



**ACADEMIC  
COMPETITION  
FEDERATION**

**2023 ACF NATIONALS**

**Prelims 6**

**Packet By**

**Harvard A and MIT A**

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TOSSUPS

1. A chord built on this scale degree is replaced by a chord built two scale degrees higher in the first chord of Jerry Coker’s Backdoor progression. A seventh chord built on this scale degree follows a tonic major seventh chord in the opening of “The Girl From Ipanema (“ee-pa-NAY-ma”).” Seventh chords built on this scale degree are the third played in both the original A and B section of the Rhythm changes and second-to-last in the Montgomery-Ward bridge. An iconic jazz progression used in “Honeysuckle Rose” places the minor chord built on this scale degree before an authentic cadence; that is the *this number*, five, one progression. The piano answers the bass with a phrase of this many chords in the opening riff of Miles Davis’s “So What.” For 10 points, a signature tune of Art Tatum is titled “tea for” how many people?

ANSWER: **two** [or **supertonic**; accept “Tea for **Two**”; accept **two** chord or **two** seventh chord; accept **ii–V–I** progression after “five, one” is read]

<Other Fine Arts>

2. Moisey (“moy-say”) Markov’s proposed design of these devices was attempted by the DUMAND project, but the project was canceled by the US DOE. One of these devices looks for signals of the Askaryan effect over the course of long-duration balloon flights. The first of these devices to be built on a cubic-kilometer scale has 80 subsurface strings arranged on a hexagonal grid, each string bearing 60 Digital Optical Modules. After defecting to the USSR, Bruno Pontecorvo proposed building one of these devices using carbon tetrachloride because chlorine-37 converts to argon-37 by reverse electron capture. AMANDA was a proof-of-concept for one of these devices called IceCube, which operates by using PMTs to measure Cherenkov radiation. For 10 points, Supernova 1987A was observed at Kamiokande II (“two”), an example of what devices that observe tiny, uncharged leptons?

ANSWER: **neutrino detectors** [or **neutrino telescopes**; or **neutrino observatory**; accept **Cherenkov detectors** or **Cherenkov telescopes** until “Cherenkov” is read; prompt on **muon detectors** or **electron detectors** until “electron capture” is read by asking “the devices were built primarily to look for what other particle?”; prompt on **telescopes** or **particle detectors** or **detectors**; reject “cosmic ray detectors”] (The second sentence refers to ANITA. Pontecorvo’s idea was used in the Homestake experiment.)

<Other Science>

3. In a play titled for this profession, Davenport investigates the murder of a man in Louisiana who cries “they still hate you!” just before dying from a gunshot wound. After hearing that Pope Paul VI is visiting New York City, Ronnie, who has this profession, plots to kill him with a bomb in a play by John Guare (“gwair”). Vernon Waters realizes the futility of his efforts to appeal to white people just before his death in a play titled for this profession by Charles Fuller. In another play, a man with this profession plots to get rich by selling a gold toilet seat he pilfered from a palace belonging to a dictator’s son. The hand of that character with this profession is bitten off by the title animal while he guards its cage. For 10 points, Kev and Tom have what profession in Rajiv Joseph’s play *Bengal Tiger at the Baghdad Zoo*?

ANSWER: **soldiers** [accept **military** officials; accept **sergeants**; accept U.S. **Army** or **G.I.s**; accept **Marines** or U.S. **Marine** Corps; accept *A **Soldier’s** Play*; prompt on **officers** or **captains**] (The John Guare play is *The House of Blue Leaves*.)

<American Literature>

2023 ACF Nationals | Prelims 6. Harvard A and MIT A

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4. In this year, Arnold Hess agreed to stay on the Board of Education to prevent opposition to his tapped successor. In this year, opposition to a planned medical school using funds from the “Model Cities” Program amplified an incident at the William P. Hayes Homes. A warning of forthcoming violence if “America don’t come around” was given in Cambridge, Maryland, in this year by H. Rap Brown. In response to prior events during this year, Walter Headley announced a tough-on-crime policy for so-called “young hoodlums” summed up as “when the looting starts, the shooting starts.” The Kerner Commission probed events during this year that culminated with one in which a bullhorn-wielding John Conyers attempted to quell protests later dealt with by George Romney. For 10 points, name this year in which the Detroit Riot spotlighted a “long, hot summer” one year before the assassination of Martin Luther King Jr.

ANSWER: **1967** [prompt on '67] (Newark Mayor Hugh Addonizio was set to appoint white councilman James Callaghan, who did not possess a post-secondary education, over City Budget Director Wilbur Parker, the first Black public accountant in New Jersey. Taxi driver John Smith was arrested near the Hayes Homes in Newark.)

<American History>

5. While this man was hiding in a cave and being beaten with a rod, an angel appeared and told the attackers “the Lord hath chosen him to be a ruler over you.” After breaking a bow made from fine steel in the wilderness, this man constructed a new one out of wood. In the opening of a book named after this man, he is described as being born of “goodly parents.” After this man is tied to a ship’s mast, a golden compass called the Liahona stops working. This large-statured man succeeds in retrieving the Brass Tablets from Laban after the failure of his wicked older brothers. This man saw a vision of an iron rod leading to the tree of life after his father led their family out of Jerusalem and prophesied (“PROFF-uh-sighed”) its destruction. For 10 points, name this son of Lehi (“LEE-high”) and author of the first two books of the Book of Mormon, whose namesake descendants frequently warred with the Lamanites.

ANSWER: **Nephi** (“NEE-fye”) [accept **Nephites**; accept First **Nephi** or Second **Nephi**]

<Religion>

6. This story describes two mountaineers who play their pipes after they encounter the Virgin Mary. A digression in this story tells of the ruins of a cliffside palace belonging to Tiberius. Unbeknownst to his family, the title character of this story falls for the tarantella dancer Carmela, who performs with her cousin Giuseppe. The daughter of this story’s title character is courted by an incognito “prince of a certain Asiatic state.” While reading the newspaper near a “grey-haired German” resembling Henrik Ibsen, the title character of this story suffers a heart attack and is taken to room No. 43 of his hotel, where he promptly dies and is placed in a soda-water box. The title character of this story and his family journey to Capri on the cruise liner *Atlantis*. For 10 points, name this short story about the title West Coast businessman by Ivan Bunin.

ANSWER: “The **Gentleman from San Francisco**” [or *Gospodin iz San-Frantsisko*]

<European Literature>

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7. This effect and results presented by Isidor Rabi were the main points of discussion at the Shelter Island Conference. Experiments using this effect to measure the proton charge radius initially showed a large discrepancy with traditional methods, sparking the “proton radius puzzle.” The experiment that discovered this effect slammed electrons into an atomic beam, then radiated the beam with microwaves, and then observed the presence or absence of current when the beam struck a tungsten foil. The strength of this effect is proportional to “the fine structure constant to the fifth, times the log of one over the fine structure constant.” On a famous train ride, this effect was calculated by subtracting a free-electron term from the self-energy of the electron. For 10 points, Hans Bethe (“BAY-tuh”) spurred the development of QED by calculating what non-degeneracy of the  $2S\frac{1}{2}$  (“two-S-one-half”) and  $2P\frac{1}{2}$  (“two-P-one-half”) states of hydrogen?

ANSWER: **Lamb shift** (Isidor Rabi reported measurements of the magnetic moment of the electron. The “proton radius puzzle” in the second sentence is diminishing due to more accurate spectroscopic methods, as discussed in the 2018 CODATA recommended values of the fundamental physical constants.)

<Physics>

8. The idea that intentionality cannot be captured without reference to this concept is defended in a Ralph Wedgwood book on “the nature of” this concept. McDowell’s notion that meaning involves this concept is discussed in a 2012 book by Allan Gibbard, whose book *Wise Choices, Apt Feelings* is subtitled for this kind of “judgment.” Four accounts of the basis of this concept – voluntarism, realism, reflective endorsement, and the appeal to autonomy – are examined in a 1996 book by a prominent Kant scholar at Harvard. That book titled for the “Sources of” this concept is by Christine Korsgaard. A branch of ethics named for this concept is sometimes called prescriptive ethics. For 10 points, name this property possessed by statements about how things [emphasize] *ought* to be, as opposed to descriptive statements about how things [emphasize] *are*.

ANSWER: **normativity** [or **normativeness**; accept *The Sources of Normativity*; accept *Meaning and Normativity*; accept *Wise Choices, Apt Feelings: A Theory of Normative Judgment*; accept *The Nature of Normativity*; prompt on **norms**; reject “normal” or “normality”]

<Philosophy>

9. These geographical features commonly name a sickness caused by *Coccidioides* (“cock-sid-ee-OY-deez”) fungi observed among the laborers who worked with “scrapers” that evolved into the first bulldozers. The Delta smelt is a threatened fish found in an estuary in one of these features that includes the Eastside Streams. An upwarping of Earth’s crust below one of these features is called the Stockton Arch. Tule (“TOO-lee”) grass wetlands produce namesake radiation fog in one of these features that has been continually sinking in cities like Corcoran due to groundwater-based agriculture. The “Golden Empire” is a nickname for one of these features whose southern Tulare Basin contains Fresno. The cities of Burbank and Calabasas are located in one of these features named for San Fernando. For 10 points, uptalk characterizes an often stereotyped accent named for what type of feature in Southern California?

ANSWER: **valleys** [accept San Fernando **Valley**; accept **Valley** girls or **Valleyspeak** or **Valley** accent; accept Central **Valley** or Great **Valley**; accept San Joaquin **Valley**; accept Sacramento **Valley**; accept **Valley** Fever]

<Geography>

10. After this event's first day, its leader said "when you go back home, you will find your children: give them a hug and say, 'this is a hug from [me]'" in the "Speech of the Moon." A participant in this event wrote gossipy reports on it under the pseudonym "Xavier Rynne." This event produced a document on how to use the "press, movies, radio, [and] television," or "the means of social communication." This event largely rejected a policy of *ressourcement* ("ruh-soorce-MAWN") in favor of one of *aggiornamento* ("ah-jor-na-MEN-toh"). This event's second leader issued a reconciliatory joint declaration with Athenagoras I of Constantinople. This event caused dissent by Marcel Lefebvre's followers, sedepriivationists ("SAY-day-privation-ists"), and sedevacantists ("SAY-day-vuh-CON-tists"). This event, which produced the document *Nostra aetate* ("eye-TAH-teh"), was interrupted by the death of John XXIII ("the 23rd"). For 10 points, masses in vernacular languages were authorized by what liberalizing 20th-century Catholic ecumenical council?

ANSWER: **Second Vatican** Council [or **Vatican II**; or **Second** Ecumenical Council of the **Vatican**; or Concilium Oecumenicum **Vaticanum Secundum**; prompt on **Vatican** Council] (John XXIII gave the speech in the first line.)  
<European History>

11. An atom of this element sits at the center of the BCC unit cell of a Heusler ("HOYSE-ler") alloy. This metal was doped into gallium nitride to form the first ferromagnetic semiconductor used in spintronics; similarly, a complex oxide containing twelve atoms of this spin-5/2 ("spin-five-halves") metal was the first-known single-molecule magnet. After reactions in acidic, neutral, and basic solutions, this element respectively speciates into +2 ("plus-2"), +4 ("plus-4"), and +6 ("plus-6") oxidation states. Spinel oxide cathodes containing this metal, instead of cobalt, intercalate lithium in a commercial lithium battery and are reduced by zinc in a commercial alkaline battery. An oxide cluster containing this element and calcium splits water in the photosynthetic oxygen-evolving complex. This metal's brown-colored dioxide precipitates when double bonds react with its +7 ("plus-7") oxidation state. For 10 points, name this transition metal found in a strong violet-colored oxidizing agent.

ANSWER: **manganese** [or **Mn**; accept **manganese** dioxide or **MnO<sub>2</sub>**] (The violet-colored oxidizing agent is potassium permanganate.)  
<Chemistry>

12. Franklin Hiram King wrote a long-term history of this profession in China, Korea, and Japan. The Northern Wèi ("way") dynasty administrator Jiǎ Sìxié ("jyah sih-sh'yeh") wrote a handbook for members of this profession called the *Qímín Yàoshù* ("chee-meen yow-shoo"). Chinese members of this profession viewed the compound deities Tǔdīgōng ("too-dee-gong") and Shèjì ("shuh-jee") as their patrons. Two groups of members of this profession were called the Lùlín ("loo-leen") and the Chiméi ("churr-may"). A philosophical school that celebrated the social role of this position was inspired by the mythical Hòu Jì ("ho jee"). Members of this profession in China credited its major innovations to the Yán ("yen") Emperor, who was identified with Shénnóng ("shun-nong"). After enacting reforms that disadvantaged this profession, Wáng Mǎng ("wong mong") faced a revolt from the "Red Eyebrows." The Suí ("sway") adopted an "equalization" of this profession's land that attempted to redistribute it like the earlier "well-field" system. For 10 points, what profession produced the "Five Cereals"?

ANSWER: **farming** [or **farmers**; or **agriculture** or **agriculturalists**; accept **planting**, **planters**, **cultivation**, or **plantations**; accept **tillers**; accept peasant **farmers**; accept answers that include specific crops, like **rice**, **millet**, **grains**, **hemp**, or **mulberry**; accept Shénnóng, nóngmín, nóngfū, or Nóngjiā until "Shénnóng" is read; accept *Farmers of Forty Centuries*; prompt on **peasants**]

<World History>

2023 ACF Nationals | Prelims 6. Harvard A and MIT A

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13. A movement of a work in this genre, scored for only strings, paraphrases Bach's Minuet in G into a limping 7/4 ("seven-four") waltz. Movements such as "Turkey Trot" and "Sennets and Tuckets" are found in that work in this genre by Leonard Bernstein. This title was retroactively given to three early, light, three-movement quartets by Mozart that are also known as the "Salzburg sinfonias." A series of Swiss dances is included in a work of this type for violin and piano, which Igor Stravinsky extracted from his ballet *The Fairy's Kiss*. The descending unison half-note melody "E-flat B-flat G E-flat" begins a six-movement E-flat major work in this genre that was first work written for string trio. A series of cluster chords ends a Mozart work in this genre riddled with satirical compositional mistakes. For 10 points, Mozart's *A Musical Joke* is a work in what light multi-movement genre that takes its name from an Italian word for "to amuse"?

ANSWER: **divertimento** [or **divertimenti**]

<Classical Music>

14. This company first reimagined the status quo as the "Belle Époque" ("bell ay-PUCK") and prepared for situations like "The Carter Miracle" as part of a pioneering risk assessment method developed by Pierre Wack called "scenario planning." Amador Nita and "Papa" Godett led a strike against this company and founded the 30th of May Workers' Liberation Front. John Major purportedly called the board of this company "wimps" for backing down on a plan to decommission the Brent Spar. While researching at this company, M. King Hubbert developed a "peak theory" about resource depletion. This company is the primary target of the social justice group MOSOP ("moh-sop"). The Ogoni Nine, including Ken Saro-Wiwa, opposed Sani Abacha's support for this company's activities in the Niger Delta. For 10 points, identify this European oil company whose name recently dropped the words "Royal Dutch."

ANSWER: Royal Dutch **Shell** [or **Shell** Oil; accept **Shell** Nigeria or **Shell** Petroleum Development Company; accept **Shell** USA or **Shell** Oil Company; accept **Shell** UK; accept **Royal Dutch Petroleum** Company or **Koninklijke Nederlandse Petroleum** Maatschappij until "Royal Dutch" is read; prompt on **Werkspoor** by asking "it is a subsidiary of what company?"] (The third line refers to the 1969 Curaçao Uprising. MOSOP is the Movement for the Survival of the Ogoni People.)

<Other History>

15. A passage describing this character riding his horse mentions two ruby-bedecked greyhounds who crisscross in front of him shortly before he hears about a porter who "goes upon his head rather than his feet." This character's father is told by his sick wife not to remarry until he sees a briar with two blossoms grow on her grave; that woman gives birth to this character upon being frightened by some pigs. This character is able to complete one of his quests after a salmon tells his crew about a water-logged prison housing the hound-tamer Mabon. After being cursed by his stepmother, this character and his cousin Arthur procure a comb and scissors from between the ears of the boar Twrch Trwyth ("toork truh-ith") to cut the hair of his lover's father, the giant Ysbaddaden ("EES-buh-DA-den"). For 10 points, a series of impossible tasks are carried out on behalf of what character who, in a namesake tale in the *Mabinogion* ("mah-bih-NOG-yun"), seeks to marry Olwen?

ANSWER: **Culhwch** ("cool-HOOK") [or **Kilhwch**] (The tale is called *Culhwch and Olwen*.)

<Mythology>

2023 ACF Nationals | Prelims 6. Harvard A and MIT A

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16. A woman in this play tells her husband, “I want you making love to me without ghosts in bed,” after repeatedly mocking him with the phrase, “Beyond repair, huh? Irreparable.” In this play, a woman realizes that she had met a man before when she overhears him use the phrase “teensy-weensy” and quote Nietzsche in a conversation with her husband. This play ends with an orchestra playing Mozart’s *Dissonance Quartet* while spotlights scan the audience and a mirror lowers from the ceiling. In this play, a doctor substitutes the name “Stud” in for “Bud” while confessing his sins into a tape recorder. A woman ties up a man and puts him on trial for torturing her during her imprisonment in this play set in the aftermath of an unnamed Latin American dictatorship. For 10 points, Paulina and Gerardo hold Roberto Miranda hostage in what play by Ariel Dorfman titled for a Schubert string quartet?

ANSWER: ***Death and the Maiden*** [or *La muerte y la doncella*]

<World Literature>

17. Since *R v Kapp*, the Supreme Court of Canada has consistently argued that a type of equality named for this adjective is protected by Section 15 of the Charter. That type of equality named for this adjective, which is incorporated into Jordan’s Principle, is contrasted with formal equality. John Hart Ely (“EE-lee”) claimed that a phrase starting with this adjective is an oxymoron, like the phrase “green pastel redness,” a claim that has been echoed by Antonin Scalia (“skuh-LEE-uh”) and Clarence Thomas. The use of a principle named for this multisyllabic adjective to strike down economic regulations, including in a case involving working hours for bakers, characterized the *Lochner* era. In the context of the interpretation of the Fifth and Fourteenth Amendments, this adjective is the opposite of “procedural.” For 10 points, unenumerated rights are protected by what form of due process?

ANSWER: **substantive** [accept **substantive** due process; accept **substantive** equality]

<Social Science>

18. Some members of this genus produce a conformationally-restricted glutamate analogue useful for reversible brain lesioning; a potent GABA-A (“GAB-uh A”) agonist derived from members of this genus has similar applications. A compound named for being discovered in this genus locks RNAPII’s (“R-N-A-P-two’s”) bridge helix into place, halting DNA translocation. Phallotoxins from this genus conjugated to rhodamine or eosin can be used to visualize muscle fibers because they specifically bind and stabilize F-actin. A species of this genus names a compound that acts as an agonist for a class of namesake G-protein-coupled acetylcholine receptors. Muscimol is responsible for the psychoactive effects of the most famous mushroom of this genus, which was often used as an entheogen. For 10 points, species *muscaria* and *phalloides* (“fal-LOY-deez”) are members of what fungal genus that contains red-and-white spotted fly agarics and toxic death caps?

ANSWER: ***Amanita*** [accept specific species like ***Amanita muscaria*** or ***Amanita phalloides***; prompt on ***A. muscaria*** or ***A. phalloides*** or **destroying angels** by asking “what is the genus name?”; prompt on **death caps** or **fly agarics** until each is read by asking “what is the genus name?”; prompt on **amatoxins** or alpha-**amanitin** or beta-**amanitin** by asking “what genus is it named for?”] (The lesioning compounds are the glutamate analogue ibotenic acid and the GABA-A agonist muscimol.)

<Biology>

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19. Sculptures of a headless and limbless Dionysus, this man's estranged wife, and a reclining sculpture of him in a red and green jacket feature in a three-sculpture memorial by Danny Osborne. Police presence prevented a sculptor from working on a piece named for this man due to his choice to include testicles. This man's grinning face and a hand holding a cigarette emerge from a bench-like sarcophagus in a Maggi Hambling sculpture titled for "A Conversation with" him. A glass barrier was installed in front of a sculpture of this man in the Père Lachaise ("pair lah-SHEZ") Cemetery to prevent people from leaving lipstick kisses on it. This writer's tomb, which includes boxy stone slabs abutting a sphinxlike creature, was sculpted by Jacob Epstein. For 10 points, name this writer whose epitaph is adorned with lines from his poem "The Ballad of Reading Gaol ("redding jail")."

ANSWER: Oscar **Wilde** [or Oscar Fingal O'Flahertie Wills **Wilde**; accept Oscar **Wilde**'s tomb; accept *A Conversation with Oscar **Wilde***]

<Painting & Sculpture>

20. A novel by this author opens with the protagonist waiting in a café outside the PanOpticon skyscraper, but failing to work up the courage to approach a lawyer who works there. In that novel by this author, the protagonist and his friend Yuzu Daimon are kidnapped by a yakuza gang. The ninth and final chapter is left blank in a novel by this author about Eiji ("ay-jee") Miyake's search for his father. In a novel by this author, a member of the rebel group Union reveals that some characters are recycled into a food called "Soap." The dystopian state of Nea So Copros in Korea is the setting of a narrative by this author in which a restaurant called Papa Song's employs the fabricant Sonmi-451. A novel by this author includes "The Pacific Journal of Adam Ewing" and "Letters from Zedelghem" among its six nested stories. For 10 points, name this British author of *number9dream* and *Cloud Atlas*.

ANSWER: David **Mitchell** [or David Stephen **Mitchell**]

<British Literature>



## BONUSES

1. Answer the following about archaeological discoveries that involve ancient astronauts, for 10 points each.

[10m] The pseudohistorian Erich von Däniken (“DAY-nih-kin”) said that markings showing an ancient astronaut blasting off appear on the bottom of the lid of this Mayan ruler’s sarcophagus. This man ruled Palenque (“pah-LEN-kay”) for 68 years, the longest reign of any ruler from the Americas.

ANSWER: **Pacal** the Great [or K’inch Janaab’ **Pakal** I; or **Pacal** of Palenque]

[10e] Von Däniken also said that ancient astronauts used these features as landing-strips for spaceships. These ancient geoglyphs were created by an eponymous Peruvian culture.

ANSWER: **Nazca** Lines [or **Nasca** Lines]

[10h] Conspiracy theories about this object, which seemingly contains a spark plug inside a 500,000-year-old geode, claim it derives from a visit by ancient astronauts. However, this artifact from California is likely just a Champion spark plug.

ANSWER: **Coso** artifact [or **Coso** geode]

<Other History>

2. Upendra Baxi (“oo-PEN-druh BOCK-shee”) wrote a book about the future of these concepts, and Marie-Bénédicte Dembour (“dom-BOOR”) wrote a book asking “who believes in” these concepts. For 10 points each:

[10h] Bryan Turner wrote an “outline of a theory of” what concepts? Turner argues that sociological theories of these concepts must supplement theories of citizenship.

ANSWER: **human rights** [accept “Outline of a Theory of **Human Rights**”; accept *The Future of **Human Rights***; accept *Who Believes in **Human Rights**?*; prompt on **rights**]

[10e] Sociological definitions of human rights often begin by discussing the “Universal Declaration of Human Rights,” which was adopted by this organization.

ANSWER: **United Nations** [or **UN**; accept United Nations **General Assembly**]

[10m] Some sociologists argue that the universality of human rights undermines this concept. The modern international political system is conventionally said to be grounded in the “Westphalian” form of this concept.

ANSWER: **sovereignty** [accept Westphalian **sovereignty**]

<Social Science>

3. The narrator of this poem asks God why, in this “huge ineducable / heterogeneous hotch and rabble,” he is “condemned to squabble.” For 10 points each:

[10h] Name this long poem written in Scots. The poet’s Marxist-Leninist views may have informed his responses to contemporary events like the 1926 United Kingdom general strike in sections of this poem.

ANSWER: “A **Drunk Man Looks at the Thistle**”

[10m] This man, who is the subject of a poem by Blind Harry, is among the historical figures whom the narrator of Hugh MacDiarmid’s (“muck-DER-mid’s”) “A Drunk Man Looks at the Thistle” sees upon the turning of the “weary wheel.”

ANSWER: William **Wallace** [or Uilleam **Uallas** or Weelum **Wallace**; accept *The **Wallace*** or *The Actes and Deidis of the Illustre and Vallyeant Campioun Schir William **Wallace***]

[10e] The narrator also makes repeated references to this Robert Burns poem that asks “Should auld acquaintance be forgot?”

ANSWER: “**Auld Lang Syne**”

<British Literature>

4. When propagating inside of a hollow, rectangular perfect conductor, these phenomena propagate in TE or TM modes. For 10 points each:

[10e] Name these phenomena that are transverse when the direction of disturbance is perpendicular to their propagation.

ANSWER: **waves** [accept electromagnetic **waves**]

[10h] This mode is the lowest allowable TE, or transverse electric, mode for a hollow rectangular waveguide made with a perfect conductor.

ANSWER: **TE<sub>10</sub>** (“T-E-one-zero”) mode

[10m] Each pair of indices of a rectangular waveguide with side lengths  $a$  and  $b$  determines a value for this quantity computed as “ $c$ , times pi, times the square root of the following:  $m$  over  $a$  squared, plus  $n$  over  $b$  squared.” Below this quantity, the solutions for the E- and B-fields indicate exponential attenuation rather than traveling waves.

ANSWER: **cutoff frequency** [accept **corner frequency** or **break frequency**; prompt on **cutoff** or **frequency**; reject “cutoff wavelength”]

<Physics>

5. David Henry Hwang wrote the libretto to an opera by this composer about the love between Federico García Lorca and Margarita Xirgu, in which García Lorca is played by a woman. For 10 points each:

[10h] Name this composer of the opera *Ainadamar*. This Massachusetts-based Argentine composer attempted to show the coexistence of cultures prior to the Reconquista in his song cycle *Ayre* (“EYE-reh”).

ANSWER: Osvaldo **Golijov** (“GO-lee-hoaf”) [or Osvaldo Noé **Golijov**]

[10m] Golijov came to prominence with a clarinet concerto inspired by this type of folk music, which inspired many melodies of Gustav Mahler and more recently a violin concerto by Noah Bendix-Balgley.

ANSWER: **klezmer** [prompt on **Jewish** folk music] (The violin concerto is *Fidl-Fantazye*.)

[10e] Golijov’s *Azul* was premiered by this Chinese-American cellist. Golijov has frequently collaborated with this man’s Silk Road Ensemble.

ANSWER: Yo-Yo **Ma** [or **Mǎ** Yǒuyǒu]

<Classical Music>

6. While most often associated with lung cancer, mutations in the receptor for an “epidermal” protein of this class are also linked to glioblastoma. For 10 points each:

[10m] Name these signaling proteins. Bevacizumab is the prototypic drug in a class of drugs designed to inhibit the action of one of these proteins that stimulates both normal and cancer-related angiogenesis.

ANSWER: **growth factors** [accept epidermal **growth factor**; accept vascular endothelial **growth factor**; prompt on **EGF** or **VEGF** by asking “what does that stand for?”]

[10h] *Three answers required.* Most breast cancers contain mutations that overexpress or amplify at least one of these three proteins, but “triple negative” ones do not, making them resistant to both trastuzumab and tamoxifen.

ANSWER: **PR** AND **ER** AND **Her2/neu** [accept answers in any order; accept **progesterone receptor** in place of “PR”; accept **estrogen receptor** in place of “ER”; accept **ERBB2**, **NEU**, **CD340**, **c-ERB2**; or **erb-b2** receptor tyrosine kinase 2 in place of “Her2/neu”]

[10e] The most frequently mutated protein in human cancers is this “guardian of the genome.” This protein arrests the cell cycle at the G1/S transition if DNA damage is detected.

ANSWER: **p53** [or tumor protein **p53**]

<Biology>

7. The defending general Bonus told his men to bang their shields and canteens to answer these people's war-drums during their siege of Sirmium. For 10 points each:

[10m] Name these people who attacked the Byzantine-ruled Balkans under Bayan I. Maurice drove these people back to Pannonia but was overthrown by Phocas before he could fully crush them.

ANSWER: Pannonian **Avars** [or **Obri**; or **Abaroi**; or **Varchonitai**]

[10e] Dagobert I, a ruler of this dynasty, supported the successful Slavic revolt of Samo against the Avars. Childeric I and Clovis I founded this first Frankish dynasty.

ANSWER: **Merovingian** dynasty [or **Merovingians**; or **Mérovingiens**; prompt on long-haired kings or reges criniti]

[10h] After Samo's Empire collapsed, this Slavic principality emerged in modern-day Austria. This principality eventually became a Carolingian march against the Avars after Arnulf inherited it from his father, Carloman.

ANSWER: **Carantania** [or **Carantanian March**; or **Karantanien** or **Karantanija**; accept March of **Carinthia**; accept Duchy of **Carinthia** or Herzogtum **Kärnten** or Vojvodina **Koroška**; accept Arnulf of **Carinthia**]  
<European History>

8. Domenico Puligo essentially copied a depiction of this saint by another artist, changing only the background, to create what Vasari thought was the best piece of his oeuvre. For 10 points each:

[10h] Name this saint whose typical depictions by Filippino Lippi and Fra Bartolomeo show him in white robes seated at a reading desk while angels surround an apparition.

ANSWER: Saint **Bernard** [or **Bernard** of Clairvaux; accept *Apparition of the Virgin to Saint Bernard*]

[10m] The definitive depiction of Saint Bernard was painted by this Renaissance artist of the Umbrian school. Christ hands the title objects to Saint Peter in a painting by this artist whose background shows an idealized palazzo.

ANSWER: Pietro **Perugino** [or Pietro **Yannucci**] (The second painting is the *Delivery of the Keys*.)

[10e] Perugino was the first to be called on by this pope to paint the Stanza of the Incendio del Borgo. Michelangelo sculpted a horned *Moses* for the tomb of this pope.

ANSWER: **Julius II** [or **Giulio II** or **Iulius II**; or Giuliano **della Rovere**; accept *Tomb of Pope Julius II*; prompt on Julius; prompt on the "Warrior Pope"]

<Painting & Sculpture>

9. The narrator imagines these animals as statues made of Parisian plaster in the piece "Five Stories on a Single Theme." For 10 points each:

[10m] Name this animal that becomes the obsession of the narrator of a novel who ponders the charcoal outlines of a dog and a naked man and woman that her former maid Janair had drawn on her wall.

ANSWER: cock**roaches** [or **baratas**; prompt on insects or arthropods]

[10e] "Five Stories on a Single Theme" is by this Brazilian author, who wrote about a woman who eats a cockroach in her novel *The Passion According to G.H.*

ANSWER: Clarice **Lispector** [or Chaya Pinkhasivna **Lispector**]

[10h] "Five Stories on a Single Theme" is one of Lispector's pieces in this genre, which are collected in the 2018 book *Too Much of Life*. This Portuguese-language genre of short, informal writings on daily topics are published in newspaper or magazine columns.

ANSWER: **crônicas** [or **chronicles**]

<World Literature>

2023 ACF Nationals | Prelims 6. Harvard A and MIT A

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

10. Richard Clay developed a form of this process called “claymotion” that makes heavy use of multiplexing. For 10 points each:

[10h] Name this activity modeled by beats in siteswap notation. Ladder diagrams document types of this activity like “Mills’ Mess” and “Rubenstein’s Revenge.”

ANSWER: **juggling** [or word forms of **juggle**; accept specific types of juggling, such as toss **juggling** or ball **juggling**]

[10m] This thinker built an early juggling robot from an Erector set and published the first mathematical equation of juggling, correlating air time to time in hand. From his “toy room” at MIT, this thinker created the toy mouse Theseus and estimated the game complexity of chess.

ANSWER: Claude **Shannon** [or Claude Elwood **Shannon**; accept **Shannon** number]

[10e] A variation of column juggling named for these toys keeps two balls moving together as if attached by string. These toys with a Tagalog name can have modified axles to make tricks like “walking the dog” easier.

ANSWER: **yo-yos** [or **bandalore**]

<Other Academic>

11. The protagonist of this novel loses a large amount of money playing bridge in her first week at Bellomont, a manor house likely inspired by the estate of the author’s friends, the Mills family. For 10 points each:

[10m] Name this novel that ends with the protagonist overdosing on chloral hydrate after her aunt Julia disinherits her and Simon pressures her to expose her friend’s former love affair.

ANSWER: *The **House of Mirth***

[10e] This author’s time in New York society inspired many of her novels, such as *The House of Mirth* and *The Age of Innocence*.

ANSWER: Edith **Wharton** [or Edith Newbold **Jones**]

[10h] Selden meets Lily in this other New York location in the opening paragraph of *The House of Mirth*. A prose poetry novel titled for this location describes Elizabeth Smart’s affair with George Barker.

ANSWER: **Grand Central** Station [or **Grand Central** Terminal; accept *By **Grand Central** Station I Sat Down and Wept*]

<American Literature>

12. Every arm of the 200-megadalton molecule PG5 is terminated by one of these functional groups but protected by a Boc (“bock”). For 10 points each:

[10e] Name this functional group that is protected by Boc or Fmoc (“F-mock”) during peptide synthesis, since it is at the N-terminus of every protein.

ANSWER: **amine** [or **amino** group; or **NH<sub>2</sub>** group]

[10m] Synthetic chemists prefer Boc to Fmoc because its deprotection has a higher value for this green chemistry metric. It equals the molecular weight of the desired product divided by the total molecular weight of the reactants.

ANSWER: **atom economy** [or **atom efficiency**; or **atom percentage**; prompt on **efficiency**; prompt on **economy** or **percentage**; reject “yield”]

[10h] Boc-protected peptides are cleaved off the surface using an acidic cocktail containing TIPS, which reacts as one of these nucleophiles to suck up reactive trityl (“TRY-till”) cations. In general, these species react stoichiometrically with inhibitors to prevent side reactions.

ANSWER: molecular **scavengers**

<Chemistry>

13. In May 2022, this business leader was excused from a court date to give Joe Biden a tour of a chip factory. For 10 points each:

[10h] Identify this executive nicknamed the “Crown Prince” who was pardoned for bribing Park Geun-hye (“gun-heh”) in August 2022 to become head of Samsung later that year.

ANSWER: **Lee Jae-yong** [or **Jay Y. Lee**; prompt on **Lee**; reject “Lee Kun-hee”]

[10e] Lee Jae-yong was pardoned by this country’s conservative president Soon Suk-yeol (“suck-yull”).

ANSWER: **South Korea** [or the **Republic of Korea** or **ROK** or **Dachanminguk**; accept **Chosŏn** or **Chosen**; accept **Hanguk**; prompt on **Korea**; reject “North Korea” or the “Democratic People’s Republic of Korea”]

[10m] Samsung is key to the Chip 4 Alliance, whose closed trade of devices includes those manufactured by this Dutch company. This company’s 200-million-dollar EUV lithography machines are capable of printing advanced microchips.

ANSWER: **ASML** [or **Advanced Semiconductor Materials Lithography**]

<Current Events>

14. A line about this concept is written on a postcard before the line “A healthy atmosphere stinks of stupidity!” For 10 points each:

[10m] Name this concept that Ludvik writes is “the opium of the people,” leading him to be interrogated by the authorities, in Milan Kundera’s novel *The Joke*.

ANSWER: **optimism** [accept “**Optimism** is the opium of the people!” or “**Optimismus** je opium lidstva!”]

[10e] The original quote, “Religion is the opium of the people,” was written by this thinker who reused ideas from his absurdist novel *Scorpion and Felix* in the essay “The Eighteenth Brumaire of Louis-Napoleon.”

ANSWER: Karl **Marx** [or Karl Heinrich **Marx**]

[10h] This character from a 1931 “nivola” agrees with Marx’s statement, telling his pupil Lazaro “Let us give them opium so that they can sleep and dream.” Angela discovers that this priest doesn’t believe in God.

ANSWER: Don **Manuel** [or Don **Emmanuel**; or Saint **Manuel**; or Saint **Emmanuel**; accept *San Manuel Bueno, mártir* or *Saint Manuel the Good, Martyr* or *Saint Emmanuel the Good, Martyr*] (He is the title character of *San Manuel Bueno, mártir* by Miguel de Unamuno.)

<European Literature>

15. *Original language term required.* This genre emerged in part due to the need to agree on versions of the stories of major religious figures that the Qur’ān only alludes to in its commentary. For 10 points each:

[10h] Name this genre of narratives sourced from Jews or other People of the Book. While scholars like at-Ṭabarī used these works to supplement their *tafsīr*, Ibn Kathīr and al-Ghazālī frowned on their use.

ANSWER: **Isra’iliyyat**

[10e] The *Isra’iliyyat* tell many versions of the same stories; for instance, most Muslims today believe that this son of ’Ibrāhīm was almost sacrificed, but many *Isra’iliyyat* narratives suggest that it was his half-brother, ’Ishāq.

ANSWER: **Ismā’īl** [accept **Ishmael**]

[10m] The story in which Ismā’īl is the sacrifice may have been more accepted because it links the story of sacrifice to this group’s lineage. The Qur’ān calls one of this group’s leaders, Abu Lahab, the “father of flame.”

ANSWER: **Quraysh** [accept **Banū Hāshim**; prompt on **Arabs**; prompt on **Adnanites**; prompt on **Meccans**]

<Religion>

2023 ACF Nationals | Prelims 6. Harvard A and MIT A

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

16. This philosopher used the example of how Martin Guerre’s wife had in good faith believed an impostor to be her husband to explain why heretics should not be punished for their beliefs. For 10 points each:

[10m] Name this Huguenot philosopher sometimes associated with skepticism. This philosopher wrote the *Historical and Critical Dictionary*.

ANSWER: Pierre **Bayle** (“bell”)

[10e] Despite his denials, Bayle was accused of holding this position, which was advocated for by Baron d’Holbach (“doll-BOCK”). A religious aphorism states that there are no holders of this position in foxholes.

ANSWER: **atheism** [or **atheist**; accept “there are no **atheists** in foxholes”; prompt on **irreligion** or **nonbelief** or **nonbelievers**]

[10h] Bayle compared this concept to “a runner who doesn’t know that the race is over.” According to Bayle, a form of this concept described by the adjective *droite* (“dwaht”), or “right,” helps ground the “common notions” of morality.

ANSWER: **reason** [or la **raison**; accept right **reason** or la droite **raison**]

<Philosophy>

17. The photograph on this book’s cover shows a woman in bed staring up at a smoking, shirtless man sitting to her right. For 10 points each:

[10h] Name this collection of photography dedicated to the author’s sister, who committed suicide. This slideshow-turned-book documents the lives of the photographer’s “re-created family” of hard-partying bohemians in New York.

ANSWER: *The **Ballad of Sexual Dependency*** (The work’s author, Nan Goldin, is the woman in the photograph referenced in the first sentence.)

[10e] This woman photographed relatives in *Identical Twins, Roselle, New Jersey, 1967* and documented so-called “freaks” in works like *A Jewish Giant at Home with his Parents*.

ANSWER: Diane **Arbus**

[10m] Sally Mann’s most famous photograph shows her daughter Jessie staring into the camera while holding one of these things. Richard Prince “rephotographed” Sam Abell’s advertisements for a company selling these products.

ANSWER: **cigarettes** [or **cigs**; accept candy **cigarettes**; accept **Marlboro** cigarettes; prompt on **tobacco** products or **candy**]

<Other Fine Arts>

18. This organization was formed a day after the end of an “Educational Conference” arranged by Syed Ahmad Khān and immediately requested the imposition of separate electoral rolls based on religious identity, a request later granted by the Minto–Morley Reforms. For 10 points each:

[10m] Name this organization that agreed to support home rule in 1916 after signing the Lucknow Pact.

ANSWER: All-India **Muslim League** [or **AIML**]

[10h] Khān’s “Educational Conference” was part of a movement based in this city designed to provide Muslims access to European-style education. Khān founded the Muhammadan Anglo-Oriental College in this city.

ANSWER: **Aligarh** [accept **Aligarh** Movement; accept **Aligarh** Muslim University]

[10e] This “father of Pakistan” signed the Lucknow Pact and led the League from 1913.

ANSWER: Muhammad Ali **Jinnah** [or Mahomedali **Jinnahbhai**; accept the **Baba-i-Quam** or the **Quaid-i-Azam**]

<World History>

2023 ACF Nationals | Prelims 6. Harvard A and MIT A

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19. For 10 points each, answer the following about oxygen fugacity's use as a petrological parameter.

[10e] Oxygen fugacity was introduced in the study of mineral syntheses that used redox buffers, such as the system of fayalite, magnetite, and this mineral. This silicate mineral usually exists as a network of SiO<sub>4</sub> tetrahedra.

ANSWER: **quartz**

[10h] This type of magma has a low oxygen fugacity, and thus a low Fe<sup>3+</sup> ("F-E-three-plus") to Fe<sup>2+</sup> ("F-E-two-plus") ratio. Unlike calc-alkaline magmas, this type of magma traces out a concave-down curve towards the alkali corner of an AFM diagram.

ANSWER: **tholeiitic** ("thoh-lee-IT-ick") magma

[10m] When this element is present, the relationship between oxygen fugacity and the Fe<sup>3+</sup>/Fe<sup>2+</sup> ratio may not be straightforward because it substitutes for iron in silicate minerals. Forsterite is the olivine end-member that is rich in this element.

ANSWER: **magnesium** [or **Mg**]

<Other Science>

20. A water barrel and coffee mill was typically attached to these vehicles, which included a canvas "possum belly" to store firewood. For 10 points each:

[10m] Name these vehicles that served as mobile kitchens for cowboys on long trail drives across the West.

ANSWER: **chuckwagons** [prompt on **wagons**]

[10e] The inventor of the chuckwagon, Charles Goodnight, signed an 1878 treaty with Quanah Parker to provide cattle to this tribe centered around the Texas Panhandle. These "Lords of the Southern Plains" fought namesake raiding wars with Texas and Mexico.

ANSWER: **Comanche** [or **Comanche** Nation; accept **Comanche** Wars; accept **Comancheria**; accept **Nermernuh**; accept **Numunuu** Sookobitu; accept **Yamparika**; accept **Kotsoteka**; accept **Nokoni**; accept **Penateka**; accept **Quahadi** or **Quahada**]

[10h] Goodnight and this rancher blazed a trail to Wyoming for cattle drives. This rancher died of gangrene after being severely wounded on the trail by the Comanche.

ANSWER: Oliver **Loving** [accept Goodnight-**Loving** Trail]

<American History>