

## 2022 ACF Regionals

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Packet F by Minnesota, Oxford A, Oxford C, South Carolina

### TOSSUPS

1. Using one of these mathematical objects whose form is given by the Lagrange (“luh-grahnzh”) inversion formula makes it possible to solve quintics of the form “ $x$  to the fifth minus  $x$  plus a constant equals zero.” If the principal part of one of these objects is identically zero, a function has a removable singularity. Analytic continuation extends a function’s domain by replacing one of these objects with another one of them that is valid over a larger domain. The residue of a function at an isolated singularity is identified with the number denoted “ $b$ -sub-one” in one of these objects named for Pierre Alphonse Laurent (“loh-rawn”). These objects sum to a unique value inside their radius of convergence. For 10 points, name these objects that include ones used to approximate functions named for Brook Taylor.

ANSWER: **power series** [accept **Laurent series** before “Laurent”; accept **Taylor series** before “Taylor”; prompt on **series**; prompt on **infinite series** before “infinite”; prompt on analytic **functions** or homomorphic **functions** by asking “what objects represent the functions?”; prompt on **polynomials** by asking “the polynomial is formed by truncating what objects?”]

<Other Science>

2. In a play set in this city, the suicide note of the Korean War veteran Kenneth is found inside a buried trunk fifty years after his death. That play set in this city opens with Bev and Russ grieving over the death of their son. In another play set in this city, a character who aspires to be a doctor is referred to as “Alaiyo” by a Nigerian man. That play set in this city inspired a Pulitzer-winning 2011 spin-off by Bruce Norris. At the end of a play set in this city, a character returns to the stage to grab her “little old plant.” In that play set in this city, Karl Lindner attempts to bribe the Younger family to not move into their new home in Clybourne Park. For 10 points, what city is the setting of Lorraine Hansberry’s play *A Raisin in the Sun*?

ANSWER: **Chicago**, Illinois [prompt on **Clybourne Park** before read] (The Bruce Norris play is titled *Clybourne Park*.)

<American Literature>

3. Benjamin West supposedly compared a statue of this figure to a “Mohawk warrior,” which offended Italians. This figure is not Laocoön (“lay-oh-KOH-ohn”), but the Bargello contains an unfinished sculpture that depicts either this figure or David that was created by Michelangelo, whose pupil Giovanni Montorsoli restored another sculpture of this figure that was missing its left hand and right arm. Statues of the Muses were found at the ruins of Cassius’s villa along with a statue of this figure playing a cithara (“SITH-uh-ruh”). A statue believed to be copied after Leochares (“lay-oh-CAR-eez”) depicts this figure with an outstretched left arm and is located at the Vatican Museums. A lizard climbs up a tree next to this figure in a statue originally attributed to Praxiteles (“prack-SIT-uh-leez”). For 10 points, identify this Greek god depicted after shooting an arrow in a white marble sculpture named for the Belvedere.

ANSWER: **Apollo** [or **Apollon**; accept **Phoebus**; accept **Apollo Belvedere**; accept **Apollo Sauroctonos**; accept **Pythian Apollo**; accept **Apollo Citharoedus** or **Apollo Citharede**]

<Painting/Sculpture>

4. W. W. Tarn argued that holy men of this religion, laden with a one hundred gold coin bounty on their heads, benefited from a series of conquests by the Euthydemid dynasty. A ruler who converted to this religion selected Sagala as his capital over the city of Bucephala. Coins that suggest a kingdom's syncretism with this religion were issued by Demetrius the Invincible. A set of conversations ending in King Menander's conversion to this religion form the 1st-century text "Milinda's Questions." A "starving" figure found at one of this religion's sites in Sikri reflects Greek influence on the Gandhāra art style. This religion's spread to Hellenistic Asian cities like Taxila can be seen in Indo-Greek coinage that depicts the dharmachakra wheel. For 10 points, name this religion promoted by Ashoka.

ANSWER: **Buddhism** [accept specific schools of Buddhism, such as **Theravāda** Buddhism; accept Greco-**Buddhism**] (Pushyamitra Shunga offered the bounties on Buddhist holy men. Milinda was the Pāli name for Menander I, and the text is also called the *Milinda Pañha*.)

<Other History>

5. In a film, this figure is served her pet rooster for dinner after a pack of greyhounds catch it behind the curtain of her father, who uses a wheelchair. In an Armenian story, a healer removes a ring from this figure's finger and causes the moon to change its answer to a pivotal question. This figure becomes a bullfighter in a black-and-white, silent 2012 film by Pablo Berger ("burger"). Bruce Bettelheim cast this figure as an Oedipal daughter. Before giving birth to this character, a woman sewing at her window pricks her finger. In some versions, the nemesis of this character dances to death in red-hot iron shoes; that enemy uses a poisoned comb in an attempt to assassinate this character for being the "fairest." For 10 points, the Brothers Grimm collected a story about what woman's stay with seven dwarfs?

ANSWER: **Snow White** [or **Schneewittchen**; or **Blancanieves**; or **Biancaneve**; accept **Snow Bella**; accept **Snow Drop**; accept **Nourie Hadig**; accept **Snow White** and the Seven Dwarfs]

<Mythology>

6. Pathologists quantify this tissue's static histomorphometric ("histo-morpho-metric") marker "eroded surface" and visualize its maturation with Goldner's trichrome stain. Surgeons operate on this tissue with antibiotic-loaded PMMA. Necrotizing infections of this tissue are walled off by sequestra. TRAP ("trap") dephosphorylates this tissue's SIBLING ("sibling") proteins, like sialoprotein and OPN. After this tissue's immature "woven" form develops, RANKL ("rank-L") regulates the remodeling of its compact, or cortical, and cancellous, or spongy, subtypes. It's not fat, but QCT and DEXA ("DEX-uh") scans measure this tissue's density. This tissue's resorption is promoted by parathyroid hormone in opposition to calcitonin. The body stores most of its phosphorus in this tissue's inorganic hydroxyapatite ("hydroxy-apatite") matrix. For 10 points, radiography images fractures of what calcium-rich connective tissue?

ANSWER: **bone** tissue [accept **ossein** or **osseous** tissue or **osteoid** tissue; accept cortical **bone** or compact **bone**; accept spongy **bone** or cancellous **bone**; accept **bone** resorption or **bone** remodeling; prompt on **connective** tissue before read] (Goldner's trichrome stain distinguishes mineralized and non-mineralized bone. PMMA is bone cement.)

<Biology>

7. In a state of this ethnic group, Gregory of Sinai founded a hesychastic community at Paroria. Harald Hardrada helped suppress a rebellion of these people led by Peter Delyan. A literary school was established in Kutmichevitsa by these people's first bishop, Clement of Ohrid. After winning the Battle of Ongal, these people established an empire under Asparukh. These people constructed the Madara Horseman during the reign of Tervel, whom Justinian II made the first foreign recipient of the title of caesar in 705. After converting these Slavicized people to Christianity, Boris I employed Saints Cyril and Methodius to distance their culture from Franco-Germanic influences, leading them to adopt the saints' Cyrillic script. For 10 points, name this ethnic group blinded en masse by Byzantine emperor Basil II.

ANSWER: **Bulgar**s [or variants like **Bulgari**; accept **Bulgarians**; accept First **Bulgarian** Empire; prompt on **Slavs** or **Slavic** peoples before read; prompt on **Turkic** peoples]

<European History>

8. John Kekes wrote that the consequences of this concept must be "serious and excessive" in his book on the "roots of" this concept. William Rowe considered specific instances of this concept to introduce his idea of "friendly atheism. According to John Hicks, a form of this concept is an inevitable byproduct in the divine process of "soul-making." In *Religion within the Limits of Reason Alone*, Kant divided this concept into subcategories of frailty, impurity, and perversity. This concept is called "natural" when it cannot be said to be caused by the actions or neglect of moral agents. The contradiction between the existence of an omnibenevolent God and this concept is considered in its "problem." For 10 points, name this form of extreme wrongdoing often ascribed to dictators or murderers.

ANSWER: **evil** [accept natural **evil**; accept moral **evil**; accept the problem of **evil** or **evil** acts]

<Philosophy>

9. *Description acceptable.* This character first witnesses cruelty when his great-aunt gives his grandfather a few drops of brandy every night just to annoy his grandmother. This character describes a woman as a "sadist" when her lover spits on a portrait of a woman's dead father. While walking on a path near his house, this character sees Vinteuil's ("vahn-TUY's") daughter having a lesbian affair. This character is given George Sand novels and watches a magic lantern while waiting for his mother's nightly kiss as a child in a book that opens, "For a long time, I went to bed early." This man, who falls in love with Albertine, eats a tea-soaked madeleine, causing him to remember the events of *The Guermantes Way* and *Swann's Way*. For 10 points, identify this unnamed character in the magnum opus of Marcel Proust.

ANSWER: the **narrator** of *In Search of Lost Time* [or the **protagonist** of *In Search of Lost Time* or equivalents; accept **Marcel**; accept *À la recherche du temps perdu* or *Remembrance of Things Past* in place of "*In Search of Lost Time*"; in place of "*In Search of Lost Time*", accept *Swann's Way* or *The Guermantes Way* or *Du côté de chez Swann* or *Le Côté de Guermantes* before read; prompt on the **narrator** by asking "of what book?"; prompt on **Proust**]

<European Literature>

10. A protégé of Leonard Bernstein born in this country made prominent use of temple block percussion in his orchestral piece *Lacerations: In memoriam*. An opera from this country that addresses issues of human trafficking and sex slavery won the 2017 Pulitzer Prize for Music; that opera is *Angel's Bone*. A student of Vincent d'Indy ("vahn-SAWN dahn-DEE") from this country composed a cantata titled for one of its rivers. A film composer born in this country solicited musicians from 70 countries to premiere his four-minute *Internet Symphony*. The oboe-like suǒnà and the pear-shaped pípá are traditional instruments from this country, where musical performances were once confined to the Eight Model Plays. For 10 points, name this country of origin of the contemporary composers Dù Yùn ("doo win") and Tán Dùn ("tahn dwun").

ANSWER: **China** [or **Zhōngguó**; or People's Republic of **China** or **PRC**; or **Zhōnghuá Rénmín Gònghéguó**] (The first clue refers to Bright Sheng. The third clue refers to Xiǎn Xīnghǎi, who composed the *Yellow River Cantata*.)  
<Classical Music>

11. This politician rented office space on the MetroTech campus for a year and a half for just 680 dollars and 57 cents with the help of Frank Carone. Advocates for Layleen Polanco criticized this politician for reinstating solitary confinement. In August 2021, this politician approved the Gowanus ("guh-WAH-nus") rezoning plan while suggesting that funds be set aside for NYCHA ("NAI-chuh") developments. Camber Property Group, which was cofounded by this politician's advisor Rick Gropper, partially owned the Twin Parks North West apartment that burned down. This politician beat Guardian Angels CEO Curtis Sliwa in a general election after defeating Kathryn Garcia and Maya Wiley in the primary. This ex-transit cop was Brooklyn borough president from 2014 to 2021. For 10 points, name this current mayor of New York City.

ANSWER: Eric **Adams** [or Eric Leroy **Adams**]  
<Current Events>

12. In a work by this poet, Eriphyle ("ur-IF-uh-lee") says he was stabbed thrice and is told "thy...health is poor; But thine arithmetic is...correct." This poet of the parodic *Fragment of a Greek Tragedy* wrote a poem describing a Roman as "ashes under Uricon," and another telling how "what God abandoned, these defended." This poet called Manilius "facile and frivolous" but spent thirty years editing his *Astronomicon*. Simonides ("sai-MON-ih-deez") inspired this poet to eulogize men who "saved the sum of things for pay" in "Epitaph on an Army of Mercenaries." This author wrote a poem that ends "Mithridates, he died old," and another poem that states "early though the laurel grows / It withers quicker than the rose." For 10 points, name this British classicist who wrote "Terence, This is Stupid Stuff" and "To an Athlete Dying Young."

ANSWER: A. E. **Housman** [or Alfred Edward **Housman**]  
<British Literature>

13. In the mid-2000s, China began to import this resource from Dauletabad and Galkynysh. Since 1970, the IGAT projects have exploited this resource in areas like its special economic zone in Asaluyeh. Explosions during the 2011 Egyptian revolution disrupted Israel's supply of this resource from the Arish-Ashkelon project. Gurbanguly Berdymukhamedov ("ber-dih-muh-khah-meh-DOHV") plans to close a natural landmark created by this resource at Darvaza, called the Gates of Hell. A shift to exporting this resource after a 1995 coup made a tiny peninsula the world's richest country per capita under Hamad bin Khalifa Al Thani. This resource, which is now piped to the Ateshgah to supply the Fire Temple of Baku, is the largest export of Turkmenistan and Qatar. For 10 points, the Nord Stream pipeline distributes Gazprom's reserves of what transitional fuel?

ANSWER: natural **gas** [or fossil **gas**; accept **LNG** or liquefied natural **gas**; accept petroleum **gas**; accept **methane** or **CH<sub>4</sub>**; accept natural-gas **condensate**; prompt on **petroleum** or **petrochemicals** or **alkanes** or **hydrocarbons**; prompt on fossil **fuels** before "fuel"; prompt on **oil and gas**; reject "oil" or "crude oil"] (Asaluyeh is located near the gigantic South Pars/North Dome Gas-Condensate field.)

<World History>

14. Vañshtein and Zel'dovich modeled these systems using cycles of stretching, twisting, and folding. The intensity and shape of a phenomenon (emphasize) *generated by* one of these systems is predicted by the Glatzmaier–Roberts model. The SOHO (“soh-hoh”) project provided further evidence that one of these systems is located in a tachocline, a region where solid body rotation gives way to differential rotation. In the Babcock–Leighton model of one of these systems, active regions decay to create a surface poloidal field. Eleven-year cycles are evident when plotting the intensity of the phenomenon produced by one of these systems at different latitudes on Maunder’s butterfly diagrams. For 10 points, name these self-sustaining systems of electrically conducting fluids that generate magnetic fields.

ANSWER: **dynamo**s [accept solar **dynamo**; accept ge**dynamo**; prompt on **magnetohydrodynamic** fluids or **MHD** fluids or **plasmas** before “fluids” by asking “as a component of what systems?”; prompt on the **Sun** or **stars** or **Earth** or **planets** by asking “what system inside those bodies?”]

<Physics>

15. A holiday honoring this deity was not widely celebrated publicly until Lokmānya Tilak began promoting it as a nationalist day of intercaste unity in the 1890s. Pushes for greener alternatives to plaster-of-Paris objects depicting this deity have led to the creation of sandalwood-anointed objects made of clay and cow dung. On a ten-day festival honoring this deity, coconut and jaggery dumplings called *modak* are offered to idols of him, which are paraded to nearby bodies of water, where they are submerged and left to disintegrate. A festival beginning on Chaturthi honors this deity’s descent from Mount Kailash after being beheaded by a trident. Pārvatī (“PAR-vah-TEE”) and Shiva are the parents of, for 10 points, what “remover of obstacles,” an elephant-headed Hindu god?

ANSWER: **Ganesh**a [or **Vināyaka**; or **Ganapati**]

<Religion>

16. A move in this dance is named for spinning around a mill wheel, and its footwork is centered on making “figure eights” through the “grapevine” method. Though traditionally in 4/4 (“four-four”) time, this dance is typically performed in 2/4 (“two-four”) time in the US, where it was popularized by a Rudolph Valentino performance in the movie *The Four Horsemen of the Apocalypse*. This dance is taught through the “eight basic steps” to the footwork of “slow-slow-quick-quick-slow.” This dance relies on a syncopated ostinato produced by a típica band, whose instruments include the bandoneón (“bahn-doh-nay-OWN”). Astor Piazzolla introduced the electric guitar to this dance, which originated as a blend of milonga and flamenco. For 10 points, name this partner dance from Uruguay and Argentina.

ANSWER: **tango** [accept specific genres, such as **tango** nuevo]

<Other Fine Arts>

17. Chinese workers in this industry led a 1938 strike against the National Dollar Stores in San Francisco. Despite mostly white national union leadership, Chinese workers in this industry led a 1982 strike in New York’s Chinatown. A strike of workers in this industry led by Bessie Abramowitz and Sidney Hillman gave rise to an amalgamated union. Rose Schneiderman declared that “too much blood has been spilled” after an event that affected workers in this industry, which also led Frances Perkins to fight for a 54-hour bill. A union in this industry led the Uprising of the 20,000 and experienced growth after a 1911 incident in which workers were unable to escape due to locked stairwells. For 10 points, workers in what industry were victims of the Triangle Shirtwaist Factory fire?

ANSWER: **garment** industry [or **clothing** industry; accept International Ladies’ **Garment** Workers’ Union; accept the Chinese Ladies’ **Garment** Workers’ Association; accept United **Garment** Workers; accept Amalgamated **Clothing** Workers of America; prompt on **textiles** or **fabric**; prompt on **shirtwaists** or other articles of clothing before “shirtwaist” is read by asking “what general industry produces that product?”]

<American History>

18. *Two answers required.* A saturation vapor curve is a set of values for these two quantities separating the two-phase state and the superheated state. Flory–Huggins theory is derived by explicitly calculating the change in one of these quantities, which is multiplied by the value of the other. In an ideal Joule expansion, one of these quantities is constant, while the other increases by log two times R. The Helmholtz free energy equals internal energy minus the product of these two quantities. A differential quantity of heat equals one of these quantities times the differential of the other. On a diagram labeled by these two conjugate variables, the Carnot (“car-NO”) cycle corresponds to a rectangle because adiabatic and isothermal processes each hold one of these quantities constant. For 10 points, name these thermodynamic variables symbolized T and S.

ANSWER: **temperature** [or **T** before read] AND **entropy** [or **S** before read]

<Chemistry>

19. A 2020 history of these businesses by Marcia Chatelain explores how Cleveland’s Operation Black Unity desegregated their ownership as part of “Black capitalism.” These businesses are criticized for adopting Disney’s strategies of cross-promotional “synergy” and Saturday advertising in a 2001 exposé by Eric Schlosser. In a 1994 “difference in differences” study of 410 of these monopolistically competitive businesses in Pennsylvania and New Jersey, Alan Krueger and David Card found that employment was not reduced by a higher minimum wage. In 1986, *The Economist* created a PPP index using a product from one of these businesses, which expanded worldwide by franchising. For 10 points, high school dropouts stereotypically work at what businesses that Morgan Spurlock criticized in *Super Size Me*?

ANSWER: **fast food** restaurants [accept **McDonald’s** or **Burger King** or **KFC** or other specific fast food chains; accept **drive-throughs**; accept **Fast Food Nation**; prompt on **food** or **restaurants** or **takeout** or similar; prompt on **outlets** or **stores** or **shops** or **service** industry or **franchises** or similar] (Chatelain’s book is *Franchise: The Golden Arches in Black America*. The PPP index is the Big Mac Index.)

<Social Science>

20. A novel by this author depicts a group of attackers as “saffron parakeets”; in that novel by this author, a mother realizes that “two words do not make a language” while examining her newborn fourth child. A character created by this author follows Bombay Silk to Khwabgah and later constructs a guest house named after the Urdu word for Paradise in a graveyard. This author, who created a *hijra* named Anjum, wrote a different novel in which unrequited love for Father Mulligan causes the enduring bitterness of Baby Kochamma; in that novel by this author, which is set in Ayemenem, Estha experiences a traumatic sexual assault and eventually reunites with his twin sister, Rahel. For 10 points, name this author of *The Ministry of Utmost Happiness* and *The God of Small Things*.

ANSWER: Arundhati **Roy** [or Suzanna Arundhati **Roy**]

<World Literature>

Tiebreaker. *Composer and type of piece required.* One of these pieces by this composer opens with a unison melody in the strings and bassoons beginning (read slowly) long C, long E-flat, A-flat-G-F-sharp, up to E-flat. The slow movements of these pieces were placed into the categories of galant, romance, dream, meditative, and minor in a study by Cuthbert Girdlestone. Performances of a C-minor one of these pieces often feature a cadenza written out by its composer’s student Johann Hummel. The first four of these pieces are arrangements of earlier pieces by Johann Eckard and Hermann Raupach, though the later seventeen “Viennese” examples are all original. Nicknames for these pieces include “Coronation” and the anachronistically named “Elvira Madigan.” For 10 points, name these pieces for keyboard instrument and orchestra by the composer of the *Jupiter* Symphony.

ANSWER: **piano concertos** by Wolfgang Amadeus **Mozart** [prompt on partial answers, such as **concertos** by **Mozart**] (The first clue refers to Piano Concerto no. 24 in C Minor.)

<Classical Music>

## BONUSES

1. Tigers and leopards assisted this legendary figure in creating “nine tripod pills” that, once completed, prompted a dragon to escort this figure to paradise. For 10 points each:

[10m] Name this figure whose *Inner Classic* serves as a foundational text in traditional Chinese medicine. This figure defeated enemies like Chīyóu (“chuh-yo”) and the Yán (“yen”) Emperor, and his wife, Léizǔ (“lay-dzoo”), invented silkworm cultivation.

ANSWER: the **Yellow Emperor** [or **Huángdì**; or the **Yellow Thearch**; accept *Inner Classic of the Yellow Emperor* or **Huángdì Nèijīng**; reject “Jade Emperor” or “Yù Dì”]

[10e] The *Huángdì Nèijīng* credits the Yellow Emperor with the invention of this procedure’s nine needles, which are placed at meridians to balance the body’s flow of qì.

ANSWER: **acupuncture** [or **zhēnjiǔ**]

[10h] In another famous episode from Chinese medicinal mythology, this red-faced figure played a game of go while Huà Tuó operated on his infected arrow wound; that event was popularly illustrated by artists like Katsushika Ōi.

ANSWER: **Guān Yǔ** [or **Guān Dì** or **Guān Gōng** or **Guān Shèng Dì Jūn** or **Guān Èr Yé** or **Yúncáng** or Marquis **Zhuàngmóu**]

<Mythology>

2. Stanley Baldwin had to enter Buckingham Palace via a window during a 1936 visit to the taker of this action. For 10 points each:

[10e] Name this action taken by Edward VIII after announcing his intentions to marry American socialite Wallis Simpson.

ANSWER: **abdication** of Edward VIII [accept descriptions like Edward VIII **giving up** the British **throne**]

[10m] After abdicating, Edward VIII was appointed governor of this colony to exile him from Europe over his accused Nazi sympathies. Governor Woodes Rodgers asserted British control over an informal pirates’ republic active in this region before it became a crown colony in 1718.

ANSWER: the **Bahamas** [accept Commonwealth of the **Bahamas**; prompt on Province of **Carolina** by asking “what part of that province later became a crown colony governed by Edward VIII?”; prompt on **New Providence** by asking “what crown colony was it incorporated into?”]

[10h] British intelligence supposedly covered up an attempted assassination of Edward VIII by an MI5 informant with this surname in 1936. George Antonius’s book *The Arab Awakening* included a translation of remarks made by a British politician with this surname on the future of Arab peoples after World War I.

ANSWER: **McMahon** [accept Henry **McMahon** or Sir Vincent Arthur Henry **McMahon**; accept George **McMahon** or George Andrew Campbell **McMahon** or Jerome **Bannigan**]

<Other History>

3. The Poincaré (“PWAHN-car-ay”) group contains the symmetries of Minkowski space-time in this theory. For 10 points each:

[10e] Name this theory proposed by Albert Einstein. This theory assumes that the laws of physics and the speed of light are the same in inertial reference frames.

ANSWER: **special relativity** [or **SR**; prompt on relativity]

[10m] The Poincaré group contains the Lorentz group and these operations. Momentum conservation is a result of a system having a symmetry associated with these operations, per Noether’s (“NUR-tuh’s”) theorem.

ANSWER: **translations** [or spatial **translations**]

[10h] Usually, the Poincaré group is defined such that it contains Lorentz transformations that are orthochronous (“or-thoh-KROH-nuss”) and described with this term. The space-time interval equals the speed of light squared multiplied by the squared change in a quantity described by this term.

ANSWER: **proper** [accept **proper** time]

<Physics>

4. An author who originally held this non-writer profession wrote an autobiography describing their soldiering in Spanish Peru, called *The Lieutenant* [this profession]. For 10 points each:

[10h] Name this early profession of Catalina de Erauso. A Jean Stafford short story was inspired by a description of a “most beautiful crystal globe, made in the shape of a castle,” written by another author with this profession.

ANSWER: **nun** [accept *The Lieutenant Nun* or *The Ensign Nun* or *La Monja Alférez*; prompt on monastics; prompt on sisters or sor]

[10e] This author of *The Way of Perfection* wrote about the soul’s movement through seven mansions in *The Interior Castle*. This Spanish nun from Ávila described a seraph with a “long spear of gold,” inspiring a Bernini sculpture.

ANSWER: **Teresa** of Ávila [or Saint **Teresa** of Jesus; or **Teresa** Sánchez de Cepeda y Ahumada; accept the *Ecstasy of Saint Teresa*]

[10m] This nun wrote about the soul trying and failing to comprehend a vision of all creation in *First Dream*. This author of *I, the Worst of All Women* defended female education in *Reply to Sister Filotea*.

ANSWER: Sor **Juana** Inés de la Cruz [or Sor Juana **Inés de la Cruz**; or Sister **Juana**; or Juana de **Asbaje** y Ramírez de Santillana]

<European Literature>

5. Art gallery visitors watch as Jordan Wolfson beats a man to death in a work in this medium titled *Real Violence*. For 10 points each:

[10e] Name this medium that allows visitors at art galleries to engage with interactive videos or 360-degree panoramas by using headsets made by Oculus Rift.

ANSWER: **virtual reality** [accept **VR**; prompt on augmented reality or AR]

[10h] The first virtual reality installation at the Cannes (“can”) Film Festival was 2017’s *Flesh and Sand*, in which participants walk across this location. The French artist JR made a picnic for a giant baby looking over this location, the planned setting of the *Brotherhood Mural*.

ANSWER: **US-Mexico border** [prompt on borders; prompt on US border or Mexican border alone by asking “border with what other country?”]

[10m] *Flesh and Sand* is an exhibit by this director, whose “Trilogy of Death” includes *Amores Perros*. This director created a movie resembling a single-shot in which an actor is taunted by floating hallucinations of a superhero.

ANSWER: Alejandro González **Iñárritu** (The unnamed second film is *Birdman*.)

<Other Fine Arts>



6. A 1970 Chicano Moratorium protest against the Vietnam War was held in this city's Jingtowntown community. For 10 points each:

[10m] Name this city where the Free Breakfast for Children Program began. A group's practice of "copwatching" in this city led to the passage of the statewide Mulford Act.

ANSWER: **Oakland**, California

[10e] Those projects in Oakland were run by this group, whose namesake "21" were wrongfully arrested on charges of planned attacks at government offices. This group was founded by Bobby Seale and Huey Newton.

ANSWER: **Black Panther** Party [or the **Black Panthers**; or **BPP**; accept the Black **Panther** 21]

[10h] While pregnant, this activist represented herself during the 1971 trial of the Panther 21, where she acquitted herself of all charges. During the trial, this activist got police officer Ralph White to admit that he had incited violence.

ANSWER: Afeni **Shakur** Davis [or **Afeni Davis**; or Alice Faye **Williams**; prompt on A. **Davis**; reject "Angela Davis"] (She was the mother of Tupac Shakur.)

<American History>

7. The dying Soupspoon Wise narrates his encounter with a famous real-life musician who played this genre in Walter Mosley's novel *RL's Dream*. For 10 points each:

[10e] Name this genre of the song that lends its title to James Baldwin's novel *Tell Me How Long the Train's Been Gone*. The speaker hears a man playing a "drowsy syncopated tune" in a poem titled for a "weary" type of this genre.

ANSWER: **blues** [or the **blues**; accept Delta **blues**; accept "The Weary **Blues**"]

[10m] The life of blues musician Lightnin' Hopkins is fictionalized in J. J. Phillips's novel *Mojo Hand*, which has been called a black female novel from this movement. A member of this movement wrote the novels *Big Sur* and *Visions of Cody*.

ANSWER: **Beat** Generation [or the **Beats**; or **Beat** Poets]

[10h] The bluesman W. C. Handy is adored by characters like Hagar and Sandy in this novel by Langston Hughes. The title of this novel set in 1910s Kansas references its author's definition of the blues as "hopeless weariness" mixed with another action.

ANSWER: **Not without Laughter** (Hughes defined the blues as "hopeless weariness mixed with an absurdly incongruous laughter.")

<American Literature>

8. The first synthesis of this molecule from ammonium cyanate is sometimes considered the historical beginning of organic chemistry. For 10 points each:

[10e] Name this molecule composed of two NH<sub>2</sub> ("N-H-2") groups and one carbonyl ("car-bo-NEEL"), which is produced in the excretory system of mammals to deal with nitrogen from the metabolism of amino acids.

ANSWER: **urea** [or **carbamide**; or **carbonyl diamide**]

[10m] Urea is mixed with diesel exhaust to reduce these oxide pollutants that contribute to smog.

Higher-temperature combustion produces these compounds from atmospheric gasses, and they are formed in a two-step mechanism proposed by Zeldovich.

ANSWER: **NOX** ("nocks") compounds [or **nitrogen oxides**; accept **nitric oxide** or **NO**; accept **nitrogen dioxide** or **NO<sub>2</sub>** ("N-O-2")]

[10h] Mixtures of urea with halide salts form a system called this type of deep solvent, which is similar to an ionic liquid. Those systems named for this term contain large nonsymmetric ions, giving them low lattice energy, leading to low melting points.

ANSWER: **eutectic** system [accept deep **eutectic** solvents]

<Chemistry>

9. A philosopher with this first name who is best known for writing about the notion of risk-taking as a means of self-surpassing ironically perished while trying to save two drowning children in 2017. For 10 points each:

[10h] Give this first name of the French philosopher with the surname Dufourmantelle. A member of the Cambridge Platonists with this first name provided a vitalist account of the spirit in the treatise *Principles of the Most Ancient and Modern Philosophy*.

ANSWER: **Anne** [accept Lady **Anne** Conway or **Anne** Finch; accept **Anne** Dufourmantelle]

[10e] Anne Conway was taught philosophy by a fellow Cambridge Platonist with this first name and the surname More. An American transcendentalist thinker with this first name wrote *Civil Disobedience*.

ANSWER: **Henry** [accept **Henry** More or **Henry** David Thoreau]

[10m] Another important Henry in the history of philosophy was Henry of Navarre, since a famous philosopher with this given name acted as an emissary for him. A later philosopher with this first name coined the terms “dispositif” and “biopower.”

ANSWER: **Michel** (“MEE-shell”) [accept **Michel** de Montaigne or **Michel** Eyquem de Montaigne; accept **Michel** Foucault or Paul-**Michel** Foucault; reject “Michael”]

<Philosophy>

10. A 2008 BBC report found that this country ranked second behind only Thailand in the number of gender reassignment surgeries performed. For 10 points each:

[10m] Name this country where Maryam Molkara convinced its 1980s leader that hormone treatment was tolerable under religious law. A 2016 OutRight Action International report argued that the high diagnoses of gender dysphoria in this country are intended to deter homosexuality.

ANSWER: **Iran** [or Islamic Republic of **Iran** or Jomhuri-ye Eslāmi-ye **Irān**; prompt on **Persia**]

[10e] Molkara convinced Ayatollah Khomeini (“koh-may-NEE”) to issue one of these Islamic decrees to declare gender reassignment surgery religiously acceptable. In 1989, one of these decrees called for the death of Salman Rushdie.

ANSWER: **fatwā** [or **fatāwā**; prompt on **ftā’**]

[10h] Khomeini gifted Molkara a black garment of this kind to officialize her transition. After the Iranian Revolution, these veiless, full-body, open cloaks became popular wear for both Sunni and Shia women.

ANSWER: **chador** (“CHUD-er”) [or variants like **chadah** or **chuddah** or **chadur**]

<Other Academic>

11. The saying “If not now, when?” and a formulation of the Golden Rule appear in a section of this text that quotes Hillel the Elder. For 10 points each:

[10h] Name this fourth division of the Mishnah, whose name translates as “Chapters of the Fathers.” This text is made up of wise sayings and ethical maxims, such as “One who exploits the crown of scholarship will pass away.”

ANSWER: **Pirkei Avot** (“peer-KAY ah-VOTE”) [or **Pirkei Avoth** or **Pirkei Avos** or **Pirke Aboth**]

[10e] The Pirkei Avot (“peer-KAY ah-VOTE”) appears in the Mishnah, which makes up this central text of Rabbinic Judaism along with the Gemara. This text is the primary source of Jewish law and theology.

ANSWER: **Talmud** [accept Babylonian **Talmud** or **Talmud** Bavli; accept **Shas**]

[10m] The numbered lists that make up chapter 5 of the Pirkei Avot all contain four, seven, or this many items. This is the number of generations between Adam and Noah and the number of Jews needed for a minyan (“MIN-yin”).

ANSWER: **ten** [or **10**]

<Religion>

12. The people of this cultural region domesticated “singing dogs” and may have dispersed semi-tame cuscus to serve as food across vast distances. For 10 points each:

[10h] Name this cultural region where the early Lapita culture left red pottery in Kilu Cave and Teouma. Nicholas Miklouho-Maclay opposed sugar estates “blackbirding” people from this transnational region and a more easterly one.

ANSWER: **Melanesia** [prompt on Oceania or the Pacific Islands or South Sea Islands; prompt on Papua New Guinea or Vanuatu or Solomon Islands or Fiji by asking “what transnational cultural region is it part of?”; prompt on Wallacea by asking “what cultural region is east of Wallacea?”; reject “Polynesia”]

[10m] While Australian sandalwood traders seized Melanesian Kanakas, blackbirders from this city’s seaport of Callao (“cah-YAO”) enslaved Polynesians. This capital of a Spanish viceroyalty contains the University of San Marcos, South America’s oldest.

ANSWER: **Lima**, Peru

[10e] Whalers from Lima refueled in Matavai Bay near the salt pork trading hub of Pape‘ete on this island ruled by the Protestant queen Pōmare IV. The artist Paul Gauguin (“gaw-GAN”) visited the Marquesas and this Society Island in French Polynesia.

ANSWER: **Tahiti** [accept Kingdom of **Tahiti** or Royaume de **Tahiti**; accept Franco-**Tahitian** War or French-**Tahitian** War]

<World History>

13. T-junctions act as low-pass filters for signals from the receptive fields of these ganglia, which have a permeable blood-nerve barrier in their capillary-dense “neuron-rich regions.” For 10 points each:

[10h] Name these sensory ganglia that contain the cell bodies of most pseudounipolar neurons that perform nociception and proprioception. The afferent (“AFF-uh-runt”) fibers of these neural ganglia relay sensations from the body’s 30 dermatomes.

ANSWER: **dorsal root** ganglia [or **dorsal root** ganglion or **DRG**; or **posterior root** ganglion or **PRG**; accept **spinal** ganglion or **spinal** nerves or ganglion sensorium nervi **spinalis**; prompt on peripheral ganglia]

[10e] This sense is conveyed by signals from the dorsal root ganglia that enter the dorsal column–medial lemniscus pathway. This basic sense is transduced by sensitive mechanoreceptors in the skin.

ANSWER: **touch** [or **mechanosensation**; or **tactile** sense or **tactition**; accept **haptic** perception or **tactile** gnosis or **stereognosis**; accept fine **touch** or crude **touch**; accept **pressure**; accept **vibration**; accept **kinesthesia** or **kinesthetic** sense]

[10m] This adjective prefixes the system of sensory neurons that detect touch and position. Mutations described by this term are not heritable, since they do not affect the germline, and occur “hyper” often to drive B cell affinity maturation.

ANSWER: **somatic** [or **somato-**; accept **somatic** mutations or **somatic** hypermutation or **somatic** cells; accept **somato**sensory system or **somesthetic** senses; accept **somatic** nervous system; prompt on vegetal cells]

<Biology>

14. After changing his login ID to “Copernicus,” this novel’s protagonist is surprised to find Aristotle and Pope Gregory together inside a Gothic-style pyramid. For 10 points each:

[10m] Name this 2008 novel in which Professor Wāng Miǎo investigates a research group known as the Frontiers of Science while attempting to advance through a certain mysterious computer game.

ANSWER: *The **Three-Body Problem*** [or **Sān tǐ**] (by Liú Cíxīn)

[10e] Ken Liu, who translated *The Three-Body Problem* into English, coined the term “silkpunk” to define his approach to this literary genre. The Hugo Awards and the Nebula Awards are given to literature in this genre.

ANSWER: **science fiction** [or **sci-fi**; prompt on **fantasy**; prompt on **speculative fiction**]

[10h] While doing physical labor near the mysterious Radar Peak in *The Three-Body Problem*, a journalist gives Yè Wénjié a copy of this book. Yè’s eventual betrayal of humanity is partly inspired by this real-life book.

ANSWER: ***Silent Spring*** (by Rachel Carson)

<World Literature>

15. Nihâl Chand was a painter from this tradition who is best known for a depiction of his mistress Bani Thani. For 10 points each:

[10h] Name this regional artistic style that developed at courts like Kishangarh (“KEESH-ahn-gar”) in 17th-century India. Paintings from this style often depicted scenes from the *Mahābhārata* and the *Rāmāyana*.

ANSWER: **Rajput** painting [or **Rajasthan**i painting]

[10e] Many Rajput works are in this form, which was brought to India from Persia. These small illustrations were often placed inside locket or “portrait boxes.”

ANSWER: **miniature** paintings [or **miniature** portraits; or **limning**]

[10m] An early Mughal miniature depicts this historical figure being lowered into the sea in a glass bell. Albrecht Altdorfer depicted a tablet in the sky in a painting of a battle won by this ruler.

ANSWER: **Alexander** the Great [or **Alexander** III of Macedon]

<Painting/Sculpture>

16. Americans of this ethnicity may use asafetida or a slime mold nicknamed “ghost vomit” to treat diseases caused by bad luck called prikaza. For 10 points each:

[10h] Name this ethnic group whose Vidin project desegregated some of their schools in 2001. Kris courts resolve disputes within this ethnic group, whose women may practice a trade called dukkering among outsiders they call gadje.

ANSWER: **Roma** [or **Romani** or **Romany**; accept **Sinti** or **Sindhi** or **Kale** or **Domi** or **Kalderasham**; prompt on **Vlax**; prompt on **Travellers**; prompt on people of **Indian** descent; reject “Romanians”; reject slurs]

[10e] Criminalization of the Roma has made their data of this type overrepresented in public databases in Bulgaria and Hungary. The Roma are stigmatized as consanguineous with this type of data, which is offered by 23andMe.

ANSWER: **genetic** data [or **genomic** data or **genotypes**; or **DNA** or **sequencing** data or equivalents; accept **polymorphisms** or **SNPs** or single **nucleotide** polymorphisms; accept genetic **genealogy** or **ancestry**; accept **microsatellites**; prompt on **forensics** or **biomedical** data or **biological** data or **health** or similar]

[10m] The bioethicist David Winickoff criticized the Human Genome Diversity Project for favoring group consent over community-led types of these committees. By the Common Rule, these “boards” must approve human research protocols.

ANSWER: **IRBs** [or **institutional review** boards; or **independent ethics** committees or **IECs**; or **ethical review** boards or **ERBs**; or **research ethics** boards or **REBs**; prompt on **review** boards; prompt on **ethics** boards]

<Social Science>

17. This symphony's vivacissimo ("vee-vah-CHEE-see-mo") third movement transitions attacca into the fourth movement's broad opening figure of the violins playing the notes D, E, F-sharp, down to C-sharp, D, E. For 10 points each:

[10h] Name this symphony written while its composer was in Rapallo, Italy. The pizzicato basses and solo bassoons that open this symphony's second movement were inspired by a vision its composer had of Don Juan.

ANSWER: Symphony no. **2** by Jean **Sibelius** in D Major, Op. 43 [or **Sibelius's Second** Symphony; prompt on "Symphony no. 2" alone by asking "by whom?"]

[10m] The energetic finale of Sibelius's Second Symphony has been compared to one of these dances, while the third movement of Sibelius's Violin Concerto was called "[one of these dances] for polar bears" by Donald Tovey. Another composer wrote a "heroic" A-flat major piece of this kind.

ANSWER: **polonaise** [accept "**polonaise** for polar bears"; accept **Polonaise** in A-flat Major, Op. 53 or **Polonaise héroïque**]

[10e] In total, Sibelius completed this many symphonies, with his last having only one compressed movement. This many distinct tones are in a major scale.

ANSWER: **seven** [or **7**]

<Classical Music>

18. Richard Steele complained about Will's Coffee House being "much altered since [this person] frequented it...where you used to see songs, epigrams, and satires...you have now only a pack of cards." For 10 points each:

[10h] Name this poet, a leader of the "Wits," who distributed Mary Chudleigh's poetry at Will's. While at Will's, Dean Lockier argued with this poet about a work in which Bruce and Longvil drop the title man down a trapdoor.

ANSWER: John **Dryden** (The work is *Mac Flecknoe*.)

[10e] This author went to Will's just to secure an introduction to Dryden. This author describes "coffee, which makes the politician wise" in his poem *The Rape of the Lock*.

ANSWER: Alexander **Pope**

[10m] This Restoration dramatist lamented that "nor is Will's the Wits Coffee-House any more" after John Dennis left. Horner and Lady Fidget exchange *double entendres* off-stage in the "china scene" of this author's play *The Country Wife*.

ANSWER: William **Wycherley**

<British Literature>

19. This operation, which can be easily constructed from a suffix array, is surprisingly reversible because it exhibits the last-first, or LF, mapping property. For 10 points each:

[10h] Identify this operation that takes an input string, forms a table from sorted rotations of the input, and then outputs the last column of the table.

ANSWER: **Burrows–Wheeler** transform [or **BWT**; prompt on **block-sorting** compression]

[10m] A terminator character, often this character, is appended to a string in the first step of the Burrows–Wheeler transform. This character is used to delimit in-line math expressions in LaTeX ("lah-tek") and call variables in bash scripts.

ANSWER: **dollar** sign [or **\$**]

[10e] Indexing and this process are the two principal applications of the Burrows–Wheeler transform. This process shrinks data into archive file formats like tar.gz ("tar-dot-g-z") and zip.

ANSWER: **compression** [accept word forms of **compress**; prompt on **encoding**]

<Other Science>

20. This ruler imprisoned two of his daughters-in-law on charges of adultery during the Tour de Nesle (“nell”) affair. For 10 points each:

[10h] Name this ruler who employed Enguerrand (“UN-gur-and”) de Marigny as grand chamberlain. This ruler’s son later executed Marigny over accusations of sorcery.

ANSWER: **Philip IV** of France [or **Philip** the Fair or **Philippe** le Bel; or **Philip I** of **Navarre**; prompt on **Philip**]

[10m] After that son, Louis X, died without a male heir, his brothers attempted to exclude this sister of theirs from the line of succession. This “she-wolf of France” conspired with Roger Mortimer to depose her husband Edward II.

ANSWER: **Isabella** of France [or **Isabella** the She-Wolf]

[10e] Ultimately, the scheming of Isabella’s brothers did not matter, since this cadet branch of the Capetians replaced the “Direct” Capetian line of French monarchs. This family’s first ruler, Philip VI, defended the French throne during the Hundred Years’ War.

ANSWER: House of **Valois**

<European History>

Extra. Magmatic activity associated with the growth of this feature also formed Valles Marineris, the largest canyon in the Solar System. For 10 points each:

[10m] Name this geological feature that contains three enormous shield volcanoes: Arsia, Pavonis, and Ascraeus Mons. Olympus Mons is to the west of this feature, which is about 7 kilometers above the surrounding terrain.

ANSWER: **Tharsis** [or **Tharsis** Bulge; or **Tharsis** Rise; or **Tharsis** Dome; accept **Tharsis** Montes]

[10e] Magma was able to accumulate in a hot spot on Mars and form Tharsis because Mars lacks these objects. These objects, which move away from each other at divergent boundaries, make up Earth’s lithosphere.

ANSWER: tectonic **plates**

[10h] Observed offsets due to this phenomenon indicate that it likely occurred due to mass redistribution by late-stage volcanism after Tharsis formed. Europa has practically flipped over due to this phenomenon, in which a solid surface moves with respect to its spin axis.

ANSWER: **true polar wander** [prompt on **polar wander**]

<Other Science>