

2022 ACF Regionals

Edited by Taylor Harvey, Jaimie Carlson, Ganon Evans, Alex Hardwick, Nick Jensen, Arjun Nageswaran, Grant Peet, Graham Reid, Jonathen Settle, Chandler West, and Annabelle Yang
Packet M by Princeton, Edinburgh, Duke B, Maryland A, Kenyon, Cambridge B

TOSSUPS

1. Subsurface magnetic fields provide the torque necessary to drive cyclic modulations of this quantity in the Applegate mechanism proposed for post-common-envelope systems. The x -axis distance between two transits on a light curve gives this quantity for an exoplanet. Comets classified by their large value for this quantity are typically thought to lack a mantle and have isotropically distributed orbits. The predicted energy loss from gravitational waves matches the rate of this quantity's decrease in the Hulse–Taylor binary. For a satellite in geostationary orbit, this quantity equals Earth's sidereal day. This quantity squared is proportional to the semimajor axis cubed by Kepler's third law. For 10 points, name this time it takes one object to revolve around another.

ANSWER: orbital **period** [or **period** of revolution; accept sidereal **period**; accept long-**period** comets; accept **year** or tropical **year** or solar **year** or calendar **year** or Earth **year** or sidereal **year**; prompt on time; prompt on T; reject "rotation period"]

<Other Science>

2. Buck Franklin fought against rezoning in this city, where a Reconciliation Park is named after his son, historian John Hope Franklin. The Stradford Hotel in this city benefited from an economic boom after discoveries in Glenn Pool. Jack Walton declared martial law after an event in this city for which insurance companies refused to offer restitution. In the early 20th century, this city was known as the "Oil Capital of the World." A newspaper in this city falsely reported that an incident in an elevator in the Drexel Building involved Dick Rowland. The affluence of this city's Greenwood district led it to be known as "Black Wall Street." For 10 points, reparations are demanded by survivors and their descendants for a 1921 race massacre in what city in Oklahoma?

ANSWER: **Tulsa**, Oklahoma [prompt on Greenwood before read by asking "what city was the Greenwood district in?"]

<American History>

3. A character in this play describes luck as skin flayed off other people to close a "great raw place here on [his] breast." Another character in this play repeats the phrase "fearfully thrilling" during an event that makes her hear "harps in the air" as she waves a shawl. In this play, twins die from drinking their mother's fevered milk. A character in this play demands the Kingdom of Orangia she was promised and urges a man to give the "younger generation" a chance. The protagonist of this play tricks his bookkeeper, Kaia Fosli, into thinking that he will help her fiancé. Hilda Wangel persuades the protagonist of this play to hang a wreath on a church steeple, causing him to fall to his death. For 10 points, name this Henrik Ibsen play about Halvard Solness, the title architect.

ANSWER: *The **Master Builder*** [or ***Bygmester Solness***]

<European Literature>

4. George Rochberg (“ROCK-berg”) controversially broke with serialism with his third piece in this genre, while his fourth through sixth pieces in this genre were recorded by an ensemble named for Concord. An “electric” piece in this genre protesting the Vietnam War asks its players to play percussion and tuned glasses across its 13 movements, the first of which evokes “electric insects.” The Sonoran Desert inspired the first of five highly dissonant pieces in this genre by Elliot Carter. Pieces in this genre are often premiered by ensembles named for Irvine Arditti and the titan Kronos. George Crumb’s *Black Angels* is a modified piece in this chamber genre that quotes an earlier piece in this genre, Franz Schubert’s *Death and the Maiden*. For 10 points, name this genre played by a cello, viola, and two violins.

ANSWER: **string quartet** [accept Concord **String Quartet**; prompt on quartet; prompt on Kronos Quartet or Arditti Quartet]

<Classical Music>

5. One of these events resulted in a division into camps known as the “large majority” and the “elders” over the following of the “ten tenets.” A group of 500 at one of these events was convened to counter the influence of a blasphemer named Balanda. Traditions disagree over whether an iteration of these events occurred in Kashmir or Sri Lanka. In one tradition, Rājagṛiha was the site of the first of these events, during which Upāli recited the first monastic rules and Ānanda recited the sermons. The Pāli canon was first written down at one of these events, of which there have been six in Buddhism. Nestorianism was condemned as a heresy at a 431 event of this type held in Ephesus. For 10 points, name these events that, in the Christian tradition, include gatherings at Chalcedon (“KAL-suh-don”) and Nicea.

ANSWER: ecumenical **councils** [accept Buddhist World **Councils**; accept Church **councils**; accept **councils** of Buddhism; accept Buddhist ecumenical **meetings**; accept *Saṅgāyana*; prompt on conventions]

<Religion>

6. In a story by this author, a nephew tries to kill his uncle via an exploding clock because a palm reader predicted that the nephew would murder someone. In another story by this author, a character steals green paint after his bloodstains are cleaned with Pinkerton’s Champion Stain Remover. This author wrote a story in which a swallow takes gold off a statue to give it to the poor. This author of “Lord Arthur Savile’s Crime” and “The Canterville Ghost” wrote an essay that describes realism as “the rage of Caliban seeing his own face in a glass”; that preface by this author of “The Happy Prince” ends, “All art is quite useless,” and accompanies a book whose title character leaves the actress Sibyl and murders the artist Basil Hallward. For 10 points, name this author of *The Picture of Dorian Gray*.

ANSWER: Oscar **Wilde** [or Oscar Fingal O’Flahertie Wills **Wilde**]

<British Literature>

Note to moderator: Read the answerline carefully.

7. A woman compared to one of these people “wouldn’t have a Willie nor a Sam” in a music hall song by Fred Murray and R. P. Weston. Synthesizers accompany the organ at St. Giles Cripplegate Church on an album whose tracks are titled for these people by Rick Wakeman. These people sing “Ja” or “Nein” on a song parodying dating apps that features the tightening of a corset. The songs “Pastime with Good Company” and “Greensleeves” were apocryphally written for two members of this group. Toby Marlow and Lucy Moss composed a musical about these people that includes songs like “Haus of Holbein” and “Don’t Lose Ur Head.” For 10 points, name this group of women who appear in the musical *Six*, which incorporates the rhyme “divorced, beheaded, died, divorced, beheaded, survived.”

ANSWER: the six **wives** of **Henry VIII** [prompt on Catherine of Aragon or Anne Boleyn or Jane Seymour or Anne of Cleves or Katherine Howard or Catherine Parr by asking “what larger group of women is she part of?”; accept answers **that list all the aforementioned wives by name**; prompt on Six or the six; prompt on British or English **nobility**; prompt on queens of England; prompt on “the widow next door” by asking “the woman in that song plays on what specific historical group of women?”] (The first line refers to “I’m Henry the Eighth, I Am.”)

<Other Fine Arts>

8. Upon an impromptu meeting with a ruler of this empire, Siniates scooped water from a nearby river and presented it to him as a gift. A letter composed by a ruler of this empire instructed royal treasurers in Jerusalem to provide Ezra with silver and supplies to perform ritual Jewish sacrifices. Within this empire, the angarium organized the delivery of messages. Influential queen consorts in this empire included Parysatis, a rival of Stateira, who orchestrated the murder of Tissaphernes. Themistocles (“theh-MIS-toh-kleez”) served as governor of Magnesia in this empire after the failed “March of Ten Thousand” recorded in Xenophon’s *Anabasis*. A ruler of this empire rebuilt the Royal Road between Sardis and Susa to connect satrapies. For 10 points, name this first Persian empire, founded by Cyrus the Great.

ANSWER: **Achaemenid** (“uh-KEE-meh-nid”) Empire [accept **First Persian** Empire before read; prompt on Persian Empire before read] (Aelian wrote of Siniates meeting Artaxerxes II.)

<Other History>

9. The four-gradient of the electromagnetic stress-energy tensor is proportional to this quantity. This quantity can be expressed as “the negative of elementary charge times electron density times drift velocity.” The fact that the volume integral of the electric field dotted with this quantity equals the rate of work done by electromagnetic fields is used to derive Poynting’s theorem. In Lorentz–Heaviside units with c set to one, (read slowly) the curl of the magnetic field equals this quantity plus the time derivative of the electric field (end read slowly). The equation “this quantity equals conductivity times electric field” is a form of Ohm’s law. The charge flowing through a surface is given by the time integral of the surface integral of this quantity. For 10 points, name this quantity with units of amperes per square meter.

ANSWER: volume **current density** [accept **four-current** density; prompt on J; reject “current”; reject “surface current density” or “K”; reject “density”]

<Physics>

10. Richard of Campsall attempted to “save” a theory of these things by differentiating “divided” and “composite” types of their components. Boethius (“bo-EE-thee-us”) unusually used the Latin word *est* in examples of these things discussed in a text titled for “hypothetical” ones. Names like Barbara and Festino are used to identify the 14 valid moods, which consist of variations of these constructs. Copulas used in these things are symbolized with a lowercase A, E, I, or O. Aristotle divided the components of these things into universal or particular affirmatives and universal or particular negatives in *Prior Analytics*. For 10 points, identify these logical constructs that consist of two premises and a conclusion, such as “All men are mortal. Socrates is a man. Therefore, Socrates is mortal.”
ANSWER: **sylogisms** [or categorical **sylogisms**; accept modal **sylogisms**; accept *On Hypothetical **Sylogisms***; prompt on categorical **sentences** by asking “those make up what larger logical constructs in this context?”]
<Philosophy>

Note to moderator: Read the answerline carefully.

11. An outdated type of this technique forms two arms and a stuffer. The “TA” type of this technique is visualized *in silico* on SnapGene. In this technique, Rop (“ropp”) proteins promote “stringent” rather than “relaxed” control and partitioning causes incompatibility. Directional topo kits aid in this technique, which may use giant BACs (“backs”), PACs (“packs”), or cosmids instead of small, high-copy “shuttles” like pUC (“puck”) or pBR322. This technique is easier with minipreps but harder when type II enzymes that recognize a polylinker’s “multiple sites” exhibit star activity. Self-ligation frustrates this technique, which creates replicons by using selectable markers and restriction sites on DNA vectors. For 10 points, what process of isolating and propagating recombinant DNA shares its name with the common term for somatic cell nuclear transfer that created Dolly the sheep?
ANSWER: molecular **cloning** [or word forms like preparing a **clone**; accept multiple **cloning** sites or TA **cloning**; accept making **recombinant DNA** before read; accept DNA **assembly**; prompt on preparing a **cDNA** library; prompt on **restriction** digest or designing/isolating **plasmids** or preparing **vectors** or gene **expression** or DNA **replication** by asking “as part of what specific task in molecular biology?”; reject “homologous recombination”]
<Biology>

12. Players modeling these people ate more pretzels and banged their game pieces loudly in a study by Paul K. Piff, who wrote a 2012 *PNAS* paper about their unethical behavior. Michael Kraus and Dacher Keltner found these people to be less helpful and trusting, among other “solipsistic tendencies.” These people name the dynamics of preferential attachment networks, also called the Matthew effect. These people may hire firms called “family offices.” Lobbyists who cater to these people are criticized in Jacob Hacker and Paul Pierson’s *Winner-Take-All Politics*. These people led Larry Bartels to call today’s America the “new” version of a period circa 1870 to 1900. The Buffett Rule would apply to these people, who make up the donor class and pay more in progressive tax systems. For 10 points, what people rule in a plutocracy?
ANSWER: **rich** people [or the **wealthy** or **affluent** or ultra-**high-net-worth** individuals; accept **upper class** or **high class** or similar; accept **millionaires** or **billionaires**; accept **plutocrats** before “plutocracy”; accept **rich**-get-richer dynamics; prompt on **elite** or **aristocracy** or **philanthropists**] (The study in the first line involved “rich” and “poor” *Monopoly* players. Bartels used the phrase “New Gilded Age.”)
<Social Science>

13. A poem by this author defines hunger as “to give / the body what it knows / it cannot keep.” In a novel by this author, two teenage boys ride bicycles while singing along to 50 Cent’s “Many Men.” This author described “the chief of police / facedown in a pool of Coca-Cola” in a poem interspersed with lyrics from “White Christmas.” This author’s only novel is framed as a letter to his mother, who works in a nail salon. The protagonist of that novel by this author explores his sexuality with the fentanyl-addicted Trevor and is abused by his mother Rose, who calls him Little Dog. For 10 points, what gay Vietnamese American author wrote the poetry collection *Night Sky With Exit Wounds* and the novel *On Earth We’re Briefly Gorgeous*?

ANSWER: Ocean **Vuong**

<American Literature>

14. A 14th-century chronicle of this kingdom, the *Garden of Pages*, describes a rich queen who divorced a Lamtuna man who invaded Barghawata, and then co-ruled this kingdom with his cousin, who conquered Tlemcen. The pirate queen Sayyida al Hurra married a ruler of this kingdom’s Zenata Wattasid dynasty. The 9th-century noblewoman Fatima al-Fihri founded this kingdom’s University of al-Qarawiyyin under its first sharīfī royal dynasty, the Idrisids. This kingdom, whose name means “the west” in Arabic, expanded south of Sijilmasa (“see-jeel-MAH-suh”) to Chinguetti and Taghaza (“tah-GAH-zah”) under Ahmad al-Mansur of the Saadi dynasty. The Almohad Caliphate overthrew this kingdom’s Almoravid dynasty. For 10 points, what North African kingdom built kasbahs to defend its imperial cities of Marrakech and Fez?

ANSWER: **Morocco** [or Kingdom of **Morocco**; or al-**Maghrib** al-Aqṣá or al-Mamlakah **al-Maghribiyyah**; accept **Almoravid** Empire or al-**Murābitūn** or **Almohad** Caliphate or al-**Muwahhidūn** or **Saadi** Sultanate or **Sa’dids** or **Idrisid** dynasty or **Wattasid** Sultanate before each is read] (The first line is about the *Rawd al-Qirtas* and Zaynab an-Nafzawiyah.)

<World History>

15. In an article on the “birth” of this painting, Wanda Corn argued against reading the artist’s trip to Munich as the primary influence on it. This painting was on view outside the United States for the first time from 2016 to 2017 at the Royal Academy and Musée de l’Orangerie. This painting is referenced by the pose of Ella Watson standing in front of a flag in a photograph with the same name. This painting currently hangs in the Art Institute of Chicago, which purchased it for 300 dollars. Misreadings of this painting as satire often come from assuming the figures in it are meant to date to when it was painted and not to the building of the Dibble House that it depicts. For 10 points, the artist’s sister and dentist modeled for what painting depicting rural Iowa life by Grant Wood?

ANSWER: **American Gothic** [accept “The Birth of a National Icon: Grant Wood’s **American Gothic**”] (The photograph is by Gordon Parks.)

<Painting/Sculpture>

16. During a protest movement led by members of this ethnic group, police attacked their annual Irreecha festival. This ethnic group used the song “Maalan Jira,” or “Do I Even Exist,” as a rallying cry. The declaration of “I am [this ethnic group] first!” became the slogan of a campaign among its diaspora led by Jawar Mohammed. In 2000, the capital of this ethnic group’s state was moved to Adama from Finfinne. Members of this ethnic group rose up after the assassination of singer Hachalu Hundessa (“hah-CHAH-loo HUN-dess-ah”). The government of Abiy Ahmed (“AH-bee AHK-med”), who is from this Cushitic ethnic group, fought against its Liberation Front in a conflict foreshadowing contemporary Tigray. For 10 points, name this largest ethnic group in Ethiopia, ahead of the Amhara.

ANSWER: **Oromoo** [accept **Oromia** or **Oromiyaa**; reject “Ethiopian”] (The Oromoo refer to Addis Ababa as Finfinne.)

<Current Events>

17. In the *Lay of Atli*, Gunnar used one of these objects after being thrown into a snake pit by Attila the Hun. The Penn Museum houses one of these objects adorned with a lapis-bearded golden bull head that represents the power of Shamash. After being stolen by the Formorians, one of these objects killed nine men as it returned to its master; that example of these objects, Uaithne (“WEN-ya”), was used by the Dagda to order the seasons. Amphion (“AMF-ee-ahn”) employed one of these objects to command heavy stones and construct the walls of Thebes. In compensation for stealing cattle from Apollo, Hermes offered one of these objects that he had invented with a tortoiseshell. For 10 points, name these musical instruments, one of which belonged to Orpheus and was placed in the stars.

ANSWER: **harp** [or **lyres** or **Lyra**; accept **cláirseach**; prompt on musical instruments or string instruments before read]

<Mythology>

18. In a form of this technique, a wiper produces a thin film from the feedstock to allow for fast heat transfer. The “batch stripper” setup for this technique differs from a “batch rectifier” in the location of the charge pot. In the extractive form of this technique, a new solvent is added, resulting in changes in fugacity. Glassware used in this technique may have “Vigreux” (“VEEG-roh”)-type indentations or be packed with beads or Raschig rings to increase surface area. Maintaining two parts of the apparatus at different pressures allows the pressure-swing type of this technique to effectively “jump” azeotropes. Fractionating columns and condensers are used in, for 10 points, what technique that separates the components of a liquid mixture by boiling point?

ANSWER: **distillation** [accept thin film **distillation**; accept wiped film **distillation**; accept batch **distillation**; accept extractive **distillation**; accept fractional **distillation**]

<Chemistry>

19. A protagonist from this country notices her great-great-aunts “full of mothmirth and dry seedy shadows of laughter” in an epilogue titled “Moon Water Picking.” In a novel from this country, a seven-year-old vomits when he hears French spoken on a boat; in that novel from this country, a traumatized boy who secretly calls himself Clare or Claro uses glass from a shop window to stab his abusive father, Joe Gillayley. In another novel from this country, Pai defies her grandfather Koro by trying to become village leader. A former painter lives alone in a tower in a novel from this country whose title is usually styled in lowercase; that painter is Kerewin Holmes. Novels from this country include *Whale Rider* and *the bone people*. For 10 points, name this country whose authors Witi Ihimaera (“wee-tee ee-hee-mah-EH-rah”) and Keri Hulme often draw on their Māori heritage.

ANSWER: **New Zealand** [or **Aotearoa**]

<World Literature>

20. This leader turned a 500-room model women’s prison devised by Victoria Kent into a brutal detention center for over ten thousand political prisoners. The identification and exhumation of mass graves populated during the reign of this leader is the goal of the Association for the Recovery of Historical Memory, or ARMH. He’s not Pinochet, but an inquiry by Judge Baltasar Garzón into crimes committed by this leader was dropped for violating a general amnesty agreement colloquially referred to as the “Pact of Forgetting.” Members of the Catholic Opus Dei organization served as ministers to this leader, who promoted the Vertical Syndicate as his country’s sole trade union. This leader was buried in the Valley of the Fallen. For 10 points, name this longtime dictator who ruled Spain until 1975.

ANSWER: Francisco **Franco** [or Francisco **Franco** Bahamonde]

<European History>

Tiebreaker. A king from this dynasty supported a rural scientific society called Friends of the Country, whose member Fausto Elhuyar first isolated tungsten. The land reforms of a king from this house led to the end of the mesta system. The depression of a king from this house led to his brief abdication, during which he was succeeded by his son Louis, who died of smallpox seven months later. After the Alcázar burned down, a king from this house built the largest palace complex in Europe, the Palacio Real. José del Campillo y Cossío was the architect of this house's namesake economic "reforms." This dynasty took control of Spain after the Treaty of Utrecht ended the War of the Spanish Succession. For 10 points, Charles III and Philip V were members of what Spanish dynasty with French origins?

ANSWER: Spanish house of **Bourbon** [or **Bourbon** dynasty; or house of **Bourbon**-Anjou; or casa de **Borbón**; accept **Bourbon** Reforms or Reformas **Borbónicas**]

<European History>

BONUSES

1. *Description acceptable.* To perform this action, First Man plants a reed that grows to the sky and sends a badger and locust to explore. For 10 points each:

[10h] Identify this action that also occurs as travelers escape a flood caused when the coyote First Angry steals the children of a water monster. Another instance of this action occurs after the first people offend the swallow people and are asked to leave.

ANSWER: **ascending** through **worlds** [accept any answers indicating **traveling** between or **entering** different **worlds**; accept specific worlds, like the Fifth **World**; accept, but DO NOT REVEAL, **Dinetah** or the **Navajo homeland** in place of a specific world; prompt on **traveling** or **migration** with “to where?”; reject answers indicating “descent” or “falling between worlds”]

[10m] Humans led by First Man, First Woman, and two coyotes pass through different worlds to arrive at the homeland of these people. Changing Woman departs to live with the Sun some time after giving birth to culture heroes of these people.

ANSWER: **Navajo** [or **Diné**]

[10e] In Zuni mythology, the creator Awonawilona sends two figures with this familial relationship to guide humanity up through four “wombs.” A Navajo pair of heroes with this relationship slay many monsters, while Mayan heroes with this relationship defeat the lords of Xibalba (“shee-BAHL-bah”).

ANSWER: **twins** [prompt on **siblings** or **brothers**]

<Mythology>

2. Benzophenones like bisoctrizole (“biz-OCT-trai-ZOL”) are additives that slow this process thanks to their broadband absorption below 380 nanometers. For 10 points each:

[10h] Name this process that degrades materials like PET and polystyrene. It proceeds through Norrish reactions, which cause chain scission.

ANSWER: **photooxidation** [accept **photodegradation**; prompt on **oxidation** or **degradation**]

[10m] Salts of this transition metal can be added to plastics to promote photooxidation, supposedly enhancing biodegradability. Salts of this element in its +7 oxidation state are strong oxidizers.

ANSWER: **manganese** [or **Mn**; accept **Mn⁺⁷**]

[10e] In addition to photooxidation, rubber polymers can be degraded by exposure to this gas. In the atmosphere, this gas is produced from oxygen by UV light and is broken down by CFCs.

ANSWER: **ozone** [or **O₃** (“O three”)]

<Chemistry>

3. After a debate at this institution about whether immediate emancipation was preferable to colonization, its trustees banned the discussion of abolition entirely. For 10 points each:

[10h] Name this Presbyterian institution founded in Walnut Hills. Asa Mahan joined a group of “rebels” that left this institution and served as the first president of a successor college.

ANSWER: **Lane** Theological Seminary [accept the **Lane** Rebels] (The successor college was Oberlin College.)

[10e] The response to the debates was overseen by the college’s president Lyman Beecher, whose children included this author of *Uncle Tom’s Cabin*.

ANSWER: Harriet Beecher **Stowe** [or Harriet Elisabeth Beecher **Stowe**]

[10m] The Lane Rebels wrote a statement in this abolitionist newspaper, whose publisher feuded with Frederick Douglass. A letter published in this Boston-based newspaper ended with the line “AND I WILL BE HEARD.”

ANSWER: *The* **Liberator** (The publisher was William Lloyd Garrison.)

<American History>

4. This author declared, “How many of ME ME ME / have died / since they came that night,” in a poem included in the collection *Black-Label*. For 10 points each:

[10h] Name this poet born in Cayenne. A European colonial government banned this author’s first volume of poetry, the 1937 collection *Pigments*.

ANSWER: Léon-Gontran **Damas** [or Léon **Damas** or Lionel Georges André **Cabassou**]

[10m] While at school abroad, Damas met this lifelong friend and collaborator. This poet’s works include the essay *Discourse on Colonialism* and the book-length poem *Notebook of a Return to My Native Land*.

ANSWER: Aimé **Césaire** (“ay-MAY say-ZAIR”) [or Aimé Fernand David **Césaire**]

[10e] Damas and Césaire both wrote in this language. They were both leading figures within the Négritude literary movement, whose name derives from this language.

ANSWER: **French** [or **français**]

<World Literature>

5. An arrangement of one of these pieces by Robert Wedraogho that uses the traditional instruments of Burkina Faso was among a slew of “world music” versions of these pieces recorded following Vatican II. For 10 points each:

[10e] Name this type of Catholic liturgical piece made up of parts like the Kyrie (“KEE-ree-ay”) and the Gloria. Palestrina (“pah-lehs-TREE-nuh”) did not actually save polyphony by composing one titled for Pope Marcellus II.

ANSWER: **masses** [or **missa** or **messes**; accept **missa** brevis; accept Pope Marcellus **Mass**]

[10h] The most popular of the world music masses is likely a version arranged by Father Guido Haazen for an ensemble from this modern-day country. The OK Jazz ensemble from this country played its distinctive style of rumba, which evolved into soukous music.

ANSWER: **Democratic Republic of the Congo** [or **DRC** or **Congo-Kinshasa**; or **République démocratique du Congo**; prompt on **Congo**; reject “Republic of the Congo”]

[10m] Another world music mass is the *Misa Criolla* by Ariel Ramírez, which incorporates the folk music of this country. A set of piano “danzas” from this country was composed by native son Alberto Ginastera (“hee-nah-STAIR-uh”).

ANSWER: **Argentina** [or **Argentine** Republic or República **Argentina**]

<Classical Music>

6. This genomic quantity is sensed when RNF12 degrades REX1 (“rex-1”) in the promoter-proximal region of the lncRNA (“link-R-N-A”) Xist (“exist”), which performs X-inactivation. For 10 points each:

[10m] Identify this quantity that underlies a common type of genomic structural variation caused by gene duplications. Female mammals are homogametic, so they have double this quantity for the X chromosome and need “compensation.”

ANSWER: gene **dosage** [or gene **dose**; accept **dosage** compensation; accept X-**dosage**; accept **copy number** or **copy number** variation or **CNV** or **number** of **copies** of a gene; prompt on **polyploidy** by asking “polyploidy increases what quantity at the level of individual genes?”]

[10e] Elena Conti’s group found that the MLE helicase recognizes this nucleobase in order to remodel the roX lncRNAs that mediate *Drosophila* (“druh-SAH-fih-lah”) dosage compensation. This nucleobase is found in RNA instead of thymine (“THIGH-meen”).

ANSWER: **uracil** [or **U** or **Ura**; accept **uridine** or **Urd**; or **pyrimidine-2,4(1H,3H)-dione** or 2,4-**pyrimidinediol**]

[10h] The uracil in ribosomal RNAs is often modified by pseudouridylation (“pseudo-uridyl-ation”) performed by these noncoding RNAs, which are “hosted” by conserved chaperone genes. Bacteria use site-specific enzymes instead of these RNAs with C/D box or H/ACA box domains.

ANSWER: **snoRNAs** (“snow-R-N-As”) [or **small nucleolar** RNAs; accept **snoRNA** host genes; prompt on **small** RNAs or **guide** RNAs; reject “snRNAs” or “small nuclear RNAs”]

<Biology>

7. The first public housing project in Canada, in this city's Hydrostone neighborhood, was constructed with funding from a relief commission created in 1918. For 10 points each:

[10m] Name this city, the site of a World War I disaster in which the *Imo* collided with the explosive-laden *Mont-Blanc*; that largest man-made explosion before 1945 destroyed much of this city's harbor.

ANSWER: **Halifax**, Nova Scotia

[10h] Before the disaster, the *Imo* was en route to pick up relief supplies to transport to Belgium, where the Canadian Corps staged a "pursuit to" this city during the Hundred Days Offensive. The successes of the British Expeditionary Force in a 1914 battle named for this city were apocryphally attributed to its namesake "Angels."

ANSWER: **Mons** [accept Battle of **Mons** or Pursuit to **Mons**; accept Angels of **Mons**]

[10e] The *Imo* intended to load in this American city, which the *Mont-Blanc* had departed before reaching Halifax. German saboteurs destroyed munitions in the 1916 Black Tom explosion, which damaged this city's harbor, including the Statue of Liberty.

ANSWER: **New York** City [or **NYC**]

<Other History>

8. In the essay "This Lonesome Place," Hilton Als identified an author's religious belief and the isolation of suffering from this condition as guiding factors for her fiction. For 10 points each:

[10h] Name this condition that affected an author who wrote two collections and two novels while living with her mother in Milledgeville, Georgia, and raising over one hundred peafowls. This condition ultimately resulted in that author's 1964 death.

ANSWER: **lupus** [or systemic **lupus** erythematosus or **SLE**; prompt on **autoimmune** disease]

[10m] Flannery O'Connor's lupus informs disability studies readings of her work; those studies often highlight this story, in which the deceptive Bible salesman Manley Pointer steals the prosthetic leg of the PhD-graduate Joy Hopewell.

ANSWER: "**Good Country People**"

[10e] The preacher-cum-con man Asa Hawks fakes this disability in O'Connor's novel *Wise Blood*. Hellen Keller wrote about her experience with deafness and this disability in *The Story of My Life*.

ANSWER: **blindness** [or being **blind** or being **unable to see**; accept **vision impairment** or equivalents]

<American Literature>

9. In a formulation of this thought experiment, millions of people equipped with walkie-talkies can communicate with one another and receive information about a mental state from overhead satellites. For 10 points each:

[10h] Name this thought experiment that challenges functionalist theories of consciousness, most famously explained by Ned Block. This thought experiment asks whether a nation of ten to the power of eleven people acting as neurons could produce emotions or thoughts.

ANSWER: **China brain** thought experiment [or **Chinese brain** thought experiment]

[10m] The China brain presents an objection to functionalism by noting the "absence" of these phenomena. These individual, subjective instances of consciousness, such as the taste of coffee, are not experienced by philosophical zombies.

ANSWER: **qualia** [accept absent **qualia**; accept **quale**]

[10e] Ned Block's "Blockhead" is an argument against the notion that these things can display real intelligence. An interrogator tries to determine if a subject is a human or one of these things in a Turing test.

ANSWER: **computer** [or digital **computer**; accept a **machine**; accept an **artificial intelligence** or **AI**; accept **robot**]

<Philosophy>

10. This designer innovated disco-influenced ready-to-wear caftans and jumpsuits, working with loyal models like Anjelica Huston and Pat Cleveland. For 10 points each:

[10h] Name this fashion designer who popularized Ultrasuede fabric and sleek Greek column dresses in the 1970s. In a recent Netflix miniseries, Ewan McGregor plays this mononymous Studio 54 fixture who dressed Betty Ford.

ANSWER: **Halston** [or Roy **Halston** Frowick; accept the **Halstonettes**]

[10m] Halston, a former Bergdorf Goodman milliner, rose to fame after designing a pale-pink type of these hats for Jackie Kennedy. British Gurkhas with chin straps wore precursors of these flat-topped, ovoid, military-style hats.

ANSWER: **pillbox** hat [prompt on **biretta**; prompt on **wool** hats by asking “in what style?”]

[10e] One of the most prominent Halstonettes was Elsa Peretti, a jewelry designer for this company that popularized sterling silver in the United States. This company’s eponymous family names a style of Art Nouveau glass lamps.

ANSWER: **Tiffany** & Co. [accept **Tiffany’s** or **Tiffany**, Young and Ellis; accept **Tiffany** lamps]

<Other Fine Arts>

11. The introduction to this novel claims that it was based on writings in “ancient Chaldee, and Egyptian hieroglyphics” painted on leaves by the Cumaean Sibyl in a cave near Naples. For 10 points each:

[10h] Name this novel about the life of the poor nobleman Lionel Verney in the last quarter of the 21st century, when he travels to Switzerland with Lord Adrian to avoid a plague.

ANSWER: *The **Last Man***

[10m] While writing this novel at the Villa Diodati in Switzerland, the author of *The Last Man* described being each morning “forced to reply with a mortifying negative” during a storytelling contest.

ANSWER: ***Frankenstein***; or, *The Modern Prometheus*

[10e] This English author, who described her trips through Europe in *Rambles in Germany and Italy*, wrote *The Last Man* and *Frankenstein*.

ANSWER: Mary **Shelley** [or Mary Wollstonecraft **Shelley**; or Mary Wollstonecraft **Godwin**]

<British Literature>

12. Answer the following about tools found in a machine shop, for 10 points each.

[10h] To ensure that the blades on these saws do not drift, the guides should be just behind the gullets and the thrust bearings should be as close to the blade as possible without touching. When using these saws, stock is fed along a table to the ribbonlike blade stretched between two wheels.

ANSWER: **band** saws

[10e] The “belt” or “strip” machines for this general process rotate material of a chosen grit size between two drums. In this process, abrasive paper removes surface material, making the surface smoother.

ANSWER: **sanding**

[10m] The TIG (“tig”) type of these tools requires manual feeding of the filler material, while the filler material is machine-fed in their MIG (“mig”) type. Some of these tools use oxyacetylene as a fuel.

ANSWER: **welder**s [or **welding** torches; or **welding** tools; accept arc **welder**s]

<Other Science>

13. Answer the following about early editions of Andreas Vesalius's *De Humani Corporis Fabrica*, a Late Renaissance text on human anatomy, for 10 points each.

[10m] Johannes Oporinus, a printer based in this canton, produced most early copies of the *Fabrica*. In this canton, Pope Martin V convened a council that negotiated an end to the Hussite Wars with the Utraquists.

ANSWER: **Basel** [or **Basle** or **Bâle** or **Basilea**; or Canton of **Basel**; accept Council of **Basel**; accept **Basel**-City; accept **Basel**-Country]

[10e] According to a census by Margócsy ("mar-GOO-jee") et al. that traced surviving copies of the *Fabrica*, by 1900, over half the remaining copies were held in universities or public examples of this type of institution. A "lost" example of this type of institution contained texts from one legendarily burned by Julius Caesar.

ANSWER: **library** [or **biblioteca**; accept Great **Library** of Alexandria; accept Lost **Library** of the Moscow Tsars or Golden **Library**]

[10h] The Biblioteca Palafoxiana in this city housed the only copy based outside of Europe until the 19th century. The French general Charles de Lorencez was dismissed after failing to take this city from a defensive force led by Ignacio Zaragoza.

ANSWER: **Puebla** [accept Battle of **Puebla**; or **Puebla** de Zaragoza or **Puebla** de los Ángeles]
<European History>

14. Answer the following about the artistic inspirations for Jeff Wall's photographs, for 10 points each.

[10h] In a Wall photograph (emphasize) *inspired by* this painting, a woman's destroyed room contains a dresser with the drawers pulled out and an overturned mattress. Sculptural depictions of elephant heads protrude from the corners of the central object in this 19th-century painting.

ANSWER: *The **Death of Sardanapalus*** [or *La **Mort de Sardanapale***] (by Eugène Delacroix)

[10m] A man and woman stand in front of a mirror in Wall's *Picture for Women*, which was inspired by this painting. A bowl of oranges sits in the foreground of this painting, which depicts a prostitute wearing a pendant on a black necklace reflected by a mirror.

ANSWER: *A **Bar at the Folies-Bergère*** [or *Un **bar aux Folies Bergère***] (by Édouard Manet)

[10e] Wall's photograph *A Sudden Gust of Wind* was inspired by this Japanese artist, who painted *Thirty-Six Views of Mount Fuji*.

ANSWER: **Hokusai** [or Katsushika **Hokusai**]

<Painting/Sculpture>

15. Stephen Breyer advocated "harmonization" or "comity" across these constructs in a 2016 book that discusses a Convention on the Civil Aspects of Child Abduction. For 10 points each:

[10h] Identify these constructs that name an "adjustment mechanism" for avoiding "carbon leakage" that circumvents emission taxes. A 2020 EU directive provides for "collective redress" of "mass disputes" that infringe on these things.

ANSWER: international **border**s [accept **border** adjustment mechanism or **border** adjustment tax or carbon **border** adjustments or **border** carbon adjustments; accept cross-**border** collective redress; prompt on **boundary** or similar]

[10m] Carbon border adjustments must avoid violating this clause of the WTO rules, which states that concessions granted to one trade partner apply to all others. This clause's three-word name comes from a status awarded in treaties.

ANSWER: **most-favored nation** clause [or **most-favored nation** status or **most-favored nation** principle]

[10e] This adjective describes "restraints" like most-favored nation clauses and resale price maintenance used by hub-and-spoke conspiracies. A company controls multiple levels in a supply chain in this type of integration.

ANSWER: **vertical** [accept **vertical** integration or **vertically** integrated; accept **vertical** restraints; prompt on **backward** or **forward** or **upstream** or **downstream** by asking "that is an example of what more general type of integration?"]

<Social Science>

16. In a poem named for an image on a specific one of these objects that shows “rough men-at-arms” and “narrow stairs,” these objects turn into a “pack of hounds” followed by Hanrahan. For 10 points each:

[10h] Name these objects that characters like “the Ingrate,” “the Alchemist,” and Roland use to communicate when they are unable to speak. A Matteo Boiardo poem enumerates these objects.

ANSWER: **tarot** (“TAIR-oh”) cards [or **tarocchi**; or **tarock**; accept “I **tarrochi**” or “The **Triumphs**”; prompt on **cards**; prompt on “The **Tower**” with “what kind of object is ‘The Tower’ depicted on?”]

[10e] This poet became fascinated with the tarot (“TAIR-oh”) after joining Aleister Crowley’s Order of the Golden Dawn and titled a poem after the tarot card “The Tower.” This Irish poet also wrote “The Second Coming.”

ANSWER: W. B. **Yeats** [or William Butler **Yeats**]

[10m] Characters communicate with tarot cards in this author’s novel *The Castle of Crossed Destinies*. Another novel by this author features a debate by professors of Cimmerian and Cimbrian literature.

ANSWER: Italo **Calvino**

<European Literature>

17. Jeffrey A. Erb’s book *Where [these people] and Mapmakers Met* analyzes how 18th-century boundary commissions responded to the independent territorial claims of Guenoa and Charrúa *tolderías*. For 10 points each:

[10h] Identify this title that Europeans applied broadly to leaders such as the Lenca Lempira and the Ngäbe Urracá. The Ciboney (“see-BOH-nay”) who lived east of the Guanahatabey (“gwah-nah-hah-TAH-bay”) conferred this title on rulers who sat on duho ritual seats.

ANSWER: **cacique** (“kah-SEE-kay”) [accept **cacicazgo**; accept **cacica**; accept *Where **Caciques** and Mapmakers Met*]

[10e] Guarionex, Enriquillo, and Hatuey (“ah-TWAY”) were caciques on this island, where Anacaona ruled Jaragua before she was captured by Nicolás de Ovando. This Caribbean island’s Taíno name, Ayiti, was given to one of its two countries.

ANSWER: **Hispaniola** [or **Ispayola** or La **Española**]

[10m] Unlike the Caribs, the Taíno did not make beer from this staple crop that they grew with the conuco system and baked on burén griddles. This starchy root crop, which was domesticated in Amazonia, requires cyanide detoxification.

ANSWER: **cassava** [or **manioc**; or **yuca**; or **mandioca** or **guacamota** or **aipim**; or ***Manihot esculenta*** or ***Manihot esculenta***]

<World History>

18. Unarius Academy of Science cofounder Ernest Norman wrote about his supposed journey to this planet in a book titled for its “voice.” For 10 points each:

[10e] Name this home planet of the beings who led George Adamski to inspire the first UFO religions. Besides Earth, this is the only planet in our solar system named after a female deity.

ANSWER: **Venus** [accept *The Voice of **Venus***]

[10h] Another major inspiration for UFO religions was this 1969 book by Erich von Däniken. This book uses the shape of Jomon figurines and the supposedly rust-proof iron pillar of Delhi to argue that ancient people received advanced technology from aliens.

ANSWER: ***Chariots of the Gods?*** [or ***Chariots of the Gods? Unsolved Mysteries of the Past***; or ***Memories of the Future: Unsolved Mysteries of the Past*** or ***Erinnerungen an die Zukunft: Ungelöste Rätsel der Vergangenheit***]

[10m] The Taiwanese True Way UFO religion relocated its base to this US state in 1997. In this state, Benjamin Roden established an offshoot of Seventh-Day Adventism that operated the New Mount Carmel Center.

ANSWER: **Texas** [or **TX**] (Benjamin Roden established the Branch Davidians in Waco.)

<Religion>

19. Tamika Catchings described being born hearing-impaired, scoring the first quintuple-double in basketball, and playing at this university in her biography *Catch a Star*. For 10 points each:

[10m] Name this university where athletes like Candace Parker and Michelle Marciniak played under legendary coach Pat Summitt. This university rivaled Diana Taurasi and Connecticut during the 2000s.

ANSWER: University of **Tennessee** [prompt on **UT**]

[10e] Catchings also played for the Fever, a WNBA team from this home state of “the Hick from French Lick,” Larry Bird. Gene Hackman coaches a high school basketball team from this state in the movie *Hoosiers*.

ANSWER: **Indiana** [or **IN**; accept **Indiana** Fever or **Indiana** Pacers]

[10h] Catchings and her Fever teammate Katie Douglas played for a basketball club in this country. An originally undrafted center from this country signed with the Miami Heat in 2021 and began to see playing time after injuries to Bam Adebayo and Dewayne Dedmon.

ANSWER: **Turkey** [or **Türkiye**; or Republic of **Turkey**; or **Türkiye** Cumhuriyeti] (Catchings and Douglas played for Galatasaray S.K. The NBA player is Ömer Yurtseven.)

<Pop Culture>

20. In large eddy simulation with implicit filtering, one of these constructs acts as a low-pass filter to remove small and universal fluid motion. For 10 points each:

[10m] Identify these constructs eschewed in smoothed-particle hydrodynamics. The finite volume method of computational fluid dynamics uses one of these constructs to divide the domain into control volumes.

ANSWER: **meshes** [or **grids**]

[10e] Large eddy simulation is a model of this type of irregular flow contrasted with laminar flow.

ANSWER: **turbulence** [or **turbulent** flow]

[10h] Eddy viscosity was introduced as the proportionality factor in one of these relationships between Reynolds stress and mean strain rate. The principle of local action and invariance to the choice of reference frame must be satisfied by these relationships, which relate the response of a continuous material to loading.

ANSWER: **constitutive** relationship [or **constitutive** equations]

<Physics>

Extra. Performers in colorful, crocheted, Morphsuit-like outfits carrying canvases attempted to get passersby to do this in a performance series orchestrated by the Polish artist Olek. For 10 points each:

[10h] Name this action that performance art pioneer Mierle Laderman Ukeles did nearly eight thousand times to honor New York City sanitation workers. A piece described in the book *Grapefruit* instructs users to do this after drilling a hole in a canvas.

ANSWER: **shaking hands** [or **handshake**]

[10e] *Grapefruit* was written by this Japanese American performance artist, who appeared nude in the *Two Virgins* photo along with her second husband, John Lennon.

ANSWER: Yoko **Ono** [or **Ono** Yōko]

[10m] Two men in suits at Warner Brothers Studios shake hands while the one on the right is engulfed in flames in the photograph that appears on the cover of this album. The designer of the art for this album, Storm Thorgerson, also designed the art for *Ummagumma* and *Animals* by the same band.

ANSWER: ***Wish You Were Here*** (by Pink Floyd)

<Other Fine Arts>