2022 ACF Winter

Packet 12 by South Carolina A, McGill A, Queen’s A, Waterloo A

Edited by Joseph Krol, Eric Mukherjee, Justin Zhang, Henry Goff, Eve Fleisig, Athena Kern, Ani Perumalla, Hari Parameswaran, Govind Prabhakar, Ethan Ashbrook, Nick Jensen

Tossups

1. When Hamilton’s characteristic function generates a transformation, this quantity becomes a constant often denoted “alpha.” It’s not the Lagrangian, but the “action” coordinate is computed as a line integral [emphasize] *of* this quantity. The derivative of the Lagrangian with respect to a generalized coordinate gives this quantity’s “conjugate” version. This quantity’s time derivative equals minus the derivative of the Hamiltonian with respect to q. In the usual phase space for a one-dimensional system, this quantity is plotted against position. The Newtonian form of this quantity, the change in which is called “impulse,” is conserved even in inelastic collisions. For 10 points, name this quantity whose “linear” type equals mass times velocity.

ANSWER: **momentum** [or linear **momentum** or conjugate **momentum** or conjugate **momenta** or generalized **momentum** or generalized **momenta**; prompt on p or p sub i; reject “angular momentum”]

<Physics>

2. This is the main instrument used on the Grammy-nominated classical album *Snowflakes are Dancing* by Isao Tomita (“ee-SAH-oh toh-MEE-tah”). Rachel Elkind collaborated with a composer who combined field recordings of nature with this instrument in *Sonic Seasonings*. This instrument accompanies a taped soprano who describes transforming into a nightingale in Milton Babbitt’s *Philomel*. This instrument was popularized by a 1968 album that features the third Brandenburg Concerto. This instrument was used for the soundtrack of the 1982 film *TRON* by WendyCarlos*.* One of these instruments, which include the RCA Mark II and which are often controlled with   
MIDI (“mid-ee”), was played in *Switched-On Bach*. For 10 points, Robert Moog (“mohg”) invented a type of what instrument that converts electronic input into sound?

ANSWER: **synth**esizer [accept **Moog** until read and prompt afterwards; accept specific types of synthesizer, such as Moog **synth**esizer or analog **synth**esizer; prompt on MIDI until read; prompt on keyboard]

<Classical Music>

3. In a play by this author, a character wearing a “loose black djellaba” is instructed to make four “gestures of helpless compassion.” In that play by this author, the Auditor stands next to a woman whose mouth is spotlit eight feet above the ground. The first stage directions of a play by this author describe a man using a stepladder to open the curtains in front of two windows. Those stage directions by this author of *Not I* describe two ashbins in which the legless characters Nagg and Nell reside. A bowler hat-wearing character fails to remove his shoe in a play by this author whose directions refer to the setting solely as “a country road” and “a tree.” For 10 points, name this author of *Endgame*, who depicted Vladimir and Estragon in *Waiting for Godot*.

ANSWER: Samuel **Beckett** [or Samuel Barclay **Beckett**]

<British Literature>

4. Malcolm Ross reported on this war, which is chronicled in a 12-volume history by Charles Bean, the founder of a war memorial that houses the painting *Menin* (“muh-NON”) *Gate at Midnight*. During this war, the “Light Horse” fought the Senussi and served in the battles of Lone Pine and the Nek, which inspired a 1981 Peter Weir film. A “gunfire breakfast” and golden syrup-laced oat biscuits are served on an April 25th holiday that honors this war’s supposed “larrikin” forces. Billy Hughes’s proposal to conscript soldiers for this war split the Labor Party. This war’s forces from New Zealand and Australia occupied colonies in Sāmoa and New Guinea, served in Sinai and Palestine, and landed at ANZAC (“ANN-zack”) Cove. For 10 points, what war included the Gallipoli Campaign against the Ottoman Empire, one of the Central Powers?

ANSWER: **World War I** [or **First World War**; or **WWI** or **WW1**; or the **Great War**] (The film is *Gallipoli*. The holiday is Anzac Day.)

<Other History>

5. This quantity is the [emphasize] *input* to a log-normal distribution developed by Gilles Chabrier (“ZHEEL SHAB-ree-ay”). In certain cases, the maximum value of this quantity for a gas sphere is a value of it named for Bonnor and Ebert. The exponent “negative 2.35” was proposed by Salpeter for an “initial function” named for this quantity that characterizes star formation. Fritz Zwicky proposed the existence of dark matter based on values for the ratio of this quantity to luminosity. The maximum value of this quantity for neutron stars is the TOV (“T-O-V”) limit, while the maximum value of this quantity for stable white dwarves is the Chandrasekhar (“CHAN-drah-SAY-car”) limit. This quantity for a star decreases in namesake “coronal ejections.” For 10 points, what quantity for the Sun equals its mean density times its volume, or about 2 times 10 to the 30 kilograms?

ANSWER: stellar **mass** [accept coronal **mass** ejections; accept **mass**-to-light ratio or **mass**-to-luminosity ratio; accept initial **mass** function; accept Bonnor–Ebert **mass**]

<Other Science>

6. *Note to moderator: Read the answerline carefully.*

The Imamate of Futa Jallon (“foo-tuh juh-LOAN”) was based in the highlands of this name east of the Rivières du Sud (“ree-VYAIR doo sood”). The first president of a country with this name descended from the founder of the Wassoulou (“wah-SOO-loo”) Empire, Samori (“sah-MOAR-ee”). This word names a country where prisoners starved at Francisco Macías Nguema’s (“mah-SEE-ahss n’GAY-mah’s”) Black Beach. This word names a mainland country led by João Bernardo Vieira (“zh’WOW bair-NAR-doo vee-AY-ruh”) after he deposed the PAIGC leader Luís, the half-brother of Amílcar Cabral (“ah-MEEL-kar kah-BRAHL”). This word names a bauxite-exporting country led by Ahmed Sékou Touré, coins made with gold from Britain’s Royal African Company, and the domesticated Senegambian “fowl.” A gulf of this name contains Bioko and São Tomé and Príncipe west of Río Muni, part of a Spanish-speaking “Equatorial” country. For 10 points, what word names West African countries led from Bissau and Conakry (“koh-nah-KREE”)?

ANSWER: **Guinea** [accept **guinea**fowl; accept Gulf of **Guinea**; accept **Guinea**-Conakry or French **Guinea**; accept Equatorial **Guinea** or Spanish **Guinea**; accept **Guinea**-Bissau or Portuguese **Guinea**; accept **Guinea** Highlands; prompt on Bissau or Equatorial by asking “what other word is that country named for?”; prompt on Ghana or Djenné or aguinaou by asking “that may be the etymology of what country name?”] (The PAIGC is the African Party for the Independence of Guinea and Cape Verde.)

<World History>

7. In a series of prints, this figure grabs a pedlar’s sleeve, steals a judge’s staff, and tills soil alongside Adam. A symbol of this figure rests on a brick under a sheaf of wheat on the outside of the *Braque Triptych*. This figure partly titles a 1526 series of 41 woodcuts by Hans Holbein. Another artist depicted snakes writhing around this figure’s neck and crown in one of the “master prints.” In a 1498 woodcut, this figure wears only a tattered cloth, holds a trident, and appears extremely emaciated. In an engraving, this figure appears to the left of a figure with goat horns as they stalk an armored rider in a narrow pass. That engraving by Albrecht Dürer depicts this hourglass-carrying figure, a knight, and the Devil. For 10 points, name this figure evoked by the danse macabre and memento mori tropes.

ANSWER: **Death** [or **Tod**; accept *The Dance of* ***Death***; prompt on *The Knight, Death, and the Devil* or *Ritter, Tod und Teufel*; prompt on the *Four Horsemen of the Apocalypse or Die vier apokalyptischen Reiter*]

<Painting & Sculpture>

8. The Taittirīya Upanishad (“tai-tee-REE-yuh oo-PUH-nee-shut”) identifies this number of “sheaths” that surround the *ātman*. Recitation of this number of rules that “purify behavior” precedes a declaration of refuge in the “triple gem.” The weaknesses of the human condition are referred to as this number of “thieves'' in Sikhism. Rules against lying and intoxication make up two of this many “precepts” followed by Daoist and Buddhist laypeople. The Prophet Muhammad negotiated with Allah to reduce the instance of an obligation from fifty down to this number of times. *Zakat* and *shahada* are members of a group of this many duties. For 10 points, give this number of times Muslims must pray per day and number of pillars of Islam.

ANSWER: **five** [or **5**; or **khams**; or **wǔ**; accept **Five** Pillars of Islam; accept **five** precepts or **pañca**śīla or **pañca**śikṣapada; accept **five** thieves or **paja** cora]

<Religion>

9. A memoir by this author opens by describing an “unutterably beautiful” mansion “as autumn advances” before a lengthy description of an acquaintance having a child. In a novel by this author, a 10-year-old child who shares this author's name is kidnapped by the protagonist and raised to be his “ideal woman.” Edward Seidensticker argued that this author never finished a novel whose final ten chapters describe the protagonist’s grandson and grand-nephew fighting over several women who live near Uji. A character created by this author, whose death is depicted by the blank chapter “Vanished into the Clouds,” pursues several women despite being married to Lady Aoi (“ah-OH-ee”). For 10 points, what medieval lady-in-waiting to Empress Soshi wrote *The Tale of Genji*?

ANSWER: Lady **Murasaki** [or **Murasaki** Shikibu; accept *The Diary of Lady* ***Murasaki*** or ***Murasaki*** *Shikibu Nikki*; prompt on Shikibu; prompt on Fujiwara no Kaoriko]

<World Literature>

10. An epic centering on one of these events opens with Mami creating seven men and seven women, who all procreate with one another. A man is told about one of these events via a whisper through his reed wall, leading him to destroy his house. After one of these events, “breath eternal” is given to a king named Ziusudra (“zee-ooh-SOO-dra”). Ea (“AY-uh”) warns the title character about one of these events in the Akkadian epic *Atrahasis*. A man who used the “Preserver of Life” to survive one of these events instructs a hero to find a plant at the bottom of the sea. That survivor, Utnapishtim (“oot-nah-PISH-tim”), tells Gilgamesh how he followed a raven during one of these events when it didn’t return to his boat. For 10 points, creation stories often feature what type of event that was survived in a giant ark by Noah?

ANSWER: **flood**s [or **deluge**s or **inundation**s; accept Great **Flood**]

<Mythology>

11. These entities are computed using the “zero differential overlap” approximation in the PPP method, which is partly named for John Pople. Whether these entities are symmetric or antisymmetric about their center of inversion determines if they are labeled *gerade* (“guh-RAH-duh”) or *ungerade* (“OON-guh-RAH-duh”). The energy of a particular one of these entities equals minus the ionization energy by Koopman’s theorem. The Fukui function characterizes reactivity based on two of these entities known as their “frontier” type. These entities, which are calculated from “linear combinations” in the LCAO method, include the HOMO and LUMO and may be “bonding” or “antibonding.” For 10 points, name these entities that represent 90 percent of the probability density of an electron’s position around a system of atoms, and which are a superposition of multiple similar “atomic” constructs.

ANSWER: **molecular orbital**s [accept **MO**s until “HOMO” is read and prompt afterwards; accept **frontier orbital**s or **bonding orbital**s or **antibonding orbital**s until each is read; accept HO**MO** or LU**MO** until each is read; accept highest occupied **molecular orbital**; accept lowest unoccupied **molecular orbital**; prompt on orbitals; reject “atomic orbitals” or “AOs”]

<Chemistry>

12. In a story, this thing’s “impertinence and everlastingness” infuriates a character who likens this thing to “a broken neck and two bulbous eyes that stare at you upside down.” A week of fog and rain prompts the protagonist to notice a low-lying “smooch” in this thing, as well as a smell that “creeps all over the house.” The narrator’s request to remove this thing, which she describes as “a debased Romanesque with *delirium tremens*,” is refused by a man who later threatens to send her to Weir Mitchell. The narrator exclaims, “I’ve got out at last… in spite of you and Jane” at her husband John, who faints after she destroys this title thing, which contains the figure of a woman imprisoned by its pattern. For 10 points, name this material that titles a feminist short story by Charlotte Perkins Gilman.

ANSWER: yellow **wallpaper** [accept “The Yellow **Wallpaper**”; prompt on paper]

<American Literature>

13. *Note to moderator: Read the answerline carefully.*

A class of molecules that exhibits this phenomenon is based on LOV domains bound to FMN cofactors. To preserve this phenomenon, DABCO (“DAB-co”) in glycerol is often used as a mounting medium. Some molecules that exhibit this phenomenon have superfolder variants. A protein exhibits this phenomenon because of the HBI cofactor attached to a cyclized serine 65, tyrosine-66, glycine-67 motif located at the center of its beta barrel. FITC (“FIT-see”) exhibits this phenomenon, which is used alongside confocal microscopy. Hybridization probes that exhibit this phenomenon are used to identify specific DNA sequences in FISH. Flow cytometry relies on labels with this property, which it activates using lasers. For 10 points, name this phenomenon exhibited by GFP, which genetic engineers use to create glow-in-the-dark animals.

ANSWER: **fluorescence** [or **fluorescent**; accept green **fluorescent** protein; accept **fluorescein**; accept **fluorophore**s or **fluorochromes**; accept **fluorescence** *in situ* hybridization; accept **fluorescence** microscopy; prompt on emitting light or luminescence or luminescent or emitting photons or glowing; prompt on dyes or stains; prompt on or reporters or tracers; prompt on labels or probes until each is read; prompt on GFP or FISH until each is read by asking “what does that stand for?”]

<Biology>

14. In a story by this author, Olivier is accused of murdering a goldsmith who hates parting with his jewelry. A later writer’s essay analyzes a story by this author as part of a “class of the terrifying which leads back to something long known to us.” In another story by this author, the protagonist calls his fiancée “accursed, inanimate” after she tells him to burn a “frightful” poem. A story by this author of “Mademoiselle de Scudéri” (“skoo-DEH-ree”) is analyzed in Sigmund Freud’s essay “The Uncanny.” In that story by this author, Coppelius steals children’s eyes and Nathanael learns that Olympia is an automaton. In another story by this author, a toy given by Drosselmeier (“DRAW-sell-mai-er”) defends Marie. For 10 points, name this German author of “The Sandman” and “The Nutcracker and the Mouse King.”

ANSWER: E. T. A. **Hoffmann** [or Ernst Theodor Amadeus **Hoffmann**; or Ernst Theodor Wilhelm **Hoffmann**]

<European Literature>

15. These objects name a form of ethics that Garret Hardin described with a metaphor in which 50 people have to choose ten out of 100 people to live. W. V. O. Quine’s *Word and Object* popularized a metaphor comparing science to one of these objects named for Otto Neurath (“NOY-rot”). Thomas Hobbes introduced duplication to a thought experiment involving one of these composite objects that is often seen as an extension of the sorites (“SOAR-ee-tays”) heap paradox. Plato’s *Republic* compares a democratic city to one of these objects whose users ignore the philosopher able to guide them. An early thought experiment by Plutarch asks if one of these objects would remain the same if all of its pieces were replaced. For 10 points, that thought experiment concerns what type of vehicle belonging to Theseus?

ANSWER: **ship**s [or **boat**s; accept **lifeboat**s or **raft**s; accept **ship** of Theseus or **raft** of Theseus; accept **Ship** of State; accept Neurath’s **boat** or Neurath’s **ship**; accept **lifeboat** ethics]

<Philosophy>

16. Refugees of this ethnicity were obscured using deepfakes in a 2020 documentary by David France. People of this ethnicity run the Adat People’s Movement’s dissident messaging channel, a moderator of which was forced to make one of many nationally broadcast apology videos. Soldiers of this ethnicity, who form the Sheikh Mansur Battalion, have been derided as a “TikTok army” for posting 2022 propaganda videos. A leader of this ethnicity, who made his sons take part in a televised 2016 MMA tournament, has conducted several anti-gay purges with the support of Vladimir Putin. For 10 points, Ramzan Kadyrov (“KAD-ee-rov”) is of what ethnicity, which names a Russian republic governed from Grozny in the North Caucasus?

ANSWER: **Chechen**s [or **Noxçi**y or **Naxço**y or **Kist**i; accept people from **Chechnya** or word forms; accept *Welcome to* ***Chechnya***; prompt on Nakh or Vainakh; prompt on Russian Muslims]

<Current Events>

17. This artist recounts helping his poet father dig a square hole in the ground in his memoir *1000 Years of Joys and Sorrows*. This artist compared himself to a cat who can “play for a whole day” in discussion of a toilet paper roll made of marble. A year before this artist released the film *Human Flow*, Nilüfer Demir captured him recreating her photograph in which waves splash on a child lying face-down on a beach. After suing Volkswagen, this artist riffed on his *Study of Perspective* series by posting a picture with their logo on his middle finger. A set of three photographs depicts this artist dropping a 2,000-year-old artifact. Soon after he filled the Tate Modern’s Turbine Hall with porcelain sunflower seeds, this artist was placed under house arrest. For 10 points, a 2011 street art campaign demanded the release of what exiled Chinese artist?

ANSWER: **Ài** Wèiwèi

<Other Fine Arts (Performance)>

18. A so-called “unknown” early draft of this text was discovered in 1893 by J. Horace Round in the French National Archives. This text was described as a “stumbling-block to the generation that came after it” in a book on its “Myth” by Edward Jenks, which accused Edward Coke of popularizing a misinterpretation of it. China was controversially visited by a 2015 world tour of a copy of this text. A provision for the removal of all fish-weirs is the thirty-third of this document’s 63 clauses. Pope Innocent III annulled this document, which was drafted by Stephen Langton. After a loss at the Battle of Bouvines, rebellious barons forced this document to be signed at Runnymede. For 10 points, name this document that established limited rights of some English people, signed in 1215 by King John.

ANSWER: **Magna Carta** [or **Magna Carta** Libertatum or **Great Charter** of Liberties; accept *The Myth of* ***Magna Carta***]

<European History>

19. Carson Schuze argued against the idea that these features “stack” in some uses of the Korean word *ka*. Jean Vergnaud (“zhahn ver-NYOH”) proposed that these features act as a “filter.” Barry Blake argued that these features develop in the order of a “hierarchy” in which their “instrumental” type is positioned highly. Multiple alternative ways exist to assign these features to words in languages with split ergativity, which have multiple methods of morphosyntactic alignment. Latin has six main examples of these features, which along with gender and number determine a Latin noun’s declension. For 10 points, what grammatical features cause nouns to be inflected according to their role in a sentence, and have types including “nominative” and “accusative”?

ANSWER: grammatical **case**s [accept specific cases such as accusative **case** or nominative **case** or instrumental **case**; accept **case** hierarchy or hierarchy of **case** roles; accept **case** filter; accept **case**-stacking; prompt on inflection or word forms; prompt on arguments or core arguments]

<Social Science>

20. A member of this family invented a type of bicycle brake in 1898, four years after writing about life in the year 2000 in his novel *A Journey in Other Worlds*. A member of this family worked with Ward McAllister to create a list of invitees dubbed “the Four Hundred.” Two buildings built by feuding members of this family were joined by the “Peacock” corridor to form a business where Oscar Tschirky (“t’CHIR-kee”) popularized Thousand Island dressing. A fort named for a member of this family was built near Lewis and Clark’s Fort Clatsop on the Columbia River. After a scion of this family died in the *Titanic* sinking, an inquest took place in a hotel founded by this family, which was partly named the “Waldorf.” For 10 points, the American Fur Company led to the colossal wealth of what family’s patriarch John Jacob?

ANSWER: **Astor** family [accept John Jacob **Astor** or John Jacob **Astor** IV; accept Caroline Webster Schermerhorn **Astor**; accept William Waldorf **Astor**; prompt on Waldorf family until read; prompt on Waldorf-Astoria or Fort Astoria by asking “what family is it named for?”; prompt on Schermerhorn]

<American History>

TB. Photographs taken in this modern-day country are spliced into images of upper-class townhomes in Martha Rosler’s series *House Beautiful*. The Art Workers Coalition overlaid a photograph taken in this country with the letters “Q” and “A” preceding the repeated phrase “and babies.” Larry Burrows took “Reaching Out” in this country, where a Hubert Van Es photograph of a government evacuation was wrongly thought to involve an embassy. Eddie Adams noted that he “killed a general with [his] camera” in this country by capturing a man’s casual execution. In this country, Nick Ut captured a naked girl running towards the camera to escape a napalm attack. For 10 points, a photograph of a Buddhist monk self-immolating was taken in what country where the Tet Offensive took place?

ANSWER: **Vietnam** [or **Việt Nam**; accept South **Vietnam** or **Việt Nam** Cộng Hòa or Democratic Republic of **Vietnam**; accept North **Vietnam** or **Việt Nam** Dân chủ Cộng hòa or Republic of **Vietnam**]

<Other Fine Arts (Photography)>

Bonuses

1. The Piasa (“PAI-ah-saw”) is a large variant of these creatures with a human head that is depicted on a large rock mural in Southern Illinois. For 10 points each:

[10m] Many Native American peoples believed that what type of creature variously fights the underwater panther and other aquatic primordial beings?

ANSWER: **bird**s [or **avian**s or **Aves**; accept thunder**bird**; accept Piasa **bird**; accept **aninikii**; accept **Wakį́yą**; accept **Kw-Uhnx-Wa**; accept specific kinds of bird; prompt on dragons]

[10h] In many traditions, the thunderbird is the benevolent counterpart to a “Great Serpent” with this physical feature. The throne of Denmark is legendarily made from a creature noted for this physical feature.

ANSWER: **horn**ed [or possessing **horn**s on its head or equivalents; accept Great **Horn**ed Serpent] (The throne of Denmark is supposedly made of unicorn horns.)

[10e] Pacific Northwest tales describe the thunderbird’s fight with one of these creatures that ends with it being lifted out of the ocean. Naturalists debate whether it was a fish or one of these mammals that swallowed Jonah in the Bible.

ANSWER: **whale**s [or **cetacean**s; or **Mimlos**-Whale or Mimlos-**Whale**; prompt on dag gadol by asking “what animal is most popularly depicted as swallowing Jonah?”]

<Mythology>

2. A poem in this form that describes a “murderous, cowardly pack” was read on the floor of Congress after the events of the Red Summer of 1919. For 10 points each:

[10e] Name this 14-line poetic form of Claude McKay’s “If We Must Die,” which is modeled on those written by Shakespeare.

ANSWER: **sonnet**s [accept Shakespearean **sonnet**]

[10m] Countee Cullen’s sonnet “Yet Do I Marvel” ends by questioning why God would “make a poet black and bid him” do this action. A Langston Hughes poem declares that “I, too” do this action.

ANSWER: **sing**ing[accept “I, too, **sing** America”]

[10h] A sonnet from this Harlem Renaissance collection warns “Boll-weevil’s coming” for the title “November cotton flower.” This collection includes short stories like “Karintha” and ends with the play “Kabnis.”

ANSWER: ***Cane*** (by Jean Toomer)

<American Literature>

3. An Austrian frigate named for this battle ferried Emperor Maximilian I to Mexico. For 10 points each:

[10h] Name this 1849 battle that occurred concurrently with the start of the Ten Days of Brescia (“BRESH-shah”). Sardinia-Piedmont was defeated by the forces of Josef Radetzky in this battle, leading to the end of the First Italian War of Independence.

ANSWER: Battle of **Novara** [or Battaglia di **Novara**; or Battle of **Bicocca** or Battaglia della **Bicocca**]

[10e] The Battle of Novara occurred about 30 miles west of this capital of Lombardy, which centuries earlier had been the base of the Sforza (“S’FORT-zah”) family.

ANSWER: **Milan** [or **Milano**]

[10m] The failure of the First Italian War of Independence forced Charles Albert of Sardinia to abdicate in favor of this son of his, whom Count Cavour later served as Prime Minister.

ANSWER: **Victor Emmanuel II** [or **Vittorio Emanuele II** or **Vittorio Emanuele** Maria Alberto Eugenio Ferdinando Tommaso di [Savoia](https://en.wikipedia.org/wiki/House_of_Savoy); prompt on Victor Emmanuel or Vittorio Emanuele; prompt on Savoy or Savoia]

<European History>

4. The best-selling drug of all time, atorvastatin (“uh-TOR-vuh-STAT-in”), is used to inhibit synthesis of this biomolecule. For 10 points each:

[10e] Statins like atorvastatin target the enzyme HMG-CoA reductase to inhibit the synthesis of what steroid lipid? This molecule can build up in arteries as plaques during atherosclerosis and has so-called “good” and “bad” types.

ANSWER: **cholesterol** [accept good **cholesterol** or bad **cholesterol**; prompt on LDL or low-density lipoprotein by asking “that lipoprotein contains what lipid that is deposited during atherosclerosis?”; prompt on sterols]

[10h] Atorvastatin exemplifies these strongly-binding inhibitors that resemble a high-energy intermediate. These inhibitors do not covalently bind to the enzyme.

ANSWER: **transition-state** inhibitors [or **transition-state** analogs]

[10m] When atorvastatin binds to HMGR, alpha-helices move to create a region that binds in a fashion named for this property. The tails of organic surfactants have this property.

ANSWER: **hydrophobic**ity [accept **hydrophobic** effect or **hydrophobic** interactions; prompt on nonpolar or word forms; prompt on lipophilic or word forms]

<Chemistry>

5. This artist wears boxing gloves in a poster that advertises his art and that of a younger friend. For 10 points each:

[10e] Name this pop artist whose New York studio was known as “The Factory.” This artist’s silkscreens include *Eight Elvises* and *Nine Jackies*.

ANSWER: Andy **Warhol** [or Andrew **Warhola** Jr.]

[10m] Warhol’s *Oxidations* series includes a portrait of this artist, his close friend. This Neo-Expressionist formed half of the graffiti duo SAMO (“SAY-moh”) with Al Diaz and often used a crown motif.

ANSWER: Jean-Michel **Basquiat**

[10h] Warhol’s *Oxidations* were made by exposing copper-coated canvases to this substance. Another New York artist used this substance and a plastic crucifix for a work in his *Immersions* series.

ANSWER: **urine** [or equivalents like **pee**; accept ***Piss*** *Christ*] (The other artist is Andres Serrano.)

<Painting & Sculpture>

6. The narrator demonstrates the difficulty of this question by recalling the story of King Midas, who swore his wife to secrecy over the existence of his donkey ears. For 10 points each:

[10h] Give this question, which a character is able to answer after encountering a foul old woman who tells him that this question’s true answer is “sovereignty.”

ANSWER: “what is it that **women desire** most?” [or equivalents such as “what do **ladies want** above all else?”]

[10e] The Wife of Bath describes a knight’s quest to discover what women desire most as part of a storytelling contest between pilgrims in this Middle English collection by Geoffrey Chaucer.

ANSWER: *The* ***Canterbury Tales*** [or ***Tales of Caunterbury***]

[10m] The Wife of Bath’s Tale inspired a later medieval poem in which this character searches for what women desire most before marrying Dame Ragnelle (“RAHG-nell”). In another poem, this character accepts a silk girdle that makes him invincible.

ANSWER: Sir **Gawain** [or variants like **Gauwaine**; accept *The Wedding of Sir* ***Gawain*** *and Dame Ragnelle* or *The Weddynge of Syr* ***Gawen*** *and Dame Ragnell*] (The other poem is *Sir Gawain and the Green Knight*.)

<British Literature>

7. This filmmaker was quoted as being “constantly aware” that he was the “comic,” while a man born just four days after him in April 1889 was the “madman,” yet it “could have been the other way around.” For 10 points each:

[10e] Name this filmmaker who took advantage of his similar toothbrush mustache to brutally satirize Adolf Hitler in his first sound film, *The Great Dictator*.

ANSWER: Charlie **Chaplin** [or Charles Spencer **Chaplin**, Jr.]

[10h] Noting that both he and Hitler greatly admired its composer, Chaplin chose the orchestral prelude from this opera to play during both the dictator Hynkel’s dance with a balloon globe and the Jewish barber’s climactic speech.

ANSWER: ***Lohengrin*** (by Richard Wagner)

[10m] While Hitler commissioned, starred in, and praised this Leni Riefenstahl (“REE-fun-sh’tahl”) propaganda film about the 1934 Nazi Congress in Nuremberg, Chaplin laughed throughout a showing at the MoMA and used it as a source to mock Hitler’s mannerisms.

ANSWER: ***Triumph of the Will*** [or ***Triumph des Willens***]

<Other Fine Arts (Film)>

8. Ziauddin Barani (“jee-oww DIN BUR-nee”) indicted this empire’s ruler Alauddin Khilji (“uh-LAO-jin KILL-jee”) for a homosexual affair with his enslaved general Malik Kafur (“MAH-leek KAH-foor”), who repulsed its invasions by the Chagatai (“CHAH-guh-tai”) Khanate. For 10 points each:

[10h] Name this empire founded by Qutb ud-Din Aibak (“KOO-tub ood DEEN AY-back”), who had been enslaved by Muhammad of Ghōr’s Tājīk Ghurid (“WHOO-rid”) dynasty. Nonbinary hījṛās (“HIDGE-ruhs”) may date from this empire, which was ruled by Razia Sultana (“ruh-ZEE-uh sool-TAHN”) and the Tughlaq (“TOOG-luck”) dynasty.

ANSWER: **Delhi** Sultanate [or Saltanat **Dêhlī**; or **Delhi** Empire; prompt on Mamluk dynasty or Salṭanat Mamlūk]

[10m] This Moroccan worked as a qāḍī (“KAW-dee”) in the Delhi Sultanate and visited Khajuraho (“KUH-joo-RAO”), whose temples contain erotic sculptures of same-sex intimacy. This 14th-century world traveler visited the Maldives (“MALL-deevz”), Mali, and perhaps China.

ANSWER: **Ibn Battuta** (“IB-un buh-TOO-tuh”) [or Abu Abdullah Muhammad **ibn Battutah** or Abū ʿAbd Allāh Muḥammad ibn ʿAbd Allāh al-Lawātiyy aṭ-Ṭanjiyy **ibn Baṭṭūṭah**]

[10e] Ibn Battuta’s (“IB-un buh-TOO-tuh’s”) *Riḥla* (“RIH-hluh”) is often read with François Bernier’s (“frawn-SWAH BAIR-n’yay’s”) travelogue on this later empire, whose *Fatawa e-Alamgiri* (“FAH-tah-WAH-ay-AH-lom-GHEER-ee”) punished homosexuality. This Muslim empire’s founder was Akbar’s grandfather Bābur.

ANSWER: **Mughal** Empire [or the **Mughal**s; or **Mogul** Empire; accept *Travels in the* ***Mughal*** *Empire*] (Bābur wrote about loving the Uzbek boy Baburi Andijani in his Chagatai-language memoir, the *Bāburnāma*.)

<World History>

9. The book *Begriffsschrift* (“beh-GRIFFS-shrift”) introduced a “turnstile” symbol used to express propositions in this discipline. For 10 points each:

[10e] Name this general field of study focused on deductive reasoning. Concepts like negation and conditionals are used to build proofs in this field of study.

ANSWER: **logic** [accept **math**ematics; accept mathematical **logic**]

[10m] This German logician and philosopher ushered in the analytic tradition of philosophy with his *Begriffschrift*. His other works include *Foundations of Arithmetic* and the essay “On Sense and Reference.”

ANSWER: Gottlob **Frege** (“FRAY-guh”) [Friedrich Ludwig Gottlob **Frege**]

[10h] Frege’s *Begriffsschrift* introduced a bivalent logic system of this type. Whereas some logic systems can only quantify elements, this type of logic system is able to quantify relations as well.

ANSWER: **second-order** logic [or **second-level** logic; prompt on set theory by asking “what type of logic system is weaker than set theory?”]

<Philosophy>

10. A method of constructing these diagrams is using UPGMA clustering to pairwise join the closest related taxa in a bottom-up fashion. For 10 points each:

[10m] Name these constructs that show the evolutionary relationships between different taxa. They are commonly created using either maximum parsimony or maximum likelihood methods.

ANSWER: **phylogenetic** trees [or **evolutionary tree**s; or **phylogeny** or **phylogenies**; prompt on trees, trees of life, cladograms, dendrograms, phylograms, or chronograms]

[10e] A phylogenetic tree using sequences from 16S rRNA was calculated by Carl Woese, who divided all life into three domains. Those domains are bacteria, archaea, and this one, which includes humans and amoebas.

ANSWER: **Eukarya** [or **Eukaryota** or **eukaryote**s or **eukaryotic** life]

[10h] Phylogenetic trees are usually rooted by using one of these clades, which are distantly related to the set of clades of interest.

ANSWER: **outgroup**s

<Biology>

11. This river’s pre-Indo-European civilization was the subject of the exhibit *The Lost World of Old Europe*, which featured the symbols of its Vinča (“veen-chah”) culture. For 10 points each:

[10e] Name this long Central European river whose ancient Vučedol (“voo-chay-doal”) and Iron Gates cultures settled modern-day Slovakia, Croatia, Serbia, and România.

ANSWER: **Danube** River [or **Donau** or **Dunaj** or **Dunav** or **Dunărea** or **Danubius**; or **Ister**; accept **Danubian** culture]

[10h] Roman territories south of the Danube were administered by Pannonia and this province to its east, which was also divided into “Superior” and “Inferior” halves. This province’s cities included modern Varna, Skopje (“SKAWP-yeh”), and Belgrade.

ANSWER: **Moesia** (“MEE-shee-uh”) [or **Moisía**; accept **Moesia** Superior or Upper **Moesia**; accept **Moesia** Inferior or Lower **Moesia**; accept **Dardania**; prompt on Dacia Aureliana or Provincia Dacia or Dacia Ripensis or Dacia Mediterranea or Two Dacias by asking “that name was given to part of what existing province after the evacuation of Dacia?”; prompt on Scythia Minor]

[10m] Moesia (“MEE-shee-uh”) was named for one of the many tribes of this region in modern Greece, Bulgaria, and Turkey. A province south of Moesia annexed the Odrysian Kingdom in this region, the homeland of Emperor Maximinus and Spartacus.

ANSWER: **Thrace** [or **Thracia**, **Thráki**, **Trakiya**, **Thráki**, or **Trakya**; accept **Thracian**s; accept Maximinus **Thrax** or Maximinus the **Thracian**]

<Other History>

12. An experiment by this psychologist tried to get people to forward “lost letters” addressed to recipients who included “Friends of the Nazi Party.” For 10 points each:

[10m] Name this psychologist whose “small world experiment” gave rise to the idea that any two people are within a certain number of “degrees of separation.”

ANSWER: Stanley **Milgram**

[10e] Milgram's experiment was an early attempt to model connections within these interpersonal structures, which lend their names to websites like Facebook.

ANSWER: social **network**s [accept social **network**ing sites or social **network**ing services; prompt on social media]

[10h] This social scientist observed the importance of one’s number of distant acquaintances compared to one’s number of close friends in “The Strength of Weak Ties,” which is often reported as the most cited social science paper of all time.

ANSWER: Mark **Granovetter** [or Mark Sanford **Granovetter**]

<Social Science>

13. Maria Ulfah, a scholar of this practice, was the first woman to win an international competition for this practice in Malaysia. For 10 points each:

[10h] Name this practice, performers of which are governed by one of several different rules called *tajwīd* (“todge-WEED”).

ANSWER: **recit**ing the **Qur’an** [or **Qirāʼāt** or **Qirāʼah**; or **read**ing the **Qur’an** a**loud**; accept **qāri**ʾ or **qāriʾūn** or **qurrā**ʾ or **qaraʾah**; prompt on recitation or reciting; prompt on reading aloud or equivalents; prompt on memorization of the Qur’an or equivalents]

[10e] In the first instance of Qirāʼah, this figure commanded the Prophet Muhammad to “recite” and then revealed the Qur’an to him. In the Bible, this archangel tells Mary about the birth of the son of God.

ANSWER: **Jibrīl** [or **Jibrāʾīl**; or the archangel **Gabriel** or **Gaḇrīʾēl**]

[10m] Recitations of all sūrahs of the Qur’an, other than the ninth, begin with this Arabic word, which means “in the name of God.”

ANSWER: **bismillāh** [or the **basmala**h; or **Bismillāh** al-Rahman al-Rahim or **Bi-smi llāh**i r-raḥmāni r-raḥīmi]

<Religion>

14. Multiple of these things are combined in a process called “blitting.” For 10 points each:

[10m] Name these things used to store image files. The name of these things refers to a function that assigns a certain color to each pixel in a grid.

ANSWER: **bitmap**s [or **bmp**; accept **bit array** or **bitmap** index]

[10e] Formats like GIF and PNG reduce the space taken up by a bitmap via “lossless” forms of this general process, in which the size of a file is shrunk.

ANSWER: **compress**ion [accept lossless **compress**ion]

[10h] The PNG format was created as an alternative to GIF because GIFs used a patented version of this algorithm. Terry Welch helped design that variant of this dictionary-based compression algorithm alongside the two Israelis it’s named for.

ANSWER: **Lempel–Ziv** algorithm [or **Lempel–Ziv**–Welch algorithm or **LZ**1 or **LZ**2 or **LZ**77 or **LZ**78 or **LZ**W]

<Other Science>

15. It’s not in Asia, but the port of Bagdad on this river was key to avoiding a blockade on cotton exports. For 10 points each:

[10h] Name this river where John “Rip” Ford's artillery fired upon confused Union soldiers repositioned along its banks during the Battle of Palmito Ranch, which is often considered the last battle of the Civil War.

ANSWER: **Río Grande** [or **Río Bravo** del Norte]

[10e] This state surrendered to the Union after the Battle of Palmito Ranch. Sam Houston, who had fought for this state’s independence from Mexico, voted against joining the Confederacy.

ANSWER: **Texas** [or **TX**]

[10m] John Bell Hood’s “Texas Brigade” distinguished themselves at this battle, where they took heavy losses while fighting to capture the Devil’s Den. The Confederates attempted to take Cemetery Ridge during this battle.

ANSWER: Battle of **Gettysburg**

<American History>

16. Depictions of a character who first appeared in this novel bookend Caryl Phillips’s novel *The Lost Child*. For 10 points each:

[10e] Name this Emily Brontë novel in which Mr. Lockwood describes Heathcliff as “dark-skinned.”

ANSWER:***Wuthering Heights***

[10h] This author adapted Heathcliff into the character Razyé (“razz-YAY”) in her novel *Windward Heights*. This author of *Ségou* (“SAY-goo”) won the New Academy Prize in Literature, which was awarded in 2018 as an alternative to the Nobel Prize.

ANSWER: Maryse **Condé** (“mah-REEZ con-DAY”) [or Maryse **Boucolon**]

[10m] *Jane Eyre*, a novel by Emily Brontë’s sister Charlotte, was adapted into this postcolonial novel written from the perspective of Antoinette Cosway by Jean Rhys (“reess”).

ANSWER: ***Wide Sargasso Sea***

<World Literature>

17. In “Music Theory and the White Racial Frame,” Philip Ewell argues that musicologists “can no longer ignore” how this music theorist’s racism “helped to legitimize harmful stereotypes” about people of color. For 10 points each:

[10h] Name this influential Austrian music theorist whose theories about the Ursatz, or fundamental structures, of compositions form the basis for his namesake field of analysis.

ANSWER: Heinrich **Schenker** [accept **Schenker**ian analysis]

[10e] To question the views in Schenker’s treatise on this concept, Ewell argues for increased education on non-Western tonality. This “vertical” counterpart to melody describes the combination of notes that occur at the same time.

ANSWER: **harmony**

[10m] Schenker also wrote a treatise on this polyphonic technique, which uses voices that are melodically and rhythmically independent, but harmonically interdependent. The treatise *Gradus ad Parnassum* introduced five “species” of this technique.

ANSWER: **counterpoint** [or **contrapuntal**; accept species **counterpoint**]

<Classical Music>

18. An author who married into this family wrote the novel *Florentin* (“floh-ren-TAHN”) and translated work by her friend Madame de Staël (“stal”) into German. For 10 points each:

[10h] Name this family that included two authors who spurred German Romanticism by founding the journal *Athenaeum* (“ath-en-AY-um”).

ANSWER: **Schlegel** (“SHLAY-ghel”) family [accept Friedrich **Schlegel** or Karl Wilhelm Friedrich **Schlegel**; accept August **Schlegel** or August Wilhelm **Schlegel**; accept Dorothea von **Schlegel** or Dorothea Friederike von **Schlegel**; prompt on Brendel Mendelssohn]

[10e] Gotthold Lessing fictionalized Dorothea von Schlegel’s (“dor-oh-TAY-ah von SHLAY-ghel’s”) father, the German-Jewish philosopher Moses Mendelssohn, as Nathan the Wise in a play that adapts a parable from this Italian author’s *Decameron*.

ANSWER: Giovanni **Boccaccio** (“boke-KAHT-choh”)

[10m] This author, a close friend of the Schlegels, first used his one-word pen name for a set of fragments published in the *Athenaeum*. This author of the *Hymns to the Night* introduced the symbol of a blue flower in the unfinished novel *Heinrich von Ofterdingen*.

ANSWER: **Novalis** [or Georg Philipp Friedrich Freiherr von **Hardenberg**]

<European Literature>

19. Answer the following about famous mathematicians’ personal documents, for 10 points each.

[10h] The Fitzwilliam Notebook contains this mathematician’s records of his 57 “sins,” like “making pies on Sunday night.” John Maynard Keynes owned a collection of most of this mathematician’s notes, which did not include a set purportedly burned by his dog Diamond.

ANSWER: Isaac **Newton**

[10e] Carl Friedrich Gauss wrote this word in all caps in his diary upon finding a proof that any number is the sum of three triangular numbers. Archimedes legendarily ran through Syracuse naked while shouting this Greek word.

ANSWER: **eureka**

[10m] In 1976, George Andrews found this mathematician’s “lost notebook,” which contained several examples of mock theta functions. According to G. H. Hardy, this mathematician once came up with a reason why the taxicab number 1729 was interesting on the spot.

ANSWER: Srinivasa **Ramanujan** (“rah-MAH-noo-jun”) [or Srinivasa Ramanujan **Aiyangar**; accept Hardy–**Ramanujan** number]

<Other Academic>

20. For two coaxial conductors, this quantity is inversely proportional to the logarithm of the ratio of the two radii. For 10 points each:

[10e] Name this quantity measured in farads. It is proportional to the plate area in a “parallel-plate” device.

ANSWER: **capacitance** [prompt on C; prompt on capacitors]

[10m] For a capacitor, this complex analog of resistance equals the reciprocal of j times frequency times capacitance. This quantity’s imaginary part is reactance.

ANSWER: electrical **impedance** [prompt on Z]

[10h] When operating at high frequency, this unwanted type of capacitance can arise when nearby non-capacitor devices interact, which limits the practical operating frequency of AC circuits.

ANSWER: **parasitic** capacitance [or **stray** capacitance; prompt on self-capacitance]

<Physics>

TB. The bodies of four women from this country are thrown off a cliff in the novel *In the Time of the Butterflies*. For 10 points each:

[10m] Name this country, [emphasize] *from which* four sisters flee in Julia Alvarez’s novel *How the García Girls Lost Their Accents*. In a 2007 novel, the accents of boys from this country generate the title nickname of a sci-fi fan who suffers from a *fukú* curse.

ANSWER: **Dominican Republic** [or **República Dominicana**; reject “Dominica”] (The latter novel is Junot Díaz’s *The Brief Wondrous Life of Oscar Wao*, in which the title nickname resembles “Oscar Wilde” in a Dominican accent.)

[10e] In that Alvarez novel, the Dominican García girls lose their accents after fleeing to this primarily English-speaking country, where Chicano literature originated.

ANSWER: **United States** of America [or **US**A; or **America**]

[10h] People were murdered or spared based on their accents during the Dominican Republic’s Parsley Massacre, an event depicted in this author's novel *The Farming of Bones*.

ANSWER: Edwidge **Danticat** (“DAWN-tee-kah”)

<World Literature>