



**ACADEMIC  
COMPETITION  
FEDERATION**

**2023 ACF NATIONALS**

**Prelims 5**

**Packet By**

**Cornell B, Georgia Tech A, Illinois A**

**Editors**

**Taylor Harvey, Sameer Apte, Ganon Evans, William Golden,  
Hasna Karim, Michael Kearney, Caroline Mao, Will Nediger,  
Grant Peet, Jonathen Settle, Adam Silverman**

**Writers**

**Cornell B: Dan Ni, Richard Niu, Sarod Nori, Shehryar Qazi, Rosa Xia  
Georgia Tech A: Matt Bollinger, Arya Karthik, Alex Li, Hari Parameswaran  
Illinois A: Max Brodsky, Yash Mandavia, Mitch McCullar, Justin Wytmar**

## TOSSUPS

1. Numerical simulations of this property are conducted with the open-source software suite CMAQ (“C-mack”). The prescribed “reference methods” or “equivalent methods” for measuring this property include samplers that separate the input with virtual impactors, beta gauges, and tapered element oscillating microbalances. When this property is low, the crustose (“crust-ose”) organisms *Lepraria incana* (“leh-PRA-ree-ah in-KA-na”) and *Lecanora conizaeoides* (“leh-ka-NOR-ah CO-nih-zay-OY-deez”) thrive. The standard scale for reporting this property ranges from 0 to 500, with 500 meaning that this property is dangerously low. This property declines as concentrations of PM2.5 (“P-M-two-point-five”) and PM10 (“P-M-ten”) rise. The common bioindicators for this property are bryophytes (“BRY-oh-fites”) and lichens (“LIKE-ens”). The EPA’s national standards for ambient values of this property place upper limits on the amount of particulate matter and ground level ozone. For 10 points, name this property that is low when there is haze, smog, or acid rain.

ANSWER: **air quality** [prompt on descriptions of how clean the air is or how breathable the air is; reject “air pollution”] (The 0-to-500 scale is the US’s Air Quality Index, or AQI.)  
<Other Science>

2. The speaker of this poem declares, “Virgins have written some *resplendent* books” while trying to convince himself that a girl “may not be a beauty, but she’s cute.” A dialogue between this poem’s speaker and his wife about the sound of the wind as they play chess is followed by a Goethe (“GUR-tuh”) reference in the line, “Who rides so late in the night and the wind? / It is the writer’s grief.” The speaker of this poem is raised by his Aunt Maud and falls in love with his future wife on a high school field trip. After being abandoned on a blind date arranged by the typist Jane Dean, the daughter of this poem’s speaker drowns in an icy lake in a possible suicide. This poem was written in New Wye on 80 index cards and begins, “I was the shadow of the waxwing slain.” For 10 points, the fictional scholar Charles Kinbote wrote a commentary on what 999-line poem by John Shade that titles a novel by Vladimir Nabokov?

ANSWER: “**Pale Fire**”  
<American Literature>

3. An annual ceremony that honored the defeat of these people with a parade of mounted youths was called “the review of the cavalry.” A leader of these people was accused of plotting a coup after his slave was bribed to plant a large quantity of swords in his lodging-place. Aulus Postumius Albinus and Aebutius Elva defeated these people at a battle that forced them to sign the “Treaty of Cassius.” The defection of these people’s city of Praeneste (“PRY-ness-tay”) helped the Romans win a war against them. According to legend, Castor and Pollux were awarded a temple after they appeared and defeated these people at the Battle of Lake Regillus. These people’s cities, including Aricia (“ah-REE-kee-ah”) and Lavinium, united under Alba Longa’s leadership to oppose local expansion by Rome in a namesake “League.” For 10 points, what ancient Italic people gave their name to the language that the Romans spoke?

ANSWER: **Latins** [accept *prisci Latini*; accept **Latians**; accept **Latin** League; accept Old **Latins**; accept **Aricians** or Turnus Herdonius of **Aricia** until “Aricia” is read; prompt on **Italic** peoples until read; reject “Etruscans”]  
<Other History>

4. A revival movement within this sect that advocates distinguishing between the “true pure knowledge self” and “the other” as a path to enlightenment was founded by Kanji Swami. A town central to this sect contains the 57-foot-tall Gommeteshwara statue, which is bathed in milk during a festival that takes place every 12 years. The *Ādipurāṇa*, an epic written by a member of this sect, describes the life of Bahubali, whom this sect credits as being the first in the present age to achieve enlightenment. Followers of this sect believe that Mallinātha was male since they teach that no woman can attain *moksha*. Monks from this sect renounce almost all their possessions, only keeping a pot to boil water and a whisk broom to sweep away insects. For 10 points, name this sect in Jainism whose monks go about naked, in contrast to those of the Shvētāmbara (“shweh-TUM-buh-ruh”), or white-clad, sect. ANSWER: **Digambaras** (“dig-UM-buh-ruhs”) [or **sky-clad** Jains; prompt on Jainism, Jains, Jaina, or Jain Dharma until “Jainism” is read]

<Religion>

5. The narrator is obsessed with a violinist with this name, who in turn is obsessed with a doll named Julio, in a story called “The Doll” that was rediscovered in 2011 after more than 70 years. Sally Beauman wrote an official sequel titled for the “tale” of a character with this first name, which deals with Colonel Julyan’s investigation into her death. Shortly before her death, a character with this first name wore a white dress inspired by a Henry Raeburn painting of an ancestor named Caroline. An inquest reveals that that character with this first name had terminal cancer, which is why she manipulated her husband into killing her. A novel titled for this name begins with the line “Last night I dreamt I went to Manderley again.” For 10 points, give this name of the first wife of Maxim de Winter in a novel by Daphne du Maurier.

ANSWER: **Rebecca** [accept **Rebecca** de Winter; accept *Rebecca’s Tale*]

<British Literature>

6. A dissertation based on fieldwork in this island’s village of Kajar (“kuh-JAR”), which argues that underdevelopment was the result of a lack of capital rather than cultural differences with the West, was posthumously published as the book *Surviving against the Odds*. Ann Dunham’s work with metalworkers on this island inspired her to create a microfinance model to help rural artisans. A chapter on “Conflict and Integration” in a 1960 book about this island calls the Rijaja (“ree-yah-YAH”) holiday a “master symbol” for its culture. A communal feast on this island called the *slametan* (“slah-muh-TAHN”) is analyzed in that book, which divides the title phenomenon into *abangan* (“ah-bung-UN”), *santri* (“SAHN-tree”), and *prijaji* (“pree-yah-YEE”) variants. This island’s “religion” titles a book by Clifford Geertz, whose work here informed the majority of his book *Islam Observed*. For 10 points, name this island that yielded the type specimen for *Homo erectus*.

ANSWER: **Java** [or **Jawa**; accept **Java** Man; accept *The Religion of Java*] (Ann Dunham was Barack Obama’s mother.)

<Social Science>

7. By assuming that these quantities were approximated by integers, Carnahan and Starling derived a closed-form algebraic expression for them. One of these quantities is computed by evaluating the integral with respect to radius of “radius squared” times the following: “the exponential of the negative of the pairwise potential over  $k$ -sub-B  $T$ , all minus one.” In the hard sphere model, one of these quantities is simply four times the particle volume, which is unphysical because it should be temperature-dependent. Calculating the eighth of these values requires evaluating 7,123 integrals of Mayer  $f$ -functions. For a van der Waals gas, the expression “ $b$  minus the quotient of  $a$  and  $k$ -sub-B  $T$ ” gives the second of these values. For 10 points, deviation from ideal gas behavior is expressed by what quantities that multiply powers of density in an equation of state that is obtained by expanding the compressibility factor?

ANSWER: **virial coefficients** [or **coefficients** in the **virial** equation of state; accept specific virial coefficients, such as the second **virial coefficient**] (The second sentence describes computing the second virial coefficient by integrating a Mayer  $f$ -function.)

<Physics>

8. In 2020, the Brooklyn Museum controversially deaccessioned *The Messenger*, a painting from this artist's Circus series that shows a man made up of pinkish blobs. A painting by this artist that shows oddly-skin-toned people wearing cowboy hats in front of building façades is part of a broader series that celebrates urban street festivals. After his "Texturologies" and "Materiologies" cycles, this artist began a series of abstract paintings based on the modular oval-based structures that he doodled while on the phone. A book by Hans Prinzhorn partly inspired this artist's trademark early style of flattened perspective and heavily textured paint layers, as seen in his *Cow with the Subtle Nose*. This artist was inspired by the art of the mentally ill to found a movement named for its "rough" aesthetic. For 10 points, name this French artist who created the *L'Hourloupe* ("loor-LOOP") series and spearheaded the *art brut* movement.

ANSWER: Jean **Dubuffet** [or Jean Philippe Arthur **Dubuffet**]

<Painting & Sculpture>

9. A suffragette from this state became wealthy by selling her famous "Pin Money Pickles" across America. An "equal suffrage league" in this state counted as members the novelist Mary Johnston, Lila Meade Valentine, and a Pulitzer Prize-winning author who fictionalized this state's Reconstruction-era society in the novel *The Deliverance*. The first American woman to head a bank chartered the St. Luke Penny Saving Bank for this state's Black residents. To challenge segregation in this state, Barbara Rose Johns organized a walk-out at Moton High School. In a "Night of Terror" at the Occoquan ("OCK-uh-kwon") Workhouse in this state, guards beat members of the "Silent Sentinels." A strategy of "massive resistance" against the *Brown v. Board* decision was wielded in this state by Harry F. Byrd. For 10 points, name this state whose Racial Integrity Act was overturned in a 1967 case brought by Mildred and Richard Loving.

ANSWER: **Virginia** [or **VA**; or Commonwealth of **Virginia**; accept *Loving v. Virginia*; accept Equal Suffrage League of **Virginia**] (The "Pin Money Pickles" were sold by Ellen Kidd. The author of *The Deliverance*, Ellen Glasgow, won the 1942 Pulitzer Prize for *In This Our Life*. Maggie L. Walker founded the St. Luke Penny Saving Bank in Richmond. The walk-out at Moton High School led to *Davis v. County School Board of Prince Edward County*, which was addressed in the *Brown v. Board* case.)

<American History>

10. Between 1998 and 2007, this country and a northern neighbor experienced attacks from a goonch catfish. A Scottish botanist who worked extensively in this modern-day country, William Roxburgh, coined the scientific name of an aquatic animal locally known by the sound it makes: "susu." A brown-antlered subspecies of Eld's Deer called the sangai is native to a park on this country built atop floating islands. The oldest national park in this country is named after an author who described hunting "the Bachelor" in *Man-Eaters of Kumaon*. That author, Jim Corbett, hunted an animal along this country's northern border with the most confirmed human fatalities in history. This country's government released 25,000 flesh-eating turtles into one of its rivers to address the problem of corpse pollution. For 10 points, name this country that is cleaning the environment of a long-snouted dolphin in the Ganga River Plan.

ANSWER: **India** [or Republic of **India**; or **Bhārat Gaṇarājya**] (The susu is the Ganges river dolphin. The sangai inhabits Keibul Lamjao National Park in Manipur. Corbett hunted Champawat, a Bengal tigress that killed over 400 people.)

<Geography>

11. Yodzis and Innes proposed that large ratios of this variable prevent robust consumer-resource limit cycles. A model derives the power-law dependence of [emphasize] *another* quantity on this variable based on the flows in a fractal-like vascular network. Energy flux per unit area is invariant with this variable by the energetic-equivalence rule. Sheldon spectra depict the inverse relationship between this variable and oceanic species abundance. J. S. Haldane observed that greater values of this quantity necessitate more complex oxygen transport mechanisms. The West–Brown–Enquist model explains the three-fourths-power allometric scaling of metabolic rate with this variable described by Kleiber’s law. Bergmann’s rule describes how cold-dwelling species exhibit larger values of this quantity, as do many deep-sea species. For 10 points, name this value whose evolutionary extremes are gigantism or dwarfism.

ANSWER: **body size** [or **body mass**; or **body length**; or **body volume**; prompt on similar answers without “body”; prompt on descriptions of **bigness** or synonyms; prompt on **size**, **mass**, **length**, or **volume** by asking “of what?”; reject “limb length” or equivalents] (Haldane wrote “On Being the Right Size.” The penultimate sentence refers to abyssal gigantism.)

<Biology>

12. A notoriously difficult text by this thinker has been called “the only text that avoids Aristotelianism” by Barbara Cassin, who wrote a book calling this thinker a “sophist.” Cassin and another disciple of this thinker distinguished sense and nonsense from “ab-sense” in a book titled for this thinker’s claim that “there’s no such thing as a sexual relationship.” This thinker argued that there are four basic discourses, called “the master,” “the university,” “the analyst,” and “the hysteric,” which he illustrated with one of his schematic “mathemes.” He paralleled Marx’s concept of surplus value with his concept of “surplus jouissance” (“zhwee-SAWNCE”), which he in turn used to define the *objet petit a* (“ob-ZHAY peh-TEE AH”). The Sainte-Anne Hospital hosted some of this thinker’s yearly seminars. For 10 points, name this French psychoanalyst who postulated the mirror stage.

ANSWER: Jacques **Lacan** [or Jacques Marie Émile **Lacan**]

<Philosophy>

13. This stuff titles a 2009 cultural history by Andrew Coe (“koh”) whose first chapter examines the influence of Jean-Baptiste Du Halde (“zhawn bap-TEEST doo ahld”), who popularized “Stags’ Pizzles.” An actress rehearsing for a play is mistaken for a kidnapping victim in a 1919 comedy titled for this stuff, which was directed by Harold Lloyd. A song titled for a “cornet” version of this stuff was an early hit by Louis Armstrong. The reputation of this food sank in the 1920s after the La Choy Corporation started selling canned vegetables for making it. This food’s origin is apocryphally attributed to Li Hóngzhāng’s visit to the US. In a painting, the name for this food appears on a neon sign outside a window near a woman separated from her Doppelgänger by a red teapot. For 10 points, a painting by Edward Hopper is titled for what Chinese-American comfort food?

ANSWER: **chop suey** [or **chop sooy**; or **zá suì**; accept “Cornet **Chop Suey**”; prompt on Chinese **food** or Chinese-American **food** or similar answers until “Chinese-American” is read]

<Other Academic>

14. Mode-coupling theory badly overestimates experimental measurements of this quantity by assuming that it coincides with the onset of the hopping regime. This quantity is additive for blends of drugs and excipients like trehalose (“TREE-hull-ose”) according to the empirical Gordon–Taylor equation. The operational definition of this quantity, which is calculated from the location of the tan-delta or loss modulus peak in DMA, corresponds to a viscoelastic relaxation time of 100 seconds after a  $t-T$  (“T-T”) superposition. Anti-plasticizers stabilize organic films by reducing this quantity; otherwise, it increases asymptotically with molecular weight. The derivative of specific heat is discontinuous at this quantity’s  $x$ -value on a DSC trace. Free volume expands, and entropy spikes, when a sample is heated past this point, allowing chains to be more flexible. For 10 points, name this temperature at which polymers transition from a rubbery state to a viscous state.

ANSWER: **glass transition** temperature [or **T**-sub-**g**; or **glass transition** point; prompt on temperature or T until “temperature” is read] (DMA is dynamic mechanical analysis. DSC is differential scanning calorimetry.)

<Chemistry>

15. A member of this family is the subject of “screeds” by the artist Sharon Hayes and a 1992 Anthony Davis opera. The Cinderella, Bear, and Fairy Houses make up a complex commissioned by this family along the McCloud River. This family’s ornate Doge’s Suite inspired a fictional building with a “collection of everything so big it can never be cataloged or appraised.” A presidential campaign by a member of this family was supported by the characters Foxy Grandpa, Buster Brown, and the Katzenjammer Kids. The Roman-inspired Neptune Pool was designed for this family by the first woman to be admitted into the architecture program at l’Ecole de Beaux-Arts (“lay-KOLE day boh-ZARR”), Julia Morgan. This family’s patriarch threatened RKO Pictures for depicting a character who whispers the name of his childhood sled before dying. For 10 points, Xanadu in *Citizen Kane* was inspired by what family’s San Simeon “castle”?

ANSWER: **Hearst** family [accept William Randolph **Hearst** Sr.; accept Patty **Hearst** or Patricia Campbell **Hearst**] (The Anthony Davis opera is *Tania*, which is about Patty Hearst’s kidnapping by the Symbionese Liberation Army. The estate in the second sentence is Wyntoon.)

<Other Fine Arts>

16. This organization conducted failed government negotiations called the “Algiers Table.” This organization was opposed by a local group known as the “spirit of Ermua.” A woman who tweeted jokes backing this organization’s actions was investigated in Operation Spider and initially sentenced to prison in the “Cassandra case.” This organization’s motto “keep up on both” referred to the snake that was wrapped around an ax in its symbol. Members of this organization were prosecuted in the Burgos trials. According to a popular joke, this organization created its country’s “first astronaut” through Operation Ogre, which bombed a politician’s car so strongly that it flew over a church. This organization assassinated Luis Carrero Blanco, the handpicked successor of Francisco Franco. For 10 points, what separatist group promoted “homeland and liberty” for the Basque Country?

ANSWER: **ETA** (“EH-tuh”) [or **Euskadi Ta Askatasuna**]

<European History>

17. One of these events involving the author’s friend Catullus nearly occurs in Juvenal’s twelfth Satire. The title characters are kidnapped by bandits after one of these events in Book 3 of *The Adventures of Leucippe and Clitophon* (“loo-KIP-ee and CLY-tuh-fon”). In the *Satyricon*, an old tutor tells a story about the faithful “woman of Ephesus” shortly before one of these events that results in the death of Lichas. Sarah Ruden translated a line delivered after one of these events as “Someday you may recall today with pleasure.” A prologue narrated by the star Arcturus details one of these events involving Ampelisca, Palaestra, and the pimp Labrax that instigates the plot of Plautus’s play *The Rope*. Zeus sends a lightning strike to cause one of these events after Odysseus’s men eat Helios’s cattle. For 10 points, ancient literary accounts of what type of event inspired Shakespeare’s *The Tempest*? ANSWER: shipwrecks [or **maritime disasters**; accept descriptions of **disasters at sea** or **disasters** involving a **ship**; prompt on sea **storms** or **thunderstorms** by asking “the storm leads to what type of event?”] (The fourth sentence refers to a speech given by Aeneas to his men after they reach dry land in the *Aeneid*.)

<European Literature>

18. A ruler of this polity was the subject of a Latin-language biography by the Sieneese (“SEE-en-EEZ”) merchant Bertrando de Mignanelli (“MEEN-yah-NELL-lee”). After the first ruler of this polity was murdered in his bath by his second wife, the consorts of his first wife beat the second wife to death with a pair of clogs. This was the later of two polities in which the pepper trade was controlled by *kārimī* merchants. A line of rulers of this polity were denoted “of the tower” in opposition to their predecessors “of the river.” This polity sheltered an exiled *ṣehzade* (“sheh-ZAH-deh”) who later submitted to the Knights Hospitaller and then the Papacy and was named Cem Sultan (“jem SOOL-tahn”). This polity was destroyed after the 1517 Battle of Ridaniya (“reh-duh-NEE-yuh”) by Selim I. This polity’s first ruler is usually considered to be Shajar al-Durr, who was widowed after the Seventh Crusade. This polity’s Burji dynasty was ruled by former Circassian slaves. For 10 points, name this sultanate that overthrew the Ayyubids (“eye-YOO-bids”) in Egypt.

ANSWER: **Mamluk** Sultanate [or Saltanat al-**Mamālīk**; prompt on **Burji** dynasty or **state of the Circassians** until “Burji” is read; prompt on **Bahri** dynasty; reject “Egypt”] (Mignanelli wrote the *Ascensus Barcoch*. The Burji and Bahri dynasties were called “of the tower” and “of the river,” respectively.)

<World History>

19. Edvard Grieg used this genre to label pieces called *Scenes from Country Life*. A “lyric” type of this genre subtitled Carl Nielsen’s cantata *Springtime in Funen*. Two opus numbers unusually split Sibelius’s suite of six short pieces in this genre for violin and orchestra. The melody [read slowly] F-sharp G-sharp A G-sharp A begins the lyrical, F-sharp minor B-section of a piano piece in this genre, which begins with a skipping rhythm in the enharmonic parallel major. An unusually sprawling, multi-movement B-flat major piano work in this genre ends with an *allegro* movement titled “To the Resolution” and is by Robert Schumann. A frequently transcribed G-flat major piece in this genre is the seventh of eight pieces in this genre by Antonín Dvořák based on themes written in New York. For 10 points, name this Romantic genre often used for short pieces that feature wit and comedy.

ANSWER: **humoresque** [or **Humoreske**; accept **Humoresques** or **Humoresky**; accept **Humoreske** in B-flat major; accept Six **Humoresques**; accept lyric **humoresque** or lyrical **humoresque**]

<Classical Music>

**2023 ACF Nationals | Prelims 5. Cornell B, Georgia Tech A, Illinois A**

Editors: Harvey, Apte, Evans, Golden, Karim, Kearney, Mao, Nediger, Peet, Settle, Silverman

20. An essay compares this character and his creator to two ships who “pass close enough to hail” but are “too busy even to wave.” The protagonist of a novel is bewildered by this character’s insistence on killing harmless apes and making clothes from their skin. In a novel, this character claims laws exist only “to hold us in check when our desires grow immoderate” and frustrates a woman with his insistence on building terraces when there is nothing to plant. This character and his creator are the subjects of the Nobel lecture “He and His Man.” After this character dies from a fever, his female companion asks his real-life creator to write about him, but he refuses because it is too boring. In a 1986 novel, this character and his servant meet Susan Barton after she washes up on their island. For 10 points, J. M. Coetzee’s novel *Foe* retells the story of what shipwrecked sailor created by Daniel Defoe?

ANSWER: Robinson **Crusoe** [or **Robinson** Crusoe; prompt on Robin]

<World Literature>



## BONUSES

1. Some of the first functions to decline during this process are IL-2 production and *ex vivo* killing abilities. For 10 points each:

[10m] Name this process during which persistent viral or tumor-mediated antigenic stimulation of T cells causes attenuation of their effector functions. Unlike anergy (“AN-er-jee”), high expression of *Tox* is associated with this process.

ANSWER: T cell **exhaustion** [accept CD8+ T cell **exhaustion** or CD4+ T cell **exhaustion**; accept word forms like **exhaust** or **exhausting** in place of “exhaustion”]

[10e] In the setting of HCV or HBV infection, higher values of this quantity correlate to more severe T cell exhaustion. NAAT tests for HIV measure this quantity that is given in RNA copies per milliliter.

ANSWER: **viral load** [or **viral burden**; or **viral titre** or **viral titer**; accept **peak viremia**]

[10h] Tumor-mediated T cell exhaustion represents a major limit to this form of therapy that can currently treat relapsed or refractory multiple myeloma, follicular lymphoma, and acute lymphoblastic leukemia.

ANSWER: **CAR-T** therapy [or **chimeric antigen receptor T-cell** therapy; accept **adoptive cell** therapy or **ACT**; prompt on **chimeric antigen receptors** or **CARs** or **chimeric immunoreceptors**; prompt on cancer **immunotherapy**]  
<Biology>

2. Selina Hastings was bequeathed an institution of this type in Bethesda, Georgia, upon the death of its founder, who modeled it on a nearby institution in Ebenezer. For 10 points each:

[10h] Name this type of institution run by the Salzburger emigrants. Dissatisfied with the standards of institutions of this type, Charles Loring Brace operated a controversial “Train Movement” to supplant them.

ANSWER: **orphanage** [or **orphan house**; accept Bethesda **Orphanage** or Bethesda **Orphan House**; accept Ebenezer **Orphanage**; prompt on **Orphan** Train Movement]

[10e] The Salzburger emigrants were welcomed by this founder of Georgia, who intended for the colony to serve as a refuge for debtors.

ANSWER: James **Oglethorpe** [or James Edward **Oglethorpe**]

[10m] This member of the “Holy Club” at Oxford founded the Bethesda Orphanage and was instrumental in the reintroduction of slavery in Georgia. Benjamin Franklin befriended this itinerant Methodist preacher during the First Great Awakening.

ANSWER: George **Whitefield** [or George **Whitfield**]  
<American History>

3. John Eastman proposed using this legal theory to overturn the 2020 elections. For 10 points each:

[10m] Name this legal theory that holds that the US Constitution grants sole authority over handling elections to state lawmakers. Gerrymandered districts in North Carolina are defended with this theory in the current case *Moore v. Harper*.

ANSWER: **independent state legislature** theory [or **ISL** theory]

[10h] This former Solicitor General under Obama argued against ISL theory in *Moore v. Harper*. This Georgetown professor defended Nestlé from a 2021 child slave labor lawsuit and was lead counsel for Guantánamo Bay prisoners in *Hamdan v. Rumsfeld*.

ANSWER: Neal **Katyal** [or Neal Kumar **Katyal**]

[10e] In his concurring opinion in this case, William Rehnquist applied ISL theory to argue that the Florida Supreme Court could not force a recount in the 2000 presidential election.

ANSWER: **Bush v. Gore** [or **Gore v. Bush**; or *George W. Bush and Richard Cheney, Petitioners v. Albert Gore, Jr. and Joseph Lieberman, et al.*; prompt on **Bush** or **Gore**]

<Current Events>

4. This work's dedicatee, the organist Gustaf Düben, eliminated coda sections in which biblical texts were combined with settings of the monk Arnulf of Leuven. For 10 points each:

[10h] Name this cycle of seven cantatas that meditate on different aspects of Jesus on the cross.

ANSWER: ***Membra Jesu Nostri*** [or ***Membra Jesu nostri patientis sanctissima***]

[10e] *Membra Jesu Nostri* was written by this Danish-born organist and composer of the Baroque period.

ANSWER: Dietrich **Buxtehude** ("BOOKS-tuh-HOO-duh") [or Diderik Hansen **Buxtehude**]

[10m] Buxtehude worked as organist at Saint Mary's Church in this north German city, where J. S. Bach walked to hear him play. This city's musical guild structure inspired many later reforms in Hamburg.

ANSWER: **Lübeck** [or **Lübeck**; or Hanseatic City of **Lübeck**; or Hansestadt **Lübeck**]

<Classical Music>

5. This cloud forest culture created mosaic friezes at Gran Pajatén ("pa-ha-TEN"), built cliff tombs at Revash, and produced the Laguna de Los Cóndores textiles. For 10 points each:

[10h] Name this culture that built the walled city of Kuélap in Amazonas, Peru. This culture's people were ascribed white skin by Inca chroniclers, whose reports of their ferocity inspired their nickname of "warriors of the clouds."

ANSWER: **Chachapoya** culture [or **Chachapoyas**; prompt on **Chacha**]

[10e] Like other cultures colonized by the Inca, the Chachapoyas practiced a standardized form of trepanation, in which holes are drilled in this body part.

ANSWER: **skulls** [accept **cranium** or **crania**; prompt on **heads**; prompt on **skeletons** or **bones**]

[10m] Trepanated skulls appear in Chachapoya sites from the "Late" one of these archaeological periods used to classify the Pre-Columbian Andes. This term also refers to a black surface designated "A" in *terra preta* ("TEH-ra PRAY-ta").

ANSWER: **horizons** [accept soil **horizons**; accept A **horizon** or pretic **horizon**; accept archaeological **horizons**; accept Late **Horizon**; prompt on **soil** or **dirt** or **earth**]

<World History>

6. Joseph Liouville ("zhoh-ZEFF l'yoo-VEEL") proved a theorem that classifies all of these functions in a Euclidean ("yoo-CLID-ee-in") space of degree 3 or higher. For 10 points each:

[10h] Name these functions that exist between any simply-connected open subset of the complex plane and the unit disk. These functions have the property of constancy of dilation at every point in their domain.

ANSWER: **conformal** maps [or **conformal** mappings or **conformal** transformations; prompt on **biholomorphic** maps or **holomorphic** maps or bijective **holomorphic** maps by asking "a holomorphic function that is a bijection is what other type of function?"] (The sentence about the complex plane and the unit disk refers to the Riemann mapping theorem.)

[10m] Liouville's theorem states that conformal maps are all higher-dimensional analogues of transformations named for this mathematician. A number-theoretic function named for this mathematician outputs one on square-free positive integers with an even number of prime factors.

ANSWER: August Ferdinand **Möbius** [accept **Möbius** function]

[10e] Conformal maps preserve these values between curves. Polar coordinates specify points using a distance and one of these values.

ANSWER: **angles**

<Other Science>

7. This author was forced to stop editing her popular children’s magazine *Juvenile Miscellany* after she published the early abolitionist book *An Appeal in Favor of That Class of Americans Called Africans*. For 10 points each:

[10h] Name this American author of the bestselling domestic manual *The Frugal Housewife* and the traditional Thanksgiving poem “Over the River and Through the Wood.”

ANSWER: Lydia Maria **Child** [or Lydia Maria **Francis**]

[10m] Child edited this slave narrative, which describes its author’s persecution by Dr. Flint. It was published under the name Linda Brent, a pseudonym for its author, Harriet Jacobs.

ANSWER: ***Incidents in the Life of a Slave Girl*** [or ***Incidents in the Life of a Slave Girl***, written by herself]

[10e] Child’s introduction of the “tragic mulatta” stereotype in her story “The Quadroons” influenced this author, who reveals it is Armand and not his wife who is part-Black at the end of her story “Désirée’s Baby.”

ANSWER: Kate **Chopin** [or Katherine **O’Flaherty**]

<American Literature>

8. Though this psychologist spent a summer with the Blackfoot, there is little direct evidence for the popular claim on social media that he took his best-known idea from them. For 10 points each:

[10e] Name this psychologist whose paper “A Theory of Human Motivation” discusses concepts like “esteem” and “self-actualization.”

ANSWER: Abraham **Maslow** [or Abraham Harold **Maslow**]

[10h] The misleading version of Maslow’s hierarchy of needs often used in textbooks was popularized in part by this management professor, who developed two theories of work motivation called Theory X and Theory Y.

ANSWER: Douglas **McGregor** [or Douglas Murray **McGregor**]

[10m] Though Maslow didn’t represent the hierarchy as a pyramid, he did think of it as an orderly sequence of categories, beginning with physiological needs, followed by this category, and then belonging and love.

ANSWER: **safety** needs

<Social Science>

9. In *The King’s Two Bodies*, Ernst Kantorowicz (“kan-TOR-oh-witz”) argues that the shattering of a mirror in this play represents the demise of the protagonist’s “body politic.” For 10 points each:

[10e] Name this Shakespeare play about a 14th-century king that is followed by the two *Henry IV* plays and *Henry V* in a tetralogy.

ANSWER: ***Richard II*** [or *The Life and Death of King **Richard the Second***]

[10m] Richard’s demise is hastened when he ignores the advice of this character. This man’s deathbed speech calls England “this royal throne of kings, this sceptred isle.”

ANSWER: John of **Gaunt** [or **John** of Gaunt; or Duke of **Lancaster**]

[10h] Richard talks about the inevitable demise of monarchs in a speech in which he says “For God’s sake, let us sit upon the ground and” perform this action. You can give the exact eight-word phrase, or just the first three words.

ANSWER: **tell sad stories** [or **tell sad stories** of the death of kings]

<British Literature>

10. A Japanese saying claims that this tradition is “for the shōgun,” while a rival tradition is “for the peasants.” For 10 points each:

[10m] Name this Japanese Zen school founded by Eisai (“AY-sigh”). It focuses on the contemplation of *kōans*, unlike the Sōtō and Ōbaku schools.

ANSWER: **Rinzai** school [or **Rinzai-shū**]

[10e] Rinzai’s founder Eisai is credited with introducing this good to Japan. This good is the subject of an aesthetic treatise by Okakura Kakuzō, which discusses the meaning imbued in the ornate ceremony for preparing it.

ANSWER: **tea** [or **ocha**; accept *The Book of Tea* or *Cha no Hon*]

[10h] Ichibata Yakushi Kyōdan, a spin-off of Rinzai, places special emphasis on prayers of this type offered to the Medicine Buddha. This term refers to prayers for things like success and health rather than afterlife rewards. You may give the Japanese term or one of its common translations.

ANSWER: **genze riyaku** [or this-**worldly benefits**; or **practical benefits**]

<Religion>

11. Answer the following about the influence of Hindustani classical music on film, for 10 points each.

[10m] Lata Mangeshkar, who took lessons in Hindustani classical music from an early age, recorded over a thousand songs as this kind of singer. They provide vocals to the songs in many Indian movies while the actors lip-sync.

ANSWER: **playback** singers [or **playback** singing; or **ghost** singers]

[10e] This man composed the scores for *Anuradha* and Satyajit Ray’s *Apu Trilogy*. Alongside Ali Akbar Khan, this sitarist popularized Hindustani music in the West.

ANSWER: Ravi **Shankar** [or Robindro **Shaunkor** Chowdhury or Ravindra **Shankar** Chowdhury; prompt on **Chowdhury**]

[10h] *Silsila* and *Chandni* composer Hariprasad Chaurasia is a master of this instrument from northern India, which is stereotypically played over shots of hills and mountains. This flute is made from bamboo.

ANSWER: **bansuri** [or **bashi**; or **banshi**]

<Other Fine Arts>

12. The narrator of this author’s story “Implosion” wonders “To explode or to implode [...] that is the question” before musing on black holes. For 10 points each:

[10e] Name this Italian author whose collection *Cosmicomics* includes several stories narrated by a being named Qfwfq (“kuh-FOOF-kuh”).

ANSWER: Italo **Calvino** [or Italo Giovanni **Calvino** Mameli; prompt on **Mameli**]

[10m] Qfwfq’s cousin, the Deaf One, excels at gathering milk from the title location in this story, the first in *Cosmicomics*. In this story, Qfwfq falls in love with Mrs. Vhd Vhd (“vood vood”).

ANSWER: “The **Distance of the Moon**” [or “The **Distance from the Moon**,” or “La **distanza della Luna**”]

[10h] In another romance-centered tale from *Cosmicomics*, Qfwfq falls for Ayl while the two are living on a prehistoric version of Earth before these title things appear along with the atmosphere.

ANSWER: **colors** [accept “Without **Colors**” or “Senza **colori**”]

<European Literature>

13. This country's early history is recorded in the manuscripts of the *White Book of Sarnen*. For 10 points each:  
[10m] Name this modern-day country whose history was chronicled by the 16th-century statesman Aegidius Tschudi ("CHOO-dee"). According to legend, this country was founded by three men who agreed to an alliance on the Rütli ("ROOT-lee") meadow.

ANSWER: **Switzerland** [or **Swiss** Confederation, Confoederatio **helvetica**, **Schweizerische** Eidgenossenschaft, Confédération **suisse**, Confederazione **Svizzera**, or Confederaziun **svizrau**]

[10e] The Rütli oath was sworn by men from Uri, Schwyz ("shvytes"), and Unterwalden ("OON-tur-VALD-in"), the three founding states of the Old Swiss Confederacy. In modern terminology, the Swiss Confederation comprises 26 of these member states.

ANSWER: **cantons** [or **Kantone** or **cantoni** or **chantuns**]

[10h] The Old Swiss Confederacy's growing independence was one of the reasons that Charles IV issued this decree, which named the Seven Electors who would vote to determine the Holy Roman Emperor.

ANSWER: **Golden Bull** of **1356** CE [prompt on **Golden Bull** or **Bulla Aurea** or **Goldene Bulle** by asking "in what year was it issued?"]

<European History>

14. The general Tlācaēllel ("TLA-ka-AY-lell") recommended sending magicians rather than soldiers to rediscover this place when Moctezuma I sought to find it to thank his people's mother goddess. For 10 points each:

[10h] Name this womb-like location in Aztlán from which the Mexica peoples emerged. This place was often depicted next to a twisted mountain corresponding to Colhuacan.

ANSWER: **Chicomoztoc** [or Place of **Seven Caves**]

[10e] Chicomoztoc was the primordial dwelling place of Cōātlīcue ("ko-aht-LEE-kway"), the mother of this god of war who led the Aztecs from Aztlán to the site of Tenōchtitlan.

ANSWER: **Huitzilōpōchtli**

[10m] Upon arriving at Chicomoztoc, the emissaries of Moctezuma sank into the sand because they had consumed too much of this drink. The Olmec believed that this drink was gifted to mankind by gods who took it from high mountaintops.

ANSWER: **chocolate** [or **cocoa**; or **cacao**; accept **chocolatl** or **xocolatl**]

<Mythology>

15. Flux balance analysis assumes that all metabolites inside a cell satisfy this condition. For 10 points each:

[10m] Name this condition that occurs in a chemical reaction network if every accumulation term equals zero. Three distinct examples of this condition can satisfy mass and energy balances inside a CSTR.

ANSWER: **steady-state** concentrations [or **stationary state**; accept pseudo-**steady state** or quasi-**steady-state**; or **SS** or **PSS** or **QSS**; prompt on descriptive answers like **not changing** or **fixed** or **static** over time; prompt on positive **equilibria** or **equilibrium** or pseudo**equilibrium**]

[10e] Steady-state concentrations are eigenvectors of a matrix that encodes rates along with these values for every reaction in the network. Molarity is exponentiated by these coefficients in the law of mass action.

ANSWER: **stoichiometric** coefficients [or **stoichiometry**]

[10h] The trajectory to steady-state for discrete molecules in a network can be computed using this stochastic simulation algorithm, which samples chemical reactions from the distribution of their rates in the master equation.

ANSWER: **Gillespie** algorithm [or Doob-**Gillespie** algorithm]

<Chemistry>

16. According to a problem identified by Peter Geach, this position entails that the phrase “It is wrong to tell lies” means something different in the conditional “If it is wrong to tell lies, then it is wrong to get your little brother to lie.” For 10 points each:

[10m] Name this non-cognitivist position that says that ethical sentences do not state facts, but rather convey the speaker’s evaluative attitudes. Emotivism is sometimes considered a form of it.

ANSWER: **expressivism** [or **expressivists**]

[10e] The aforementioned problem is co-named for this German author of “On Sense and Reference.”

ANSWER: Gottlob **Frege** (“FRAY-guh”) [or Friedrich Ludwig Gottlob **Frege**; accept **Frege**–Geach problem]

[10h] The developer of this theory, Simon Blackburn, used commitment-theoretic semantics to address the Frege–Geach problem. This theory says that ethical sentences project the speaker’s attitudes as if they were statements about the world.

ANSWER: **quasi-realism** [or **quasi-realists**; prompt on **projectivism** or **projectivists**; reject “realism” or “realists”]  
<Philosophy>

17. This ruler formed a 5,000-man mounted royal bodyguard called the *monaspa*. For 10 points each:

[10m] Name this Bagrationi (“ba-gra-tee-OWN-ee”) dynasty ruler who defeated the Seljuks at the Battle of Didgori. This ruler then re-captured his kingdom’s capital city and moved his government there from Kutaisi (“koo-TY-see”).

ANSWER: **David** the **Builder** [or **David IV** of Georgia; or **David** the **Rebuilder**; or **David** the **Restorer**; or **David** the **Great**; or **Davit Aghmashenebeli**; prompt on **David** of Georgia]

[10e] The Seljuks originally invaded Georgia after Alp Arslan defeated Byzantine forces at this battle. Romanos IV was captured at this battle, which occurred in 1071.

ANSWER: Battle of **Manzikert** [or Battle of **Malazgirt**]

[10h] Among David’s building achievements in Georgia was founding this monastery near Kutaisi, at which he was later buried. Ioane Petritsi (“YOH-ah-neh puh-TREET-see”), Georgia’s foremost medieval philosopher, worked in this monastery’s academy.

ANSWER: **Gelati** Monastery [or **Gelati** Academy; or **Gelati** Monastery and Academy]

<Other History>

18. In this short story, Sister Sara explains to the narrator how women invented solar power and defeated an advancing army by scorching them with it. For 10 points each:

[10h] Name this 1905 short story in which an unnamed narrator has a vision of a peaceful futuristic society called Ladyland, which is run by women and confines men to the house.

ANSWER: “**Sultana’s Dream**”

[10m] Begum Rokeya’s story “Sultana’s Dream” notably came out a decade before this novel, in which Van Jennings discovers an all-female society where women reproduce through parthenogenesis.

ANSWER: **Herland** (by Charlotte Perkins Gilman)

[10e] “Sultana’s Dream” and *Herland* are both early works of feminist fiction in this genre. This term describes an ideal society that titles a book by Thomas More.

ANSWER: **utopia** [accept **utopian**]

<World Literature>

19. Lorenzo Costa the Elder painted an allegory of the coronation of this ruler of Solarolo, who appears as Minerva in the 1502 painting *Triumph of the Virtues*, which she commissioned. For 10 points each:

[10m] Name this noblewoman from Ferrara who collected ancient art in her Studiolo in Mantua's Palazzo Ducale. Titian painted this woman wearing an ermine *zibellino* and a *balzo* headdress.

ANSWER: **Isabella d'Este** [accept *Allegory of Isabella d'Este's Coronation*; accept **Isabella d'Este** in the *Realm of Harmony* or **Isabella d'Este nel regno di Armonia**; prompt on **Isabella** or **d'Este**]

[10e] *Triumph of the Virtues* was painted by this Mantua-based painter who used foreshortening in his *Dead Christ*.

ANSWER: Andrea **Mantegna**

[10h] Mars and Venus stand atop a natural arch in a Mantegna painting made for Isabella's Studiolo and titled for this place. Mantegna himself stands between Titian and Veronese in a frieze named for this place carved by Henry Hugh Armstead and John Birnie Philip.

ANSWER: **Parnassus** [or Mount **Parnassus**; or **Parnassós**; accept Frieze of **Parnassus** or **Parnassus** Frieze] <Painting & Sculpture>

20. *Two answers required.* Descriptions of deformation named for these two scientists differ on whether or not deformation is measured relative to a fixed configuration or a continually updating configuration. For 10 points each:

[10m] Identify these two scientists who name analogous descriptions in fluid mechanics that are related to each other by the material derivative.

ANSWER: Leonhard **Euler** ("LEE-uh-nard OY-lur") AND Joseph-Louis **Lagrange** ("zhoh-zeff loo-EE luh-GRAHNJ") [accept answers in either order; accept Giuseppe Luigi **Lagrangia** in place of "Joseph-Louis Lagrange"]

[10h] This tensor describes how line elements are deformed from the reference configuration to the current configuration. This tensor is defined as the partial with respect to the reference position of a body's motion under deformation.

ANSWER: **deformation gradient** tensor [prompt on **gradient** tensor or  **$F$** ]

[10e] A deformation has this property when the deformation gradient tensor is independent of the reference position. Objects with this property have the same composition everywhere.

ANSWER: **homogeneous** [or **homogeneity**; accept spatially **homogeneous** or spatial **homogeneity**] <Physics>