

## Chicago Open 2023

Head Edited by Henry Atkins and Alex Fregeau

Edited by David Bass, Jacob Egol, Ganon Evans, Davis Everson-Rose, Alistair Gray, Gerhardt Hinkle, Arya Karthik, Caleb Kendrick, Itamar Naveh-Benjamin, Dan Ni, Victor Pavao, Ryan Rosenberg, and Kevin Thomas

Written by Ankit Aggarwal, Mike Bentley, Austin Brownlow, Jason Hong, Allan Lee, Young Fenimore Lee, Sheena Li, Tim Morrison, Ani Perumalla, Jonathen Settle, Munir Siddiqui, Joe Su, Ashish Subramanian, Geoffrey Wu, and Ivvone Zhou

Proofreading and Logistics by Em Gunter and Young Fenimore Lee

Made Fresh by Subway

## Finals 1

### Tossups

1. A technique named for this physicist derived from writing “one over  $A$ ” as an integral of a negative exponential allows for combining propagators. This physicist’s name is [emphasize] *alphabetically later* in equations for the functional derivative of the generating functional, often called the QFT analog of the Euler–Lagrange equations. This physicist names the electric field limit at which pair production occurs. This physicist’s name is [emphasize] *alphabetically second* in an equation that avoids a (\*) singularity by changing a denominator to “ $E$  minus  $H$ -nought plus-or-minus  $i$  epsilon” and writes a scattered wavefunction in terms of the scattering potential; that equation is co-named for Bernard Lippmann. For 10 points, name this physicist who, with Tomonaga and Feynman, won the 1965 Nobel Prize for developing quantum electrodynamics.

ANSWER: Julian Schwinger [or Julian Seymour Schwinger; accept Schwinger parametrization, Schwinger functions, Schwinger limit, or Lippmann–Schwinger equation] (The second sentence refers to the Schwinger–Dyson equation.)

<Tim Morrison, Physics>

2. The studio version of this song is compared to a live version recorded at Michigan State in a 2016 book edited by Philip Lambert, which also identifies a short “fugato” section between its final chorus and coda. A section of this song underpinned by jaw harp and tack piano abruptly cuts to a slow “meditation” section in F major. This song’s coda begins as the cellos chug low triplets and Paul Tanner plays an electro-theremin. A re-recording of this song appears after the previously unreleased songs (\*) “In Blue Hawaii” and “Mrs. O’Leary’s Cow” on a 2004 album. Derek Taylor popularized the term “pocket symphony” when describing this 1966 song, which features vocals from Al Jardine and Mike Love. This song’s title was suggested by Tony Asher, who previously collaborated on *Pet Sounds*. Brian Wilson wrote, for 10 points, which progressive pop song by the Beach Boys, whose chorus mentions getting “excitations”?

ANSWER: “Good Vibrations”

<Victor Pavao, Other Fine Arts>

3. In a play by this author, a poet tricks a beautiful woman into smiling by telling her that an imaginary bird will “fly better” if she does. In another play by this author, a chamberlain quips that it would be a “most acceptable interlude” if a pair of seals would sing “Salamambo;” later in that play, two actors sing “Salamambo” while an Illusionist presents an “Interlude” which reveals that Bertha is not royalty but a fisherman’s child. One of this author’s characters claims that she has never actually seen her husband, since some futures appear gray to her while others appear in vivid color. Maurice (\*) Valency translated a play by this author that adapts de la Motte Fouqué’s (“duh lah mut foo-KAY’s”) *Märchen* (“MAYR-chen”) “Ondine.” The “Gates of War” are shut and reopened in a play by this author that ends with Troilus accepting Helen’s kiss. For 10 points, Christopher Fry’s *Tiger at the Gates* adapts what French playwright’s *The Trojan War Will Not Take Place*?

ANSWER: Jean Giraudoux (“zhee-roh-DOO”) [or Hippolyte Jean Giraudoux]

<Arya Karthik, European Literature>

4. **The explosion in popularity of studying this concept is critiqued in a 2011 article and 2017 “genealogy” by Ruth Leys. The effect of this concept on judgment is heightened in complex situations, per Joseph P. Forgas’s model of its “infusion.” Artificial intelligence meant to identify this concept in humans is the focus of a branch of computing pioneered by Rosalind Picard. A related concept is “constructed” from this “core” one, per a theory developed by (\*) Lisa Feldman Barrett. Silvan Tomkins wrote a four-volume text titled for this concept, imagery, and consciousness. Key texts in a trendy psychological theory named for this concept include Lauren Berlant’s *Cruel Optimism* and Brian Massumi’s essay on this concept’s “Autonomy.” The display of this concept may be “flat” for people with autism. For 10 points, name this term in psychology for the experience of feeling emotion.**  
ANSWER: **affect** [accept word forms like **affective**; accept **affect** infusion model; accept **affective** computing; prompt on **emotion** or **feelings**]  
<Tim Morrison, Social Science>

5. **This company’s products tended to corrode quickly due to their use of top-secret 7075 aluminum alloy, or “extra super duralumin.” The Scottish merchant Thomas Blake Glover helped establish this company in the 1870s as a shipping and coal mining venture, which quickly absorbed a rival steamship line that became its subsidiary NYK. John Thach developed the “Thach Weave” to counter this company’s products; one of those products underwent (\*) reverse-engineering after being found on Akutan Island. Workers forced into labor at this company’s shipyards were awarded damages by the South Korean Supreme Court in 2018 as part of an ongoing trade dispute. Jirō Horikoshi designed the Raiden (“rye-den”) and the A5M as chief engineer for this *zaibatsu*. For 10 points, name this conglomerate and auto manufacturer that, during WWII, built armaments and planes like the Zero.**  
ANSWER: **Mitsubishi** [or the **Mitsubishi** Group, **Mitsubishi** Corporation, **Mitsubishi** Heavy Industries, or the **Mitsubishi** Aircraft Company; accept **Mitsubishi** Motors]  
<Henry Atkins, World History>

6. **This character challenges a man whom he likens to a snake charmer by proposing that all goods can be divided into intrinsic goods, instrumental goods, and goods that are both. After this character dismisses a city free of luxury as “a city of pigs,” another character proposes a “feverish city.” In response to this character, his interlocutor discusses a man with poor eyesight reading tiny letters from a great distance to motivate an analogy between the (\*) soul and a city. After his interlocutor refutes Thrasyarchus’s claim that justice is “the advantage of the stronger,” this brother of Adeimantus challenges Socrates by telling a story about a shepherd who murders the king of Lydia and sleeps with his wife. For 10 points, name this elder brother of Plato who, in the Book II of the *Republic*, tells the story of the Ring of Gyges.**  
ANSWER: **Glaucon**  
<Caleb Kendrick, Philosophy>

7. **One algorithm for this task deals with potential race conditions by inserting low-level “reference barrier” code on reads and writes that allow it to safely move data. That algorithm for this task is named Shenandoah. “Eden space” is one term for the first level of a hierarchy used by algorithms for this task that account for the empirically-justified generational hypothesis. Cheney’s algorithm for this task was the first to copy between “to-space” and “from-space,” in an example of (\*) tri-color approaches to this task. Weak references can prevent cycles that hinder completing this task. Early algorithms for this task “stop the world” periodically to perform mark-and-sweep passes, leading to unpredictable large pauses in execution. Reference counting is an alternative to tracing methods for this task. For 10 points, name this task of cleaning up memory that holds unreachable objects.**  
ANSWER: **garbage collection** [accept **tracing**; prompt on automatic **memory management**]  
<Alistair Gray, Other Science - Computer Science>

8. A character with this role titles a poem that dedicates several stanzas to describing the flattering qualities of a king seen during his “victory tour of the world.” In Arthur Ryder’s rhyming translation, a character with this role is told to recall “o’er and o’er” a conch and a flower “painted by the door.” In a 16th-century poem, a swan acts in this role after a love goddess collapses in grief near a riverbank. In another poem, an “elephant-shaped” character with this role is told of rivers from which they will be able to drink after putting out a forest (\*) fire. A genre focusing on characters with this role began with a long poem that pioneered 17-syllable *mandākrāntā*, or “slow-stepping,” meter. In that poem, a banished *yaksha* (“YUCK-shuh”) asks a character to perform this role and fly to the Himalayan city of Alakā (“UH-luh-kah”) to find his bride. For 10 points, a cloud takes on what role in a long poem by Kālidāsa?

ANSWER: messengers [or dūta; accept *The Cloud Messenger* or *Meghadūta*; accept *The Wind Messenger* or *Pavanadūta*; accept *The Swan Messenger* or *Haṃsadūta*; prompt on clouds, winds, or answers that describe a weather phenomenon until “cloud” is read by asking “what role does that character perform?”]

<Henry Atkins, World Literature>

9. They’re not from Brazil, but Arthania and Kuyaba were two of the three realms the lands of these people were divided into by Arab authors. Some scholars have postulated a controversial hypothetical state of these people based on use of the word “chacanus” (“hah-kah-nooss”) in texts like the *Annales Bertiniani*. A controversial document may reference a king of these people when using the letters HLGW. Modern nationalists who claim that these people were almost entirely autochthonous are called (\*) anti-Normanists. The founder of a dynasty of these people was “called” to rule a city known to a people to their west as Holmgard. They aren’t Bulgars, but the hygiene of these people was criticized by Aḥmad ibn Faḍlān. An elite bodyguard unit for Byzantine emperors was named these people, the Varangian Guard. For 10 points, name these people who founded a state governed from Kyiv.

ANSWER: Rus’ [or Kievan Rus’ or Variags; accept Varangians until “Varangian” is read; prompt on Slavs, Russians, Ukrainians, Ruthenians, Vikings, Norsemen, Swedes, or Scandinavians] (Chacanus is a latinization of “khagan.”)

<Alex Fregeau, European History>

10. Palm fronds are placed on hearses to invoke this figure’s patronage of motorists, whom he protects from accidents by warding off evil spirits. The soothing nature of snail’s blood calms this figure when it is applied to cuts made during circumcision. Followers of this figure fear instant death and being cuckolded from the sight of mating spitting cobras. Witnesses may kiss a machete when swearing by this figure to tell the truth in court. Dogs are commonly sacrificed to this figure, who is variously syncretized with (\*) St. Anthony and St. George in Candomblé. Ire Ekiti was home to this orisha, who sank into the earth. It’s not Oduduwa, but Ifè’s Olojo festival celebrates this father of Prince Òrànmiyàn, who led the orishas as they descended on Earth. For 10 points, knives, guns, and anvils are symbols of what patron of hunters and blacksmiths, the orisha of war and iron?

ANSWER: Ogun [or Ogum or Ogou; accept Gu or Egu]

<Kevin Thomas, Beliefs>

11. To mock an artwork in this museum, Régis Parray used a toy dump truck to move 340 grams of dust from the basement of Chartres Cathedral. An artwork in this museum consists of 66 fluorescent tubes visible from its outside neighborhood. This museum contains a kinetic sculpture in which 1,080 toy cars traverse multiple levels of tangled track, *Metropolis II*. This museum’s director Michael Govan has commissioned ambitious projects such as a suspended 360-ton (\*) boulder slowly trucked in from a quarry 100 miles away. This museum is losing much of its floor space as part of a controversial renovation of its East Campus by Peter Zumthor. This museum’s outdoor installations include Michael Heizer’s *Levitated Mass* and a grid of 202 refurbished street lamps, Chris Burden’s *Urban Light*. For 10 points, name this large art museum on Wilshire Boulevard located next to the La Brea Tar Pits.

ANSWER: LACMA [or Los Angeles County Museum of Art] (The second clue refers to Robert Irwin’s Miracle Mile.)

<Henry Atkins, Visual Fine Arts>

12. Before rising to international fame as a cyclist, Major Taylor helped found this city's See-Saw Cycling Club for black residents. This city's namesake *Freeman* newspaper was the first [emphasize] *illustrated African-American newspaper*. The "Battle of Pogue's Creek" was the arrest and disarmament of attendees of a Democratic convention in this city that convened to criticize the wartime policies of Governor Oliver P. Morton. In 1910, the (\*) Madam C. J. Walker Manufacturing Company was incorporated in this city. A speech given in this city by Robert F. Kennedy called for "[taming] the savageness of man" in response to the assassination of Martin Luther King, Jr. Madge Oberholtzer's 1925 abduction from this city led to a massive decline in membership of its state's most prominent organization. For 10 points, D. C. Stephenson created the largest chapter of the KKK in the 1920s from what city?

ANSWER: Indianapolis, Indiana

<Alex Fregeau, US History>

13. In the bromination step of this compound's synthesis, the solvent must be dioxane because that step has an indirect mechanism in which the dioxane is brominated and in turn brominates the target molecule. One step in the synthesis of this molecule has a double dehydrobromination whose product immediately dimerizes via the Diels-Alder reaction. The 2022 synthesis of the perfluorinated form of this compound confirmed the presence of "sigma stellation" in which overlapping antibonding orbitals allow it to form a radical anion by (\*) trapping an electron in its interior. Because of more efficient crystal packing, this compound's heptanitro- form is actually an even more powerful explosive than its octanitro- form. Philip Eaton developed the first synthesis of this compound, which was previously thought to be impossible because of its many strained 90 degree bond angles. For 10 points, name this hydrocarbon whose eight carbons form the vertices of a Platonic solid.

ANSWER: cubane [prompt on C8H8]

<Gerhardt Hinkle, Chemistry>

14. After this leader openly endorsed Mike Cargile for California's 35th district in 2022, he was accused of election interference by representative Norma Torres. A law passed by this leader's government was inspired by the success of an initiative begun by American surfer Mike Peterson in the town of El Zonte. This leader sent armed soldiers into parliament to force legislators to accept a \$109 million U.S. loan in an incident known as 9-F. This leader's government built the (\*) megaprison CECOT as part of an ongoing "state of exception," which has resulted in his country having the world's highest incarceration rate. In 2017, this leader founded the party Nuevas Ideas after being expelled from the FMLN. The unavailability of the e-wallet Chivo undermined this leader's 2021 decision to accept bitcoin as legal tender. For 10 points, name this right-wing populist president of El Salvador.

ANSWER: Nayib Bukele [or Nayib Armando Bukele Ortez]

<Caleb Kendrick, Modern World>

15. In this book, a footnote to the word "foetus" consists of French text excerpted from the fictional study "Les enfants célèbres." A chapter in this book opens with five story diagrams drawn with the "help of a vegetable diet." This book contains a vicious Latin excommunication with alternate word endings printed between lines, one of many sections with "mistranslated" bilingual text presented *en face*. The first editions of this book contained a (\*) marbled page made up of swirling colors, unique for each copy. Early editions of this book represent a death by printing two pages blacked out with ink. This novel, which uses thousands of dashes of varying length for parentheticals, includes a discussion of private obsessions called "HOBBY-HORSES." For 10 points, Doctor Slop and Uncle Toby appear in what digressive novel by Laurence Sterne?

ANSWER: Tristram Shandy [or *The Life and Opinions of Tristram Shandy, Gentleman*]

<Henry Atkins, British Literature>

16. Every 7 years, this figure adds a stitch to a linen chemise while imprisoned in a rock, awaiting a man brave enough to remove the golden key in her mouth. This figure used magic to construct a castle depicted on the March miniature of the *Très Riches Heures* (“tray reesh urr”) *du Duc de Berry*. The Good Knight of England fails to retrieve a treasure guarded by this figure’s sister, Palatyne, who awaits the arrival of this figure’s son, Geoffrey of the Great Tooth. This figure joins her sisters in trapping their father, King Elynas, under a mountain, resulting in their exile from Avalon. A prose romance by (\*) Jean d’Arras (“dah-RAHSS”) follows this ancestor of the Houses of Anjou, Lusignan (“loo-seen-YAWN”), and Luxembourg. This figure flew out of a window after learning that her husband, Raymund, entered her chambers on a Saturday and discovered her supernatural form while she bathed. For 10 points, name this French water fae cursed with the lower body of a serpent.

ANSWER: Mélusine [or Melusina; accept *le Roman de Mélusine*]

<Henry Atkins, Beliefs>

17. A protein which transfers molecules containing this functional group was targeted by Pfizer’s clinically ineffective inhibitor torcetrapib (“tor-SET-tra-pib”). A subclass of drugs defined by this functional group more often cause an allergic reaction reversed with Intralipid and characterized by tinnitus, a metallic taste, and seizures. Pralidoxime can free up serine-204 of the Ser-His-Glu triad to bind this functional group if it is administered before enzyme “aging” occurs. The hydrolysis of this functional group forms benzoyl-ec-gonine in the metabolism of (\*) cocaine. CETP exchanges molecules containing this functional group between HDL and LDL. An enzyme that cleaves this functional group is inhibited by organophosphates at the synaptic cleft, preventing it from breaking down acetylcholine. For 10 points, which functional group forms the bonds between the three fatty acid chains and glycerol backbone of triglycerides?

ANSWER: esters [accept cholesteryl esters or choline esters; accept acetylcholinesterase; prompt on acetylcholine by asking “which functional group is generated by the synthesis of acetylcholine?”; prompt on triglycerides] (The second clue refers to ester local anesthetics, which more commonly cause local anesthetic systemic toxicity (LAST) than amide local anesthetics.)

<Itamar Naveh-Benjamin, Biology>

18. This conflict inspired a Trinidadian trade unionist named Adrian Rienzi to organize a platform of demands against the eventual winner. Three sacks of wedding rings donated by housewives during this conflict allegedly funded the construction of the headquarters of their country’s communist party. A failed assassination attempt in the aftermath of this conflict led to the Yekatit 12 massacre. Wilfred Thesiger pointed to the 425 religious officials massacred in (\*) Debra Lebanos to reject a satire of sensationalist journalism based on this conflict. A young Anthony Eden failed to prevent this conflict in negotiations following a boundary dispute at an oasis called Walwal. One side’s use of chemical weapons at Mekelle during this conflict was announced to the League of Nations in a speech given in Amharic. For 10 points, name this conflict in which Mussolini invaded an African country led by Haile Selassie.

ANSWER: Second Italo-Ethiopian War [or Second Italo-Abyssinian War; accept Mussolini’s invasion of Ethiopia until “Mussolini” is read; accept Italian invasion of Ethiopia in 1935-1936; prompt on Italo-Ethiopian War; prompt on Italian invasion of Ethiopia or equivalents]

<Mike Bentley, Other History>

19. After leaving a sitting-room, this story’s protagonist sleeps with the lights on, afraid that he will find pictures of George Washington and John Calvin above his bed. At the end of this story, its protagonist imagines “the blue of Adriatic water, the yellow of Algerian sands” before dropping back “into the immense design of things.” The protagonist of this story first recognizes the idea of a “vocation” while spending all his free time around the actor (\*) Charley Edwards. Afraid of being shot as a burglar, this story’s protagonist hides in the basement after sneaking into his own home on Cordelia Street. In this so-called “Study in Temperament,” a former usher spends eight profligate days at the Waldorf-Astoria before jumping in front of a train. For 10 points, the title Pittsburgh native absconds to New York with stolen money in what Willa Cather story?

ANSWER: “Paul’s Case: A Study in Temperament”

<Tim Morrison, American Literature>

20. Parts of this piece may originate from an abandoned piece in the same genre that its composer promised for Cosima von Bülow. After this piece's dedicatee rushed its first movement, its composer added "Allegretto" to that movement's *Ben moderato* tempo marking. Two musicians' parts start one bar apart and gradually merge in a canon from this piece that starts with the quarter notes "B, C-sharp, A, G-sharp, F-sharp, E." Reminders to play *molto dolce*, *sempre dolce*, and *dolcissimo* intensify under a rocking motif in this piece that is first stated as a broken dominant (\*) ninth chord and is developed in this piece's Recitativo-Fantasia. Because its venue banned artificial light, this piece was premiered from memory in the dark according to Vincent D'Indy ("dahn-DEE"). This A major piece's dedicatee played it "con amore" since it was a wedding gift. For 10 points, name this piece for piano and a string instrument, composed by a Belgian organist for Eugène Ysaÿe ("oo-ZHEN ee-ZYE").

ANSWER: César **Franck's Violin Sonata** in A major [prompt on Franck Sonata; prompt on answers that mention a Sonata by Franck but specify an instrument other than the violin by asking "for what instrument was it originally composed?"]

<Jacob EgoI, Classical Music and Opera>

## Bonuses

1. This punning command follows the phrase “God sobs in my arms” in a poem that begins by quoting Laurence Hope’s “Kashmiri Song.” For 10 points each:

[m] Give this command that appears at the end of Agha Shadid Ali’s poem “Tonight.” This directive also titles a poetic literary monograph that Charles Olson expanded out of his master’s thesis.

ANSWER: “**Call me Ishmael**” [or “**Call me Ishmael tonight**”]

[e] The line “Call me Ishmael tonight” titles a book of these poems in English by Agha Shadid Ali. Urdu poet Mirza Ghalib wrote many of these originally Arabic and Persian love odes.

ANSWER: **ghazals** [accept *Call Me Ishmael Tonight: A Book of Ghazals*]

[h] At poetry readings, Ali often recited a Carolyn Forché poem about this conflict titled “El Colonel.” The author of “Poema de Amor,” Roque Dalton, was assassinated during this conflict.

ANSWER: **Salvadoran Civil War** [or **Guerra civil** de **El Salvador**]

<Ani Perumalla, World Literature>

2. A widely cited Ruth Macklin paper argues that appeals to this concept in bioethics are so vague and uninformed as to be “useless.” For 10 points each:

[h] A collection of lectures by Jeremy Waldron identifies what controversial concept as a universal extension of rank or status established by the framework of human rights?

ANSWER: human **dignity** [accept *Dignity, Rank, and Rights*; accept “**Dignity** is a useless concept.”]

[e] Appeals to dignity in bioethics are particularly common among thinkers affiliated with this institution. Key texts in the modern social teaching of this institution include *Dignitatis humanae* and *Caritas in veritate*.

ANSWER: Roman **Catholic** Church [accept the **Vatican**; prompt on the **Church**; prompt on the **papacy** by asking “what larger institution does the papacy head?”]

[m] The applied ethics movement of the 1970s popularized this method in bioethics outside of its original Catholic context. Taken narrowly, this term refers to the application of precedent to particular cases.

ANSWER: **casuistry** [prompt on **case**-based reasoning; prompt on **Jesuitism**]

<Henry Atkins, Philosophy>

3. You are a peasant in medieval France disenchanted with orthodox Catholicism. Answer the following about some alternative options, for 10 points each:

[m] Stephen of Bourbon recorded that a village asked a “saint” named Guinefort (“gheen-FOR”), one of these animals, to cure their sick children. The Dominican Order’s emphasis on preaching led them to be nicknamed “[these animals] of God.”

ANSWER: **dogs** [or **canines**; accept **greyhounds**; accept “**hounds** of God”] (The Dominicans have been called the *Domini Canes*, or “hounds of God.”)

[e] You could join this group in southern France, enjoying the protection of Raymond VI of Toulouse. However, avoid this sect’s strongholds of Carcassonne and Béziers (“bayz-YAY”) once Innocent III calls for a crusade against them.

ANSWER: **Cathars** [or **Albigensians**, **Good Christians**, or **Cathari**; accept **Catharism**]

[h] You might also consider joining a “Manichaean” sect in this city, said by Adémar of Chabannes to engage in standard cult activities like orgies and child sacrifice. Louis VI was crowned in this non-Reims (“rahse”) city.

ANSWER: **Orléans** (“or-lay-AWN”)

<Alex Fregeau, European History>

4. Computer scientists at Northwestern created the MiLa (“mee-lah”) machine to help teach young musicians an audiovisual facet of this system. For 10 points each:

[m] Name this music education “method” that assigns syllables to note values to teach rhythm, such as “ta” for quarter notes and “ti” for eighth notes. It also teaches solfège using signs developed by John Curwen.

ANSWER: **Kodály** (“KOH-dye”) method

[h] Music theorists from Belmont, Texas, and Ithaca addressed weaknesses in the Kodály method via this system of rhythmic solmization, which assigns its namesake syllables to beats. This system is named after rhythms in Carnatic music.

ANSWER: **Takadimi** (“TUH-kuh-dee-mee”)

[e] In contrast, Suzuki teachers teach rhythm using variations on this song, with mnemonics like “Mississippi, Stop Stop.” This nursery rhyme’s title is sung to the notes “C, C, G, G, A, A, long G.”

ANSWER: “**Twinkle, Twinkle**, Little Star” [accept “**Ah vous dirai-je, Maman**,” “**Baa, Baa, Black Sheep**,” or “The **Alphabet Song**”]

<Jacob Egol, Classical Music and Opera>

5. A partition of unity is “subordinate” to a collection of sets with this property if the support of each function of the partition is contained within the corresponding set with this property. For 10 points each:

[e] Name this property that is possessed, by definition, by sets for which every point is an interior point.

ANSWER: **open** (The lead-in refers to open covers.)

[h] A measure has the “outer” form of this property if the measure’s value on every Borel set is the infimum of the values the measure takes on open supersets.

ANSWER: **regularity** [accept outer **regularity**]

[m] Given a positive linear functional,  $\psi$ , this theorem gives a unique regular measure,  $\mu$ , such that integrating any function  $f$  with respect to  $\mu$  equals  $\psi$  of  $f$ . Another theorem with this name gives an equivalence between operators and inner products on vector spaces.

ANSWER: **Riesz representation** theorem [accept **Riesz–Markov–Kakutani representation** theorem; prompt on partial answer] (Frigeys Riesz gave the initial statement of the Riesz–Markov–Kakutani representation theorem. Partitions of unity are used in one proof of the Riesz representation theorem.)

<Arya Karthik, Other Science - Mathematics>

6. This fungal genus sees use as pest control against invasive insects like the cotton mealybug and as traditional Chinese medicine. For 10 points each:

[e] Name this fungal genus prominent in the 2023 zeitgeist that consists of approximately 600 species, most of which are especially evolved for a single host that they “zombify” before sprouting characteristic stalks.

ANSWER: **Cordyceps**

[m] Another agent of biological pest control is this clade of insects, many of which inject their prey with polydnaviruses (“po-LID-nuh-viruses”). Aphids and whiteflies maintain the endosymbiont *Hamiltonella defensa* to protect against these insects.

ANSWER: **parasitoid wasps** [prompt on **wasps**; prompt on **Orussoidea**, **Apocrita**, or **Vespidae** by asking “what non-taxonomic group contains that clade?”]

[h] To replace insecticides, plants may be engineered to produce these compounds from the bacteria *B. thuringiensis*. These compounds engage in domain III swapping and lyse epithelial cells by forming pores in their membranes.

ANSWER: **Cry toxins** [or **Cry proteins**, **crystal toxins**, **crystal proteins**, or **delta-endotoxins**]

<Munir Siddiqui, Biology>



7. In their translations of a novel set in this city, both Michael Hofmann and Eugene Jolas use the archaic word “yclept” (“ee-KLEPT”) in an oft-repeated lyric that compares Death to a “mower” and declares, “soon will he slash, man must bear the gash.” For 10 points each:

[e] An Alfred Döblin novel is titled for what city’s Alexander Square?

ANSWER: **Berlin** [accept *Berlin Alexanderplatz*]

[m] Near the end of *Berlin Alexanderplatz*, Franz Biberkopf “lift[s] himself up again to receive [Death]” while in one of these places. A collection of manuscripts written in millimeter-tall letters in one of these places has been translated by Susan Bernofsky.

ANSWER: insane **asylums** [or insane **asyla**, **mental hospitals**, or **psychiatric hospitals**; accept **sanatoriums**; accept Buch **asylum**, Herisau **asylum**, or Herisau **sanatorium**, or the **sanatorium** of Appenzell; prompt on **hospitals** or **clinics**] (The second clue refers to Robert Walser’s microscripts.)

[h] A short chapter between Franz’s “death” and “rebirth” depicts Death’s defeat of a person named for this place. Döblin’s next novel, titled for this place, is about the wanderings of the forgotten god Konrad.

ANSWER: **Babylon** [accept the Whore of **Babylon**; accept *The Babylonian Exile* or *Babylonische Wandrung*]

<Arya Karthik, European Literature>

8. Answer the following about the effects of the warm and wet weather of the Roman Climatic Optimum, for 10 points each:

[e] Warmer temperatures allowed viticulture to spread much farther north in this province than can be supported today. Antoninus Pius and Hadrian built walls to mark the northern extent of this Roman province.

ANSWER: **Britannia** [or Roman **Britain**]

[m] The wood of a Roman structure used to attack this site defended by the Sicarii indicates that its region was wetter than today. Both Arches of Titus commemorate the Roman victory in the war ended by the siege of this site.

ANSWER: **Masada** [or **Metsada**]

[h] Food insecurity near the end of the Roman Climatic Optimum may have inspired this ruler to found his own state in the mid-3rd century. This ruler adopted the title “King of Kings in the East” and may have been killed by his cousin Maeonius.

ANSWER: Septimius **Odaenathus** [or **Ödainat**]

<Alex Fregeau, Other History>

9. Answer the following about disasters that engineering students in North America may learn about on their first day of class, for 10 points each:

[e] Although the Tacoma Narrows Bridge collapse was caused by aeroelastic flutter, engineering courses use it to introduce this behavior in which a system oscillates at high amplitude due to excitation near its natural frequency.

ANSWER: **resonance** [or **resonating**]

[h] Canadian students often discuss how faulty conversion from imperial to metric units for fuel mass resulted in a 1983 Air Canada flight gliding to an emergency landing in this Manitoba town. This town is home to the largest ethnic Icelandic population outside of Iceland.

ANSWER: **Gimli** [accept **Gimli** Glider]

[m] Engineering ethics courses use the 1981 collapse of a lofted walkway in a Kansas City building owned by this company to discuss negligence and internal review. The Pritzker Prize was created by a co-founder of this company.

ANSWER: **Hyatt** [or **Hyatt** Hotels Corporation or **Hyatt** Hotels & Resorts; accept **Hyatt** Regency Hotel; reject “Hyatt Regency O’Hare”]

<Ani Perumalla, Other Academic>

10. In one painting, this medical condition may be implied by the missing brain and eyes of Oblivion, who is stopped by Father Time from throwing a blanket. For 10 points each:

[m] Name this condition implied by a cherub trampling thorns and a toothless depiction of Jealousy in agony in Bronzino's painting *Venus, Cupid, Folly, and Time*.

ANSWER: **syphilis** [accept word forms such as being **syphilitic** or suffering from **syphilis**; prompt on **mercury** poisoning by asking "what was it being used to treat?"]

[e] This series's third painting, *The Inspection*, depicts a viscount with syphilis sores at a "quack doctor." *The Tête à Tête* ("tet ah tet") appears in this series by William Hogarth about unfaithful nobles.

ANSWER: **Marriage A-la-Mode**

[h] Before dying from syphilis, the "Dutch Poussin" Gérard de Lairesse ("lay-RESS") created a painting of these things represented by a bird eating from a woman's hand and a boy holding a triangle. A woman representing one of these things sits near medical equipment in a 1618 series.

ANSWER: five **senses** [accept **sight**, **sound**, **smell**, **taste**, and **touch** or equivalents in any order] (The 1618 series is by Jan Brueghel the Elder and Peter Paul Rubens.)

<Ganon Evans, Visual Fine Arts>

11. This character's elaborate schemes include purchasing books to make inhabitants of a brothel seem well-read and renting all the rooms of an inn and filling them with impostors hired to impersonate his relatives. For 10 points each:

[m] Name this archetypical rake whose drugging and imprisoning of a woman leads her to write ten "Mad Papers," the last of which includes sideways and diagonal text.

ANSWER: Sir Richard **Lovelace** [prompt on **Richard**]

[e] Lovelace is the villain of this approximately 1,500-page epistolary novel by Samuel Richardson, which Harold Bloom dubiously claimed to reread every year.

ANSWER: **Clarissa** [or **Clarissa**; or, *The History of a Young Lady: Comprehending the Most Important Concerns of Private Life. And Particularly Shewing, the Distresses that May Attend the Misconduct Both of Parents and Children, In Relation to Marriage*]

[h] Lovelace carries Clarissa to bed after a maid accidentally performs this action while reading *Pandosto*. Clarissa insists that Lovelace must have performed this action, as he takes the opportunity to grope her. A description is acceptable.

ANSWER: almost **starting a fire** [accept equivalents; accept answers indicating that she **sets** some curtains on **fire** or equivalents; accept answers indicating that she **knocks over a candle** or **lamp** or equivalents]

<Henry Atkins, British Literature>

12. *Specific term required.* In a two-sided framework of this status, subjects who have it are either Always-Takers, Never-Takers, or Defiers. For 10 points each:

[m] Intention-To-Treat analysis ignores what experimental status? Subjects with this status do not receive the assigned treatment.

ANSWER: **noncompliance** [accept word forms like **noncompliant**; accept one-sided **noncompliance** or two-sided **noncompliance**; prompt on **failure-to-treat**; prompt on **Defiers** by asking "what more general status do defiers have?"]

[e] A notable example of noncompliance outside of a trial is lack of adherence to this drug regimen. When taken as prescribed, this anti-HIV drug regimen is nearly 100 percent effective—but only about 70 percent of takers fully adhere.

ANSWER: **PrEP** [or **pre-exposure prophylaxis**; prompt on **Truvada** or **Descovy**]

[h] Medical approaches to noncompliance often incorporate treatment based on this model of care developed by George Engel at the University of Rochester. It emphasizes each of its namesake three dimensions in caring for a patient.

ANSWER: **biopsychosocial** model

<Henry Atkins, Social Science>

13. The kora player Toumani Diabaté (“too-MAH-nee jah-bah-TAY”) partnered with a player of this instrument on the Grammy-winning albums *In the Heart of the Moon* and *Ali and Toumani* to blend Songhai and Bambara traditions across Mali. For 10 points each:

[e] Name this instrument that players like Ali Farka Touré and Mdou Moctar have popularized in the West African genre of desert blues.

ANSWER: **electric guitars** [prompt on guitars]

[h] When Diabaté and Touré collaborate, Touré often plays these traditionally kora-based ostinatos central to Bambara *jaliyaa* music on his guitar, allowing Diabaté to play the contrasting improvisation-based *birimitingo* parts.

ANSWER: **kumbengo** [or **kunbengo**]

[m] On the track “Sabu Yerko,” Touré adapts a song from this country to Songhai lyrics to celebrate Malian independence. This country’s music also inspired the *soukous* and *benga* music of Central and East Africa.

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

<Ashish Subramanian, Other Fine Arts>

14. Answer the following about changes to Native American ethnic identity in the face of European colonization, for 10 points each:

[h] The effects of European settlement may have led some of the Jumanos people of Texas and New Mexico to move far north, becoming this tribe. Despite linguistic affinity with peoples like the Tewa, this tribe is first recorded as living along the upper Missouri River before moving to the Great Plains.

ANSWER: **Kiowa** [or **Ka'igwu**, **Cáuígú**, **Gáuígú**, or **Gaigwu**]

[m] Much of this US state was depopulated by slavers prior to the Yamasee War, with its most famous tribe forming from refugees in the aftermath. Saturiwa assisted a group of Huguenot settlers in this state.

ANSWER: **Florida** [or **FL**]

[e] The importance of hairstyles to Native American identities in the eastern US made these objects a common war trophy. Colonial authorities often paid bounties for these objects collected from the bodies of Native people.

ANSWER: human **scalps** [prompt on human heads]

<Alex Fregeau, US History>

15. Data obtained by this spacecraft allowed for detailed analysis of volcanism on Venus. For 10 points each:

[e] Venus was mapped from 1990 to 1994 by what NASA spacecraft named for an explorer?

ANSWER: **Magellan**

[h] Laboratory weathering experiments on this mineral combined with near-infrared observations of Venus’s surface support the idea that Venus is currently geologically active. Ringwoodite and wadsleyite are high-pressure polymorphs of this mineral that are common in shocked meteorites.

ANSWER: **olivine**

[m] Some Venusian volcanoes form pancake domes and “tick-like” structures, which is thought to be due to the eruption of lava rich in this mineral under Venus’s high-pressure atmosphere.

ANSWER: **silica**

<Jonathen Settle, Astronomy>

16. A measure of this property named for a “harmonic oscillator model of [it]” is proportional to the sum of the squared differences between a molecule’s bond lengths and certain reference values. For 10 points each:

[e] Name this property that is also correlated with hardness. Molecules with this property produce a diamagnetic ring current in NMR spectroscopy.

ANSWER: **aromaticity** [accept word forms]

[h] To calculate this measure of aromaticity developed by Schleyer et al., one places a ghost atom dubbed “Banquo” at the center of a ring, then calculates the effect on it of the magnetic field induced by the ring current.

ANSWER: **nucleus-independent chemical shift** [or **NICS(0)**; prompt on chemical shift]

[m] The NICS replaced this quantity’s “exaltation” as the most common NMR-derived quantification of aromaticity. A capillary filled with pure solvent is placed in an NMR tube in the Evans method for determining this quantity.

ANSWER: magnetic **susceptibility**

<Arya Karthik, Chemistry>

17. The owners of a historic grand hotel at the foot of this mountain caused outrage in 2010 by trying to trademark this mountain's name. For 10 points each:

[m] Name this mountain, whose 150-year-old "Cog" is the world's oldest ascending rack-and-pinion railway.

ANSWER: Mount **Washington**

[e] The Cog begins in this resort area within the town of Carroll. A 1944 monetary conference held at the Mount Washington Hotel in this area created the World Bank and the IMF.

ANSWER: **Bretton Woods** [accept the **Bretton Woods** Conference]

[h] Some Appalachian Trail thru-hikers follow a tradition of taking this action while passing by the Cog. This action, usually taken in protest against pollution, is a possible reference to the Cog's original nickname.

ANSWER: **moon**ing the Cog [accept descriptions of **pulling down one's pants**] (The Cog is sometimes called "The Railway to the Moon.")

<Henry Atkins, Geography>

18. Lynd Ward's last book in this genre was *Vertigo*, an unusually lengthy depiction of three people's lives during the Depression. For 10 points each:

[h] Name these expressionist books popular in the 1920s and 30s. Frans Masereel's *Passionate Journey* is one of these books, which often focused on the struggles of the working class.

ANSWER: **wordless novels** [accept **woodcut novels**; accept **novel in woodcuts**]

[e] This cartoonist and Lynd Ward fan paid homage to wordless novels in the expressionist strip "Prisoner on the Hell Planet," which appears in this cartoonist's graphic novel *Maus*.

ANSWER: Art **Spiegelman** [or Itzhak Avraham ben Zeev **Spiegelman**]

[m] Laurence Hyde's wordless novel *Southern Cross* uses unusually curved woodcuts to depict one of these events. A 30-thousand word *New Yorker* piece follows six people after one of these events, including a seamstress and a priest.

ANSWER: **nuclear** blasts [accept answers indicating the explosion of **nuclear** weapons; accept **atomic** bombings or **nuclear** tests; prompt on **bombings**] (That piece is *Hiroshima* by John Hersey.)

<Henry Atkins, American Literature>

19. A 2012 article by Bessie-Sweet et al. argues that one of these objects served a separate purpose from one called the *sak huun*. For 10 points each:

[h] Name these objects, which an inscription shows being used by Sak K'uk' and her son. A piece of bark-paper was often the most symbolically important part of these objects, which could be adorned with *hu'unal*.

ANSWER: **headdress** [accept **headband**, **crown**, or "drum major" **headdress**]

[m] Lady Sak K'uk' was regent of this city when she bestowed the "drum major" headdress to her son, Pakal the Great, which had previously been governed by her mother, or possibly grandmother, Yohl Ik'nal.

ANSWER: **Palenque** [or **Lakamha** or **Baak**]

[e] Some of these objects at the site of Cobá show that female rulers were military leaders just as men were. These large stone pillars, also common in Rome, Aksum, and China, were carved with calendrical dates and the deeds of kings.

ANSWER: **stelae** [or **stelas** or **stele**]

<Alex Fregeau, Other History>

20. A golden statue discovered in Kul Oba depicts two Scythian men using a drinking horn to engage in this rite, which, according to Herodotus, involved the mutual consumption of wine tainted by both individuals. For 10 points each:

[m] Name this rite that, in the Fóstbrœðra (“FOAST-bry-dhrah”) and Gísla (“ghees-LAH”) sagas occurred underneath an arch of turf held aloft by spears. In a Mongol account, this ritual known as *anda* (“UHN-dah”) involved the exchanging of knucklebones.

ANSWER: becoming **blood brothers** [accept answers of forging a **foster brotherhood**, **sworn brotherhood**, **sworn friendship**, or swearing **loyalty** to each other as **brothers** and similar; accept *bræðralag*; prompt on creating **friendships** or **alliances**; prompt on answers indicating unrelated **men** swearing **loyalty** to each other that do not mention “brothers”; prompt on **blood oaths** or **blood compacts**; prompt on *leikr*] (Scythian wine was tainted by blood; knucklebone exchange was between Temujin and Jamukha.)

[h] A bloody battle that ends in a draw forges a blood-brotherhood between this man and Hjalmar (“yahl-MAR”). This man took on the moniker “Barkman” after becoming a recluse following a bloody battle with the half-troll Ogmund.

ANSWER: Orvar-**Odd** [or Arrow-**Odd**]

[e] In his namesake poem, this deity invokes the rite of hospitality after referencing his blood-brotherhood with Odin. That poem features this god’s flyting, or series of insults, against Bragi, Idunn, and Thor.

ANSWER: **Loki** [accept *Lokasenna*]

<Kevin Thomas, Beliefs>