Fall Open 2019
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Tossups

1. **At the funeral of a character with this surname, the Swede Hjalmar ("h'YAL-mar") Arvid Boström mutters, "Oh, well – [he] wasn't going to write Beethoven's Ninth Symphony anyway." A character with this surname examines his shit-covered shoulder in a "leak" before stumbling across a car wreck between a Chevy and a dairy truck. A welder with this surname attributes the downfall of mankind to the "oversized human brain," and dies in Malmö during the construction of a cruise ship named the *Bahía* ("bah-EE-ah") *de* (*)** *Darwin.* A character with this surname produces the work *Now It Can Be Told,* which convinces a used car dealer in Midland City that everyone around him is a robot. This is the surname of Leon, the ghost who narrates the novel *Galapagos*, as well as of his father, an obscure writer whose few fans include the millionaire Eliot Rosewater and the soldier Billy Pilgrim. For 10 points, give this surname of the fictional author Kilgore, a creation of Kurt Vonnegut.
ANSWER: **Trout** [accept Kilgore **Trout** or Leon **Trout**]
<INB, Long Fiction>

2. **This opera calls for an orchestra that includes four horns, two with valves and two without valves, in addition to twelve onstage horns used to make hunting calls. Act I, Scene III of this opera begins with an unaccompanied solo for backstage English horn. Its overture opens Andante maestoso, with winds playing a motif whose first four notes are: (read slowly) B, then up to long E, then B again, then down to long G-sharp. The 1861 version of this opera fared poorly at its Paris premiere because its Act I (*)** bacchanale ("bah-cah-NAHL") clashed with dinnertime for wealthy operagoers. This opera's third-act aria "*O du mein holder Abendstern*" ("OH doo mine holder AH-bent-sh'tern") is a song to the evening star that foreshadows the death of Elisabeth. Its lengthy overture is a popular concert piece that introduces leitmotifs associated with the pilgrims' chorus and the Venusberg. For 10 points, name this Richard Wagner opera in which Wolfram von Eschenbach ("ESH-en-bahk") and the title minstrel have a singing contest at the Wartburg.
ANSWER: *Tannhäuser* ("TAHN-hoy-zer") [or *Tannhäuser und der Sängerkrieg auf Wartburg*]
<KL, Classical Music and Opera>

3. **This author recalled being told that his "parts were solid, and would wear well" in an essay that opens by observing that a reader rarely chooses a book until he knows whether its author is black or white. Upon discovering the corpse of his son, the title character of a play by this author laments, "what pity is it / That we can die but once to serve our country." That play's immense popularity in the Colonies led George Washington to ignore a congressional ban on theatre and order that it be performed at Valley Forge. This author was (*)** parodied as "Atticus" in Alexander Pope's "Epistle to Dr. Arbuthnot." This author of the play *Cato* wrote the majority of a set of 555 works that featured the recurring character Roger de Coverley and were published from 1711 to 1712. For 10 points, name this English essayist who, with Richard Steele, founded *The Spectator.*
ANSWER: Joseph **Addison**
<INB, Miscellaneous Lit>

4. **A canal named after this city that fell into disuse was filled in on the orders of political boss Alexander Shepherd. This non-Philadelphia city was home to an impoverished neighborhood named Swampoodle, which was mostly demolished to make room for its busiest train station. Some of Andrew Jackson Downing's ornate landscaping in this city was simplified according to the 1902 McMillan Plan. The construction of the (*)** Cairo Hotel in this city led to the passage of an act restricting the heights of its buildings to twenty feet more than the width of the adjacent street. Sandstone from Aquia Creek ("uh-KWY-uh") was used to construct many buildings

in this city, including one modeled after Dublin's Leinster ("LEN-ster") House and the Charleston City Courthouse by James Hoban. This is the largest city surrounded by "boundary stones" placed during a survey conducted by Andrew Ellicott and Benjamin Banneker. For 10 points, name this city whose layout was planned by Charles L'Enfant ("lahn-FAHN").
ANSWER: **Washington**, D.C.
<KS, Geography>

5. **This essay likens effects of its title subject to drooling at the smell of a peach and to the assassins' fanatical devotion to the Old Man of the Mountain. This essay notes that one position is weakened by the inevitable existence of men of a "wider sort of social feeling" who realize that "other nations and other centuries" exist. This essay posits that natural selection promotes a "fallacious tendency of thought" on theoretical subjects to argue that (*)** inquiry does not extend beyond the title subject. This essay argues that "the social impulse is against" an approach illustrated by an ostrich burying its head in the sand. For failing to include an "external permanency" to sooth the "irritation of doubt," this essay finds the "*a priori* method, "the method of authority," and the "method of tenacity" to be inadequate. For 10 points, name this essay in which C. S. Peirce ("purse") argues that the scientific method is best suited to reach the title "settling of opinion."
ANSWER: "The **Fixation of Belief**"
<JG, Philosophy>

6. **The elaborately decorated lids of censers used at this site often featured ceramic ornaments called *adornos*. A book on the art of this site by Esther Pasztory ("pastor-ee") features a mask on its cover that is dominated by round ear-flares and a rectangular nosebar. In 1971, a four leaf clover shaped chamber was found underneath one structure at this site, while another contains the "*adosada* platform." Alternating sloping and protruding rectangular paneling characterizes a style popularized by this site. The (*)** Wagner murals were illegally taken from this site, which popularized the *talud-tablero* architectural style. The entrance to one structure at this site features a complex known as the Ciudadela ("s'yoo-dah-DEL-lah") that contains the Temple of the Feathered Serpent. A fifty meter wide Avenue of the Dead connects the large Pyramids of the Sun and Moon at this site. For 10 points, name this Early Classic period Mesoamerican site near Mexico City that was home to a Pre-Aztec civilization.
ANSWER: **Teotihuacan** ("TAY-oh-tee-wah-CAHN")
<AK, Architecture>

7. **This justice's "pragmatic" jurisprudence was analyzed in a two-part history by his ex-clerk Mark Tushnet, whose memos to him are often credited with swinging the result of *Roe v. Wade*. An opinion by this justice defined the "materiality" standard in securities contexts in *TSC Industries v. Northway*. A Pulitzer-winning book by Gilbert King follows this justice's work on a case in Groveland, Florida. This future justice and his mentor Charles Hamilton Houston used *Murray v. (*)** Pearson*, a suit against UMB, as a test case. This justice, who usually formed a one-two punch with William Brennan, called the Constitution "defective from the start" and described his approach as "do what you think is right and let the law catch up." A case *argued* by this justice cited the research of Kenneth and Mamie Clark. This man argued *Brown v. Board* as head of the NAACP ("N-double-A-C-P") Legal Defense Fund. For 10 points, name this first African-American Supreme Court justice.
ANSWER: Thurgood **Marshall**
<JG, US History>

8. **A collaboration between Marc Tessier-Lavigne's ("tess-YAY-lah-VEEN's") lab and the Salk Institute demonstrated the role of one of these enzymes in axonal pruning via inhibition with Z-VEID-FMK ("Z-V-E-I-D-F-M-K"). Immunodeficiency results from defects in these enzymes in ALPS-II ("A-L-P-S-two") and CEDS ("C-E-D-S"). Gasdermin D acts as a substrate for these enzymes in the noncanonical inflammasome pathway, and one of these enzymes activates itself after binding to the inflammasome. The BIR ("B-I-R")**

domains of XIAP ("X-I-A-P") bind and inhibit these enzymes. The cleavage of DFF by one of these enzymes activates the DNase ("D-N-ace") CAD ("C-A-D"). The cleavage of (*) PARP-1 ("P-A-R-P-one") by these enzymes inactivates it. These enzymes that cleave their target at aspartate residues are recruited through mutual CARD ("card") domain binding by APAF-1. It has nothing to do with clotting, but the intrinsic pathway that activates these enzymes begins with the release of cytochrome ("cyto-chrome") *c*. For 10 points, apoptosis proceeds through a cascade of what proteolytic ("PRO-tee-oh-lytic") enzymes?

ANSWER: **caspase**s [or **cysteine-aspartic protease**s; accept **cysteine aspartase**s or **cysteine-dependent aspartate-directed protease**s; prompt on proteases; accept specific answers like **caspase**-1 or **cysteine-aspartic protease**-11]

<JS, Biology>

9. **According to a later myth, this modern-day country was inhabited by an enormous three-horned beast which locals called the "tooth-tyrant." This country was home to the Padaei ("pah-DAY-eye"), a tribe of cannibals who wisely slaughtered sick members to prevent the illness from tainting their flesh. After Astraeis ("as-STRAY-iss") led this country's army into a disastrous battle, the victors relented and introduced this country to wine. The dual prophecy of a solar eclipse and of an eagle tossing a snake into a river presaged the defeat of this country's king (*)** Deriades ("deh-RYE-uh-deez"). According to Herodotus, this country's men harness female camels as soon as they give birth, then ride them into the desert to retrieve gold powder dug up by enormous ants. In an epic written by Nonnus, a mismanaged invasion of this country is led by Dionysus. A version of Heracles worshipped in this country was described by the ambassador Megasthenes ("meh-GAS-thuh-neez"). For 10 points, name this country whose inhabitants the Greeks called the "people of the Indus River."

ANSWER: **India** [or Republic of **India**; or **Bharat** Ganarajya]

<INB, Mythology>

10. **A general from this family defeated the Holy Roman Empire's troops at the Battle of Renty, forcing Charles V ("the-fifth") to give up the Three Bishoprics in this family's homeland. This family sold the title of their cadet branch, Duke of Mayenne ("mah-YEN"), to Cardinal Mazarin. While serving as regent, a member of this family was opposed by the Lords of the Congregation during the reign of her daughter Mary, Queen of Scots. Two members of this family were assassinated by the "Forty-Five" bodyguards of a king who they previously forced to flee to (*)** Blois ("bl'WAH"). A nobleman from this family named Francis was sent by Henry II to besiege and capture Calais ("cah-LAY") from the English. This family from Lorraine briefly took power after the Day of the Barricades under a duke who formed the Catholic League to oppose the Huguenots ("h'YOO-guh-nots"). For 10 points, name this family that produced a duke who contested the French throne with Henry III ("the-third") and the future Henry IV ("the-fourth") in the War of the Three Henrys.

ANSWER: House of **Guise**

<KS, European History (Continental)>

11. **Agol et al. as well as Murray and Holman found that resonant perturbers caused the largest variation in the interval between these events in a pair of papers that developed the TTV method. The expression "a-cosine-i, all over R-star," gives the impact parameter of these events. Spin-orbit angles are measured from the anomalous Doppler shifts created by these events. The Rossiter-McLaughlin effect occurs during these events. Limb darkening causes the light curves created by these events to appear more (*)** U-shaped. The observed flux from these events sharply decreases between the first and second contacts. The radial velocity method is used to confirm exoplanet discoveries made by observing these events. Unlike eclipses, these events do not cause a complete shadow. For 10 points, name these events in which a smaller body passes in front of a larger body.

ANSWER: **transit**s [accept **transit**-time variations; accept **transit** photometry; prompt on eclipses or occultations]

<JS, Astronomy>

12. **This book characterizes the assumption that theta equals five percent as tautological in a section on the "Question of Time Preference." This book describes the "Anglo-Saxon phenomenon" of the rise of "supermanagers." This book examines the assumptions behind the Harrod-Domar model in a passage criticizing both sides of the "Two Cambridges debate." A threefold decomposition is illustrated in this book with (*)** Vautrin's ("vo-TRAN's") lesson to Rastignac ("rah-steen-YAHC") in one of its many references to Honoré de Balzac and Jane Austen. This book repeatedly describes a "U-Shaped curve" created from WTID data. This book's introduction criticizes the assumptions of the Kuznets curve and describes a fundamental divergence as the rate of return on capital outstrips economic growth. For 10 points, name this book that proposes *r* being greater than *g* is driving rising income inequality, a 2013 bestseller by Thomas Piketty.
ANSWER: _**Capital in the Twenty-First Century**_
<AK, Economics>

13. **The decision to hold the 1930 Eucharistic Congress in this country galvanized its independence movement, which was briefly stymied by the murder of union leader Farḥat Ḥached ("far-HAT ha-SHED"). This country's Batto Sfes ("s'FESS") case led Aḥmad ibn Abī Diyāf to draw up a law code called the "Fundamental Pact." This country's independence movement built support from riots against burying citizens of France in Muslim cemeteries in this country's "naturalization issue." A coup in this country declared a leader's call for Rachīd ("rah-SHEED") (*)** Ghannouchī's ("gah-noo-SHEE's") arrest to be evidence of senility. This country's independence was spearheaded by Ḥabīb Bourguība's ("hah-BEEB ber-GHEE-bah") Neo-Destūr Party. The fallout from murders of secularist politicians in this country was mitigated by a "National Dialogue Quartet." The 2010 seizure of a fruit cart in Sīdī Bouzīd ("see-DEE boo-ZEED") brought down a leader of this country. For 10 points, name this country, whose people ousted Zine Abidine ("zyne abi-DEEN") Ben Ali after Mohammad Bouazizi ("boo-ah-ZEE-zee") self-immolated, starting the Arab Spring.
ANSWER: **Tunisia** [or Republic of **Tunisia**; or al-Jumhūrīyah at-**Tūnisīyah**; or République **Tunisienne**] (the Fundamental Pact is generally considered the first constitution, especially one guaranteeing human rights, adopted in the Arab world by an entity outside than the Ottoman Empire)
<JG, Other History>

14. **A book on this artist opens by analyzing how one of his paintings was cut into _Landscape with Halberdier_ and _The Finding of Moses_. Svetlana Alpers and Michael Baxandall collaborated on that book on _[this artist] and the Pictorial Intelligence._ This artist reimagined prints by Giovanni Castiglione ("KAH-steel-YO-nay") and Salvator Rosa in a series of _Capricci_ ("kah-PREE-chee") and _Scherzi_ ("SKER-tsee"). This artist depicted the pillars of Hercules at the edge of an oval fresco whose central figure is being (*)** crowned by a swooping angel in a fresco at the Royal Palace of Madrid. A woman with a feathered headdress rides a crocodile in a personification of _America_ by this artist of _Apotheosis of the Spanish Monarchy_. A ceiling fresco by this artist is gradually revealed by walking up the _Treppenhaus_ ("TREP-pen-house"), is titled _Allegory of the Planets and Continents_, and is housed in a building designed by Balthasar Neumann ("NOY-man"). For 10 points, name this 18th century Venetian painter who painted frescoes for the Wurzburg Residenz ("vurts-burk residence").
ANSWER: Giovanni Battista **Tiepolo** [or Giambattista **Tiepolo**; accept **Giambattista**]
<AK, Painting and Sculpture>

15. **This conflict exiled the settlers known as the "Eleutheran Adventurers." J. H. Hexter argued against reducing the origins of this conflict to economics in an article that quieted a debate over its causes between R. H. Tawney, Lawrence Stone, and Hugh Trevor-Roper termed the "Storm Over the Gentry." Christopher Hill pioneered Marxist analysis of this conflict. In an early trigger of this conflict, James Hannay got nailed with a stool thrown by one Jenny Geddes. This conflict's winner was targeted by the (*)** Sealed Knot society. A theater of this conflict involved a local faction termed "Engagers." A propaganda war during this conflict concerned the alleged magic powers of a white hunting poodle. The loser of a battle in this conflict made an improbable six-

week escape that involved hiding in an oak tree in Boscobel wood. Rupert of the Rhine lost this conflict's critical Battle of Naseby. For 10 points, name this conflict won by the innovative New Model Army.
ANSWER: **English Civil** War(s) [accept Wars of the **Three Kingdoms**, **British Civil** Wars or **Great Rebellion**; anti-prompt on any specific sub-conflict or theater like the Bishops' Wars, Irish Confederate Wars, Scottish Civil War, or anything else that can demonstrably be similarly considered "part" of the English Civil War]
<JG, European History (Commonwealth, Ancient, Historiography)>

16. **In a story set in this country, an employee of Mama's Emporium weaves a baby out of hair clippings, but is forced to burn it when it develops a taste for human flesh. A character born in this country discovers two blank slips of paper in her fortune cookie while on a first date at the Chinese restaurant Chang's. An author who was raised in this country wrote about a Mathematician who implements Furcal's Formula to absorb the grief of wealthy people in the story "What It Means When a Man Falls from the Sky." The narrator attempts to flee this country after her (*)** four-year-old son is murdered in a story titled for this country's "American Embassy." An immigrant from this country works at a diner in Connecticut after her "uncle" attempts to molest her in the story "The Thing Around Your Neck." For 10 points, identify this country, the childhood home of Lesley Nneka Arimah and birthplace of Chimamanda Ngozi Adichie ("chee-mah-MAN-dah ung-GO-zee ah-DEE-chee").
ANSWER: **Nigeria** [or the Federal Republic of **Nigeria**]
<INB, Short Fiction>

17. **Two sets of quantities with this adjective are equal for the left stretch and right stretch components produced by polar decomposition of the deformation gradient *F*. The third deviatoric invariant *J*-sub-three can be written simply as the product of three quantities with this adjective. In one graphical method, the angle of a diameter gives two times an angle with this adjective. That method also has two quantities with this adjective as the *x*-intercepts of a circle, and is named for (*)** Mohr. It's not "normal," but the maximum shearing stress is given by halving the difference of two stresses with this adjective. Euler's equations of rotation can be written as three equations, with *I*-sub-one through *I*-sub-three symbolizing quantities with this adjective. The eigenvalues ("EYE-gun-values") of the inertia matrix have this adjective, and the eigenvectors ("EYE-gun-vectors") are axes with this adjective. For 10 points, name this adjective of three mutually orthogonal axes that define the coordinate system in mechanics.
ANSWER: **principal** [accept **principal** axes; accept **principal** stresses; accept **principal** moments of inertia]
<AK, Physics>

18. **One of these people, Khadīja's ("kuh-DEE-juh's") cousin Warqah ibn Nawfal, supposedly saved ur-muezzin ("oor-moo-ezz-ZEEN") Bilāl ibn Ribāḥ from an early martyrdom. Ibn Isḥāq ("iss-HAHK") describes one of them named Baḥīra ("buh-HEE-ruh") recognizing a tree's shadows on a young Muhammad as the seal of prophethood. Exegetes ("EX-uh-jeets") often take the Sūrat al-Fātiḥa's ("FAH-tee-huh's") phrase "those who are misguided" to refer to these people, who chicken out of a contest involving slinging curses from under a cloak when Muḥammad shows up with his family to the "Mubāhala ("moo-BAH-huh-luh") Event." The Qur'ān accuses these people of altering the (*)** *injīl* ("in-JEEL") and tells them "Do not say 'three,' stop that." A figure revered by these people uses his breath alone to kill the army of al-Masīh al-Dajjāl ("al-mah-SEE-hud-duj-JAHL"). This is the *youngest* group of people to be traditionally given the status of *ahl al-dhimmah* ("ell-luh-DIM-muh"). The Qur'ān often attacks these people for suggesting that Allah could have a son. For 10 points, name these people, whom the Qur'ān criticizes for erroneously worshipping Jesus as God.
ANSWER: **Christian**s [accept al-**Masīhī**yyūn or al-**Naṣrānī**yyūn; accept **hanīf**s until "Sūrat al-Fātiḥa" and prompt after; accept **Ebion**ites until "Sūrat al-Fātiḥa" and do NOT accept or prompt after; prompt on monks or priests; prompt on Ahl al-Kitāb, People of the Book, or monotheists; prompt on dhimmī/ahl al-dhimma until mentioned; anti-prompt on any sect of Christians]
<JG, Religion>

19. **Izzy's recitation of this poem is immediately interrupted by her teacher Ms. Bellamy in Celeste Ng's ("eng's") novel *Little Fires Everywhere*. A line spoken by Menelaus in *The Odyssey* appears alongside this poem's first stanza to open the prologue of Siddhartha Mukherjee's 2016 book *The Gene*. This poem's title was borrowed from a passage set "under the wide and starry sky" about a dead sailor who "lies where he longed to be." Robert Louis Stevenson's (*)** "Requiem" inspired the title of this poem, which describes a "misery" that "deepens like a coastal shelf" after picturing "fools in old-style hats and coats… at one another's throats." This three-stanza-long poem from the collection *High Windows* directly addresses its reader as it describes a pair of people that "fill you with the faults they had / and add some extra, just for you." For 10 points, the line "They fuck you up, your mum and dad" opens what brief poem by Philip Larkin?
ANSWER: "**This Be The Verse**"
<INB, Non-epic Poetry>

20. **This is the heavier of the two molecules that are present in homoleptic complexes that undergo oxidative addition to produce thiolate ("THIGH-oh-late") complexes for hydrogenase biomimetics ("bio-mee-MEE-tics"). Triangular platinum clusters are part of the structure of clusters of this molecule named for Paolo Chini ("KEE-nee"). A complex containing this molecule is used to measure a ligand's Tolman electronic parameter. It's not cyclopentadienyl ("cyclo-penta-dye-EE-nil"), but an iron based anti-knock agent contains (*)** five equivalents of this molecule. IR spectroscopy is often used to study complexes containing this molecule, which, like nitrosyl and cyanide complexes, participates in strong pi backbonding. Along with two iodide ligands, both the catalyst in the Monsanto and Cativa processes contain two equivalents of this molecule. Four equivalents of this compound complex to a nickel center in the second step of the Mond process. For 10 points, name this toxic diatomic molecule found in carbonyl ligands.
ANSWER: **carbon monoxide** [or **CO**; or **carbonyl** ligands]
<AK, Chemistry>

Bonuses

1. This ruler recognized Stefan Nemanja ("NEH-mahn-yah") as the rightful *župan* ("zhoo-pan") during an incredibly successful campaign through Serbia. For 10 points each:
[10] Identify this expansionist Byzantine emperor whose reign was chronicled by his loyal historian John Cinnamus. He magnanimously forgave Raynald of Chatillon ("shah-tee-YON") for his Cyprian massacre in exchange for total fealty.
ANSWER: **Manuel** I Komnenos [or **Manuel** the Great]
[10] A spat with a holder of this title named Vitale Michiel ("vee-TAH-lay mee-k'YELL") prompted Manuel to round up some 10,000 Venetians living in Constantinople. These highest elected officials of Venice included the blind Enrico Dandolo.
ANSWER: **doge**s
[10] During the prisoner negotiations with Manuel, over a thousand Venetian soldiers died of plague while camped on this island. An 1822 invasion that killed most of its residents also damaged its long-enduring mastic industry.
ANSWER: **Chios** ("KEE-oss")
<INB, European History (Continental)>

2. Two characters dealing with this condition share a bag of Skittles at the beginning of Rebecca Gilman's play *Luna Gale.* For 10 points each:
[10] Identify this condition. Orangutan, Chutes&Ladders and Fountainhead converse in Haikumom's chatroom for people with this condition in Quiara Alegría Hudes's ("kee-AH-rah ah-lay-GREE-ah OOH-dess's") play *Water by the Spoonful.*
ANSWER: drug **addiction** [or crack **addiction**; accept answers about (recovering from a) drug **addiction**]
[10] In 2012, *Water by the Spoonful* edged out plays by Stephen Karam and Jon Robin Baitz to win Hudes this prize's award for Drama. The following year, it was awarded to Ayad Akhtar for his play *Disgraced.*
ANSWER: **Pulitzer** Prize for Drama
[10] Heidi Schreck's play titled for *What [this object] Means to Me* was a finalist for the 2019 Pulitzer. In *Inherit the Wind*, Drummond explains that his mission is to "prevent the clock-stoppers from dumping a load of medieval nonsense into" this object.
ANSWER: the United States **Constitution**
<INB, Drama>

3. Vladimir Vavilov's 1970 setting of this text is frequently misattributed to the Baroque composer Giulio Caccini ("JOO-lee-oh kah-CHEE-nee"). For 10 points each:
[10] Name this text which Anton Bruckner set to music in a seven-part motet. Giuseppe Verdi's *Otello* includes an Act IV ("four") aria based on this text.
ANSWER: **Ave Maria** [or **Hail Mary**]
[10] This French composer's Ave Maria is set over an arrangement of the C major prelude from J.S. Bach's *The Well-Tempered Clavier.*
ANSWER: Charles **Gounod** ("goo-NOH") [or Charles-François **Gounod**]
[10] Franz Schubert's Ave Maria, originally titled "Ellen's Third Song," is one of these German art songs exemplified by his "Erlkönig" and "Gretchen at the Spinning Wheel."
ANSWER: **lied** ("leet") [or **lieder**]
<KL, Classical Music and Opera>

4. A woodcut of one of these objects appears in Ephraim Squier's memoir, which describes overcoming it only to have a mule nearly fall to its death. For 10 points each:

[10] Identify these objects made primarily of woven *ichu* ("EE-choo") grass that aided *chasqui* ("CHASS-kee") runners in overcoming *pongos*. An extant one of these objects is rebuilt annually under the instruction of Victoriano Arizapana.

ANSWER: **Inca** rope **bridge**s [prompt on bridges with "made by which culture?"]

[10] The Inca used *mit'a* ("MITT-ah") labor to construct the rope bridges which connected sections of this 25,000-mile-long system together.

ANSWER: Inca **road** system

[10] An alternative to crossing gorges by bridge was by using one of these objects called an *oroya.* In his chronicle, Garcilaso de la Vega recorded an incident in which Spaniards dressed one of these objects in a suit of mail, only for an Inca archer to fire an arrow through both the armor and this object.

ANSWER: **basket**s

<INB, Other History>

5. In Del Re's ("ray's") method, these structures approximately factor the overlap matrix into 2-by-2 blocks. For 10 points each:

[10] Name these structures whose orthonormality ("ortho-normality") leads to Coulson's directionality theorem concerning the internal angle between them. Bent's rule helps calculate these structures when substituents have different electronegativities ("electro-negativities").

ANSWER: **hybrid orbital**s [accept **hybrid**s; prompt on orbitals; do NOT accept or prompt any other specific type of orbital, e.g. "atomic orbitals", "molecular orbitals", "bonding orbitals", or "antibonding orbitals"]

[10] Bent's rule partially depends on how many of these groups of particles not involved in bonding are possessed by the central atom. Repulsion between these things predicts molecular geometry in VSEPR ("vesper") theory.

ANSWER: **lone pair**s [accept **electron pair**s; accept valence shell **electron pair**s; prompt on electrons with "how are the electrons organized?"]

[10] For the two sp-hybrid ("S-P-hybrid") orbitals, each 2s ("two-S") orbital contributes equally so their coefficient is this value. Since normalization sets the wavefunction squared equal to one, this is the coefficient of each state if the overall wave function is the superposition of two equally likely states. You have 10 seconds.

ANSWER: **one over root-2** [or **one over the square root of 2**; or **root-2 over 2**]

<JS, Chemistry>

6. In a book review for *The New York Times*, Anne Tyler described this author's typical protagonist as "invariably a mild-mannered English spinster, pleasant to look at… and impeccably dressed." For 10 points each:

[10] Identify this author who wrote about one such spinster, a writer named Edith Rose, in a novel which won the 1984 Man Booker Prize, *Hotel du Lac.*

ANSWER: Anita **Brookner**

[10] In *Hotel du Lac,* Edith rebuffs Mr. Neville's proposal for an open marriage during a stay at a hotel in this country. Hans Castorp resides in a sanatorium in this country in Thomas Mann's *The Magic Mountain.*

ANSWER: **Switzerland** [or the **Swiss** Confederation]

[10] Brookner's focus on spinsters led Anne Tyler to compare her to the author of *Excellent Women,* who had this surname. A character with this surname joins his friend Augustus as a stowaway aboard the whaling ship *Grampus.*

ANSWER: **Pym** [accept Barbara **Pym** or Arthur Gordon **Pym**]

<INB, Long Fiction>

7. This patriarch is traditionally considered to be the same person as the Muslim prophet Idris, who dwells in the fourth of seven heavens. For 10 points each:

[10] Name this man who lives for 365 years, and then enters heaven alive where, according to Kabbalah, he becomes the angel Metatron.

ANSWER: **Enoch** ("EE-nock")

[10] The Book of Enoch equates the "sons of God" before the Genesis flood with this group of fallen angels. Samyaza copulates with us humans, and Azazel teaches us forbidden knowledge, and by extension quizbowl.
ANSWER: the **Watchers** [or **Grigori** or *egrḗgoroi*; or *ʿiyr* or *ʿiyrin*]
[10] Another class of antediluvian angels are the cherubim, who guard this location from which Adam and Eve are banished.
ANSWER: Garden of **Eden**
<KL, Mythology>

8. In June 2019, an extortion scandal led Marek Lisinski to resign leadership of the Have No Fear foundation, which mainly investigates this institution. For 10 points each:
[10] Identify this institution whose sexual abuse cases in Poland were exposed by a 2019 documentary titled *Tell No One*. The 2018 comedy-drama *Kler*, which satirized this institution, became Poland's third-highest grossing film.
ANSWER: **Catholic** Church [prompt on the church, the clergy, or Christianity]
[10] *Kler* was denounced as anti-Catholic propaganda by members of this right-wing party, which retained its majority government after the 2019 parliamentary elections in Poland.
ANSWER: **Law and Justice** [or **Prawo i Sprawiedliwość**; or **PiS**]
[10] This inflammatory far-right priest has received over 55 million dollars in government subsidies since the 2015 election. This founder of the University of Social and Media Culture in Toruń ("TOH-roon") runs a Polish media empire that includes the Radio Maryja ("mah-RIH-yuh") station.
ANSWER: Tadeusz **Rydzyk**
<KS, Current Events>

9. For 10 points each, answer the following about the study of novelty in evolutionary developmental biology.
[10] One of the most central discoveries of evo-devo ("ee-voh-dee-voh") is the remarkable conservation of genetic mechanisms among organisms that exhibit tremendous diversity and novelty in this set of physically observable characteristics.
ANSWER: **phenotype**s
[10] Despite the presence of this phenomenon, novelty can emerge when genetic variation exceeds some threshold. Developmental capacitance arises from this phenomenon in which developmental processes produce the same phenotype despite genetic and environmental variance.
ANSWER: **canalization**
[10] One of the central novel developments in evo-devo is multicellularity, which depended on the co-option of these proteins. These calcium-dependent proteins are found in desmosomes.
ANSWER: **cadherin**s
<JS, Biology>

10. This film inspired "Afterthoughts" to the essay "Visual Pleasure and Narrative Cinema" in which the author claims this film shows an "internal oscillation of desire" letting women enjoy male-gaze heavy films. For 10 points each:
[10] Name this King Vidor film about a love triangle between Jesse and Lewt McCanles and the mixed-race orphan Pearl Chavez. It ends with Chavez and Gregory Peck's brutish Lewt killing each other in the title event.
ANSWER: *Duel in the Sun*
[10] This feminist film theorist argued that Hollywood's female characters are systematically coded with "to-be-looked-at-ness" in "Visual Pleasure and Narrative Cinema," which coined the term "male gaze."
ANSWER: Laura **Mulvey**
[10] Mulvey uses this Hitchcock film as a literal example of identifying the spectator with male characters. In this film, Jimmy Stewart's character spies on a neighbor seemingly murdering his wife through the title aperture.
ANSWER: *Rear Window*
<JG, Film>

11. A classic article on this problem by Stan Openshaw, who coined its name with P. J. Taylor, illustrates it by proving that spatial data from the same Iowa elections can show correlations ranging from negative-point-99 to positive-point-99. For 10 points each:

[10] Name this endemic problem in spatial analysis, a species of ecological fallacy in which the same method and parameters can produce wildly inconsistent results due to the fact that geographic divisions tend to be arbitrary.

ANSWER: the **MAU** ("M-A-U") or **MAUP** ("M-A-U-P") [or the **modifiable areal unit** problem; prompt on scale problem or aggregation problem]

[10] The MAUP is an issue for studies using this popular computerized spatial analysis method, first created for Canada's forestry service. Its name is prefaced by "GRASS" and "Arc" in two popular software platforms for it.

ANSWER: **GIS** ("G-I-S") [or **geographic information system**; accept **geographic information science**; prompt on partial answer]

[10] John Snow's study tracking Cholera outbreaks to the Broad Street Pump remains a benchmark for spatial analysis in general and in this field in particular. This vital public health field uses the Bradford-Hill criteria.

ANSWER: **epidemiology** [prompt on medicine and equivalents]

<JG, Other Academic>

12. John Fraser chose to ignore reports about this product in order to avoid having to shut down a St. Brunswick production facility. For 10 points each:

[10] Identify this product of which over a million units were deemed unfit for human consumption and recalled in a 1985 scandal.

ANSWER: canned StarKist **tuna** [accept **Tuna**gate; prompt on fish]

[10] StarKist withdrew from Canada following Tunagate, which occurred while this Canadian Prime Minister was in office. He named Quebec a "distinct society" in a proposed 1987 amendment that was never ratified.

ANSWER: Brian **Mulroney** [or Martin Brian **Mulroney**]

[10] Though Mulroney's legacy was practically unaffected by Tunagate, he did face backlash for allegedly receiving bribes from this European competitor of Boeing in exchange for orders placed by Air Canada.

ANSWER: **Airbus**

<INB, European History (Commonwealth, Ancient, Historiography)>

13. Deleuze wrote of an "ontological" version of this concept as part of a commentary on Spinoza. For 10 points each:

[10] Name this concept that states that the ultimate difference in the "possession of pure perfections" between God and creatures or objects is one of degree, not of meaning.

ANSWER: **univocity** of being

[10] Duns Scotus formulated the concept of univocity of being in the *Ordinatio* where he also analyzed this book of theology. Peter Auriol is best known for his large commentary on this work grouped into "distinctions" by Alexander of Hales.

ANSWER: Peter Lombard's The Four Books of **Sentences** [or *Libri Quattuor **Sententiarum***]

[10] This thinker also wrote a commentary on the *Sentences*. His five arguments for the existence of God are known as the "five ways."

ANSWER: St. Thomas **Aquinas** [prompt on "Thomas"]

<JM, Philosophy>

14. In his collection *Translations from the Natural World,* Les Murray described these "humble" animals as "spacefarers past living planetfall." For 10 points each:

[10] Identify these animals. In a poem titled for them, the speaker informs the reader that "This, today, is all we can tell you: what we are *not*, what we do *not* want."

ANSWER: **cuttlefish** [or "**Cuttlefish** Bones;" accept "Ossi di **seppia**;" prompt on fish, even though they aren't really fish]
[10] This Italian Hermeticist wrote "Cuttlefish Bones," and admonished his fellow poets for only walking "among plants with rare names" in his poem "The Lemons."
ANSWER: Eugenio **Montale**
[10] In a book-length treatise, Arshi Pipa compared Eugenio Montale to this earlier Italian. This poet standardized the Tuscan dialect with his *La Vita Nuova,* which was inspired by his love for Beatrice.
ANSWER: **Dante** Alighieri
<INB, Non-epic Poetry>

15. An "intermediate painter" sometimes identified as Barthelemy van Eyck contributed to a project undertaken by these artists. For 10 points each:
[10] Identify these artists whose work was abruptly halted when they all succumbed to plague. Sixty years later, a project begun by this group was completed by Jean Colombe.
ANSWER: the **Limbourg** brothers [or Herman, Paul, and Johan **Limbourg**]
[10] The Limbourg brothers' *Tres Riches Heures* ("tray reesh ER") was produced for the Duc de Berry in this style, best exemplified by Gentile da Fabriano's *Strozzi Altarpiece.* It peaked in popularity at the start of the *quattrocento.*
ANSWER: **International Gothic** [prompt on Gothic]
[10] Da Fabriano's altarpiece is dominated by a version of this scene populated by such exotic animals as lions, camels and monkeys. In Botticelli's version of this scene, Cosimo de' Medici and his sons present frankincense and myrrh to the Virgin Mary.
ANSWER: **Adoration of the Magi**
<INB, Painting and Sculpture>

16. The Lorentz transforms can be derived from the invariance of this quantity. For 10 points each:
[10] Name this quantity that separates two events in Minkowski space and is additive along worldlines.
ANSWER: **spacetime interval** [accept **delta-s** or **delta-s-squared**; prompt on interval]
[10] In the mostly minus metric, the spacetime interval equals the following expression: this quantity squared times time-squared minus distance-squared. Special relativity assumes this quantity is the same in all inertial frames.
ANSWER: **speed of light** in vacuum [accept **c**]
[10] If the spacetime interval between two events is space-like, then this property of the two events depends on the reference frame. Events separated by time-like and light-like intervals will not have this property in any frame.
ANSWER: **simultaneity** [accept **simultaneous** or other word forms; accept descriptions that say something like the events occurring at the **same time**]
<JS, Physics>

17. This passage's name literally means "The Root Verse," and it is typically the first *gurbani* one learns as a Sikh. For 10 points each:
[10] Name this passage, whose ridiculously tough-to-translate first words, "Ik Onkar," proclaim "One Universal Creator God," Waheguru ("WAH-hay-guru"), "whose name is truth." This passage opens both the Japji prayer and the Adi Granth.
ANSWER: the **Mūl Mant**ar [accept answers that give any word form of **mantra**]
[10] The Mūl Mantar is said to be the first verse written by this first Guru and founder of Sikhism immediately upon realizing that "there is no Hindu and no Muslim."
ANSWER: Guru **Nanak** Dev Ji
[10] Nanak resolved to start a new religion after this event, in which his friends panicked by the Kali Bain while he received a cup of nectar from Waheguru in a divine trance. A description is acceptable
ANSWER: the **Three Days** in the **River** [accept any answer that gives equivalents of both underlined portions; accept any answer that describes Nanak **vanishing into or near a river**]

<JG, Religion>

18. Identify these subjects of the Macmillan-published *English Men of Letters* biography series, for 10 points each.
[10] The first entry in the series was Leslie Stephen's biography of this eighteenth-century writer, who was also the subject of a more famous biography written by his close friend, James Boswell.
ANSWER: Samuel **Johnson**
[10] Edward Dowden and John Nichol wrote biographies about these *two* authors, one of whom wrote *The Vision of Judgment* in response to the other's attack on the so-called "Satanic School" in his *A Vision of Judgment.*
ANSWER: Lord **Byron** AND Robert **Southey** [accept George Gordon **Byron**, 6th Baron Byron for "Lord Byron"]
[10] John Cotter Morison's 1882 biography of this writer was completed forty years after this writer published a popular set of narrative poems, the first of which recounts the story of a one-eyed hero who lived "in the brave days of old."
ANSWER: Thomas Babington **Macaulay** (The poem is "Horatius" from *Lays of Ancient Rome*.)
<INB, Miscellaneous Lit>

19. Optimizing neural networks is hard because it requires solving this kind of problem. For 10 points each:
[10] Name this kind of optimization problem, in which the Hessian of the objective is neither strictly positive definite nor strictly negative definite. This kind of optimization problem can have multiple local optimums that are not global optimums.
ANSWER: **non-convex** optimization
[10] Convex optimization problems can always be solved using an algorithm that takes repeated steps in the direction of this vector. This vector is the direction of unit length in which a function is decreasing most quickly.
ANSWER: **gradient** [accept **gradient** descent]
[10] Gradient descent can only be used on differentiable functions. A variant of gradient descent that can optimize the sum of a differentiable and non-differentiable function uses these operators, which are defined as the following:
(read slowly) "arg-min of *f*-of-*x*" plus one-half times "norm of *y*-minus-*x*" squared.
ANSWER: **proximal** operators
<SK, Math>

20. Along with *The Silent Brotherhood*, this book was required reading for members of a community called Elohim City. For 10 points each:
[10] Name this book serialized in the newspaper *Attack!*, which was run by the National Alliance. Robert Matthews drew inspiration from this book for the name of an organization that murdered the talk show host Alan Berg.
ANSWER: The **Turner Diaries**
[10] After dropping out of college, this man saw an ad for *The Turner Diaries* in the right-wing magazine *Soldier of Fortune*. This man later perpetrated the Oklahoma City bombing with help from Terry Nichols.
ANSWER: Timothy **McVeigh** [or Timothy James **McVeigh**]
[10] The author of *The Turner Diaries*, William Luther Pierce, was inspired by a book distributed by this group titled *The John Franklin Letters*. This group was named for the supposed "first American casualty of the Cold War."
ANSWER: **John Birch Society** [or **JBS**]
<AK, US History>