sum of the Gibbs free energy and the reorganization energy all over four times the reorganization energy according to Marcus theory. This quantity is often found by plotting one over the temperature against the logarithm of the (*) rate constant since negative this quantity over RT is the exponential in the Arrhenius equation. This quantity is determined by finding the saddle point on the potential energy surface, which represents the transition state. For 10 points, name this quantity lowered by a catalyst.

ANSWER: **activation energy** [or **E_a**; or **delta G double dagger**; prompt on energy or transition state energy]
<Gerhardt Hinkle, Chemistry>

12. The phrase “thorn in my back” was coined by an emperor of this dynasty to describe his general Huo Guang [“hwoh gwong”], who deposed Prince He [huh] after twenty eight days. Peasants donated five pecks of rice to join a Daoist state within this dynasty led by the Celestial Masters. During this dynasty, the former merchant Sang Hongyang developed a form of grain supply management called the “equable marketing system” and facilitated the Discourses on Salt and Iron. Peasants painted their (*) eyebrows red to stand against a court official who rebelled and interrupted this dynasty with the Xin [“shin”]. Wang Mang [“wong mong”] rebelled against this dynasty, whose decline included Taoist revolts during the Yellow Turban Rebellion. For 10 points, name this Chinese dynasty founded by Liu Bang [“lyoo bahng”], that succeeded the Qin dynasty.

ANSWER: **Han** dynasty [or Western **Han**; or Eastern **Han**]
<Erik Christensen, World History>

13. Legendarily, in the sacred precinct of a temple of Zeus in this region, no shadows were cast, and anyone who entered would die within a year. In this region, Persephone was believed to be the daughter of Poseidon and was worshiped under the title Despoina. The Pleiades were born on a mountain in this region; Maia was later impregnated by Zeus in a cave on that mountain, Mount Cyllene. The main festival of this region was said to involve cannibalism, inspired by a king of this region who was turned into a (*) wolf by Zeus for serving him the flesh of his own son and was named Lycaon. The nymph Syrinx turned into reeds to escape a resident of this region who then made those reeds into a namesake set of pipes. For 10 points, Hermes and Pan were from what mountainous region in the Peloponnese that was considered a pastoral utopia?

ANSWER: **Arcadia** [prompt on the Peloponnese or Peloponnesos before mentioned]
<Gerhardt Hinkle, Mythology>

14. A poem in this language asks to “let the vineyards gallop and the sky remain” and concludes “child’s is the kingdom.” Repeated comparisons of a bright sun in the “unbleached gauze of sky” contrasting with a “sleeping sea” appear in a poem in this language inspired by liturgical songs of praise and split into three sections labeled “Genesis,” “The Passion,” and “The Gloria.” An Edmund Kelley-translated poem in this language describes “arriving” to the title city as “what you’re destined for” and wishes “your road is a long one, full of (*) adventure.” A group of men “assembled in the forum” face “sudden bewilderment” in a poem in this language, which concludes that the title people “were a kind of solution.” For 10 points, name this language used by the poets Constantine Cavafy and Odysseas Elytis.

ANSWER: Modern **Greek** [do NOT accept or prompt on “Ancient Greek”] (The poems are “For Efessos,” “The Axion Esti,” “Ithaka” and “Waiting for the Barbarians.”)
<Ganon Evans, European Literature>

15. Two beliefs called **Monkey Theory** or **Kitten Theory** in this tradition debate whether practitioners “cling on” or are nursed by God. It’s not Sufism, but “madmen for God” of this tradition are bauls. Saints in this tradition such as **Andal** and **Mira Bai** merged with statues in temples. Followers of this tradition typically make a *tilak* of U-shaped vertical lines representing a deity’s foot with a red dot representing a “Sri.” This tradition developed out of the **Pancharata movement** and is the most followed tradition of (*) bhakti devotees. This tradition follows a “Purushottama” who is worshiped alongside his twenty two avatars, including the Dashavatara. For 10 points, name this largest Hindu denomination which considers the Preserver God of the Trimurti as a supreme being.

ANSWER: **Vaishnavism** [or **Vaishnavite** Hinduism; or **Vaishnava** Hinduism; or Vaishnavi Hinduism; or **Vaisnava**; prompt on "Vishnu worship" or other descriptive answers; prompt on Hinduism]
<Ganon Evans, Religion>

16. This painting’s leftmost figure was inspired by a cameo of Augustus riding a Capricorn owned by **Domenico Grimani**. A **Leo Steinberg** essay attempts to identify “who’s who” in this painting, which serves as the backdrop for **Barbara Kruger’s** *You Invest in the Divinity of the Masterpiece*. Theories about a group of twelve people in this painting include one theorizing a dangling green cloth as an umbilical cord. A bearded man in a flowing (*) pink robe in this painting was the last figure its artist painted on custom scaffolding for a project financed by Pope Julius II. A male figure with an extra rib lounges on a green hill in this painting. For 10 points, name this Michelangelo painting on the Sistine Chapel’s ceiling depicting God extending his index finger towards the first man.

ANSWER: *The **Creation of Adam*** [prompt on answers mentioning the Sistine Chapel ceiling with “What painting within there?”]
<Ganon Evans, Painting/Sculpture>

17. A confederation of nobles, clergy, and cities named for this state fought the **Thirteen Years War**, seeking to be annexed by a neighboring kingdom; that war ended with the **Second Peace of Thorn**, which separated the “Royal” part of this region. The first ruler to adopt Lutheranism as a state religion was this state’s first duke **Albert**, a former **Hochmeister** of a (*) crusader order which he promptly expelled. A duke of this state, which had become joined with Brandenburg in a personal union, encouraged Protestants in France to immigrate with the Edict of Potsdam. An enlightened despot of this state conquered Silesia from Maria Theresa’s Austria. For 10 points, name this Baltic region famed for military might and ruled by the Hohenzollern king Frederick the Great.

ANSWER: **Prussia** [or **Preußen** (“PROY-sun”); or **Prūsija**; or Royal **Prussia**; or Ducal **Prussia**; or **Pomerelia**; or **Pomerania**; or **Masuria**]
<Erik Christensen, European History>

18. This event titles a poem which begins “I have a life that did not become,” titled for its “Morning” by **A. R. Ammons**. Two hourglass-shaped stanzas which shrink and grow with the speaker’s health make up a poem titled for this event, which ends “Affliction shall advance the flight in me.” Yet another poem titled for this day begins by musing upon “polite meaningless words” that the speaker uttered to (*) “vivid faces” which he met at “close of day.” George Herbert wrote a poem titled for this day’s “Wings.” The speaker names such martyrs as “MacDonagh and MacBride / And Connolly and Pearse” in a poem titled for this day which repeats “a terrible beauty is born” and honors an uprising in Dublin during World War I. For 10 points, a poem by William Butler Yeats is titled for what Christian holiday in 1916?

ANSWER: **Easter** [or **Pascha** or **Resurrection Sunday**; or “**Easter** Morning”; or “**Easter** Wings”; or “**Easter**, 1916”; or **Easter** Rising]
<Will Alston, British Literature>

19. **Richard Serra's tallest sculpture consists of seven steel plates located outside a museum on this city's dhow harbor. This city's airport contains an Urs Fischer sculpture of a massive yellow teddy bear sitting inside a lamp. In this city, a replica of the Rialto Bridge spans the Qanat Quartier on an artificial island called its country's namesake "Pearl." This city's northern suburb of Lusail contains a motor racing circuit and an "Iconic" stadium which is (*) under construction. Wadah Khanfar led the expansion of a media network based in this city whose name translates to "The Island". I.M. Pei's Museum of Islamic Art is located in this world capital, where a stadium named for Khalifa al-Thani will host the third-place match of the 2022 World Cup. Al Jazeera is headquartered in, for 10 points, what capital of Qatar?**

ANSWER: **Doha** [or ad-**Dahwa**]

<Jacob Augelli, Geography>

20. **A series of sequential reactions that all consume this species is its namesake "ladder." The antimatter counterpart of this species was made by colliding gold nuclei by the STAR collaboration. Two nearly-simultaneous reactions using this species are both only possible because of resonances in which their reactants and products have nearly identical energies; the second produces an unusual excited state of a different species named for (*) Hoyle. One over the square root of the energy of these particles is related to the log of the half-life by the Geiger-Nuttall law. In stellar nucleosynthesis, three of these particles combine to form a carbon-12 nucleus. The nucleus was discovered from the deflection of a beam of this particle shot at a piece of gold foil. For 10 points, name this particle made of two protons and two neutrons.**

ANSWER: **alpha** particle [or **helium-4** nucleus; or **${}^4\text{He}^{2+}$** ; or **${}^4\text{He}^{+2}$** ; prompt on **helium** nucleus, **He^{2+}** , or **He^{+2}**]

<Gerhardt Hinkle, Physics>

1. After a foreign policy disaster, an un-coded telegram from this prime minister's Queen castigating him was made public. For 10 points each:

[10m] Name this prime minister, who faced a major public backlash after failing to prevent General Gordon's death at the hands of a messianic religious and military leader who claimed to be the Mahdi.

ANSWER: William Ewart **Gladstone**

[10e] The Mahdi revolted against British and Egyptian rule in this modern-day country. His forces defeated Slatin Pasha in this country's region of Darfur.

ANSWER: Republic of **Sudan**

[10h] For most of its existence, the Mahdist State was led by this man, whose rule collapsed after his defeat by Lord Kitchener in the 1898 Battle of Omdurman, where he had moved his capital from Khartoum after succeeding the Mahdi. Title or name acceptable.

ANSWER: The **Khalifat** Al-Mahdi [or the **Caliph**; or **Abdullah Ibn-Mohammed** Al-Khalifa; or Abdullah **al-Khalifa**; or **Abdullahi al-Khalifa**]

<Lia Rathburn, Other History>

2. Siriku Adepoju is a master of one type of these instruments whose tone can be modified to mimic human speech. For 10 points each:

[10e] Give this type of percussion instrument, which includes the West-African Djembe and the Udu.

ANSWER: **drums**

[10h] The talking drum is referred to as the Tama and is used with the Nder and Sabar drums in this musical genre. The Orchestra Baobab and Youssou N'Dour are two popular artists in this genre from Senegal and the Gambia.

ANSWER: **mbalax** [or **mbalakh**]

[10m] Youssou N'Dour co-wrote the song "La Cour des Grands" for one of these events. Other songs written for these events include Carlos Santana's "Dar um Jeito" and Shakira's "Waka Waka."

ANSWER: FIFA **World Cups**

<Aidan Fein, Other Fine Arts>

3. This author's collection *Lost in the Funhouse* opens with a one sentence "Frame-tale" intended to be cut out and turned into a Mobius strip. For 10 points each:

[10m] Name this postmodern author of *Giles Goat-Boy* and *The Sot-Weed Factor*.

ANSWER: John **Barth** [or John Simmons **Barth**]

[10e] Barth's postmodern manifesto "The Literature of Exhaustion" points to this author of "Signs and Symbols" and the novel *Lolita* as a major precursor.

ANSWER: Vladimir **Nabokov** [or Vladimir Vladimirovich **Nabokov**; or Vladimir **Sirin**]

[10h] This author of the 2020 Pulitzer winner *The Night Watchman* studied creative writing under Barth. This author's debut novel expands stories like "The Red Convertible" and "The World's Greatest Fisherman."

ANSWER: Louise **Erdrich** [or Karen Louise **Erdrich**]

<Henry Atkins, American Literature>

4. This quantity times the path length times the extinction coefficient gives the absorbance, according to the Beer-Lambert law. For 10 points each:

[10e] Name this quantity which for a solution is often measured in millimolar. The activity can replace this quantity in calculations of the equilibrium constant for additional accuracy.

ANSWER: **concentration**

[10m] The Beer-Lambert law governs the operation of these devices, one version of which requires a quartz cuvette to hold the sample. The Nanodrop is one of these devices which allows you to pipet the sample onto a pedestal.

ANSWER: **spectrophotometer**

[10h] Spectrophotometry is often applied to double-stranded DNA, which has peak absorption at this wavelength. The ratio of absorbance at this wavelength to absorption at 280 nanometers is a measure of DNA purity.

ANSWER: **260** nanometers [accept just **260**, but if they say any other units don't accept the answer]

<Eric Mukherjee, Chemistry>

5. One piece in this genre consists of seven uninterrupted sections and is indirectly based on the rhythms and melodies of Armenian folk music although it includes no direct quotations. For 10 points each:

[10h] Name this genre of a celebrated A-flat major "virtuoso showpiece" by Alexander Arutunian.

ANSWER: **trumpet concerto** [prompt on concerto]

[10m] This composer's two-movement D major trumpet concerto is one of his few pieces in the standard repertoire. This Salzburg-based composer wrote a famous violin textbook and arranged lessons for his daughter Nannerl starting at age 7.

ANSWER: **Leopold Mozart** [prompt on Mozart]

[10e] This composer's first piano concerto is sometimes considered a double concerto for trumpet due to the solo trumpet's prominent role. This Soviet composer wrote the *Babi Yar* and *Leningrad* symphonies.

ANSWER: Dmitri **Shostakovich**

<Chris Sims, Classical Music>

6. Caryl Churchill and Tom Stoppard got their professional starts working in this genre, which boomed after World War II. For 10 points each:

[10m] Name this genre. The audience listens to the dreams of sleeping townfolk like Captain Cat and Mrs. Ogmores-Pritchard in one of these works, *Under Milk Wood*.

ANSWER: **radio** dramas [or **radio** play; prompt on drama; prompt on play]

[10e] This author wrote *Under Milk Wood* and recited stories like *A Child's Christmas in Wales* on BBC Radio. This author also wrote the poem "Do not go gentle into that good night."

ANSWER: Dylan **Thomas**

[10h] This author began a meteoric rise in the 1960s with the BBC Radio drama *The Ruffian on the Stairs*. This author of dark comedies like *Loot* and *What the Butler Saw* was murdered just four years later.

ANSWER: Joe **Orton** [or Joe Kingsley **Orton**]

<Henry Atkins, British Literature>

7. In a book titled for this philosopher Gilles Deleuze argued that “if all the future is already given in the past,” then “true innovation is impossible.” For 10 points each:

[10m] Name this philosopher who used the image of an inverted cone to illustrate his idea that the past affects perception of the present to varying degrees. This philosopher illustrated his concept of multiplicity in *Time and Free Will*.

ANSWER: Henri **Bergson**

[10e] Bergson’s image of an inverted cone appears in his book titled for this concept and memory. Hylomorphism argues for the equivalence of form and this concept, which according to Democritus is divided into atoms.

ANSWER: **matter**

[10h] Bergson criticized the theory of changeless “Ideas” proposed in this dialogue. In this dialogue, Socrates draws a distinction between sensibles and the Forms and argues that things can take part in both the forms for Unity and Plurality.

ANSWER: **Parmenides**

<Vikshar Athreya, Philosophy>

8. Answer some questions about events in Marine officer Smedley Butler’s book *War is a Racket*, for 10 points each:

[10e] Butler described fighting Filipino rebels resisting their new American colonizers after this war. The U.S. also acquired Puerto Rico after this war.

ANSWER: **Spanish-American** War

[10h] *War is a Racket* discusses the Banana Wars and this 1933 conspiracy in which Butler claimed that corporate interests approached the American Legion and proposed a coup against Franklin Delano Roosevelt.

ANSWER: **Business Plot**

[10m] Butler’s Marines were ambushed at Fort Dipitie at the start of the 19-year American occupation of this country in 1915 after the death of Vilbrun Guillaume Sam. A dictator of this country earned his nickname while studying medicine as part of American efforts to eradicate tropical diseases.

ANSWER: **Haiti** (The unmentioned dictator is “Papa Doc” Duvalier.)

<Erik Christensen, American History>

9. Answer the following about mythological figures committing violence against the sun. For 10 points each:

[10m] Name this archer who shot nine of the ten suns when they all rose at the same time, turning them into three-legged ravens. This husband of the moon goddess, Chang’e, defeated the elephant-eating snake *bashe*.

ANSWER: **Hou Yi** [or **Shen Yi**]

[10e] In Polynesian mythology, this figure decided the Sun moved too fast across the sky, and proceeded to hit the sun god with a jawbone until he agreed to slow down. This trickster god pulled islands from the sea with a fishhook.

ANSWER: **Maui**

[10h] In Norse mythology, this figure chases the sun goddess Sol, while Hati chases the moon. This figure’s name means “trickery.”

ANSWER: **Sköll**

<Owen Riley, Mythology>

10. In order for this aircraft to be deployed, a “belly pan” protecting the Sample Caching System was dropped to the ground. For 10 points each:

[10m] Name this helicopter drone that was brought to Mars in 2020 on the *Perseverance* rover.

ANSWER: **Ingenuity** [prompt on *Ginny*]

[10h] *Perseverance*'s Sample Caching System features five preloaded “witness tubes” included to detect the presence of the “forward” form of this phenomenon. Planetary protection is the goal of preventing one form of this phenomenon, which possibly occurred when the *Beresheet* lander crashed on the moon.

ANSWER: **contamination** [or forward **contamination**; or biological **contamination**]

[10e] *Perseverance* landed in Jezero, an example of one of these features that used to contain a lake. These features, which may contain plains like Hellas Planitia, are caused by impacts of smaller bodies.

ANSWER: impact **crater** [anti-prompt (ask “can you be less specific?”) on impact **basin**]

<David Bass, Other Science>

11. This religion's primary scripture features an account in which a speech reminiscent of *The Thunder, Perfect Mind* is addressed to the anthropomorphic book Dinanukht; that speech is by Ruha, the queen of the World of Darkness. For 10 points each:

[10h] Name this religion whose main scripture has "Right" and "Left" halves traditionally written on opposite sides of the same book. This religion's central soteriological narrative is Hibil Ziwa's descent into the World of Darkness.

ANSWER: **Mandaic** [or **Mandaeanism**; or **Mandaiia**; or **Mandā'īya**; or **Sabianism**; or **Sābi'iyah**]

[10e] Before Hibil's descent, the King of Light baptizes him in 360 of these places. Mandaicans are baptized every Sunday in these places; their central prophet, John the Baptist, baptized Jesus in one of these places.

ANSWER: **rivers** [or **yardnas**; or **yardenas**]

[10m] Mandaicism is the only branch of this tradition that survived from antiquity into the present. The aforementioned poem *The Thunder, Perfect Mind* also came from this tradition and was in a cache of this tradition's texts at Nag Hammadi.

ANSWER: **gnosticism**

<Gerhardt Hinkle, Religion>

12. In 1960 under the backing of Belgian mining companies, the State of Katanga under Moïse Tshombe declared independence from this leader's government. For 10 points each:

[10m] Name this first Prime Minister of an independent Democratic Republic of the Congo. This leader was deposed by Mobutu Sese Seko after seeking assistance from the Soviet Union.

ANSWER: Patrice **Lumumba**

[10e] In the 1970s, the Shaba I and Shaba II invasions were fought after soldiers based in this country entered the Congolese region of Katanga. The MPLA and UNITA fought a civil war in this country, which like Mozambique, was a Portuguese colony in southern Africa.

ANSWER: **Angola** [or the Republic of **Angola**]

[10h] The Shaba I and II invasions were supported by this leader of the MPLA. This first President of Angola allied with Cuba and the USSR in his country's War of Independence and subsequent Civil War before his death in 1979.

ANSWER: António Agostinho **Neto**

<Lia Rathburn, World History>

13. In a novel, this character is served by Mark Ratslayer and becomes obsessed with a condemned prisoner named al-Notsri. [“ha-notes-ree”] For 10 points each:

[10m] Name this character, who is the protagonist of a novel-within-a-novel that is restored after Professor Woland tells the Master that “manuscripts don’t burn.”

ANSWER: **Pontius** Pilate [or Marcus Pontius **Pilate**]

[10e] The Master is one of the two title characters in this author’s novel *The Master and Margarita*.

ANSWER: Mikhail **Bulgakov**

[10h] In *The Day of the Oprichnik*, a novel by this author of the *Ice Trilogy*, the title character inverts Bulgakov, saying “in general, books burn well. Manuscripts go like gunpowder.”

ANSWER: Vladimir **Sorokin**

<Andrew Hanna, European Literature>

14. During a nomination hearing, SEC Chairman Gary Gensler brought concerns over the enormous size of control that this firm has over trading. For 10 points each:

[10m] Name this firm, led by founder and CEO Ken Griffin, which controls 40% of all stock trades in the U.S.

ANSWER: **Citadel** Securities [or **Citadel** LLC]

[10e] Many of the stock trades made on this app, named for a folk hero, are sold to Citadel for a finder’s fee. This company has been criticized for encouraging unusually high levels of trading.

ANSWER: **Robinhood**

[10h] Much of the profit made by the high levels of trading on Robinhood is from charging a small rebate known by this four-word phrase for directing the trade to Citadel. Bernie Madoff pioneered charging rebates known by this phrase, often criticized as a legal form of kickbacks.

ANSWER: **payment for order flow** [or **PFOF**]

<Erik Christensen, Other>

15. Strigolactones [“STREE-go-lack-tones”] stimulate the formation of these structures by activating mitochondria and increasing oxidation. For 10 points each:

[10m] Name these mutualistic associations, the arbuscular variety of which involves penetration of cortical cells. These symbiotic relationships involve the exchange of sugars produced from photosynthesis for soil nutrients.

ANSWER: **mycorrhizae** [or arbuscular **mycorrhizae**; or ecto**mycorrhizae**]

[10e] Plants that receive more nutrients from mycorrhizae than photosynthesis exhibit the “myco” variety of this behavior. Unlike autotrophs, organisms that exhibit this behavior are unable to perform carbon fixation

ANSWER: **heterotrophy** [or myco**heterotrophy**; or chemo**heterotrophy**]

[10h] Parasitic fungi often have hyphae with these sharp tips on the end. These structures penetrate and lyse cell walls in order to increase their contact area with cell membranes.

ANSWER: **haustoria** [or **haustorium**]

<Vikshar Athreya, Biology>

16. A fictional version of this author tries to take over the world with an army of Carlos Fuentes clones in *The Literary Conference*. For 10 points each:

[10h] Name this author of a novel in which Johann Moritz Rugendas is struck by lightning in the Pampas, *An Episode in the Life of a Landscape Painter*. He also wrote *How I Became a Nun*.

ANSWER: Cesar **Aira**

[10m] In another novel, Aira's nemesis is a man with this profession, Actyn, who tries to prove Aira cannot perform miracles. Juvenal Urbino has this profession in *Love in the Time of Cholera*.

ANSWER: **doctor** [or **physician** or other obvious equivalents; prompt on **medical** professional]

[10e] *Love in the Time of Cholera* was written by this Colombian author of *One Hundred Years of Solitude*.

ANSWER: Gabriel **García Márquez** [prompt on partial answers; or Gabriel José de la Concordia **García Márquez**]

<Owen Riley, World Literature>

17. Paintings like Carl Ray's "Taboo Island," which shows a man surrounded by a large bird, exemplify art from this country's PNIAI group of artists. For 10 points each:

[10h] Name this country, whose PNIAI group included Carl Ray and Daphne Odjig. A painter from this country who used bright colors and thick black outlines founded this country's "Woodlands School" of art.

ANSWER: **Canada**

[10m] Norval Morriseau, who founded the "Woodlands School," signed his works as a "copper" one of these animals. These indigenous motifs of the Pacific Northwest and Canada are often depicted in an X-shape with red zig-zagged wings.

ANSWER: **Thunderbirds** [or **binesi**; or **animikii**; or **pihesiw**; or Copper **Thunderbird**; or Ozaawaabiko-**binesi**; or Miskwaabik **Animikii**; prompt on **birds**]

[10e] Morriseau painted a spirit shaman alongside a thunderbird depicted as one of these structures. Examples of the "shame" type of these carvings are ones named for Exxon and Seward, which are usually made from large trees.

ANSWER: **totem** poles [or **totems**]

<Aidan Fein, Painting/Sculpture>

18. This king's wife, Clotilde, was canonized for her role in having him convert to Catholicism over the prevalent Arian sect. For 10 points each:

[10m] Name this king, who allied with the Ostrogoths through his sister Audofleda's marriage to Theodoric and founded the Merovingian kingdom.

ANSWER: **Clovis** I

[10e] Clovis' conquests included territories won from the *Visi-* branch of these people in southern France. The *Ostro-* branch of these people ruled Italy immediately after the fall of the Roman Empire.

ANSWER: **Goths** [or **Visigoths**; or **Ostrogoths**]

[10h] Clovis I defeated Syragius at a battle named for this city and integrated its territory into the Frankish kingdom. That state centered on this city claimed to succeed the Roman Empire as the "*Regnum Romanorum*."

ANSWER: **Soissons** ("swuh-son") [or **Noviodunum**]

<Erik Christensen, European History>

19. Hamilton's principal function is usually formulated by fixing this quantity at time t sub zero and letting it vary at time t . For 10 points each:

[10m] Name this quantity, the time integral of the Lagrangian. The Euler-Lagrange equation is used to find a trajectory that minimizes this quantity.

ANSWER: **action**

[10e] The Lagrangian is the difference between this quantity, symbolized T , and the potential energy. For translational motion, this quantity equals one-half $m v$ squared.

ANSWER: **kinetic** energy

[10h] This version of the principle of least action states that the path of a system between two states corresponds to an extremum of the abbreviated action functional.

ANSWER: **Maupertuis'** ("MAU-per-toyz") principle

<Eric Mukherjee, Physics>

20. In Philippe Aghion and Peter Howitt's model of this phenomenon, a business-stealing effect leads to more economic growth than is desirable. For 10 points each:

[10m] Name this process of entrepreneurs creating new products or markets that render existing ones obsolete.

ANSWER: **creative destruction**

[10e] Creative destruction was called a "perennial gale" in this economist's book *Capitalism, Socialism, and Democracy*.

ANSWER: Joseph Alois **Schumpeter**

[10h] Schumpeter's teacher Eugen von Böhm-Bawerk worked on explaining why this value was positive. His contemporary Knut Wicksell distinguished between a "natural rate" of this value based on the return on capital and a "market rate."

ANSWER: **interest** rate [prompt on return on capital]

<Sam Bailey, Social Science>