

1. **A transfer matrix containing coefficients named for this scientist can be used to model the response of a coherent thin film multilayer. One of those coefficients named for this scientist is equal to the ratio of the magnitudes of two Poynting vectors in the TE case. A regime named for this non-German scientist may allow the viewing of a circular shadow called an Arago spot. This man names a pair of equations that describe the relative rates of (*) transmission and reflection, and which enable the calculation of Brewster’s angle. When a dimensionless value named for this man is greater than one, a wave passing through an aperture undergoes near-field diffraction, which is also named for this man. A type of lens that is flat on one side and concave on the other is named after, for 10 points, what Frenchman who studied optics?**

ANSWER: Augustin-Jean **Fresnel** (“fruh-NELL”) [accept **Fresnel** coefficients or **Fresnel** equations or Kirchhoff-**Fresnel** diffraction or **Fresnel** number or **Fresnel** lens]
<Physics, WA>

2. **An artist from this country photographed cramped Japanese subway passengers in his *Tokyo Compression* series. A husband-and-wife team of photographers from this country created many typologies of factories, such as *Industrial Facade* #23. Every five years, photo tours are given in this country during the Documenta exhibition. An artist from this country created a “diptych” of a packed supermarket and an edited photo of a river horizontally arranged between two perfectly flat (*) grasslands, which are two of the most expensive photographs ever sold. The creator of *99 Cent II* (“two”), Andreas Gursky, is from this country, where Yevgeny Khaldei (“KHAL-day”) depicted a flag being hoisted over ruins in 1945 by Soviet troops. For 10 points, name this country whose Reichstag building was depicted in that photo.**

ANSWER: **Germany** [or Federal Republic of **Germany**; or Bundesrepublik **Deutschland**] (The first sentence refers to Michael Wolf; the second refers to Bernd and Hilla Becher.)
<Other Art: Photography, WA>

3. **A narrator speculates that some of these things may encode a “departed prophet” and likens them to “hieroglyphic marks” while observing a man lying in state. Some of these things are likened to a “Cretan labyrinth” in the opening of a chapter in which the narrator awakens with a man’s arm thrown over him. Fayaway only has “narrow bands” of these things, but Kory-Kory has “three broad longitudinal stripes” of them. A narrator first describes several of these things as (*) “blackish looking squares” belonging to his bedfellow. These things are found on the heads of most of the Typees, as well as on a “purplish face” that a narrator first sees in the Spouter-Inn. A skilled harpooner is described as a “clean, comely looking cannibal” who is covered in these. For 10 points, what artistic patterns feature on the bodies of many Polynesians like Queequeg?**

ANSWER: **tattoos** [accept Queequeg’s **tattoos**]
<Long Fiction, WA>

4. **Records from a trove of 300,000 *genizah* (“guh-NEE-zah”) documents indicate that this policy applied to all people over nine years of age. Complying with this policy allowed certain people to avoid the conscription laid out in the Gulhane (“gool-HAH-neh”) Edict, though this policy was later abolished in the 1856 Edict during the Tanzimat period. A Rajput revolt opposed the implementation of this policy by a ruler who created a law code called the *Fatawa-e Alamgiri*. This policy was reinstated in the (*) Mughal Empire by Aurangzeb a century after its abolition by Akbar. For most people in medieval Persia, avoiding this fiscal policy provided the primary reason to convert to Islam, as this policy reduced the take-home income of *dhimmi* residents. For 10 points, name this poll tax historically levied in Islamic states against those of different religions.**

ANSWER: jizya [prompt on taxes or poll taxes or head taxes by asking “what is the original language term?”; prompt on dhimma or dhimmi; prompt on religious intolerance]
<World History, WA>

5. A McNemar test can be used as an alternative to methods that use this distribution when studying so-called “related measures.” When methods using this distribution are applied to a sample with inhomogeneous variance, Welch’s correction can be used to improve accuracy. This distribution can be derived by dividing a [emphasize] *similar* distribution by the square root of the quantity [read slowly] “chi-squared of ν , divided by ν ,” where ν is the number of (*) degrees of freedom. This distribution is generally chosen to improve robustness when estimating variables within a small sample because its tails are larger than the similar normal distribution. It is alternatively known by W. S. Gosset’s (“GOSS-it’s”) pseudonym of “Student.” For 10 points, name this distribution used in tests that are employed as alternatives to z -tests.

ANSWER: Student’s t -distribution [accept Student’s t -distribution before “Student”]
<Other Science: Math, WA>

6. In the second scene of a play, this title character consults with a doctor about a depressed teenager who eats only “hamburgers and peanut butter” and masturbates into a sock “without a flicker of pleasure” in Scene One; Sarah Kane wrote that play titled for this character’s “Love.” In another play, this character begs a man to “give me your sword, if not your hand” to kill herself, leading to later suspicion when people notice that the man’s sword is missing. This character lashes out at and drives (*) Oenone (“ee-NOH-nee”) to suicide, despite Oenone having earlier helped her frame Aricia’s lover. In the last act of a play written entirely in alexandrine verse, this woman commits suicide after learning that the object of her love has died in a battle with a sea monster sent by Neptune. For 10 points, name this mythological woman who, in a Jean Racine (“zhawn rah-SEEN”) play, frames her stepson and Theseus’s son Hippolytus in a fit of jealousy.

ANSWER: Phaedra [or Phèdre; accept Phaedra’s *Love*]
<Drama, JC>

7. Under the Howell code, settlers of this state established a “first in time, first in right” doctrine for water use. Settlers of this state irrigated their farms with refurbished canals built by the ancient Hohokam (“ho-HO-kum”) culture. Jimmy Carter faced severe pushback when his “hit list” targeted a “Central Project” that managed this state’s water. The 1902 Newlands Reclamation Act funded the creation of a dam in this state named for the sitting president, the (*) Theodore Roosevelt Dam. The huge growth of this state’s major city in the late 20th century can be credited to the nation’s largest nuclear power station at Palo Verde, as well as the Salt River Project that manages the city’s water supply. Lake Powell was created by the construction of this state’s Glen Canyon Dam. For 10 points, name this state whose cities include Tombstone, Tucson, and Phoenix.

ANSWER: Arizona
<US History, WA>

8. A compound containing this element, which is used to hydrogenate 1,3-dienes, adopts a “piano-stool” geometry due to the presence of an aryl group. Hein reacted a salt of this element with phenylmagnesium bromide to yield the first arene-containing sandwich compound. Fischer was the first chemist to characterize a carbene that contains five carbonyl groups coordinated to this element. When supported on silica gel, this element’s oxide forms the Phillips catalyst, which is used to produce polyethylene. (*) Six equivalents of this element bonded to chlorine catalyzes the Takai olefination for generating alkenes. This element is mixed with pyridines in PDC and the Corey–Suggs reagent. When mixed with sulfuric acid, this metal’s trioxide forms the Jones reagent. For 10 points, name this highly toxic metal whose atomic number is 24 and whose symbol is Cr.

ANSWER: chromium [accept Cr until read]
<Chemistry, RRP>

9. Frescoes of people performing this activity were found at Toquepala (“toh-kay-PAH-lah”). Early interpretations of a painting executed in “twisted perspective” called the “Accident Scene” claimed that it showed this activity gone awry. Henri Breuil (“on-REE BRUH-ee”) theorized that rituals pertaining to this activity are depicted in the art of a complex that caused Pablo Picasso to quip “we have learned nothing in twelve (*) thousand years.” Stick figures perform this activity in the paintings at the Altamira complex. The standard anthropological interpretation is that rituals pertaining to this activity, or this activity itself, is depicted on the paintings at Lascaux (“lah-SKOH”) caves. For 10 points, identify this activity performed by cavemen in which wild animals, such as bison and woolly mammoths, are killed.

ANSWER: hunting [accept specific types of hunting such as lion hunts or bison hunts; do not accept or prompt on “bullfights” or “fighting bulls”]

<Painting/Sculpture, WA>

10. A Michel Foucault essay uses another writer’s essay titled for this concept to contextualize Charles Baudelaire’s writings about the painter Constantin Guys (“gheez”). Samuel Moyn critiqued a “package logic” developed in Jonathan Israel’s history of this concept’s “radical” form. István Hont (“EESHT-vahn hohnt”) and Michael Ignatieff traced the invention of political economy to the particular historical instance of this concept in Scotland exemplified by Dugald Stewart, Francis Hutcheson, and (*) Thomas Reid.

Neo-reactionaries may call themselves the “Dark” version of this movement. Its motto was proposed to be *Sapere aude* (“SAH-peh-ray OW-day”), or “Dare to know,” in an essay asking what it is by Immanuel Kant. For 10 points, name this European intellectual movement that emphasized reason.

ANSWER: Enlightenment [or Aufklärung; accept Radical Enlightenment or Counter-Enlightenment or Dark Enlightenment or Scottish Enlightenment “What is Enlightenment?” or “Was ist Aufklärung?”]

<Thought, WA>

11. This author described a mother traveling in a palanquin (“pal-an-KEEN”) protected by her son from bandits in the poem “The Hero.” A poem by this non-Chilean author that begins “You are like the cloud floating in my dreams” was ripped off by Pablo Neruda to create the sixteenth of the *Twenty Love Poems*. This author of the collection *The Gardener* bid “let me carry the pangs of this sorrow in my dreams and in my wakeful hours” in the poem “Let Me Not Forget.” He imagined a place (*) “Where the mind is without fear” in a nationalistic poem that proclaims “Let my country awake!” This poet described himself as a “frail vessel” filled by the divine, who “hast made me endless, such is thy pleasure,” in the first line of a collection of religious “Song-Offerings.” For 10 points, name this Bengali author of *Gitanjali* (“gee-TAHN-juh-lee”).

ANSWER: Rabindranath Tagore

<Non-Epic Poetry, WA>

12. It’s not Russia, but early wars involving this modern-day country’s Tavastian people are described in the First Chronicle. An English clergyman named Henry was killed in this country during a 12th-century campaign led in this modern-day country by Eric the Lawgiver. Territories in this country that comprised Österland (“UR-stair-lahnd”) were ceded after a short war that ended in 1809. This country’s name originally referred to the area around the port of Åbo (“OH-boh”), which is locally known as (*) Turku. This is the [emphasize] *original* home of the Kven people, who migrated to the north west. Birger Jarl (“yarl”) led the 13th-century invasion that put much of this country under Swedish rule for six centuries until it became a Grand Duchy under Russian control. For 10 points, name this country whose regions include Karelia and which is governed from Helsinki.

ANSWER: Finland [or Suomi]

<Continental post-600 History, WA>

13. A document released by the USCCB subtitled *The Church's Constant Teaching* argues that the Church has condemned this practice since the 1st century. In 2015, Pope Francis allowed all priests to remit the penalty of excommunication for this practice. According to the Septuagint translation of Exodus 21:22, the target of this action can be “formed” or “unformed,” resulting in a question of immediate or delayed (*) animation that was resolved by Pius IX, who restored penalties for this practice at any point in time. *Gaudium et spes* calls this practice an “unspeakable crime,” a use of terminology that is repeated by Pope John Paul II’s *Evangelium vitae*. For 10 points, the Catholic Church condemns what operation that results in the death of an unborn baby?

ANSWER: **abortion** [prompt on contraception or birth control]

<Religion, NB>

14. In the frame story of a novel titled for this physical action, an old man and a boy hide in a burned-out bus, where they discover the notebooks of Kindzu. After a character who performs this action exits, a man remarks “My mind she has mated, and amazed my sight. I think but dare not speak.” This action describes lands ravaged by the Mozambican Civil War in the title of a Mia Couto (“KOO-toh”) novel. In a famous 1794 interpretation of a character doing this action, a candle was controversially (*) placed on the ground by Sarah Siddons. A character who does this action claims that “the Thane of Fife had a wife” while speaking with a doctor and gentlewoman, and says “All the perfumes of Arabia will not sweeten this little hand.” For 10 points, what action names a famous scene in which the line “Out, damned spot!” is spoken by Lady Macbeth?

ANSWER: **sleepwalking** [or **somnambulation**; accept *Sleepwalking Land* or Terra *Sonnambula*]

<Misc. Lit, WA>

15. This composer used both 3/4 (“three-four”) and 9/8 (“nine-eight”) time in the *Allegro spiritoso* finale of his three-movement Symphony in C. His only piano sonata is in E-flat minor and is dedicated to Camille Saint-Saëns (“kuh-MEE san-SAWNS”). In a tone poem by this composer, three bassoons introduce a bouncy F minor theme in 3/8 (“three-eight”) time consisting of two long notes “F, high C,” followed by short notes rising from low C to F. Another passage from that tone poem by this composer features the glockenspiel and uses cymbal clashes to depict the axe strokes of a boy who desperately tries to (*) stem the flooding of a workshop. A tone poem by this composer, subtitled “Scherzo after a ballad by Goethe,” was illustrated in *Fantasia* by Mickey Mouse animating broomsticks to life. For 10 points, name this French composer of *The Sorcerer’s Apprentice*.

ANSWER: Paul **Dukas** (“due-KAHSS”)

<Classical Music/Opera, WA>

16. The creation of these substances features a hit-to-lead (“hit-to-lead”) stage that is followed by a lead-optimization stage that may rely on QSAR models. These substances are assumed to be present throughout the distribution volume in single compartment models. The acronym ADME is a set of criteria that evaluate these substances. These substances are stabilized using excipients composed of cellulose that act as binders or bulking agents. Hydroxylation by (*) cytochrome p450s occurs in phase I of the breakdown of these substances. The first-pass effect due to hepatic absorption can reduce the bioavailability of these substances, which are prefixed with “pro-” if they are activated by metabolism. For 10 points, the bodily effects of what xenobiotic substances are studied in pharmacokinetics?

ANSWER: **drugs** [or **medications**; accept **pharmaceuticals** before “pharmacokinetics”; anti-prompt on specific answers like pills or tablets by asking “can you be less specific?”; prompt on medicines]

<Biology, AK>

17. Marxist philosopher David Bohm lambasted the developers of this idea as people who “discard scientific facts in order to reach conclusions convenient to the Catholic Church.” Former BBC producer Simon Singh

wrote a 2004 book about the origins of this title idea. In a 1951 address to the Pontifical Academy of Sciences, Pope Pius XII praised this scientific idea, though he was told that his interpretation was incorrect by the Belgian priest who wrote the 1931 paper credited with developing it, (*) Georges Lemaître (“luh-MET-ruh”). This idea was called “repugnant” by Arthur Eddington. Fred Hoyle coined the name for this idea on a BBC show to contrast it with the “steady state” model. About 10-to-the-negative-36 seconds after this event, the era of inflation began. For 10 points, name this event that, according to prevailing cosmological theory, began the universe.
ANSWER: the **Big Bang** [prompt on answers referring to the expansion of the universe]
<Other/Misc Academic, WA>

18. Book II of the *Metamorphoses* opens with a description of this god’s palace, where he swears an oath to the River Styx. In Book XII of the *Odyssey*, this god incites Zeus to make animal skins crawl around and scream for six days and nights as punishment. This father of Lampetia makes a voyage [emphasize] *every night* floating across the northern streams of Oceanus. Both Tiresias and Circe warn Odysseus about this god’s sacred island of (*) Thrinacia, where his men are later thunderbolted for eating the holy cattle of this god. This god lends his golden goblet to Heracles to help him travel west for his tenth labour. In the *Metamorphoses*, this god fails to dissuade his mortal son from a fatal journey driving this god’s chariot across the sky. For 10 points, name this father of Phaethon who is often identified with Apollo due to their roles as gods of the Sun.
ANSWER: **Helios**
<Mythology, KL>

19. A “realist” theory of these events is presented as an alternative to a “folk theory” in a 2017 book by Christopher Achen and Larry Bartels. Ray Fair created a predictive model linking these events to changes in GDP. These events are used to demarcate several systems in a cyclical framework advocated by Walter Burnham (“BURN-um”). Odd outcomes of these events may result from violations of the monotonicity criterion. (*) “Critical” examples of these events may bring about a “realignment.” If there is no “prophet” or “dictator,” then these events cannot produce a community-wide transitive ranking when they involve multiple options, according to Arrow’s impossibility theorem. Plebiscites are an example of, for 10 points, what events that democracies use to choose leaders?
ANSWER: **elections** [accept critical **election** or realignment **election**; prompt on votes or voting]
<Social Science: PoliSci, WA>

20. The murderer of Seleucus I, Ptolemy Keraunos, was killed by a group of these people led by Bolgius (“BOL-gee-us”) two years after becoming king of Macedon. Three groups of these people, the Tolistobogii (“toh-list-oh-BOH-gee”), Trocmii, and Tectosages (“tek-toh-SAH-ges”), belonged to the Volcae (“VOL-kye”) confederacy. Strabo records that a number of these people threw the treasures that they stole into lakes because they believed that the treasures were cursed. These people (*) ransacked Delphi after winning a battle at Thermopylae, after which some groups of them settled in Anatolia and became the Galatians. An invasion by these people was repulsed by Marcus Camillus Furius after sacking Rome; that invasion, like their invasion of Greece, was led by a man with the title Brennus. For 10 points, name these Celtic inhabitants of modern-day France.
ANSWER: **Gauls** [accept **Volcae** before “Volcae”; accept **Galatian**s before “Galatians”; prompt on Celts or Keltoi]
<Ancient History, WA>

Bonuses

1. The speaker of a poem receives an unusual, mostly-blank letter from one of these people who had been dead for forty years in “The Mysterious Arrival of an Unusual Letter.” For 10 points each:

[10] Identify these people, one of whom waltzes with the speaker in a Theodore Roethke (“RET-kee”) poem that recalls whiskey-scented breath. Dylan Thomas’s “Do not go gentle into that good night” has been interpreted as an elegy written for a person of this type.

ANSWER: **fathers** [or **dads** or **papas** or equivalents; accept “the child is the **father** of the man”; accept “My **Papa**’s Waltz”]

[10] “The Mysterious Arrival of an Unusual Letter” was written by this poet who published “Delirium Waltz” in *Blizzard of One*. This author known for prose poetry wrote “In a field / I am the absence / of field” in the rather depressing “Keeping Things Whole.”

ANSWER: Mark **Strand**

[10] Strand’s poem “2002” says, “I am not thinking of” this being, but this being “is thinking of me.” Emily Dickinson wrote the poem “Because I could not stop for” this being.

ANSWER: **Death**

<Non-Epic Poetry, JC>

2. The speakers of Tsakonian dialects, the linguistic descendents of Laconic dialects, have been largely marginalized through this country’s language standardization. For 10 points each:

[10] Name this country where late-18th-century revolutionaries created the conservative dialect *katharevousa* in order to speak a language more like their ancient forefathers, who spoke the *koine* (“koy-NAY”) dialect.

ANSWER: **Greece** [or Republic of **Greece**; or **Hellenic** Republic]

[10] This adjective names the form of common Greek speech that became the country’s standard language via reforms passed in 1982. This adjective also refers to a form of ancient Egyptian writing used by common people, as opposed to priests or royal scribes.

ANSWER: **Demotic** [or **Dimotiki** or **dēmotikós**]

[10] The language reform was carried out during one of the three terms that this founder of the PASOK party served as Prime Minister. When elected in 1981, he became Greece’s first socialist prime minister.

ANSWER: **Andreas Papandreou** [prompt on **Papandreou**; do not accept or prompt on “George Papandreou”]

<Continental post-600 History, WA>

3. The FHIR (“fire”) standard aims to improve interoperability between these systems. For 10 points each:

[10] Identify these systems. In 2018, the Department of Veterans Affairs finalized a deal with Cerner, which is the second-largest provider of these systems in the US behind Epic.

ANSWER: **electronic medical records** systems [or **electronic health records** or **EMRs** or **EHRs**; prompt on partial answers such as **medical records** or **health records**; do not accept or prompt on “health systems” or “hospitals” or “health practices”]

[10] The security of information from EMRs is regulated by this 1996 law, whose requirements were extended by the HITECH act of 2013. In 2017, Memorial Health Systems was fined 5.5 million dollars for violating this law by improperly accessing the records of over 100,000 patients.

ANSWER: **HIPAA** (“HIP-uh”) [or **Health Insurance Portability and Accountability Act** of 1996]

[10] A May 2018 report by this Cabinet department found that its Health Agency sites violated HIPAA by failing to implement correct EMR security protocols. It encompasses the Army, Navy, and Air Force.

ANSWER: United States Department of **Defense** [or **DoD** or **USDoD**]

<Other/Misc Academic, WA>

4. The energy associated with these structures can be calculated as a function of the shear modulus, the Burgers vector, and spacing, according to the Read–Shockley equation. For 10 points each:

[10] Name these structures that come in tilt and twist varieties and can also be classified as low-angle or high-angle depending on the degree of misorientation.

ANSWER: **grain boundaries** [prompt on **boundaries**; prompt on, but DO NOT REVEAL, crystal **defects**]

[10] Grain boundaries are an example of the planar type of these phenomena, examples of which include Frenkel pairs and screw and edge dislocations, whose distortion is quantified by the Burgers vector.

ANSWER: crystal **defects** [or crystallographic **defects**]

[10] A type of crystal defect known as a stacking fault is common in lattices that have this crystal structure, which comes in face-centered and body-centered types and has a unit cell with equal height, length, and width.

ANSWER: **cubic** [accept **cube**; accept face-centered **cubic** or body-centered **cubic**]

<Physics, AK>

5. This author’s story “Gusev” is based on a real-life burial at sea that he witnessed during a journey to Sakhalin. For 10 points each:

[10] Name this author who also used a seaside setting to open a story in which a misogynistic man befriends the wife of the nobleman Von Diderits.

ANSWER: Anton **Chekhov** (The other story is “Lady with a Dog.”)

[10] This author’s short story “The Three Hermits” depicts three pilgrims and a bishop traveling by sea to Archangel. This author’s works of short fiction include *The Death of Ivan Ilyich*.

ANSWER: Leo **Tolstoy**

[10] This Russian short story describes the exploits of Tiberius on the island of Capri while briefly digressing from narrating a journey on the cruise liner *Atlantis* by an unnamed American robber baron.

ANSWER: “The **Gentleman from San Francisco**” [or **Gospodin iz San-Frantsisko**] (by Ivan Bunin)

<Short Fiction, WA>

6. During Kanyadan, the bride and groom may hold one of these objects while the bride’s family pours water or milk over it. For 10 points each:

[10] Identify these objects whose use in rituals is often credited to Adi Shankara (“uh-DEE SHAHN-kuh-ruh”) because of his condemnation of animal and human sacrifices.

ANSWER: **coconuts**

[10] Because coconuts are a favorite fruit of this god, Hindus will often smash coconuts for auspicious beginnings like buying a new house or car. This god’s head was replaced with an elephant’s after his father Shiva beheaded him.

ANSWER: **Ganesha** [or **Ganapati**, **Vinayaka**, or other names]

[10] Coconuts adorned with *tilak* will often be placed atop a *kalasha* or *poornakumbham* during these ceremonies. These ceremonies, including one devoted to Sathyanarayan, may include coconuts as offerings to gods.

ANSWER: **pujas** [or **poojas**]

<Religion, PC>

7. The Procede (“proh-SEH-deh”) system, introduced by Carlos Salinas in 1993, introduced individual land ownership into these things, effectively aiming to eliminate them. For 10 points each:

[10] Name these communal land units that were reintroduced to Mexico by Lazaro Cardenas through large scale expropriation of the land of elite landowners.

ANSWER: **ejidos** (“eh-HEE-dohs”)

[10] This Mexican revolutionary and promulgator of the Plan of Ayala was a proponent of the *ejido* system.

ANSWER: Emiliano **Zapata**

[10] Salinas legalized the privatization of *ejidos* as part of his economic liberalization program, which facilitated Mexico's entry into this 1994 agreement with the US and Canada to reduce trade barriers.

ANSWER: **NAFTA** [or **North American Free Trade Agreement**]

<World History, EL>

8. Lady Augusta Gregory collected a number of stories about this man and published them in translation in 1902, but left out some of his more exotic traits such as spiky hair. For 10 points each:

[10] Name this hero who is forbidden to eat dog's meat by a *geis* ("gesh") curse that eventually causes his demise.

ANSWER: **Cú Chulainn** ("koo KULL-in") [or **Setanta**; accept **Cuchulain** of *Muirthemne*]

[10] Cú Chulainn is a hero from the "cycle" of stories named for and set in this northern region of Ireland whose flag contains a red hand.

ANSWER: **Ulster** [accept **Ulster Cycle**]

[10] Among Cú Chulainn's strange features is this ability, which he once triggered by sucking in his eye, and which monstrously alters his body to make him formidable in battle. You may give either the Irish term or either of the two common English translations, used by Thomas Kinsella and Joseph Campbell.

ANSWER: **riastrad** ("REE-uh-strahd") [or **warp-spasm** or **hero's paroxysm** or **hero paroxysm**; do not accept or prompt on partial answers]

<Mythology, WA>

9. According to legend, Anna Strong hung a black petticoat and different numbers of white handkerchiefs to relay information about people performing this action. For 10 points each:

[10] Name this practice for which James Jay developed the "sympathetic stain" invisible ink. Nathan Hale was hanged for this practice.

ANSWER: **espionage** [or **spying** for the United States during the Revolutionary War]

[10] George Washington's most organized espionage effort was the development of this spy group that was helped by Hercules Mulligan and his spy Cato. Abraham Woodhull and Robert Townsend were this group's main spies.

ANSWER: **Culper** Ring

[10] The Culper Ring's army contact was a general with this last name who led the successful raid on Fort St. George. A later congressman with this last name proposed Missouri's admittance to the union as a free state in an amendment to the Missouri Compromise.

ANSWER: **Tallmadge** [accept Benjamin **Tallmadge** or James **Tallmadge**; accept **Tallmadge Amendment**]

<US History, EL>

10. This combination of techniques is considered to be a gold standard in forensics and drug tests, in part because tandem analytic techniques are extremely costly. For 10 points each:

[10] Name both of these techniques. Issues of co-elution ("koh-ee-LOO-shun") that occur in the first technique, which often uses a thermal conductivity detector, are ameliorated by the output of the second technique, whose instruments are set to SIM or SCAN modes.

ANSWER: **gas chromatography** AND **mass spectrometry** [accept **GC-MS**; prompt on **chromatography** for the first of the two answers; do not accept or prompt on any other type of chromatography]

[10] In a typical GC-MS setup, the analyzer typically consists of rods in this configuration. Magnets in this configuration are used to focus beams in particle accelerators.

ANSWER: **quadrupole**

[10] While helium is often the preferred mobile phase carrier in the gas chromatography component, this other noble gas with atomic number 18 is often used instead.

ANSWER: **argon** [prompt on **Ar**]

<Chemistry, WA>

11. This printmaking technique was named for the fact that it did not require the use of acid, unlike traditional etching. For 10 points each:

[10] Name this printmaking technique in which the artist uses a needle to directly scratch a metal plate. Scratching in this technique often leaves a burr behind, which absorbs ink to create very dark parts of the print.

ANSWER: **drypoint** [prompt on intaglio printmaking]

[10] Light streams down on three crucified men in *The Three Crosses*, a drypoint etching by this artist of the *Hundred Guilder Print*. This artist created his last print a year before he painted a group of six syndics of a guild judging the quality of some fabric.

ANSWER: **Rembrandt** van Rijn

[10] Rembrandt's etchings in this genre include several *tronies* of himself in Eastern costumes. His paintings in this genre include one in front of two circles in which he wears a beret and another of himself "as Zeuxis."

ANSWER: **self-portraits** [prompt on portraits]

<Painting/Sculpture, AK>

12. Answer the following about Chinese folk songs, for 10 points each.

[10] The popular song "Meet in Yurt" originates from in this Asian country. It is home to a style of throat-singing that is similar to throat-singing in the neighboring Tuva Republic.

ANSWER: **Mongolia** [or **Monggol Uls**]

[10] Many songs and a Chinese violin concerto were inspired by a tale about the lovers Liang Shanbo ("lyong shahn-bo") and Zhu Yingtai ("joo yeeng-tie"), who turn into these animals after death. The Opus 2 piano suite by Robert Schumann is titled for these animals and depicts a masked ball.

ANSWER: **butterflies** [accept **Butterfly** Lovers Violin Concerto; accept **Papillons**; prompt on insects]

[10] A popular Qing-era folk song that describes this plant's sweet, budding flowers was adapted by Giacomo Puccini to represent the splendor of the title princess in his opera *Turandot*. In 2011, pro-democracy protesters in China sung that song named for this plant during a revolution of the same name, resulting in the song's censorship.

ANSWER: **jasmine** [accept **Jasmine** Revolution; accept **Mòlihuā**]

<Other Art: Misc Auditory, WA>

13. A so-called "tortoise" example of these things goes to negative infinity as the Schwarzschild ("SHWARTZ-shilled") radius approaches $2GM$. For 10 points each:

[10] Identify these things. Arthur Eddington and David Finkelstein independently proposed one of these things that extends the Schwarzschild metric across the event horizon.

ANSWER: **coordinates** [or **coordinate systems**; accept tortoise **coordinates** or Eddington–Finkelstein **coordinates**]

[10] Eddington–Finkelstein and Kruskal–Szekeres ("SEH-keh-resh") coordinates are used to simplify calculations regarding these objects, beyond whose event horizons not even light can escape.

ANSWER: **black holes** [prompt on singularity]

[10] A lecture by this physicist was the first to actually use Eddington–Finkelstein coordinates to model black holes beyond the event horizon. With Stephen Hawking, this physicist proved a set of singularity theorems showing that geodesic incompleteness occurs in all black holes.

ANSWER: Roger **Penrose** [accept **Penrose**–Hawking singularity theorems]

<Other Science: Astronomy, WA>

14. This river originates in the state of Mato Grosso in Brazil and flows for about 2,600 kilometers before confluencing with the Paraná River. For 10 points each:

[10] Name this river. The capital of a country with the same name is Asunción ("ah-soon-s'YONE").

ANSWER: **Paraguay** River

[10] The confluence of the Paraguay and Paraná Rivers is found along the southern border of this Argentine province, which takes its name from an archaic pronunciation of the word “beautiful.” Coincidentally, this province is nearly antipodal to an island that was also once known by this name.

ANSWER: **Formosa**

[10] This largest wetland in the world is fed by the Paraguay River, which separates it from the Gran Chaco. It is home to the endangered hyacinth macaw and populations of the marsh deer.

ANSWER: **Pantanal**

<Geography, BD>

15. This author’s 2018 book *Bullshit Jobs* analyzes work that fosters a “simmering resentment” against people “whose work has clear and undeniable social value.” For 10 points each:

[10] Name this activist and author of *Fragments of an Anarchist Anthropology*. This author’s best-known book illustrates how the title concept originated in Sumer and replaced “human economies” over 5,000 years.

ANSWER: David **Graeber** (The book is *Debt: The First 5,000 Years*.)

[10] Graeber calls interactions between people in which a return is not expected an “everyday” form of this system. In *Bullshit Jobs*, Graeber jokes that capitalism was supposed to eliminate bullshit jobs, unlike this economic system of the USSR.

ANSWER: **communism** [accept everyday **communism**]

[10] Graeber studied under this anthropologist and anti-Vietnam War protest leader, with whom he collaborated on the monograph “On Kings.” This thinker coined the term “primitive communism” in *Stone Age Economics*.

ANSWER: Marshall **Sahlins**

<Social Science: Anthropology, EL>

16. Many examples of these taxes were eliminated by the Anglo-French Cobden–Chevalier Treaty. For 10 points each:

[10] Identify this general kind of tax exemplified by the Corn Laws. The Liberal Party strongly opposed these taxes, which came back into vogue in the late 19th century thanks to German and US protectionism.

ANSWER: **tariffs** [prompt on any answer mentioning **trade**]

[10] In the late 19th and early 20th centuries, Joseph Chamberlain promoted of this set of policies, which would have promoted free trade among British dominions and colonies, while imposing high tariffs on goods from outside them. The popularity of this scheme was revived in the Depression by the Bennett government in Canada.

ANSWER: **Imperial Preference** [or **Commonwealth Preference**]

[10] Canada abandoned its plan to adopt an Imperial Preference scheme under this Liberal Prime Minister, who both preceded and succeeded Bennett.

ANSWER: William Lyon Mackenzie **King** [do not accept or prompt on “William Lyon Mackenzie”]

<British/CW History, WA>

17. Josef Lhévinne (“lay-VEEN”) described a so-called “Russian” example of this dynamic marking in which the performer emphasizes a peak in the music by actually getting softer at the end of a phrase. For 10 points each:

[10] Give this Italian word that normally instructs a performer to increase in volume.

ANSWER: **crescendo** (“kruh-SHEN-doh”) [accept Russian **crescendo**]

[10] The term “Russian crescendo” was coined to describe how this composer played these pieces as a soloist himself. This composer wrote the third of these pieces, a very difficult piece in D minor, for his 1909 US tour.

ANSWER: **piano concertos** by Sergei **Rachmaninoff** [prompt on **piano concertos** by asking for the composer; prompt on **concertos** by **Rachmaninoff** by asking for the instrument; prompt on **concertos** by asking for both]

[10] This contemporary Russian pianist’s interpretations of Chopin sometimes feature Russian crescendos. This pianist with a serious Jewfro played Mozart’s Piano Concerto No. 20 for his debut at age 10, and gave the first solo recital ever featured at the Proms in 1997.

ANSWER: Evgeny **Kissin**
<Classical Music/Opera, WA>

18. Answer the following related to women's exploration of the UK immigrant experience, for 10 points each.

[10] This Bangladeshi-born British novelist wrote the novel *Brick Lane* about the title neighborhood of Bangladeshi immigrants.

ANSWER: Monica **Ali**

[10] Xiaolu Guo ("sh'yao-loo gwoh") wrote a novel whose protagonist, a Chinese immigrant woman in the UK, writes one of these books "for lovers." Samuel Johnson created a famous example of these books.

ANSWER: **dictionary** [accept *A Concise Chinese-English Dictionary for Lovers*]

[10] British-Nigerian author Buchi Emecheta's novel *Gwendolen* follows a girl of this nationality who is sexually abused by Uncle Johnny. In Zadie Smith's novel *White Teeth*, the Jehovah's Witness Clara Bowden and her mother Hortense are both of this nationality, which is also the nationality of Zadie Smith's mother.

ANSWER: **Jamaican** [or **Jamaica**]

<Long Fiction, WA>

19. Lenore Fahrig's research mainly focuses on this process, including how the construction of roads can contribute to it. For 10 points each:

[10] Name this process that can produce metapopulations, or spatially separated populations of the same species. In this process, the continuous environment that organisms inhabit is divided into smaller environments.

ANSWER: habitat **fragmentation** [or population **fragmentation**; prompt on **habitat loss**]

[10] Habitat fragmentation can result in the loss of this property, the amount of ecological and genetic variation in an area. This property is high in "hotspots" near the equator like Madagascar.

ANSWER: **biodiversity** [or species **diversity** or species **richness**]

[10] Habitat fragmentation results in these effects that can occur in ecotones. An example of these effects is the brood parasitism of the brown-headed cowbird, which lays its eggs in other birds nests at the periphery of forests.

ANSWER: **edge** effects

<Biology, AK>

20. This poet's Pulitzer-winning collection *Divine Comedies* contains "The Book of Ephraim," which describes a number of conversations with friends in another world. For 10 points each:

[10] Name this American poet who used a ouija ("WEE-juh") board to write *The Changing Light at Sandover*.

ANSWER: James **Merrill**

[10] Matt, a character from *The Changing Light at Sandover*, shares this surname with Merrill's long-term partner, David. An author with this surname wrote about a town sacrificially stoning one of its residents in "The Lottery."

ANSWER: **Jackson** [accept Matt **Jackson** or David **Jackson** or Shirley **Jackson**]

[10] Merrill's poem titled "For" this author opens "You stop for breath outside the lit hotel," referencing this author's asthma. The poem later states "There had been a little phrase / She hummed," referencing a novel by this author in which a "little phrase" in a violin sonata evokes the narrator's love.

ANSWER: Marcel **Proust** [accept "For **Proust**"]

<Misc. Lit, WA>

