2022 ACF Regionals
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TOSSUPS

1. Saint Malachy ("mal-lek-ee") legendarily cursed this family after discovering the hanging body of a common thief whom a member of this family promised to spare. The *Lanercost Chronicle* first bestows the title of king on a member of this family before his ordering of a market day chevauchée to Durham. A member of this family who titles an epic poem by John Barbour supposedly chose to continue a resistance campaign after watching a spider in a cave struggle to spin a web. Pope John XXII's ("the twenty-second's") excommunication of a member of this family caused the issuing of the Declaration of Arbroath. A lord of Annandale from this family contended with John Balliol during the Great Cause, which ended when Edward I chose a king of Scotland. For 10 points, name this family of the victor at the Battle of Bannockburn, Robert.
ANSWER: **Bruce** family [or variants like **Brus** or **Bruis** or **Brix** or **Broase**; accept Robert the **Bruce**]
<Other History>

2. This behavior depends on "pre-interaction factors" that influence synchrony, matching, and unintentional "leakage" in a theory of David B. Buller and Judee K. Burgoon. Bella DePaulo collected diaries to estimate the everyday frequency of "other-oriented" types of this behavior, which was studied by John Augustus Larson in 1921 experiments for the Berkeley policeman August Vollmer. The biased relevant-irrelevant and control-question tests for this behavior use pneumographs, galvanometers, and sphygmomanometers ("s'FIG-moh-ma-nom-ih-ters") like one invented by William Moulton Marston. The emotion researcher Paul Ekman argued that facial microexpressions can expose this behavior, which occurs pathologically in mythomania that is often called "compulsive." For 10 points, what behavior is inaccurately detected by polygraph tests?
ANSWER: **lying** [or word forms like **liar**s; or **dishonest**y or **not** being **honest** or **falsification** or **mendacity** or word forms; accept **deception** or **conceal**ment or similar; accept **lie** detectors; accept **cheat**ing; prompt on guilt or crime by asking "what behavior that may occur in guilty subjects?"] (William Moulton Marston also created Wonder Woman.)
<Social Science>

3. R. C. Haddon introduced an "axis vector" associated with these systems in pyramidal molecules. These systems can interact non-covalently with charged arginine and tyrosine ("TAI-roh-seen") residues. Only these systems are included in the Roothaan equations in the Pariser–Parr–Pople method. These systems cannot form adjacent to bridgehead carbons, explaining Bredt's rule for bridged bicyclic compounds. Pigment molecules like lycopene and beta-carotene have many of these systems, resulting in a conjugated delocalized network. Sp2 hybridized systems contain one of these systems while sp3 hybridized systems contain none. Four n plus two of these systems are occupied in planar aromatic molecules according to Hückel's rule. For 10 points, name these systems in double bonds that are formed from overlapping p orbitals.
ANSWER: **pi orbital**s [accept **pi bond**s; accept **pi electron**s; accept cation-**pi interaction**s; prompt on molecular orbitals; prompt on double bonds or triple bonds by asking "which specific part of that bond?"]
<Chemistry>

4. A writer sends his parents letters from this country, leading his mother to wonder why his stories are not set in this country, in the short story "Swimming Lessons." In another short story, an electrical engineer in this country declares "it's a parent's duty to hope" and describes how two boys could have swum to a nearby island. After a plane crash, the government worker Judith Templeton asks Shaila to help people in this country perform the title "Management of Grief." In a novel written in this country, a boy named after a swimming pool who practices Hindusim, Islam, and Christianity narrates two versions of how he survived a shipwreck with Richard Parker, a tiger. For 10 points, name this adopted country of Rohinton Mistry, Bharati Mukherjee, and Yann Martel ("YAWN mar-TEL").
ANSWER: **Canada**
<British Literature>

Note to moderator: Read the answerline carefully.
5. A portrait of two members of this institution, one of whom appears to be making a finger-gun-like gesture, appears on the cover of Hannah Williams's history of it *in Portraits*. A painting created for this institution depicts a green-cloaked Peace ushering in a bare-breasted Abundance. This institution codified a hierarchy that placed paintings of historical scenes at the top and still lifes at the bottom. This institution awarded a scholarship that funded students to stay in the Palazzo Mancini to study art in Rome. Members of this institution had their work highlighted in official Salons. For 10 points, identify this institution founded by Charles Le Brun whose membership included the artists Antoine Watteau ("vah-TOH") and Jacques-Louis David.
ANSWER: French **Academy** [or **Academy** of Fine Arts or **Académie** des Beaux-Arts or **Académie** Royale de Peinture et de Sculpture or **Academy** of Painting and Sculpture; accept ***Académie** Royale: A History in Portraits*; prompt on Institut de France; prompt on Royal Academy said in that order; prompt on French government or similar answers; prompt on French ministry of arts; reject "salons"] (The first sentence refers to Hyacinthe Rigaud's portrait of Charles Le Brun and Pierre Mignard. The second sentence refers to Elisabeth Vigée Le Brun's painting *Peace Bringing Back Abundance*.)
<Painting/Sculpture>

6. *Specific term required.* Jytte Klausen's "thirty-year history" of this concept traces its global spread to a 1980s-era fundraising campaign for a network that operated from Boston's Care International. This concept's relationship with empire titles an 1870 to 1920 history by Neil Faulkner that describes Reginald Wingate's fear of its "contagion" after William Hicks's expedition to Kordofan. An activist who founded a pan-Ummah party in Ismailia in 1928 disparaged a "greater" form of this concept "of the heart" and promoted it "against the polytheists." This concept names campaigns against Hausaland led by Fulanis like Usman dan Fodio of the Sokoto Caliphate. Sayyid Quṭb ("KOO-tub") preached a Salafi form of this concept "of the sword" that was embraced by al-Qāeda. For 10 points, give this term for spiritual struggle or Islamic holy war.
ANSWER: **jihād** [or **jihad**ism; accept Fulani **jihad**s; accept *Empire and **Jihad***; accept *Western **Jihad**ism: A Thirty-Year History*] (The first line refers to Abdullah Yusuf Azzam. The third line is about Hassan al-Banna, founder of the Muslim Brotherhood.)
<World History>

7. After being forbidden from sleeping with her father, the protagonist of a novel by this author asks her cousin to sleep over under the pretense that he looks scared. The protagonist of that novel by this author hits a soldier over the head with a pitcher while he sexually assaults her. In another novel by this author, a character hears the *Eroica* Symphony on the radio while hiding in the bushes. In a novel by this author, the wedding of Janice and Jarvis is obsessed over by the protagonist, who changes her name from Frankie to F. Jasmine. While eating one of many meals at the New York Café, the protagonist of another novel by this author meets the alcoholic Jake Blount. For 10 points, the deaf-mute John Singer commits suicide in what author's novel *The Heart Is a Lonely Hunter*?
ANSWER: Carson **McCullers** [or **L**ula Carson **Smith**; prompt on Smith] (The unnamed novel is *The Member of the Wedding*.)
<American Literature>

8. Samuel Wheeler and Peter Unger used conclusions drawn from this problem to argue against the existence of swizzle sticks, tables, and people in the paper "There Are No Ordinary Things." This problem can be addressed by rejecting the initial premise, by using a truth-value gap view based on supervaluationism, or by rejecting its validity by introducing degrees of truth. A balding man was used to illustrate an alternate version of this problem attributed to Eubulides of Miletus ("mil-EE-tuss"). This problem emerges from the fact that it uses vague predicates, meaning it is impossible to say if removing one object from a group constitutes the destruction of a collective object. For 10 points, what problem is framed by removing grains from a pile and asking when it ceases to be a pile?
ANSWER: **sorites** ("so-RYE-teez") paradox [accept paradox of the **heap**; accept logical **sorites**; accept **sorites** problem; accept **line-drawing** problem; prompt on vagueness before read; prompt on balding man before "balding" by asking "that paradox is more generally known as what paradox?"]
<Philosophy>

9. The shear tensor quantifies the (emphasize) *lack* of this property in Bianchi cosmological models. This is the alphabetically (emphasize) *second* of the two properties required for three-dimensional turbulent flows to have a predictable kinetic energy spectrum, as shown by Andrey Kolmogorov ("kull-mah-GOR-uff") in three 1941 papers. Wet etching techniques with this property include using HF on silicon dioxide. Materials that are linear, are elastic, and possess this property are characterized by just two independent elastic constants. In dielectrics (emphasize) *lacking* this property, permittivity is a second-rank tensor. The universe is homogeneous and has this property by the cosmological principle. Models of the early universe explain why the CMB (emphasize) *lacks* this property. For 10 points, give this term for systems that are uniform in all directions.
ANSWER: **isotropic** [or **isotropy**; reject "anisotropy" or "anisotropic"] (The other property in the second sentence is homogeneous.)
<Physics>

10. In a surrealistic sequence, a character with this profession is sucked into the shadow of a man and later encounters a newspaper that folds into a human shape. In another film, a character with this profession is stabbed through the heart and then thrown through a rainbow-colored skylight. The camera disorientingly spins as a character with this profession is repeatedly told, "Attack it!" A character with this profession uses a glass peacock feather to stab the flashing outline of a witch at the end of Dario Argento's film *Suspiria*. While bleeding through a dress after jumping onto a mattress, a character with this profession whispers, "I was perfect"; that character had earlier hallucinated herself growing black feathers. For 10 points, name this profession of Natalie Portman's character in *Black Swan*.
ANSWER: **ballerina** [or **ballet** dancer; prompt on dancer or performer] (The first line is from *The Red Shoes*.)
<Other Fine Arts>

11. A relic thought to be this person's skull was found during renovations of the Termoli Cathedral. P. N. Harrison found that a third of the vocabulary in a book named for this person consists of New Testament *hapax legomena*. Friedrich Schleiermacher first observed that figures condemned in a text named for this person appear anachronistically gnostic ("NOSS-tick"). This person is told that "itching ears" will delude selfish followers in an epistle in which he is instructed to drink wine for his health. Epistles named for this figure are often grouped with the Epistle to Titus as the "pastoral epistles" and state that "I suffer not a woman to teach, nor to usurp authority over a man." For 10 points, name this bishop of Ephesus and close companion of Paul whose two namesake epistles condemn female ordination.
ANSWER: **Timothy** [or Saint **Timothy** of Ephesus; or **Timótheos**; accept First **Timothy** or 1 **Timothy**; accept Second **Timothy** or 2 **Timothy**]
<Religion>

12. In a story by this author, an old man tries to use a bread roll dipped in an executed revolutionary's blood to cure his son's illness. The title character of a novella by this author steals turnips from the Convent of Quiet Self-Improvement. This author of "Medicine" created a character who provokes Whiskers Wang ("wong") into beating him in a fight; that character created by this author is unable to sign his name as a perfect circle or recite lines from Chinese opera before his execution. This author depicted a peasant who claims "spiritual victories" and a narrator who imagines that texts contain the words "Eat People!" in two works within the collection *Call to Arms*. For 10 points, name this Chinese author of *The True Story of Ah Q* and "A Madman's Diary."
ANSWER: **Lǔ** Xùn ("LOO SHUN") [or **Zhōu** Shùrén]
<World Literature>

Note to moderator: Read the answerline carefully.
13. A cryptic form of this process was recently discovered in the Drakensberg crag lizard. Christian Konrad Sprengel observed that this process (emphasize) *does not* occur in cases of "larceny" or "robbing." Charles H. Turner presented organisms performing this process with cardboard cones to test for color vision. Monotropy ("mono-tropy") and oligolecty ("oligo-lecty") are restricted types of this process, whose "syndromes" include chiropterophily ("chirop-tero-phily") and ornithophily ("ornitho-phily"). Pseudocopulation ("pseudo-copulation") may occur during this process, which drove the coevolution of long-nosed bats and agave. In monoecious ("muh-NEESH-us") and bisexual species, "tubes" can undergo both "self" and "cross" types of this process, which precedes double fertilization in angiosperms. For 10 points, what process of transferring male gametes ("GAM-eets") from the stamen to pistils of female plants is often performed by bees?
ANSWER: **pollination** [or **pollinator**s; accept cross-**pollination** or self-**pollination** or **pollen** tubes; accept **pollination** syndromes; prompt on fertilization or reproduction or microspore dispersal; prompt on foraging or feeding by asking "what ecological consequence of the foraging?"; prompt on interspecific interactions or mutualism] (The second sentence refers to floral larceny and nectar robbing. Turner was likely the first Black PhD graduate of UChicago.)
<Biology>

14. This politician is the alphabetically first in a "study of political conflict" by Denis Mack Smith, who linked the opportunism of this politician to the later emergence of a fascist state. The Marquis di Villamarina subverted this politician's negotiations at the 1856 Congress of Paris. This politician spearheaded a set of centrist coalitions known as the *connubio* that supplanted a government formed by Massimo d'Azeglio. This politician negotiated an alliance with France in the Plombières ("PLOM-byair") Agreement after Felice Orsini threw three bombs into the carriage of Napoleon III. In denouncing the Armistice of Villafranca, this politician split with the Piedmontese monarchy and embraced the Risorgimento. For 10 points, name this advisor to Victor Emmanuel II and first prime minister of a unified Italy.
ANSWER: Camillo Benso di **Cavour** [or Camillo **Benso** di Cavour; accept Count **Cavour**; or Camillo Paolo Filippo Giulio **Benso** or Count of **Cavour**, Isolabella and Leri]
<European History>

15. A word in this language meaning "behind" was corrupted into "Arthur" in a Middlesex County waterway. In the Ramapo Valley, this language formed a pidgin with Unami. This was the first language of Sojourner Truth, who was enslaved in Esopus County. The name of a waterway in this language means "hidden river" because its mouth was covered by vegetation near the Delaware River's League Island. Nine-pin bowling on namesake "greens" was popularized by speakers of this language, who brought cookies and coleslaw to the American colonies. The names for Brooklyn and Harlem originate from this language, whose speakers paved "Walloon Street." For 10 points, name this language spoken at home by Martin van Buren and other descendants of New Amsterdam.
ANSWER: **Dutch** [or **Nederlands**] (The word in the first line is "achter." The "hidden river" is the Schuylkill.)
<Geography>

16. This substance was worn as armor by a group of black Amazons led by Queen Calafia in *The Adventures of Esplandián*. Between a mountain of diamond and a mountain of this substance, survivors of a shipwreck founded the City of the Caesars. A figure known as "the Turk" claimed that the king napped under a tree adorned with this substance in Quivira. Due to its famed export of wood and this substance, the biblical kingdom of Ophir ("oh-FEER") was identified with Hispaniola by Christopher Columbus. In a legendary coronation ceremony, rulers-to-be coated themselves in this substance and leaped into Lake Guatavita, emerging as zipa of the Muisca ("moo-EE-skah"). For 10 points, Spanish conquistadors searched for Cibola, El Dorado, and other lost cities of what precious metal?
ANSWER: **gold** [or **Au**; or **oro**; prompt on precious **metal**s before read]
<Mythology>

17. In neo-Riemannian theory, an R transformation on a major triad built on this note results in an F-sharp minor triad. In E minor, this pitch is the bass note of a 4/2 ("four-two") chord whose root is the dominant. In the major key with a tonic on this note, the Neapolitan chord would be a B-flat major chord. A plagal cadence that begins on a D major resolves to a chord with this note as its root. This note is directly across from E-flat in the circle of fifths. Playing the Aeolian ("ay-OH-lee-in") mode beginning on this note on a piano would result in the playing of no black keys. C major is the relative major of this note's minor key. The most common concert pitch used today uses an oboe playing this 440-hertz note as a reference. For 10 points, the minor key with a tonic on what note has no sharps or flats?
ANSWER: **A** [accept **A**-440 or **A**4]
<Classical Music>

18. A Supreme Court case involving this legal issue struck down an Idaho law about appointing the administrators of estates. A brief in a case involving this legal issue credited Pauli Murray as a co-author despite her not directly contributing to it. This legal issue was the focus of a case about the drinking age, *Craig v. Boren*, that introduced the concept of intermediate scrutiny. An act addressing this legal issue was renamed for Patsy Mink. This legal issue was the focus of *Reed v. Reed*, in which one side's brief was written by Ruth Bader Ginsburg. This legal issue was addressed in schools by the passage of Title IX ("nine"). The Lilly Ledbetter Fair Pay Act aimed to combat one form of, for 10 points, what type of unequal treatment that would be addressed by the Equal Rights Amendment?
ANSWER: **sex**-based **discrimination** [accept **gender** in place of "sex"; accept **discrimination** against **women** or **discrimination** against **men** or equivalents; accept **sex**ual **equal**ity or similar; prompt on discrimination or equivalents; prompt on sexism or misogyny or sexual harassment or the wage gap or similar by asking "what legal issue is involved?"]
<American History>

19. A standard example for which only one form of this result holds uses a function of the following form: (read slowly) some constant over quantity two times x-squared times the natural log of x, end quantity. Under a non-negativity assumption, a form of this result is proven by showing a subsequence indexed by n-squared is summable and then showing convergence by the first Borel–Cantelli lemma. Assuming a finite variance, Chebyshev's ("CHEB-uh-shevs") inequality can give a proof of a form of this result that requires convergence in probability. This result explains why Monte Carlo methods can approximate numerical results. For 10 points, the central limit theorem is closely related to what result that claims the sample mean converges to the population mean as the number of observations tends to infinity?
ANSWER: **law of large numbers** [or **LLN**; or strong **law of large numbers** or S**LLN**; or weak **law of large numbers** or W**LLN**; or uniform **law of large numbers** or U**LLN**]
<Other Science>

20. In a story by this author, a town sends a woman to seduce Saufe ("SAUF"), who tries to build wings so he can talk to angels before becoming a pearl fisher. At the end of a story by this author, a woman is embraced and told that she "will enchant the angels." In another story by this author, the Prioress tries to force Boris and Athena to marry, before magically changing places with the title animal. The devout Protestant daughters of the Dean are frightened when a turtle enters their kitchen in a story by this author of "The Monkey." In a story by this author, Martine and Phillipa learn that the title Catholic cook has spent her entire lottery winnings on an extravagant dinner. For 10 points, name this author of the stories "The Deluge at Norderney" and "Babette's Feast," the collection *Seven Gothic Tales,* and the memoir *Out of Africa.*
ANSWER: Isak **Dinesen** [or Karen **Blixen**; or Karen Christenze von **Blixen**-Finecke; accept Tania **Blixen**; accept **Osceola**; accept Pierre **Andrézel**] (The first line refers to the story "The Diver.")
<European Literature>

Tiebreaker. The narrator of a poem by this author wonders whether a noise she hears is from "My enemy . . . prodding sly" or "My loved one . . . planting rue," even though both of them have forgotten her. In another poem by this author, a group of corpses "sat upright" after hearing a noise that makes them think "it was the Judgment-day." This poet wrote from the perspective of a corpse whose dog "quite forgot it was your resting place" upon burying a bone in the poem "Ah, Are You Digging on My Grave." This poet wrote about "Century's corpse outleant" and a creature with "Some blessed Hope, whereof he knew / And I was unaware" in a poem beginning, "I leant upon a coppice ("COP-iss") gate." For 10 points, name this death-obsessed Victorian poet who wrote "Channel Firing" and "The Darkling Thrush."
ANSWER: Thomas **Hardy**
<British Literature>

BONUSES

1. Answer the following about contemporary American composer Gabriela Lena Frank, for 10 points each.
[10h] Frank's string orchestra piece *Leyendas* is subtitled for a "walkabout" in this cultural region, the birthplace of her mother. Instruments from this region include *siku* panpipes and the *charango* lute.
ANSWER: **Andes** Mountains [or **Andean** Mountains or Cordillera de los **Andes**; accept **Peru**; accept **Altiplano** or **Cordillera Blanca**; prompt on South America or Latin America]
[10e] Frank is a member of the Silk Road Ensemble, which also features this superstar Chinese American cellist.
ANSWER: Yo-Yo **Ma** [or **Mǎ** Yǒuyǒu]
[10m] Frank's *La Llorona* ("yo-RO-nah") tone poem is written for orchestra and this instrument, which is played by Nobuko Imai. William Primrose and Lionel Tertis both acted as soloists during performances of William Walton's concerto for this instrument.
ANSWER: **viola** [accept **Viola** Concerto]
<Classical Music>

2. An author born in this country depicted the protagonist Moses Aloetta in a novel that describes London as a "glitter city." For 10 points each:
[10m] Name this birthplace of Sam Selvon, who wrote *The Lonely Londoners*. Another author born in this modern-day country wrote the collection *Miguel Street* and a novel whose six-fingered protagonist marries Shama.
ANSWER: **Trinidad and Tobago** [or Republic of **Trinidad and Tobago**; prompt on Trinidad]
[10e] Selvon and his fellow Trinidadian author V. S. Naipaul both had works broadcast by the BBC's London-based *Caribbean Voices* radio program in the 1950s, much like this Saint Lucian author of the epic poem *Omeros*.
ANSWER: Derek **Walcott** [or Sir Derek Alton **Walcott**]
[10h] This author argued that British poetic traditions cannot express Caribbean experiences by saying, "The hurricane does not roar in pentameters." This author wrote the poetry collection *Born to Slow Horses* and adapted *Antigone* into the play *Odale's Choice*.
ANSWER: Kamau **Brathwaite** [or Edward Kamau **Brathwaite**]
<World Literature>

3. During a 1926 to 27 Harvard University expedition to this country, researchers interviewed one of the few women to become a local ruler, Suah Koko. For 10 points each:
[10m] Name this country where melegueta pepper was traded on the Grain Coast. Joseph Jenkins Roberts was installed as governor of this country by a group whose leaders included Robert Finley and Bushrod Washington.
ANSWER: **Liberia** [or Republic of **Liberia**] (The group was the American Colonization Society.)
[10h] In addition to annexing communities named for Kentucky and Mississippi, Liberia annexed this republic, established on Cape Palmas by slaves from its eponymous state. This republic was led by John Brown Russwurm.
ANSWER: Republic of **Maryland** [or the Independent State of **Maryland**; or **Maryland** in Africa; or **Maryland** in Liberia]
[10e] This American political party inspired the name of a long-ruling Liberian party with "True" in its name. The American Colonization Society was supported by Henry Clay, a member of this no-longer-extant political party.
ANSWER: **Whig** Party [accept True **Whig** Party or Liberian **Whig** Party]
<American History>

4. Polly Matzinger's "danger model" explains why these complexes can be activated by DAMPs ("damps"), or danger-associated molecular patterns, like pannexin-1 and P_2X_7 ("P-2-X-7"). For 10 points each:
[10h] Name these wheel-shaped protein complexes that canonically activate caspase-1 from a scaffold, such as NLRP3. By proteolytic cleavage, these complexes release IL-1 beta, IL-18, and gasdermin-D during pyroptosis.
ANSWER: **inflammasome**s [accept canonical **inflammasome** or noncanonical **inflammasome**]
[10e] One of the main signals of cell damage that activates the inflammasome is the efflux of this cation, which neutralizes superoxide in phagolysosomes. An ATPase "pump" exchanges this ion with sodium.
ANSWER: **potassium** [or **K**⁺ or **potassium**-plus; accept sodium–**potassium** pump or Na⁺/**K**⁺ pump]
[10m] Potassium efflux alters histamine release by mast cells and these other IgE-responsive myeloid cells. These rare pro-T_h2 ("T-H-2") granulocytes stain differently than eosinophils and neutrophils.
ANSWER: **basophil**s
<Biology>

5. In *A History of Balance*, Joel Kaye argued that Peter John Olivi began to reduce the acceptance of this policy by distinguishing a new type of a certain concept from its "simple" or "numerata" type. For 10 points each:
[10h] Describe this policy, to which Hostiensus outlined thirteen exceptions. Gratian's ("GRAY-shun's") classic statement of this policy in the *Decretum* drew on the Aristotelian idea that a sterile substance cannot propagate.
ANSWER: medieval **ban** on **usury** ("YOO-zhur-ee") [or **ban** on **interest**; accept **anti-usury** or **anti-interest** position; accept any answer that describes **usury** or **interest** being **immoral** or **bad** or **evil** or equivalents]
[10e] This thinker compared usury ("YOO-zhur-ee") to charging for both a cake and for the eating of the cake. This philosopher condemned usury in his *Summa Theologica*.
ANSWER: Saint Thomas **Aquinas** [or Tommaso d'**Aquino**; prompt on Doctor <u>Angelicus</u> or Doctor <u>Communis</u> or Doctor <u>Universalis</u>]
[10m] A classic of later medieval economic philosophy is the *De Moneta* of Nicolas Oresme, who worked with this other medieval philosopher on theorizing the concept of impetus. This philosopher names a paradox in which an animal placed midway between food and water is unable to move to one or the other.
ANSWER: Jean **Buridan** [or Johannes **Buridanus**; accept **Buridan**'s ass]
<Philosophy>

6. Answer the following about a shaft subjected to torsion, for 10 points each.
[10m] This scientist's stress function simplifies the calculation of the shear stress on noncircular shafts. This scientist first described the boundary layer in a 1904 paper he presented in Heidelberg.
ANSWER: Ludwig **Prandtl** [accept **Prandtl** number]
[10e] Ludwig Prandtl also showed that the amount of this quantity applied to the shaft is twice the integral of his stress function over the cross section. This quantity is the rotational analog of force.
ANSWER: **torque** [prompt on <u>tau</u>]
[10h] To design shafts experiencing torsional loading, the shear stress is replaced with an allowed value using this number generally calculated as yield stress over working stress. This number shares its name with a quantity used in tokamak design that equals the number of poloidal rotations of a magnetic field line per one toroidal rotation.
ANSWER: **factor of safety** [or **safety factor**; prompt on <u>Kruskal–Shafranov factor</u> by asking "what other name is given to that quantity?"]
<Physics>

7. Answer the following about precision agriculture, the push for big data on farms that could perhaps lead to a third modern farming revolution, for 10 points each.
[10e] GPS and real-time kinetics can be used to guide these vehicles to increase the accuracy of rowing. These vehicles are designed to pull heavy loads, such as the machinery required for tilling and plowing.
ANSWER: **tractor**s
[10h] This class of technologies uses sensor data or maps created with drone imaging to identify the optimal treatment of different field management zones. This class of technologies prescribes the amount of seeding, crop nutrients, irrigation, pesticides, et cetera that best fit a zone's topology and soil characteristics.
ANSWER: **variable rate** technology [or **VR**T]
[10m] Yield monitoring provides farmers with accurate data by equipping these machines, tractors, and grain elevators with lots of IoT ("I-O-T") sensors. These machines have a front-mounted header for reaping, a conveyor belt to deliver grain to threshing drums, a separating unit to remove stalks, and a cleaning unit to winnow the grain.
ANSWER: **combine** harvesters [or **combine**s; reject "harvesters"]
<Current Events>

8. An R-16 intercontinental missile test at this facility caused the explosive Nedelin catastrophe in 1960. For 10 points each:
[10m] Identify this launch facility named for a copper mining town to disguise its secret location near the Syr Darya River. The Buran program was tested at this spaceport.
ANSWER: **Baikonur** Cosmodrome [or **NIIP-5**/GIK-5 range; or **Scientific Research Test Range Number 5**; or **Pjáty Naúchno-Isslédovatel'skii Ispytátel'nyi Poligón**; prompt on Cosmodrome; prompt on Tyuratum or Leninsk]
[10e] Missions like Vostok 1 and Sputnik 1 were launched from the Baikonur Cosmodrome in this large modern-day country, where a nuclear blast formed Lake Chagan when it was a Soviet socialist republic governed from Almaty.
ANSWER: **Kazakhstan** [or Republic of **Kazakhstan** or **Qazaqstan** Respublikasy; accept **Kazakh** Soviet Socialist Republic or **Qazaq** Keñestik Socïalïstik Respwblïkası or **Kazakhskaya** Sovetskaya Sotsialisticheskaya Respublika]
[10h] The USSR conducted hundreds of nuclear tests at this secret site in Kazakhstan, causing birth defects exposed in the documentary *After the Apocalypse*. Olzhas Suleimenov's "Nevada" movement halted tests at this site in 1989.
ANSWER: **Semipalatinsk** Test Site [or **Semey** Polygon or the **Polygon** or **Semipalatinskiy** ispytatel'nyy yadernyy poligon; accept Nevada **Semipalatinsk**; accept village of **Sarzhal**]
<European History>

9. Translations of poems by authors like Paul Valéry and Horace are placed throughout this poet's most famous collection. For 10 points each:
[10h] Name this author of the Pulitzer Prize-winning collection *Moy Sand and Gravel*. This author remembers traveling through "Dunnamanagh and Ballynascreen" in his native Northern Ireland in the poem "Hard Drive."
ANSWER: Paul **Muldoon**
[10e] In a eulogy at this author's funeral, Muldoon recalled a time when this author "bounced [him] off like snow off a plough" during a game of football. This countryman of Muldoon penned the collection *Death of a Naturalist*.
ANSWER: Seamus **Heaney** [or Seamus Justin **Heaney**]
[10m] Muldoon's poem "Erm" is dedicated to this poet. The title animal "enters the dark hole of the head" after setting "neat prints into the snow" in "The Thought-Fox," one of this author's many poems about animals.
ANSWER: Ted **Hughes** [or Edward James **Hughes**]
<British Literature>

10. The onset of scotopic conditions causes the "Purkinje ("pur-KIN-jee") shift" in this faculty, which functions only for moving stimuli in patients with Riddoch syndrome. For 10 points each:
[10e] Identify this faculty whose "acuity" is measured with Snellen and logMAR charts. The opponent-process and Young–Helmholtz trichromatic theories explain how this faculty processes colored objects.
ANSWER: **vis**ion [or **visual** perception; or **sight** or **see**ing; accept **visual** acuity; accept color **vision** or trichromatic **vision**; prompt on perception or senses or sensory systems]
[10m] Lawrence Weiskrantz found that patients can exhibit "blindsight" despite damage to the visual cortex in this lobe of the cerebral cortex. Both the dorsal and ventral pathways of vision exit this lobe in the two-streams hypothesis.
ANSWER: **occipital** lobe
[10h] This trait, which may be correlated with occipital petalias and homosexuality, corresponds to negative scores on the Edinburgh inventory. A 2020 *Neuron* paper reported that 4.25% of women with this trait might be able to smell without an olfactory bulb.
ANSWER: **left-handed**ness [or **sinistral**ity; accept **ambidextrous** or **ambidexterity** or **cross-dominance** or **mixed dominance** or **mixed-handed**ness or **hand confusion**; prompt on handedness or dexterity or laterality or Edinburgh Handedness Inventory; prompt on sinister]
<Social Science>

11. The precursor of this material is called clinker. For 10 points each:
[10m] Name this material produced by heating aluminosilicate minerals in a kiln with limestone and grinding the resulting clinker to form a powder. This material is mixed with water and aggregate to form a ubiquitous building material.
ANSWER: Portland **cement** [prompt on concrete]
[10h] Clinker is formed in cement kilns via this process, in which the temperature doesn't rise above the melting point. This process can cause undesirable loss of surface area and is performed by lasers in an additive manufacturing technique.
ANSWER: **sinter**ing [accept **frittage**; accept selective laser **sinter**ing]
[10e] Cement production produces large quantities of this greenhouse gas, which is released when calcium carbonate from limestone heated in the kiln decomposes into calcium oxide and this gas.
ANSWER: **carbon dioxide** [or **CO$_2$** ("C-O-2")]
<Chemistry>

12. This artist often paints self-portraits of himself wearing a blonde wig and lipstick. For 10 points each:
[10h] Name this contemporary African American painter who depicted a barber shop in *Da Style*. This artist often paints figures with literally black skin, such as a painting of a man with a single missing tooth titled *A Portrait of the Artist as a Shadow of His Former Self*.
ANSWER: Kerry James **Marshall**
[10m] Marshall was dubbed *La Lectura* in a portrait of him by this artist. This artist often recreates the work of Old Masters with black subjects, such as a man wearing Timberlands in his version of David's *Napoleon Crossing the Alps*.
ANSWER: Kehinde **Wiley** (The portrait of Marshall is from Wiley's *Trickster* series.)
[10e] Marshall created a series critiquing public housing that depicts five housing projects all with one of these places in their name. Hieronymus Bosch painted one of these places "of Earthly Delights."
ANSWER: **garden** [accept The ***Garden*** of Earthly Delights; accept The ***Garden*** Project]
<Painting/Sculpture>

13. The kingdoms of Soppeng and Wajoq formed the Tellumpocco alliance against Talloq on this island, whose Kingdom of Luwu was spuriously credited with the epic La Galigo. For 10 points each:
[10h] Name this island whose Tongkonan houses are preserved at Tana Toraja. Arung Palakka led this island's Boné Bugis ("BOO-ghiss") people, who profited from the Treaty of Bungaya, which subjugated this island's Gowa Sultanate to Fort Rotterdam.
ANSWER: **Sulawesi** [or **Celebes**]
[10e] During this century, Sulawesi's kingdoms of Tobungku and Banggai were claimed as vassals of Sultan Babullah of Ternate, who expelled the Portuguese to Timor. Lapu-Lapu's army killed Ferdinand Magellan during this century.
ANSWER: **16th** century CE [or **1500**s; or **16th** century AD]
[10m] During a 16th-century Spanish invasion of this modern-day country, Naresuan ("nah-ray-SOO-un") sacked its "Dark Age" capital, Longvek. After the Nam tiến "march to the south," this country (emphasize) *lost* its former "Water Chenla" delta west of Champa.
ANSWER: **Cambodia** [or **Kâmpŭchéa**; or Kingdom of **Cambodia** or Preăh Réachéanachâkr **Kâmpŭchéa**; or **Cambodge** or **Camboya**; accept **Cambodian**–Spanish War or Guerra hispano-**camboyana**]
<World History>

14. A member of this family wrote a biography of his daughter subtitled *The Breath of Childhood* that was deemed unpublishable by Ralph Waldo Emerson. For 10 points each:
[10h] Identify this family that included a member who was compared to Psyche in that book's title. The prose piece *Transcendental Wild Oats* satirized this family's involvement in the Transcendentalist utopian community of Fruitlands.
ANSWER: **Alcott** family [accept Louisa May **Alcott**; accept Bronson **Alcott** or Amos Bronson **Alcott**; accept Elizabeth Sewall **Alcott** or Lizzie **Alcott**]
[10e] Louisa May Alcott's sister Elizabeth inspired Beth, one of the title characters of this novel that details the lives of the March sisters.
ANSWER: ***Little Women***
[10m] This author of *Woman in the Nineteenth Century* was invited to join the Transcendentalist utopian community of Brook Farm thanks to her editorship of *The Dial*.
ANSWER: Margaret **Fuller** [or Sarah Margaret Fuller **Ossoli**]
<American Literature>

15. Rudolf Simek conjectures that this number, marking how many nights Odin hung from Yggdrasil ("IG-druh-sil"), was significant in Norse myth because it is a factor of twenty-seven, the number of days in the lunar calendar. For 10 points each:
[10e] Give this number whose cosmological importance is exemplified by the *Völuspá*'s ("vuh-LUSS-puh's") declaration that Yggdrasil supports this many worlds.
ANSWER: **nine** [or **9**]
[10m] Adam of Bremen reported that at this Swedish temple, nine males of various species were hung from trees as sacrifices to the gods every nine years. A university in a city with the same name as this temple is the oldest in Sweden.
ANSWER: Temple at **Uppsala** [accept **Uppsala** University or **Uppsala** universitet]
[10h] This figure's valkyrie wife left nine years after he stole her swan garments to marry her. In revenge for being hamstrung and enslaved, this figure fashioned goblets from the skulls of the sons of Nidudr.
ANSWER: **Völund** [or **Vǫlundr**; accept **Wēland** or **Wayland** the Smith]
<Mythology>

16. Answer the following about Afro-Caribbean immigrants to the United Kingdom, for 10 points each.
[10e] Norman Tebbit controversially devised an assimilationist "test" to determine whether immigrants supported the English national team or teams from their ancestral homelands in this bat-and-ball sport popular in the Commonwealth.
ANSWER: **cricket** [accept Test **cricket**]
[10m] The wave of Afro-Caribbean immigrants to the UK after World War II is often referred to as the "generation" of this ship, which ferried over a thousand West Indians to London in 1948.
ANSWER: HMT *Empire **Windrush*** [accept **Windrush** generation]
[10h] The mishandling of an investigation into the 1993 murder of this teenaged son of Jamaican immigrants prompted an inquiry headed by William Macpherson to cast the Metropolitan Police as "institutionally racist."
ANSWER: Stephen **Lawrence**
<Other History>

17. You only look once, that's the motto. Answer the following about YOLO ("yoh-loh"), a unified architecture for real-time object detection, for 10 points each.
[10m] YOLO uses a single one of these neural networks to compute class probabilities of objects in an image. These neural networks apply filters to images in layers that perform their namesake operation, use pooling layers to aggregate results, and end with fully connected layers.
ANSWER: **convolutional** neural networks [or **CNN**s; or **ConvNet**s]
[10h] YOLO computes a confidence score using the Intersection over Union between the predicted one of these regions and a ground truth one. These regions are rectangles occupied by objects of interest in an image.
ANSWER: **bounding box**es [prompt on boxes]
[10e] These units are used to measure the speed of YOLO and other object-detection architectures. Humans can't perceive rates higher than 60 of these units, which are used to report the refresh rate of computer monitors.
ANSWER: **frames per second** [or **fps**; prompt on hertz or Hz; prompt on frames; prompt on frame rate or frame frequency by asking "what units measure that quantity?"]
<Other Science>

18. A former TV presenter founded a radical utopian Buddhist movement in this country that heavily criticizes members of the Saṅgha who make amulets or use lustral water. For 10 points each:
[10h] Name this country where the Santi Asoke movement was founded. The anti-materialist Sekhiyatham movement in this country has clashed with its government over Westernizing reforms.
ANSWER: **Thailand** [or Kingdom of **Thailand** or Ratcha-anachak **Thai**; accept **Siam**]
[10m] A revivalist "tradition" of Buddhist monks called vanavasi or thudong, who insist on living only in these natural places, is most prevalent in Thailand. The title of the *Bṛhadāraṇyaka Upanishad* ("BROAD-ah-rahn-yaka oo-pun-ee-SHUT") is usually translated as "the great" one of these places.
ANSWER: **forest**s [or **jungle**s; accept the **woods** or rain **forest**s; accept Thai **Forest** Tradition; prompt on wilderness]
[10e] The Thai Buddhist philosopher Buddhadāsa taught that this state should be viewed as the liberation from egoistic preoccupation rather than a literal escape from rebirths. This state of release from samsara is generally seen as the end goal of the Buddhist path.
ANSWER: **nirvāṇa** [accept **nibbana** or **nibbāna**; accept **moksha**]
<Religion>

19. Answer the following about the risqué inspirations for Franz Kafka's *The Metamorphosis*, for 10 points each.
[10m] In *The Metamorphosis,* a painting of a woman with a fur muff and hat alludes to this Austrian nobleman's novella *Venus in Furs,* in which the "supersensual" Severin obsesses over Wanda and asks her to dominate him.
ANSWER: Leopold Ritter von **Sacher-Masoch** (Masochism is named for him.)
[10e] In *Venus in Furs,* Severin adopts this name to represent his role as Wanda's servant. In *The Metamorphosis*, a character with this first name awakens to find himself a giant vermin.
ANSWER: **Gregor** [accept **Gregor** Samsa]
[10h] Kafka describes his nocturnal writing habits drafting *The Metamorphosis* as committing adultery on this woman. This twice-fiancée of Kafka titles a collection of letters written from 1912 to 1917.
ANSWER: **Felice** Bauer [or Felice **Bauer**; accept *Letters to **Felice***]
<European Literature>

20. Taxi drivers in this country helped popularize the stomach-thrusting-and-knee-bending-heavy gwara-gwara dance. For 10 points each:
[10h] Name this home country of the "Gqom ("goam") Queen" Babes Wodumo. Other native dance styles of this country include kwaito and pantsula.
ANSWER: **South Africa** [or Republic of **South Africa** or R**SA** or Republiek van **Suid-Afrika**; or iRiphabhuliki yase**Ningizimu Afrika**; or iRiphabliki yo**Mzantsi Afrika**]
[10e] South Africa's whistle-heavy IsiPantsula dance evolved from actions like dice rolling and this other dance style. The vaudeville performer Bojangles Robinson popularized this dance style, in which fancy footwork with special shoes creates a percussion rhythm.
ANSWER: **tap** dancing
[10m] Indaba dancers have found success in competitions in this style whose dancers use freezers before moves like a six-step or air flares. Power moves like the windmill in this style split its toprock and downrock positions.
ANSWER: **break**dancing [or **break**ing or **break**ers; accept **b-boy**ing or **b-girl**ing]
<Other Fine Arts>

Extra. A green scarf, or pañuelo ("pahn-y'way-loh") verde, is the symbol of an Argentine movement named for this noun that has pushed for reproductive rights since 2018, like the earlier "Ni una menos" ("nee oo-nah MAY-noce"). For 10 points each:
[10m] Identify this noun preceded by "pink" to describe the early 21st-century election of leftist Latin American leaders like Mauricio Funes, Tabaré Vázquez, and Evo Morales prior to a conservative backlash in the 2010s.
ANSWER: **tide**s [accept **wave**s; or **marea**s or **onda**s; accept pink **tide** or **marea** rosa or **marea** rosada or **onda** rosa or pink **wave**; accept green **tide** or **marea** verde or **ola** verde or green **wave**]
[10h] This country's PAIS ("pah-ees") Alliance took power with a pink tide president who broadcast the show *Citizen's Link*. In the 1980s, the radical group Alfaro Lives, Damn It! terrorized this country, led five times by the populist José María Velasco Ibarra.
ANSWER: **Ecuador** [or Republic of **Ecuador** or República del **Ecuador** or **Ikwadur** Ripuwlika] (The first sentence is about Rafael Correa. The group's Spanish name was ¡Alfaro Vive, Carajo!)
[10e] Dolores Cacuango and Tránsito Amaguaña organized Ecuadorian examples of these peoples depicted in Jorge Icaza's novel *Huasipungo*. The Pachacutik party and rainbow wiphala ("wee-PAH-lah") promote rights for this general class of peoples, like the Shuar, Aymara, and Quechua ("KETCH-oo-uh").
ANSWER: **Indigenous** peoples [or pueblos **indígena**s or **originario**s de América; accept **Indigenism**o or **Indigenist** movement or **Indigeneity**; accept **Indian**s or **Native**s or **First Nation**s or **Aboriginal** peoples or amer**indio**s or **aborígen**es or **nativo**s; accept Ecuadorian **Indian** Federation or Federación Ecuatoriana de **Indio**s]
<World History>