

2023 ACF Regionals

Packet L by Columbia A, Liberty A, Oxford A, Oxford C, Purdue A, Toronto A

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Tossups

1. The Birmingham Group learned this technique from a handbook translated by Edwardian artist Christiana Herringham. Paul Cadmus and Jacob Lawrence contributed to a 20th-century revival of this technique, which Andrew Wyeth learned from Peter Hurd and used for *Christina's World*. Cennino Cennini's *Craftsman's Handbook* provided ratios for this medium, which was used with encaustic for the Fayum mummy portraits. A plaster and rabbit-skin glue mixture called gesso ("JESS-soh") was first developed as a ground for this medium, which may use casein ("KAY-seen") glue. Medieval panel paintings like the gold-leaf-adorned work of Duccio were created in this medium, which was fully supplanted by oil painting during the Renaissance. For 10 points, what medium mixes pigments into binders such as egg yolk?

ANSWER: **tempera** [or egg **tempera**; reject "fresco"]

<Painting/Sculpture>

2. A 2008 adaptation of this play by Diane Samuels and Tracy-Ann Oberman changed its setting to postwar Liverpool. A passionate speech by a "Lovesick Major" in this play is met with another character's response "I'm staying for lunch." A character in this play compares her heart to a piano with a locked-up key after agreeing to marry a lieutenant for whom she has no romantic feelings. In this play, a drunk doctor reveals an affair between Natasha and the unseen Protopopov, and later sardonically sings "Ta-ra-ra-boom-di-ay" in the final scene. Captain Solyony kills Baron Tuzenbach in this play, which is set on a day that doubles as a protagonist's name day and the anniversary of her father's death. For 10 points, Olga, Masha, and Irina are the title characters of what play by Anton Chekhov?

ANSWER: **Three Sisters** [or **Tri sestry**]

<European Literature>

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

Arabic or English terms acceptable. The 'Akhbāris split from the Usulis due to the latter's embrace of a form of this skill whose "example" is demonstrated by a Twelver marja'. Mu'tazilah-influenced Zaydī imāms exercise a form of this skill that aims to keep the Basic Code intact and may be translated as "discretion" or "exhaustion." Taqlīd gradually supplanted a form of this skill whose "gate" was said to "close" in the 9th century. Ḥanbalī scholars equated unrestrained use of this skill with analogy, or qiyās. Classically, the failure of all four uṣūl al-fiqh to produce a clear solution was a prerequisite to using a form of this skill called ijtihād. Ibn Sīnā developed a "temporal" system for this skill and wrote commentaries on its "modal" statements in the *Organon*. For 10 points, the falsafah movement taught what skill with Aristotelian syllogisms?

ANSWER: **logic** [accept **ijtihād** or **syllogisms** until each is read; accept **inferences**, **deductive** reasoning, **inductive** reasoning, modal **logic**, or temporal **logic**; prompt on **qiyās** or **analogy** until each is read; prompt on **law**, **sharī'a**, **fiqh**, **jurisprudence**, **interpretation**, independent **ruling**, **judgment**, **conclusion**, **understanding**, or **opinion** by asking "achieved by applying what mental skill?"; prompt on **reasoning**, **rationality**, 'aql, **thinking**, **intellect**, **ingenuity**, or equivalents]

<Religion>

4. When calculating the energy stored in a capacitor, this operation is applied to the change in the displacement field and integrated over the dielectric region. This quantity for the H -field equals the negative of this quantity for the magnetization. The negative of this operation applied to the polarization field gives the bound charge density in a linear dielectric. This operation applied to a solenoidal vector field yields zero, and applying this operation after the curl always yields zero. This operation applied to the magnetic field gives zero in the absence of magnetic monopoles, since this operation for a volume is equivalent to integrated surface flux. Gauss's law sets this operation for the electric field proportional to the charge density. For 10 points, name this operation that quantifies how a vector field spreads out and is symbolized "del dot."

ANSWER: **divergence** [or **div**; accept **del dot** or **nabla dot** until "del dot" is read]

<Physics>

5. Alexander Enmann theorized a lost history of parts of this century, which he called the *Kaisergeschichte* ("Kaiser-guh-SHICK-tuh"). During this century, instigators of a large revolt in Thysdrus nominated an 80-year-old ruler who reigned for two weeks then took his own life after the death of his son. A set of Transylvanian coins minted during this century was controversially authenticated by a 2022 study. When confronted with debasing coins during this century, Felicissimus led a revolt of mint workers. Sponsianus and Philip the Arab ruled during this century, in which the Plague of Cyprian compounded disorder that began with the assassination of Severus Alexander. At the end of this century, the Tetrarchy was established by Diocletian. For 10 points, name this century whose "crisis" nearly caused the collapse of the Roman Empire.

ANSWER: **third** century [or **200s** CE or **200s** AD; accept Crisis of the **Third** Century] (The 80-year-old ruler was Gordian I, the shortest-serving Roman Emperor at 22 days.)

<Other History>

6. A widely doubted theory argues that several words for tools in this language are derived from the word for "stone." Larry Trask provided evidence in this language's aizkora ("eyes-ko-ra") controversy. In November 2022, a word in this language was discovered and decoded on a two-thousand-year-old bronze hand. This language uses the "-k" case ending to mark nouns as the subjects of transitive, but not intransitive verbs, since this language uses ergative-absolutive rather than nominative-accusative alignment. The "ch" sound is written with the digraph "T-X" in this language, which is the ultimate origin of the name Sancho. This language's speculated origins often group it with ancient Aquitanian and the extinct Iberian language. For 10 points, the only European language isolate is what language spoken in a namesake "Country" in northern Spain?

ANSWER: **Basque** [or **euskara**; accept **Basque** Country or **Euskal** Herria; prompt on **Vasconic**]

<Social Science>

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

In 2021, Sebastian Seibold's group quantified this process in 55 forest sites across "bioclimatic space." Enzymes that counteract "recalcitrance" to this process are produced by the flagellate endosymbiont *Trichonympha* in insects of the clade Isoptera. If it is constrained, this process may create unsaturated mors instead of fulvic-acid-rich mulls that are typical of actinomycetes. This exothermic process, which drives remineralization, may be depicted to the side of a pyramid receiving arrows of energy flow from each trophic level. Saprophytes perform this type of chemoorganoheterotrophy ("chemo-organo-hetero-trophy"), which produces vermicast and humus ("HYOO-muss") in garden bins full of nightcrawlers. For 10 points, mycelia and detritivores like earthworms perform what ecological function that recycles soil nutrients from dead organisms?

ANSWER: **decomposition** [or word forms like **decomposers**; or **decay** or biodegradation; accept **composting**; accept **detritivory** until read; accept **saprotrophy**, **saprophytism**, **saprobies**, or **saproxily** until "saprophytes" is read; accept **lignivory** or **eating deadwood** or leaf **litter** or equivalents; accept **lysotrophy**; accept **remineralization** until read; prompt on **recycling** or nutrient **cycling** until "recycles" is read; prompt on **feeding** or **digestion** or **heterotrophy**] (Isopterans are termites.)

<Biology>

8. The protagonist of this novel learns that "conversation did not exist" and endures "shrieking" about "personalities" and a "stunt" about a hen-catcher. An overhyped Chautauqua ("shuh-TOCK-wuh") disappoints this novel's protagonist, who walks for 32 minutes and despairs at "shelters for sparrows" at the title location, which the hyperbolic preface calls "the climax of civilization." This novel's protagonist, who tries to avoid the "Village Virus," fails at "amateur dramatics" when her choice of *Androcles and the Lion* is rebuffed for *The Girl from Kankakee* by the Thanatopsis Club. In this novel, a former librarian befriends Guy Pollock and the handsome Swede Erik Valborg after she marries the doctor Will. For 10 points, Carol Kennicott fails to liberalize Gopher Prairie, Minnesota, in what novel by Sinclair Lewis?

ANSWER: **Main Street**

<American Literature>

9. In an aria from this opera, a solo viola d'amore accompanies a man who declares his love for a woman "whiter than the white ermine ("ER-min")." After hearing three monks bless weapons, a couple in this opera sings a dramatic Act Four love duet that is interrupted by the tolling of bells. In this opera, the old servant Marcel sings the battle song "Piff paff ("peef pahf"), piff paff!" and marries the central couple after one of them refuses to wear a white scarf. This opera ends with a chorus singing the hymn "A Mighty Fortress" and being slaughtered by Catholic soldiers who chant "God wants blood!" This opera was the second collaboration between its composer and librettist Eugène Scribe ("oo-zhen screeb"), five years after *Robert le diable*. For 10 points, name this grand opera by Giacomo Meyerbeer about the St. Bartholomew's Day Massacre.

ANSWER: *Les **Huguenots*** [or *The **Huguenots***]

<Other Fine Arts>

10. During this historical period, Tsuneno became a maidservant before marrying Hirosuke (“hee-RO-skeh”), according to a 2020 book by Amy Stanley. This period’s kabunakama guilds formed state-sponsored monopolies over the urban nightsoil trade. During this period, strongmen known as Danzaemon gained influence over *eta-hinin* outcast groups. Sukegō villages proliferated during this period to service road checkpoints called sekisho. People who passed this period’s fumi-e tests often remained “hidden” afterwards. This period’s sankin-kōtai system of alternate residency in the capital checked the power of regional feudal lords. Only the Dutch were permitted to trade on Dejima Island under this period’s isolationist sakoku policy. For 10 points, name this period of shogunate rule centered around modern-day Tokyo.

ANSWER: **Tokugawa** shogunate [or **Tokugawa** period or **Tokugawa** bakufu; accept **Edo** period or **Edo** bakufu] (The book in the first line is titled *Stranger in the Shogun’s City*. The fifth line refers to “hidden Christians.”)
<World History>

11. CakeML supports automatic verification for this task as an improvement over Standard ML. During this process, an iterative worklist algorithm is often used to compute reaching definitions. This task is the subject of a textbook by Aho, Lam, Sethi, and Ullman that is often referred to as the “Dragon Book.” Use-def chains are built during this process for tasks like constant propagation. In SSA form, which is used to aid this task, variables must be assigned exactly once. This process may include optimizations such as loop unrolling. Syntax errors are typically caught during this process, which names a family of programming languages traditionally contrasted with interpreted languages. For 10 points, name this process of converting source code into machine-executable code.

ANSWER: **compilation** [or word forms such as **compiling**; accept **compile**-time errors; accept **compiled** languages; accept **Compilers: Principles, Techniques, and Tools**; prompt on **building code**] (SSA form stands for static single-assignment form.)
<Other Science>

12. This play’s protagonist justifies a spontaneous outburst by making up a lie about her ice pudding being spoiled. A man in this play beams with pride whenever he mentions his library, the only one in his country. At the end of this play, a man lists among his possessions “ten thousand knives and forks” before he claims to have the highest rank possible, “a free citizen.” This play’s protagonist puts her father’s coat on for him to remove a photograph of herself that she had slipped inside. When a man in this play climbs into a woman’s bedroom during the Serbo-Bulgarian War, his habit of using his cartridge pockets to store sweets leads her to call him her “chocolate-cream soldier.” For 10 points, Captain Bluntschli and Raina Petkoff fall in love in what comedy by George Bernard Shaw whose title comes from the *Aeneid*?

ANSWER: ***Arms and the Man***
<British Literature>

13. A 2020 book on “deciphering” this industry calls the US a “gray rhino” due to a company’s 2016 sanctions, nominally for shipping to Iran and North Korea. The “war” for this industry titles a 2022 history by Chris Miller. This industry’s demand for ultra-pure water caused a 2021 drought that led the Irrigation Agency to pray to a sea goddess and motivated Hsinchu Science Park’s desalination plant. This industry uses High NA machines invented by the Dutch firm ASML. To reduce reliance on this industry’s TSMC plants in Taiwan, a 2022 act aimed to bolster domestic manufacturing “for America.” Made in China 2025 supports SMIC’s foundries in this industry to compete with fabrication by Samsung and Intel. For 10 points, Moore’s law notes the rising complexity of what devices that are used in microprocessors?

ANSWER: **semiconductors** [accept micro**chips** or computer **chips** or **CHIPS** For America Act; accept **transistors**; accept integrated **circuits**; accept micro**processor**s until read; accept **Semiconductor** Manufacturing International Corporation; prompt on **electronics** or **computing**; prompt on **fabs** or **fabrication** until read; prompt on **foundry** or **foundries** until read; prompt on polycrystalline **silicon**, **Si**, **wafers**, **germanium**, or **Ge**] (The books in the first two lines are *Deciphering China’s Microchip Industry* and *Chip War*. The sea goddess is Māzū.)

<Current Events>

14. Two of these figures have an “encounter” that leads one to jump down from a heavenly body in a Luo tale. Lewis Hyde wrote that this type of figure “makes this world,” citing the “appetite” and “boundary-crossing” of examples like Mawu’s son Aflakete. This type of figure titles E. E. Evans-Pritchard’s study of the Zande (“ZAHN-day”) Ture (“TOO-ray”). Roger D. Abrahams collected stories of the “gross immoralities” of these figures, who include the Haitian Ti Malice and the Igbo Mbeku. Henry Louis Gates Jr.’s *The Signifying Monkey* traces wordplay to some of these figures who derive from the òrìshà of the crossroads, Èshù. Despite Claude Lévi-Strauss’s view that carrion-eating animals fill this “mediating” archetype, in many African tales it is the tortoise, hare, or spider. For 10 points, what mischievous heroes include Anansi?

ANSWER: **tricksters** [or word forms like **trickery**; accept *The Zande Trickster*; accept *Trickster Makes This World*; accept “The **Tricksters**’ Encounter”]; prompt on folk **heroes** or **òrìshàs** until each is read; prompt on **gods**, **spirits**, **loas**, **shapeshifters**, or **animals**; prompt on **spiders**, **arachnids**, **hares**, **rabbits**, **lagomorphs**, **tortoises**, **turtles**, **reptiles**, or **chelonians** by asking “performing the role of what mythological archetype?”] (The first line is a story about the hare and spider from Roger D. Abrahams’s *African Folktales*. Aflakete is another name for Legba.)

<Mythology>

15. While trying to convert these people to Christianity, the two Hewalds, who were distinguished by the color of their hair, were both martyred. Opportunistic classes of these people called the *lazzi* and *frilingi* gained mild concessions in the Stellinga Uprising. After being relieved of their annual tribute of five hundred cows, these people aided Dagobert I. These people, who held Marklo councils, sacked a church constructed by Lebuin at Deventer, prompting the destruction of a sacred site near Eresburg. The Annals of Einhard recount the destruction of these people’s tree-like Irminsul and their execution at the Massacre of Verden. Charlemagne forced the conversion of these people’s ruler Widukind. For 10 points, name these Germanic people who invaded Britain along with the Jutes and the Angles.

ANSWER: **Saxons** [or **seaxana**; accept **Saxon** Wars; prompt on **Germanic** peoples until read] (The two Hewalds were Hewald the Black and Hewald the White. The Irminsul was the site near Eresburg.)

<European History>

16. The Klopman–Salem equation gives the change in energy when these structures begin to interact, providing a mathematical basis for a theory describing how they influence reactivity. The symmetry properties of these structures are compared on correlation diagrams used to infer reaction mechanisms. These structures correspond to the vertices of a polygon inscribed in a circle in a shortcut for describing them in cyclic molecules, a technique introduced by Frost. The frontier subtype of these structures are the highest-energy occupied and lowest-energy unoccupied examples of them. In the LCAO method, these structures are computed from the linear combination of atomic counterparts. For 10 points, identify these structures that describe the area occupied by electrons in molecules.

ANSWER: **molecular orbitals** [or **MOs**; accept frontier **molecular orbitals**; accept **HOMO** or highest occupied **molecular orbital**; accept **LUMO** or lowest unoccupied **molecular orbital**; prompt on **orbitals**; reject “atomic orbitals”]

<Chemistry>

17. A character in one of these places imagines receiving letters addressed to “Somewhere, Belgium.” In one of these places, the protagonist writes “the great man can no longer just get up and go” under a picture of Columbus in chains. In another book, Gillian Blanchard works at one of these places, where she falls in love with a former RAF member named Ricky. At one of these places, Gwen becomes a close friend of Annie John. One of these places is the setting of an autobiographical novel by the Guyanese (“guy-uh-NEEZ”)-born author E. R. Braithwaite. A character working in one of these places in Edinburgh is reported by her confidante, Sandy Stranger, for being a fascist sympathizer. For 10 points, *To Sir, With Love* is set in what kind of institution, like Muriel Spark’s *The Prime of Miss Jean Brodie*?

ANSWER: **schools** [or **school**room or **classroom**; accept more specific answers like high **school**; prompt on Caribbean **islands** or **Antigua**; prompt on **educational** institutions; reject “colleges” or “universities”] (The first two lines are from *Annie John* by Jamaica Kincaid.)

<World Literature>

18. A cantata from this country includes a prayer by Mary Queen of Scots as its first “song of imprisonment,” written to express its composer’s political ostracization. A left-wing composer from this country used Schoenberg’s “Ode-to-Napoleon” hexachord in an early set of serialist variations. That frequent attendee of the Darmstadt Summer Courses, who was from this country, was hailed as a successor to Webern for his cantata *The Suspended Song*. A composer from this country set text from Claude Lévi-Strauss’s *The Raw and the Cooked* in an avant-garde *Sinfonia*. That composer from this country wrote 14 virtuosic solo pieces for various instruments, each titled *Sequenza*. A recorded nightingale features in a tone poem about the “Pines of” this country’s capital. For 10 points, name this home country of Luciano Berio and Ottorino Respighi.

ANSWER: **Italy** [or **Italia** or **Italian** Republic or Repubblica **Italiana**] (The first two composers are Luigi Dallapiccola and Luigi Nono.)

<Classical Music>

19. Thomas Morris was released from captivity in this present-day state by Pacanne (“pah-KAHN”), who led a village here known for its prized blackberry bushes. Two dozen settlers were massacred near Pigeon Roost Village in this state, which was the western terminus of the Buffalo Trace. The 1818 “New Purchase” took this state’s central region away from the Miami people. Young Tobacco aided George Rogers Clark in capturing this present-day state’s Fort Sackville in Vincennes (“vin-SENZ”). John Tipton’s diary chronicled an expedition in this state led by Spier Spencer’s Yellow Jackets against Tenskwatawa. The Shawnee and their allies abandoned Prophetstown in this state after William Henry Harrison defeated Tecumseh at a battle between the Wabash and Tippecanoe rivers. For 10 points, what present-day state contains the former trading post of Fort Wayne?

ANSWER: **Indiana** [or **IN**; accept **Indiana Territory**] (That village is called Kekionga, which translates as “blackberry bush” in Algonquian.)

<American History>

20. Leibniz’s *Theodicy* rejects the possibility of this thought experiment in real life because the Universe is not “ambidexter.” This thought experiment, which dates to Aristotle’s *On the Heavens*, resembles one formulated by al-Ghazālī involving dates. This thought experiment satirizes the views of a philosopher best-known for authoring the *Summulae de Dialectica* and for theorizing a motive force called “impetus” while at the University of Paris. This thought experiment is often resolved by proposing a freedom to be indifferent or by reasoning that free will would enable an individual to break arbitrary ties. For 10 points, a medieval French philosopher names what paradoxical thought experiment in which an animal starves to death when placed equidistant between two identical bales of hay?

ANSWER: **Buridan’s ass** [or **Buridan’s donkey**]

<Philosophy>

21. This is the easternmost of two countries whose folk songs inspired a set of 25 arrangements by Beethoven for piano trio and voice. A location in this country titles an orchestral work that features the recurring 4/4 (“four-four”) rhythm “eighth rest, two eighth notes, two sixteenth notes, two quarter notes.” In a concertante piece inspired by this country, the opening quadruple stops of its *allegro guerriero* finale are doubled on the harp. In the lively second movement of an A minor symphony, a clarinet introduces this country’s namesake “snap” rhythm. Folk music from this country inspired Max Bruch to compose a four-movement violin fantasy. During a visit to this country, Felix Mendelssohn was inspired to write his Third Symphony, as well as an overture sometimes called “Fingal’s Cave.” For 10 points, name this country that inspired the *Hebrides Overture*.

ANSWER: **Scotland** [accept **Scottish Symphony**; accept **Scottish Fantasy**; accept **Scotch** snap; accept 25 **Scottish Songs**; prompt on **United Kingdom** or **UK**]

<Classical Music>

Bonuses

1. Mario Vargas Llosa's ("YO-sah's") novel *The Dream of the Celt* fictionalizes Roger Casement's investigations of a genocide named after this South American river. For 10 points each:

[10h] Identify this tributary of the Amazon River around which thousands of Witoto, Andoke, and Bora Indians were enslaved on plantations owned by Julio César Arana's Peruvian Amazon Company.

ANSWER: **Putumayo** River [accept **Putumayo** District or **Putumayo** Province; prompt on **Japurá** River by asking "that river is in the region north of what other tributary of the Amazon?"]

[10e] Indigenous peoples were enslaved around the Putumayo River during the Amazon's 1880s-to-1910s boom in this commodity, which was extracted by tappers from trees in the form of thick latex.

ANSWER: **rubber** [or natural **rubber** or India **rubber**; accept **tree gum**; accept **caoutchouc** or **caucho**; or *Hevea brasiliensis*; accept Amazon **rubber** boom or Ciclo da **borracha**]

[10m] After rubber's decline, Putumayo's major cash crop became this plant, whose ritual use among peoples like Colombia's Arhuaco has been stigmatized. This crop's Bolivian growers formed a union once led by Evo Morales.

ANSWER: **coca** plant [or **coca** leaves; accept **Erythroxylaceae** or *Erythroxylum coca* or *Erythroxylum novogranatense*; prompt on **cocaine** or **coke** or **kúka**]

<World History>

2. A book by Jacob Olupona that calls Ilé-Ifè ("ee-LAY ee-FEH") the "city of 201 of" these beings was supported by Kimberley C. Patton, who wrote about the reflexivity of ancient Greek pots that depict them preparing libations. For 10 points each:

[10e] Thales claimed that "all things are full of" what beings, which include Sumerian dingir like Anu and Enki?

ANSWER: **gods** [or **deity** or **deities**; accept **goddesses**; accept **Olympians**; accept **Anunnaki** or **Igigi**; accept *Religion of the Gods: Ritual, Paradox, and Reflexivity*; accept *City of 201 Gods: Ilé-Ifè in Time, Space, and the Imagination*]

[10h] In his studies of the Vedas, Max Müller popularized this term for the belief in many gods but devotion to a single supreme god, such as ancient Somali worship of Waaq or ancient Egyptian worship of Ra.

ANSWER: **henotheism** [or word forms like **henotheistic**; accept **monolatry**; prompt on **kathenotheism**]

[10m] The martial god Chemosh ("keh-MOHSH") was venerated henotheistically in this kingdom, which is attested by the Mesha Stele. In the Book of Judges, Eglon rules this Canaanite kingdom in modern-day Jordan, the homeland of the biblical Ruth.

ANSWER: **Moab** [or Kingdom of **Moab**; accept **Moabites** or **Moabite Stone**]

<Religion>

3. This process dominates flows when the Péclet number is small; as a consequence, RMS particle displacement scales as time to the one-half power. For 10 points each:

[10e] Name this transport process in which substances move from regions of high concentration to regions of low concentration via random thermal motion.

ANSWER: **diffusion**

[10m] Particles undergo diffusion when this quantity, which describes how particles move between collisions, is small compared to the system size. In contrast, when this quantity is larger than system size, particles undergo ballistic transport, leading to displacement proportional to time.

ANSWER: **mean free path** [prompt on ℓ]

[10h] This term describes transport regimes in which the average squared displacement has a power-law dependence with an exponent other than one. It includes hyperdiffusion, in which the displacement increases faster than ballistic transport induced by fluctuating disorder.

ANSWER: **anomalous** diffusion

<Physics>

4. Sergey transports these objects from the Donbas to Crimea in an Andrey Kurkov novel that features the Ukrainian and Carniolan practice of arranging them into healing beds. For 10 points each:

[10h] Name these objects that Albanian women revive after the Kosovo War in a 2021 short film. In a 2019 film, a North Macedonian family harvests these objects from the wild, where they yield a “mad” product in Turkey.

ANSWER: bee**hives** [accept **honey**combs; accept **bees**; accept **apiary**; accept mad **honey**; accept box **hives**; accept **wax foundations**; accept **vulyk**, **čebelnjak**, **zgjoj**, **pčelarnik**, or arı **kovanı**] (Kurkov’s novel is *Grey Bees*. The documentaries are *Hive* and *Honeyland*.)

[10m] A major use of bees in Slovakia and Moldova is pollinating this crop, which became a symbol of Ukrainian resistance to Russia in 2022. This crop provides oil and seeds that are used to make the Russian version of halva.

ANSWER: **sunflowers** [or *Helianthus annuus*; accept **sunflower** seeds; accept **sunflower** oil; or **sonyashnyk**, **podsolnukh**, **floarea-soarelui**, **napraforgó**, or **slněčnica**]

[10e] The canonical example of the bioremediation technique of rhizofiltration is sunflowers removing cesium nuclides from the water in this site’s “exclusion zone” near the Ukraine–Belarus border.

ANSWER: **Chernobyl** [accept **Pripyat**; accept **Chernobyl** Nuclear Power Plant or **Chernobyl**’skaya atomnaya elektrostantsiya or **Chornobyl**’s’ka atomna elektrostantsiya; accept **Chernobyl** Exclusion Zone, Zona otchuzhdeniya **Chernobyl**’skoy, Zona vidchuzhennia **Chornobyl**’s’koyi, or Zona adčuzhennia **Čarnobyl**’skaj]

<Other Academic>

5. Many of this author’s plays feature what he called “spectacle characters,” figures with mental disabilities who often provide spiritual or biblical wisdom. For 10 points each:

[10e] Name this Black playwright who created the stuttering Sylvester in *Ma Rainey’s Black Bottom* and the delusional Hedley in *Seven Guitars*, two plays from his Pittsburgh Cycle.

ANSWER: August **Wilson** [or Frederick August **Kittel** Jr.]

[10m] This character from Wilson’s *Fences* has a metal plate in his head due to a brain injury sustained during World War II. He returns from an asylum and plays his trumpet to “open the gates” of Heaven at the play’s end.

ANSWER: **Gabriel** Maxson [prompt on **Maxson**]

[10h] In *Two Trains Running*, Sterling teaches Black Power slogans to an impaired man whose name references his ability to only say two phrases about this foodstuff. After his death, Sterling steals this food to place in his coffin.

ANSWER: **ham** [accept **Hambone**; prompt on **meat** or **pork**]

<American Literature>

6. Answer the following about chemical oscillators, reactions in which the state periodically changes over time, for 10 points each.

[10e] In one of the most famous clock reactions, discovered by Landolt, species of this element react in the presence of starch. This halogen is commonly added to table salt.

ANSWER: **iodine** [or **I**; accept **iodide** or **iodized** salt]

[10m] The Briggs–Raucher oscillator reaction is prepared by combining a strong acid with a solution of an iodate salt and this compound. This chemical is combined with iron(II) salts to oxidize wastewater in Fenton’s reagent.

ANSWER: **hydrogen peroxide** [or **H₂O₂** (“H-2-O-2”)]

[10h] This class of nonlinear chemical oscillator reactions includes autocatalytic processes that interconvert neutral bromine with bromide ions. These reactions, which are named for two Soviet chemists, can form self-organized structures and exhibit reaction–diffusion dynamics.

ANSWER: **Belousov–Zhabotinsky** reactions [or **BZ** reactions]

<Chemistry>

7. *Description acceptable.* This part of a larger work ends with the violins playing a high A more than one hundred times. For 10 points each:

[10h] Name this symphonic movement whose composer allegedly claimed it was “as if someone were beating you with a stick and saying “your business is rejoicing” in the book *Testimony*.

ANSWER: the **fourth** movement of Dmitri **Shostakovich**’s Symphony No. **5** [accept the **final** movement or **finale** in place of “fourth movement”; accept **Fifth** Symphony in place of “Symphony No. 5”; accept Dmitri Dmitriyevich **Shostakovich** in place of “Dmitri Shostakovich”]

[10m] Seven bars of repeated high D’s appear in the finale of this Russian symphony. This symphony is nicknamed for its emulation of Haydn, and its gavotte was re-used in its composer’s *Romeo and Juliet*.

ANSWER: Sergei **Prokofiev**’s Symphony No. **1** [or “**Classical**” Symphony; accept Sergei Sergeyevich **Prokofiev** in place of “Sergei Prokofiev”]

[10e] Prokofiev also opened his piano piece in this genre with a passage of repeated fast D’s. This genre, whose name comes from the Italian word for “to touch,” is paired with a fugue in a dramatic D minor piece by J. S. Bach.

ANSWER: **tocatta** [accept **Tocatta** and Fugue in D minor]

<Classical Music>

8. Answer the following about theorists of international trade, for 10 points each.

[10e] Likely the best-known class of trade models originated with this 19th-century economist’s theory of comparative advantage, which he illustrated with the example of Portuguese wine traded for English cloth.

ANSWER: David **Ricardo**

[10m] This economist’s “core–periphery” model was a key contribution to the “new trade theory” developed in the 1970s to explain why, contra Ricardian models, most trade occurs between similar countries. This economist did a tongue-in-cheek analysis of interest rates approaching the speed of light in “A Theory of Interstellar Trade.”

ANSWER: Paul **Krugman** [or Paul Robin **Krugman**]

[10h] Along with Pol Antràs, this economist developed “new new trade theory” to explore how trade can induce the least productive firms to shut down or only produce for the domestic market, generating a novel channel of gains from trade.

ANSWER: Marc **Melitz** [or Marc J. **Melitz**]

<Social Science>

9. This technology was legendarily invented by the historian of the Yellow Emperor, Cāngjié (“tsahng-j’yeh”). For 10 points each:

[10e] Name this technology whose earliest Chinese form can be found on oracle bones dating to the Shāng dynasty.

ANSWER: Chinese **writing** [or Chinese **script** or Chinese **characters**; accept oracle bone **script** or jiǎgǔwén]

[10h] Based on oracle bone inscriptions, this wife of King Wǔ Dīng is believed to have led Shāng armies against neighboring peoples such as the Tǔ-Fāng. The tomb of this warrior queen is the only well-preserved Shāng dynasty tomb and was unearthed in 1976.

ANSWER: Fù **Hǎo** [or Lady **Hǎo** or **Mǔ** Xīn; prompt on Fù]

[10m] As an ancestral offering, the tomb of Fù Hǎo was littered with some seven thousand of these shells. A Chinese character for “money” likely derives from drawings of these shells collected from the Indian Ocean.

ANSWER: **cowrie** shells [or **cowry** shells; prompt on sea **snail** shells]

<Other History>

10. A deeply controversial gay author used this language to write the novel *The Evenings*, which is traditionally read over the last ten evenings of the year. For 10 points each:

[10e] Name this language used by Gerard Reve (“KHAY-rart RAY-vuh”). Anne Frank used this language to write *The Diary of a Young Girl*.

ANSWER: **Dutch** [or **Nederlands**]

[10h] Reve is considered one of the “Great Three” of Dutch post-war literature, who also include this author. This author wrote *The Assault* and depicted an unnamed angel manipulating events on Earth in *The Discovery of Heaven*.

ANSWER: Harry **Mulisch** [or Harry Kurt Victor **Mulisch**]

[10m] In 1993, Mulisch won a prize named after this 19th-century Dutch author. This author of the satirical novel *Max Havelaar* is best known by a one-word pen name whose Latin meaning is “I have suffered much.”

ANSWER: **Multatuli** [or Eduard Douwes **Dekker**; accept **Multatuli** Prize or **Multatuliprijs**]

<European Literature>

11. For a film by this director, special effects director Arnold Gillespie hung muslin cloth from a steel crane to create the illusion of a moving tornado. For 10 points each:

[10h] Name this director who replaced George Cukor (“KYOO-kor”) on a four-hour historical film. Hattie McDaniel became the first African American to win an Academy Award for that film by this director.

ANSWER: Victor **Fleming** [or Victor Lonzo **Fleming**]

[10e] Fleming left the production of this other film to oversee the troubled filming of *Gone With the Wind*. This film transitions from sepia to Technicolor after the protagonist and her dog Toto get whisked away by a tornado.

ANSWER: *The **Wizard of Oz***

[10m] Fleming’s last film starred Ingrid Bergman as this person. Carl Theodor Dreyer directed a silent film about this historical figure that begins with a transcript being found at the Chamber of Deputies library.

ANSWER: **Joan** of Arc [or **Jeanne** d’Arc; accept *The Passion of **Joan** of Arc* or *La Passion de **Jeanne** d’Arc*]

<Other Fine Arts>

12. Mahatma Gandhi is cast as a modern version of this goddess's son in Shashi Tharoor's *The Great Indian Novel*. For 10 points each:

[10m] Name this goddess who kills the infant Vasus until her husband Shantanu saves her final son, the Kauravas' future commander Bhīshma. Like Vāruṇa, this goddess rides the reptilian vāhana Makara.

ANSWER: **Gaṅgā** [or **Gaṅgā** Mata; accept **Ganges** River; accept **Jahnavi** or **Shivapriya** or **Vidyadhari**; accept **Gangaputra** or **Gangaji**; prompt on **Nandinī** or **Nalinī**]

[10h] Gaṅgā provides water to Bhīshma after he battles Arjuna and this mahārathī warrior, who is a reincarnation of his ill-fated love Amba. This child of Drupada is born female, but obtains the manhood of a yaksha.

ANSWER: **Shikhandī** [accept **Shikhandinī**; accept **Srikandī**]

[10e] Bhīshma chooses his moment of death on a bed of arrows shot by Shikhandī and Arjun, a scene depicted in a relief from this Khmer ("k'mye") temple complex that appears on the flag of Cambodia.

ANSWER: **Angkor** Wat [accept **Yashōdharapura**]

<Mythology>

13. Pietro and Alessandro Verri ran a periodical titled after one of these locations and were close friends with the criminology pioneer Cesare Beccaria. For 10 points each:

[10m] Name this type of location outside which Camille Desmoulins ("day-moo-LAN") called for the beginning of the French Revolution. Jerzy Kulczycki ("YEH-zih cool-CHIT-skee") legendarily opened the first of these locations in Vienna using items left behind from the 1683 Ottoman siege.

ANSWER: **coffeehouses** [or **coffeeshops**; or **cafés**; accept *Il Caffè* or *The Coffeehouse*; accept **Café** de Foy; prompt on **restaurants**; reject "bakeries" or equivalents]

[10e] Coffeehouses served as ideal locations for exchanging ideas and philosophies during this period of European history that lends its name to a brand of absolutism exemplified by Catherine the Great and Frederick the Great.

ANSWER: Age of **Enlightenment** [accept **enlightened** absolutism or **enlightened** despots]

[10h] Another enlightened despot was this Grand Duke of Tuscany, who patronized the Accademia dei Georgofili and outlawed capital punishment in 1786 before being elected to his highest position.

ANSWER: **Leopold I** [or **Leopoldo I**; accept **Leopold II, Holy Roman Emperor**; prompt on **Leopold**; prompt on **Leopold II** by asking "of what title?"]

<European History>

14. This mission launched in 2021 and is currently orbiting at the Earth–Sun Lagrange point L2. For 10 points each:

[10e] Name this largest optical space telescope. Its primary mirror is composed of 18 large gold-plated hexagons that give its images characteristic six-pointed diffraction patterns.

ANSWER: James **Webb** Space Telescope [or **JWST**]

[10m] One of Webb's scientific goals is to better understand this early-Universe process, which happened after recombination at a redshift between z equals 20 and z equals 6, ending the cosmological Dark Ages.

ANSWER: **reionization** [accept epoch of **reionization**]

[10h] Another approach to studying reionization is measuring this feature in the spectra of very distant quasars. This feature is caused by absorption by the Lyman-alpha line of neutral hydrogen in the intergalactic medium.

ANSWER: **Gunn–Peterson** trough

<Other Science>

15. Answer the following about ancient Greek sculptures that are praised in Kenneth Clark's study *The Nude*, for 10 points each.

[10e] Clark identifies the *rhythmos* and *symmetria* of a Classical sculpture by Myron that shows an athlete leaning forward as he prepares to throw what object?

ANSWER: **discus** [accept **Discus** thrower; accept **Discobolus**]

[10m] The Kritios Boy, which Clark described as "the first beautiful nude in art," is often contrasted with these earlier idealized depictions of standing male nude youths to chart the development from the Archaic to the Severe style.

ANSWER: **kouroi** [or **kouros**]

[10h] Clark discusses the "light and graceful" pose of a bronze statue of one of these creatures found at the center of a Roman impluvium. This creature erroneously titles an oft-restored sculpture of a figure asleep on a rock once held by the Palazzo Barberini.

ANSWER: **fauns** [or **faunus** or **fauni**; accept **satyrs**; accept House of the **Faun** or Casa del **Fauno**; accept *Dancing Faun*; accept *Barberini Faun* or *Fauno Barberini* or *Drunken Satyr*]

<Painting/Sculpture>

16. A stagecoach mail service with this name was awarded to John Butterfield's company as a northern alternative to the recently opened Jackass Mail. For 10 points each:

[10h] Give this name that was also shared by a mail line owned by the "Stagecoach King" Ben Holladay. That trail with this name started in Atchison and passed through Julesburg, where George Bent recorded a clash between Spotted Tail's Brulé Sioux ("sue") and the U.S. Army.

ANSWER: **Overland** [accept **Overland** Trail or **Overland** Stage Line; accept Butterfield **Overland** Mail] (The "Battle of Julesburg" occurred during the Colorado War.)

[10m] Holladay's Overland mail line serviced this territory, whose namesake war resulted in Alfred Cumming becoming governor. The Baker-Fancher wagon train was ambushed in this territory's Mountain Meadows.

ANSWER: **Utah** Territory [accept **Utah** War]

[10e] This express service followed the Mormon Trail to Utah en route to deliver urgent mail. This service, which was erroneously named for an animal, operated for 18 months before the first transcontinental telegraph line was built.

ANSWER: **Pony** Express [or **Central Overland California & Pike's Peak** Express Company]

<American History>

17. The grading of these phenotypes with tools like the Quigley scale and orchidometer inspired activists from the ISNA to create a satirical ruler described in *Galileo's Middle Finger*. For 10 points each:

[10m] Name this heterogeneous set of phenotypes that includes Müllerian agenesis and 5-alpha-reductase deficiency. These traits are often modified without consent early in life.

ANSWER: **intersex** [accept **DSDs**, **disorders of sex development**, **differences in sex development**, **diverse sex development**, **variations in sex characteristics**, or **VSCs**; accept **hermaphroditism** or pseudo**hermaphroditism** or word forms (note that it is often considered pejorative); accept **ambiguous genitalia**, **undermasculinization**, **undervirilization**, or **underfeminization**; reject “nonbinary” or “transgender”] (ISNA was the Intersex Society of North America. The ruler is the “phall-o-meter.”)

[10h] Intersex Dominican “güevedoces” lack the 5-alpha-reductase to produce this non-aromatizable androgen, which virilizes external genitalia. Oxandrolone is an anabolic derivative of this androgen, which regulates hair growth and loss.

ANSWER: **DHT** [or **dihydrotestosterone** or 5-alpha-**dihydrotestosterone**; or andro**stanolone**; reject “testosterone”]

[10e] The controversial organization/activation hypothesis holds that sex differences in this organ may result from exposure to androgens like DHT that may correlate with volumes of grey and white matter.

ANSWER: **brain** [accept **brain** matter] (The hypothesis was systematically criticized by Rebecca M. Jordan-Young in *Brain Storm*.)

<Biology>

18. Answer the following about 19th-century British poetry that praises paganism, for 10 points each.

[10m] This poet decried the replacement of paganism by Christianity in his “Hymn to Proserpine.” He also wrote the verse drama *Atalanta in Calydon*.

ANSWER: Algernon **Swinburne** [or Algernon Charles **Swinburne**]

[10h] The speaker of this sonnet exclaims “Great God! I’d rather be a pagan suckled in a creed outworn” so that he might “hear old Triton blow his wreathèd horn.” This sonnet’s speaker laments, “little we see in Nature that is ours.”

ANSWER: “The **World Is Too Much with Us**” (by William Wordsworth)

[10e] This poet’s inclusion of a “Hymn to Pan” in his poem *Endymion* (“en-DIM-ee-un”) led Wordsworth to quip that it was “a very pretty piece of paganism.” This poet’s interest in the classics is also evident in his “Ode on a Grecian Urn.”

ANSWER: John **Keats**

<British Literature>

19. In *The Theory of Moral Sentiments*, Adam Smith considers whether anyone would let this country be swallowed up in an earthquake to save their “little finger.” For 10 points each:

[10e] Name this modern-day country where a school of ancient philosophers emphasized virtues like benevolence, righteousness, and filial piety.

ANSWER: **China** [or **Zhōngguó**; or People’s Republic of **China** or **PRC**; or **Zhōnghuá Rénmín Gònghéguó**]

[10h] Mencius criticized this philosopher from China’s Warring States period by claiming that he would “not pluck a hair from his body to benefit the world.” This “Master” founded a namesake school that espoused ethical egoism.

ANSWER: **Yáng Zhū** [or **Yang** Chu; or **Yángzi**; accept Master **Yáng** or **Yangism**]

[10m] This non-Chinese philosopher similarly wrote that it is within reason to “prefer the destruction of the whole world to the scratching of my finger.” A treatise by this philosopher calls reason the “slave of the passions.”

ANSWER: David **Hume** [or David **Home**]

<Philosophy>

20. Along with other young writers, this author founded a modernist literary group named Shinkankakuha, or “New Sensationalist School.” For 10 points each:

[10e] Name this author who emphasized brevity in his *Palm-of-the-Hand Stories*. This Japanese author wrote the novel *Snow Country*.

ANSWER: Yasunari **Kawabata** [or **Kawabata** Yasunari]

[10m] This Kawabata novel especially reflects his interest in depicting sensory stimuli. This novel’s protagonist, the elderly businessman Shingo Ogata, frequently reflects on his failing memory and disturbing dreams.

ANSWER: *The **Sound of the Mountain*** [or **Yama no oto**]

[10h] Shinkankakuha formed while Kawabata was living in this Tokyo district, which he depicted in a novel titled for “The Scarlet Gang of” this district. In a haiku, Matsuo Bashō asked whether a temple bell was from this district or Ueno (“oo-eh-noh”).

ANSWER: **Asakusa** [accept *The Scarlet Gang of **Asakusa*** or **Asakusa Kurenaidan**]

<World Literature>

21. Despite their brief half-life of around a day, these cells undergo epigenetic reprogramming that activates “trained immunity” after exposure to beta-glucan. For 10 points each:

[10m] Name these mature, circulating myeloid cells that differentiate into DC-SIGN-positive dendritic cells, or more commonly macrophages.

ANSWER: **monocytes** [accept **monos**; accept **monocyte**-derived dendritic cells; accept trained **monocyte** or circulating differentiated **monocytes**; prompt on white **blood** cells or **leukocytes**; prompt on **moDCs** by asking “what does that stand for?”]

[10h] GM-CSF, LPS, and this “signature” Th1 (“T-H-one”) cytokine polarize monocytes into M1 macrophages. Natural killer cells secrete this cytokine, which promotes T-bet and class II MHC expression and was named for antiviral activity.

ANSWER: **IFN-gamma** [or **interferon-gamma**; or **IFN-g** or **IFG**; prompt on type II **interferons** or immune **interferon** or **IFNs**]

[10e] IFN-gamma stimulates opsonizing antibodies that bind to Fc (“F-C”) receptors on cells that perform this process of engulfing pathogens, such as monocytes and macrophages.

ANSWER: **phagocytosis** [accept **phagocytes**; prompt on **endocytosis**]

<Biology>