

ACF Regionals 2020

Packet L by Columbia B, Dallas A, Georgia Tech A, Liberty A, and Michigan State A

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Tossups

1. The reuptake of these molecules is inhibited by AM404, a metabolite of acetaminophen. The activation of a type of receptor for these molecules causes depolarization-induced suppression of inhibition. In 2018, the FDA approved the use of one of these molecules called Epidiolex to treat Lennox–Gastaut (“LEN-ux gas-TOH”) syndrome and Dravet (“dra-VAY”) syndrome. Raphael Mechoulam (“meh-shoo-LOM”) performed a total synthesis of one of these molecules and discovered 2-arachidonoylglycerol (“2-uh-RACK-id-on-oil-glycerol”) and anandamide, which are endogenously produced examples of these molecules that bind to the CB1 and CB2 receptors. A diol member of this class of molecules is non-psychoactive and often administered in the form of an oil. For 10 points, name this group of molecules, one of which is responsible for the psychoactive effects of marijuana.

ANSWER: **cannabinoids** [or endo**cannabinoids**; or phyto**cannabinoids**; prompt on THC or tetrahydrocannabinol or CBD or cannabidiol by asking “what class of molecules does that belong to?”; prompt on CB1 or CB2 receptor] <Biology>

2. This practice “in miniature” titles a Laurie Patton essay arguing for etymological religious scholarship, in response to an essay titled for this practice that critiques “Pan-Babylonian” comparisons, by Jonathan Z. Smith. The Mithras Liturgy and other Hellenized Greek Papyri instruct readers in this practice, which modifies a “garden” in Max Weber’s (“VAY-bur’s”) vision of the pre-modern world. A “sacred” version of this practice was outlined in *The Book of Abramelin*, an influential grimoire (“grim-WAHR”). In Acts, a Gnostic leader wows people with this practice before Peter converts him. The Samaritan Simon mastered this practice, which a woman from Endor uses to summon Samuel for Saul. This belief is a precursor of religion according to *The Golden Bough* (“bao”). For 10 points, name this practice persecuted by witch trials.

ANSWER: **magic** [or **sorcery** or **enchantment**; accept **witchcraft** or the **Witch** of Endor; accept the **occult** or **divination** or **necromancy**; prompt on supernatural; accept Simon **Magus**; accept Greek **Magical** Papyri; prompt on flying or levitation by asking “what power let Simon fly?”] (The Jonathan Smith essay is “In Comparison a Magic Still Dwells.”) <Religion>

3. In this artwork, the odd shift of a robe’s hue from green to yellow exemplifies the *cangiantismo* (“kahn-jahn-TEEZ-mo”) technique. That detail has been used to argue that the restoration of this artwork in the 1980s destroyed a wash of glue and carbon black. In this artwork, garlands of oak and bronze medallions frame the image of a bearded figure reaching his hands into clouds. A sonnet by its artist claims that creating this artwork “jammed [his] belly under [his] chin” and gave him a goiter. A muscular woman turns to lift a giant book in this artwork’s depiction of the Libyan Sibyl. Twenty male *ignudi* (“een-YOO-dee”) appear in this artwork, which includes *The Separation of Light from Darkness* and a painting centered on two outstretched fingers. For 10 points, *The Creation of Adam* is part of what set of frescoes by Michelangelo?

ANSWER: **Sistine** Chapel **ceiling** [or **Volta** della Cappella **Sistina**; prompt on the Sistine Chapel; anti-prompt on *The Separation of Light From Darkness* until “Separation” is read by asking “can you be less specific?”] <Painting/Sculpture>

4. A character in a poem by this author remarks how he may “seem more bitter to your taste / Than herb Sardinian, rougher than the broom, / More worthless than strewn sea-weed.” Gavin Douglas’s full vernacular translation of a

poem by this author was praised by Robert Fitzgerald in an essay centering on John Dryden's landmark translation of it. The line "love conquers all; let us, too, yield to love" appears in the last poem of a collection by this author that borrowed its structure from Theocritus's *Idylls* ("idles"). A poem by this author that praises Gaius Asinius Pollio has been theorized to concern Jesus Christ due to its mention of a "great progeny of Jove." An epic poem by this author opens with the line "I sing of arms and the man." For 10 points, name this poet of the *Eclogues* and the *Aeneid*.

ANSWER: **Virgil** [or Publius **Vergilius** Maro]

<World/Other Literature>

5. "Wanton addicts" with no second-order desires cease to be people and lose this status according to a paper that presents the "hierarchical mesh model." Susan Wolf argued that having this status is the same as having the ability to do what one thinks is right, in a book titled for this "within Reason." Robert Kane is among the philosophers who endorse the libertarian view on this status, which he explores in a book he titled for this status "and Values."

"Reactive attitudes" are presented in a P. F. Strawson essay whose title pairs this status with resentment. Frankfurt cases challenge the view that moral responsibility requires this status. The position of compatibilism states that this status is compatible with determinism. For 10 points, name this status in which one has control over their actions.

ANSWER: having **free** will [accept **freedom** or being **free**; accept "**Freedom** and Resentment"; accept **Freedom and Values**; accept **autonomy**] (The paper in the first sentence is Harry Frankfurt's "Freedom of the Will and The Concept of a Person.")

<Philosophy>

6. A member of this group named George Maynard brought a compelled speech case to the Supreme Court after covering the "Live Free or Die" motto on his New Hampshire license plate. The Court ruled that the First Amendment did not cover "fighting words" in *Chaplinsky v. New Hampshire* after a member of this organization who distributed pamphlets called a cop a "racketeer." Members of this group were the plaintiffs in *West Virginia v. Barnette*, which reversed an earlier decision that upheld the expulsion of the Gobitis children for their refusal to salute the flag. A 2009 Canadian court case over children's legal competence arose out of this sect's refusal to accept blood transfusions. For 10 points, name this Christian denomination that publishes *The Watchtower* and meets in Kingdom Halls.

ANSWER: **Jehovah's Witnesses** [prompt on **JW**; prompt on **Christians** or **Protestants** by asking "of what denomination?"]

<American History>

7. In X-ray crystallography, the X-rays can cause these phenomena, forming a namesake field that can be investigated to resolve the phase problem. The closeness of the load impedance to the characteristic impedance ("im-PEE-dense") in transmission lines can be evaluated by using a ratio named for these phenomena, which is the ratio of the maximum to minimum AC voltages, as impedance mismatch causes these phenomena. Microwave cavities create these phenomena in the cavity's interior at its resonant frequency. In one dimension, these phenomena arise from the superposition of two waves with the same frequency and amplitude and opposite propagation velocities, which can result from reflection of a travelling wave at the end of the medium. For 10 points, name these phenomena whose nodes and antinodes do not move in space, often demonstrated via shaking a toy slinky or jump rope.

ANSWER: **standing waves** [or **stationary waves**; accept X-ray **standing waves** or X-ray **standing wave** field; accept (voltage) **standing wave** ratio; "wave" is not needed after read; prompt on **waves** until read]

<Physics>

8. A 2017 opera with a name inspired by an earlier opera by this composer draws on the letters of Louise Clappe and the newspaper articles of Mark Twain and is the most recent opera by John Adams. After writing the song "Avalon," Al Jolson was sued by this composer's publisher, who claimed that the song plagiarized a B minor tenor aria by this

composer that opens with a clarinet solo. An opera by this composer includes a tenor aria, “Ch’ella mi creda,” sung by the bandit Dick Johnson, who asks a crowd not to mention his fate to Minnie. The aria “E lucevan le stelle” (“ay loo-CHAY-von lay stell-ay”) is sung by Caravadossi to the title diva of another opera by this composer, who herself sings “Vissi d’arte” while being manipulated by Baron Scarpia. For 10 points, name this composer of *The Girl of the Golden West* and *Tosca*.

ANSWER: Giacomo **Puccini**

<Other Arts (Opera)>

9. After two characters in this play make wishes on the rising moon, one reveals that she asked for “success and happiness for my precious children.” A character in this play autographs a program of a high school production of *The Pirates of Penzance* in a scene that’s lit by candlelight, since another character paid for a membership in the Union of Merchant Seamen instead of the light bill. In this play, a shoe warehouse worker nicknamed “Shakespeare” warns that this play will be “sentimental... and not realistic” as “memory takes a lot of poetic licence.” At the end of this play, a character nicknamed “Blue Roses” is told to “blow out the candles” by Tom. For 10 points, the “gentleman caller” Jim accidentally breaks a unicorn from the title collection of Laura Wingfield’s figurines in what Tennessee Williams play?

ANSWER: *The **Glass Menagerie***

<American Literature>

10. Rafaela Herrera defended this country’s pirate-proof Fortress of the Immaculate Conception. Shipwrecked slaves and the Mayangna formed this country’s Sambu people. A [emphasize] *neighboring country’s* national hero Juan Santamaría set fire to a hotel in this country during the Second Battle of Rivas. The Puritan Providence Island Company colonized an island off this country’s east coast and established relations with a tortoiseshell-trading kingdom around this country’s city of Bluefields. Cornelius Vanderbilt opposed an American filibustering expedition to this country that briefly resulted in its rule by William Walker. In 1894, this country annexed the Mosquito Coast. For 10 points, name this country where the Contras fought the Sandinistas.

ANSWER: **Nicaragua**

<World History>

11. A book by Alison Dagnes (“DAG-niss”) uses social networks to explain why liberals are more successful at deploying this phenomenon than conservatives. In his book titled the “anatomy of” this concept, Arthur Asa Berger outlined 45 logical mechanisms that lead to the generation of this thing, which Victor Raskin claimed is generated linguistically through script opposition. In communications theory, non-bona-fide communication tends to evoke this phenomenon. Theories of this phenomenon include the benign violation theory and relief theory. Henri Bergson’s writing on this phenomenon focuses on incongruous juxtaposition. The superiority and inferiority theories of this phenomenon respectively rely on ridicule and self-deprecation. For 10 points, name this social phenomenon that may elicit laughter.

ANSWER: **humor** [accept **comedy**; accept **laughter** until read; accept any descriptive answer indicating making something **funny** or **humorous**; accept **jokes** or **joking**; accept the **comic**; accept **sarcasm**; prompt on **irony**] (The Alison Dagnes book is *A Conservative Walks Into a Bar*.)

<Social Science (Sociology and Other)>

12. In a piece titled for these figures, the short sixth movement, *Pavana Lachrymae*, quotes the chorale from Franz Schubert’s “Death and the Maiden,” then fades away. The highest note sung in the documented history of the Met was in a performance of a 2016 opera titled for one of these figures by Thomas Adès (“ADD-iss”). A movement called *Threnody I: Night of the Electric Insects* opens a piece for “electric string quartet” titled for these figures. A bass aria sung by one of these figures “of Agony” appears in Edward Elgar’s *The Dream of Gerontius*. The first movement of Paul Hindemith’s *Mathis der Maler* (“MAH-tiss dare MAH-lur”) symphony is titled for a “concert” of

these beings. George Crumb's string quartet is titled for "Black" ones. For 10 points, Alban Berg's ("ALL-bahn BAIRG's") Violin Concerto is dedicated "to the memory of" what kind of holy being?

ANSWER: **angels** [accept *Black Angels*; accept *The Exterminating Angel*; accept **Angel** of (the) Agony; accept "*Engelkonzert*" or "**Angelic** Concert"]

<Classical Music>

13. B. W. Silverman showed that if a set of values are assumed to have this property, then the optimal bandwidth for kernel density estimation depends on the number of values to the negative one-fifth power. Subpopulations with this property are represented by the most common "mixture model" for clustering data. The Box-Cox transformation outputs a set of values with this property, which can be verified using the Shapiro-Wilk test. Like independence, this property is assumed to hold for the data [emphasize] *within* groups before performing ANOVA. Sample means that are repeatedly taken from any distribution will collectively have this property, according to the central limit theorem. For 10 points, the "68-95-99.7" rule can only be used if the data have what property, meaning they approximate a "bell curve"?

ANSWER: **normality** [or **normally** distributed; accept conforming to or approximating a **normal** distribution or **Gaussian** distribution; prompt on **bell** curve or **bell-shaped** curve; do not accept or prompt on "normalized"]

<Other Science (Math)>

14. In a story by this author set on "the eve of the August Bank Holiday," a character "whose words were almost confined" to "Yes" and "No" remarks "Wren built that house, father says." After meeting Granger and an economic attaché, a character created by this author tries to go to the House of the Five Hundred Girls. In a story by this author, the Wormsley Common Gang dismantles Old Misery's house. A character created by this author finds a plastics company after being inspired by York Harding's argument for a "Third Force." In a novel by this author of "The Destroyers," a yellow-eyed Mestizo meets the protagonist when he is on the run from an anti-clerical lieutenant. For 10 points, name this author of *The Quiet American* and *The Power and the Glory*.

ANSWER: Graham **Greene**

<British Literature>

15. This family's arrangements with the Bishop of Brixen nearly bankrupted them when the bishop died. This family promoted guaiacum ("GWAI-uh-kum") as a cure for syphilis because this family shipped guaiacum wood from Hispaniola. Due to the namesake flowers appearing on their coat-of-arms, one branch of this family was known as "[this family] of the Lily." Three daily prayers were accepted in lieu of rent at a collection of yellow buildings that are named for this family. This family contributed over one thousand kilograms of gold to ensure Charles V's election as Holy Roman Emperor. A member of this Augsburg family bought the rights to silver mines in Tirol and controlled a European copper monopoly. For 10 points, name this German banking family led by Jakob ("YAH-kop") the Rich.

ANSWER: the **Fugger** ("FOOG-guh") family [accept Jakob **Fugger** the Rich]

<European History>

16. *L.A. Times* journalist Amy Kaufman wrote a 2018 *New York Times* best-selling book partly titled for this show that begins by examining its creation by Mike Fleiss. In one scene in this show, a woman refuses to use the phrase "cleaning lady" to refer to her "nanny" Raquel. In 2019, a spinoff of this show featured a landmark same-sex relationship between Kristian Haggerty and Demi Burnett, who was originally in love with a man who jumps a fence in one episode. Corinne Olympios was involved in a sexual assault scandal that temporarily suspended production of a spinoff of this show that is set "in Paradise." Cassie Randolph was chosen as the winner of its 23rd season by Colton Underwood. Chris Harrison hosts, for 10 points, what romantic reality television show?

ANSWER: *The Bachelor* [accept *Bachelor Nation*; accept *Bachelor in Paradise*]

<Pop Culture>

17. Satirical versions of this animal were depicted with magpies in *minhwa* folk art. A flower-plucking *rishi* has the legs of this animal, which Budhi Pallien can shapeshift into. A painter who drew an animal that was part-horse, part-this animal inspired a Chinese saying meaning “mediocre” or “so-so.” In a Jātaka tale, a jackal tricks this animal into going back in a cage to aid a Brahmin. After this animal gives up waiting to become human in a cave, the bear-woman Ungnyeo (“oong-nyuh”) marries Hwanung (“HWAH-noong”) and gives birth to King Dangun (“DAH-noon”). To feed this animal, Prince Sattva sacrifices himself. This brave, competitive zodiac animal only gets third in the Great Race despite its strength and represents the West when it’s shown with white fur. For 10 points, what animal is depicted as Shere Khan (“sheer con”) in the *Jungle Book*?

ANSWER: **tigers** [or **tigresses**; or **lǎohǔ**; or **fu**; or **holang-i** or **horangi**; accept **sher** until read; or **baagh**; or **vyaghra**; prompt on big cats or felines or other nonspecific answers]

<Mythology>

18. A drawing of a grain of wheat is at the center of one of the diagrams of this author’s work that Józef Czapski made for lectures on this author that he delivered in a Soviet prison camp. Eric Karpeles wrote a companion to this writer’s allusions to art, such as the nickname “Giotto’s Charity” that is given to a kitchen-maid or the description of a woman resembling Botticelli’s Zipporah. A character created by this author associates his beloved with a “little phrase” in a violin sonata. This author’s magnum opus was retitled after a phrase from Shakespeare’s Sonnet 30 in the original English translation by C. K. Scott Moncrief. For 10 points, memories of Combray are brought back by the taste of a tea-soaked madeleine in *Swann’s Way*, the first part of what French author’s *In Search of Lost Time*?

ANSWER: Marcel **Proust** [accept Valentin Louis Georges Eugène Marcel **Proust**]

<European Literature>

19. Heating up isotoluene causes it to isomerize by a reaction discovered by this man. This man discovered a reaction in which a bond migration and a 1,5-hydrogen shift occurs between an alkene with an allylic hydrogen and a compound with a multiple bond. This discoverer of the ene reaction is the second namesake of a reaction by which [4]-annulene dimerizes. This man is the second namesake of a reaction involving a suprafacial interaction between a four pi electron system and a two pi electron system, and proceeds through an endo transition state. This man is the second namesake of reaction that forms cyclohexene derivatives from dienes and dienophiles. For 10 points, name this scientist who names a reaction with Otto Diels.

ANSWER: Kurt **Alder**

<Chemistry>

20. Finance Minister Francis Hincks aided the growth of this industry by sponsoring the passage of the Guarantee Act of 1849. The priest Albert Lacombe persuaded Crowfoot to accept this industry in the Blackfoot Nation. James Ross headed an engineering project in this industry with a memorial at Craigellachie (“cray-GHEL-uh-kee”). The discovery that a magnate of this industry, Hugh Allan, had secretly funded the Conservative Party allowed Alexander Mackenzie’s liberals to come to power. Sandford Fleming worked in this industry, which inspired him to develop the idea of time zones. Bribes paid by this industry to officials in John MacDonald’s government resulted in the Pacific Scandal. For 10 points, name this industry that enabled transcontinental travel over land in the 19th century.

ANSWER: Canadian **railroad** industry [or **railway** industry; or **train** industry; prompt on transportation industry]

<European History>

21. Stephen Dale’s theory of an architectural style named for this phenomenon is discussed in a Sebastian Prange book titled for this type of Islam. The reconstructed terms “habaRat” and “timuR” are thought to refer to a directional axis based on this phenomenon in Proto-Austronesian. The practice of *kharif* coincides with this phenomenon, while the practice of *rabi* follows it. Ahmad ibn Mājid is apocryphally credited with helping Vasco de

Gama use this phenomenon, which Gama nonetheless struggled against on his return from Calicut. This phenomenon dictated trade cycles on the Indian Ocean by forcing mariners to travel northeast in the summer. The Tonlé Sap River reverses due to, for 10 points, what wind system that brings rain to Southeast Asia?

ANSWER: **monsoons** [or **monsoon** season; prompt on wind, rain, wet season, or rainy season]

<World History>

Bonuses

1. By one etymological reasoning, this city's name means "new new city." For 10 points each:

[10] Name this city captured by Scipio Africanus in 209 BC. Scipio was aided in that effort by a storm that drained the lagoon surrounding this city, allowing him to attack its undefended north.

ANSWER: **Carthago Nova** [or **New Carthage**; or **Cartagena**; do not accept or prompt on "Carthago" or "Carthage"]

[10] Carthago Nova was founded by this man's son-in-law Hasdrubal, who shared a name with a son of this man killed at the Metaurus. Livy wrote that this man made another son dip his hands in blood and swear perpetual hostility to Rome.

ANSWER: **Hamilcar** Barca [prompt on **Barca**] (The son is Hannibal.)

[10] Diocletian designated Carthago Nova as the capital of the Carthaginensis province in this region. A folk etymology connects this peninsula's city of Barcelona with its supposed founding by Hamilcar Barca.

ANSWER: **Hispania** [or the **Iberian Peninsula**; or **Spain**]

<European History>

2. Owen Flanagan named this philosophical position after a 1960s garage rock band. For 10 points each:

[10] Name this position in the philosophy of mind that states that the hard problem of consciousness cannot be solved by humans. This position is championed by Colin McGinn.

ANSWER: New **Mysterianism** (The position is named after the band "? and the Mysterians.")

[10] Philosophers of mind often use these theoretical entities in thought experiments to test intuitions about consciousness. These entities are indistinguishable from humans but lack qualia or sentience.

ANSWER: philosophical **zombies** [accept p-**zombies**]

[10] Contemporary debate about the metaphysics of consciousness boils down to pitting materialism versus this position, which states that the conscious mind is non-physical in some sense. Descartes is closely associated with the mind-body form of this position.

ANSWER: **dualism** [accept mind-body **dualism**]

<Philosophy>

3. This section urges the reader to follow reading methods that both parallel and ironically cause the reader to skip the polemic ramblings of a mysterious writer. For 10 points each:

[10] Name or describe this section that notes how, of the 155 chapters of the novel it appears in, the last 99 chapters are "expendable." It advises the reader to read the novel's chapters in various different orders and combinations.

ANSWER: "**Table of Instructions**" [accept "**Tablero de dirección**"; accept descriptions such as the **introduction** or **beginning** or **author's note** or **prologue** of *Hopscotch* or *Rayuela*; do not accept any answers indicating that this section is the first chapter]

[10] The "Table of Instructions" opens *Hopscotch*, which is a novel by this author who also wrote short stories such as "Blow-Up" and "Axolotl."

ANSWER: Julio **Cortázar**

[10] The "Table of Instructions" often leads readers into skipping chapters told from the perspective of this mysterious writer, who is theorized to be the true author of *Hopscotch* within the narrative. This writer uniquely titles several chapters in *Hopscotch*, including one that is supposedly "Written by [him] in the hospital."

ANSWER: **Morelli** [accept *Morelliana*]

<World/Other Literature>

4. Name some things about the hottest song of 2019, "Baby Shark," for 10 points each.

[10] “Baby Shark” became the unofficial anthem of the Nationals, whose reliever Sean Doolittle was praised for his explanation of why he refused to do this action. The Golden State Warriors’ invitation to take this action was revoked after rumors that Steph Curry would not participate.

ANSWER: **visiting** the **White House** [accept equivalents; prompt on answers like visiting Trump or visiting the President by asking “where?”]

[10] “Baby Shark” has also become popular at Lebanese protests, which were sparked in part by a tax on this platform. India launched a fact-checking program for this platform after it provoked several lynchings.

ANSWER: **WhatsApp** [prompt on messaging or VoIP]

[10] Jess Phillips, a politician from this city, launched a crowdfunding campaign to protest planned school cuts using “Baby Shark.” This city’s large Muslim minority has launched protests against LGBT-inclusive education, leading to a controversial ban on holding such protests near school grounds.

ANSWER: **Birmingham** [accept Birmingham **Yardley**]

<Current Events>

5. The major form of this scale, when built in the key of C, consists of the notes C, D, E, G, A, C. For 10 points each:

[10] Name this type of scale. In musicology, a hemitonic version of this scale called the *in* scale is often contrasted with an anhemitonic version of it called the *yo* scale.

ANSWER: **pentatonic** scale [accept major **pentatonic** scale; accept hemitonic or anhemitonic **pentatonic** scale]

[10] Many East Asian folk songs are built on the pentatonic scale, such as this Korean folk song. In 1896, after hearing three Korean students singing this song, anthropologist Alice Fletcher made the oldest extant recording of it.

ANSWER: “**Arirang**” (“ah-ree-rahng”) [accept **Arirang** Mass Games (Festival) or **Arirang chukje**]

[10] Another Korean folk music tradition, *pansori*, usually involves a singer performing with a player of the *buk*, which is a Korean variety of this instrument. Other types of this instrument include the *djembe* (“JEM-bay”) and the bongos.

ANSWER: **drums** [prompt on percussion instruments]

<Classical Music>

6. The protagonist exclaims “vive la guerre éternelle!” at the end of his speech explaining the thesis of this essay, which differentiates the “masters of the present” from the “masters of the future.” For 10 points each:

[10] Name or describe this essay published in *Periodical Discourse*, which Porfiry Petrovich questions the protagonist about because it suggests that “extraordinary” people have the right to “transgress the law.”

ANSWER: “**On Crime**” [accept equivalents such as the **article** written by Rodion **Raskolnikov** or Rodion **Raskolnikov**’s **article** about crime; prompt on the article from *Crime and Punishment* by asking “by who?”]

[10] The article “On Crime” lays out the ideas that motivate Raskolnikov’s murder of an elderly pawnbroker in *Crime and Punishment*, a novel by this Russian author.

ANSWER: Fyodor **Dostoevsky**

[10] During their discussion of “On Crime,” Porfiry asks Raskolnikov if he believes in this story. In Part IV, Raskolnikov forces Sonya to read him this story, which he’s later reminded of by a book under his pillow before turning himself in.

ANSWER: the raising of **Lazarus** [or equivalents of Jesus raising **Lazarus** from the dead; prompt on the Bible, the New Testament, or the Gospel of John]

<European Literature>

7. Through quantum computing, it would be theoretically possible to solve a symmetric 128-bit cryptographic key in only 2-to-the-64th iterations using this algorithm. For 10 points each:

[10] Name this quantum algorithm that performs a search in “big-O of the square root of *n*” time.

ANSWER: **Grover**’s algorithm

[10] Without quantum computing, this is the runtime required to perform a sequential search. Give your answer using big-O notation in terms of n , the number of entries in the set.

ANSWER: big-O of n [or **linear** time]

[10] To prepare for quantum-based threats to its namesake cloud, IBM is developing a suite called CRYSTALS that implements this general form of cryptography. Encryption in this scheme is based on solving the “shortest vector problem.”

ANSWER: **lattice**-based cryptography

<Other Science (Computer Science)>

8. Those who read about ancient Rome today might learn some dubious lessons from the people they held up as models of virtue. For 10 points each:

[10] Gaius Mucius Scaevola (“gai-oos mu-kee-oos SKY-voh-lah”) proved his bravery in this profession by sticking his hand in a fire. Cloelia swam across the Tiber and Horatius Cocles remained on a collapsing bridge to assist men with this profession campaigning against Lars Porsena of Clusium.

ANSWER: **soldiers** [or **militēs** or **miles**; accept any equivalents like **military** or **infantry**]

[10] Veturia became a model Roman matron when she refused to help this son of hers rebel against Rome, consigning him to death at the hands of the Volscians. In a play about this general, his mother is renamed Volumnia.

ANSWER: Gaius Marcius **Coriolanus** [accept *The Tragedy of Coriolanus* (by Shakespeare)]

[10] After the lustful *decemvir* (“dih-SEM-ver”) Appius Claudius tried to abduct this woman by claiming that she was his slave, her father stabbed her to preserve her chastity. Like Lucretia, this woman inspired a Botticelli furniture painting intended for a bridal chamber.

ANSWER: **Virginia** [or **Virgīnia**; accept *The Story of Virginia* or *The Stories of Virginia* or *Le Storie di Virginia*]

<Mythology>

9. Killed in an accident aboard this ship, the enslaved servant Armistead was the only victim who did not lie in state at the White House. For 10 points each:

[10] Name this ship where Armistead’s owner President John Tyler escaped injury from an explosion. Captain Robert Stockton’s faulty Peacemaker cannon caused the explosion during a Potomac River cruise.

ANSWER: *USS Princeton*

[10] John Ericsson, the designer of the *USS Princeton*, pioneered the design of these ships. Ericsson built the *USS Monitor*, which fought the *CSS Merrimack* in the first duel between these armored ships.

ANSWER: **ironclads** [or **ironclad** warships]

[10] During the Mexican-American War, Stockton developed a rivalry with this general over who had authority over California. Kit Carson’s shoeless trek allowed Stockton to send reinforcements in time to save this general at San Pasqual.

ANSWER: Stephen W. **Kearny**

<American History>

10. This metal forms a triangular polycation with a 4+ charge composed of 3 atoms of it. For 10 points each:

[10] Name this metal that forms a diatomic polycation with a charge of 2+, which is the cation in calomel. It is toxic and liquid at room temperature.

ANSWER: **mercury** [or **Hg**]

[10] An electrode made of calomel was formerly a commonly used reference in this group of electroanalytical techniques that comes in “linear sweep” and “cyclic” forms. In it, the current generated by a redox reaction is measured as electric potential is changed.

ANSWER: **voltammetry** [accept linear sweep **voltammetry**; accept cyclic **voltammetry**; prompt on **LSV** or **CV** by asking “what does that stand for?”]

[10] The calomel electrode has mostly been replaced by this reference electrode due to its toxicity. It produces a potential of about 198 millivolts with respect to the standard hydrogen electrode when used in a saturated solution of potassium chloride.

ANSWER: **silver** chloride electrode [or **AgCl** electrode]

<Chemistry>

11. Chapter 27 of this novel adopts second-person to describe a cotton picker who sometimes puts rocks in the sacks that the crooked “scale man” pays him for. For 10 points each:

[10] Name this novel whose main story alternates with “intercalary” chapters, such as one describing a turtle crawling across a highway. In the following chapter, Tom encounters a preacher sitting under a willow tree.

ANSWER: *The **Grapes of Wrath***

[10] One of the “intercalary” chapters of John Steinbeck’s *The Grapes of Wrath* describes the beauty of springtime in this state, where “Okies” such as the Joad family travel to find work in the novel.

ANSWER: **California**

[10] Another of the interchapters is set in one of these places, where Mae gives peppermint candy canes to two migrant children who visit it. Richard Russo’s *Empire Falls* centers on Miles Roby, the owner of one of these places.

ANSWER: **diners** [or **restaurants**; or **grills**; accept **greasy spoons** or other equivalents]

<American Literature>

12. According to Merrit Ruhlen, this language family’s frequent use of n sounds in first person singular pronouns, and m sounds in second person singular pronouns, lends credence to its existence. For 10 points each:

[10] Name this controversial proposed language family first described by Joseph Greenberg. This macrofamily would encompass all languages of the Western Hemisphere not found in the Eskimo–Aleut or Na-Dene (“NAH den-AY”) families.

ANSWER: **Amerind** language family [prompt on American Indian languages; prompt on Native American languages]

[10] The most widely spoken of the Na-Dene languages is this Southern Athabaskan language spoken widely in the Four Corners region of the American Southwest. This tonal language is closely related to Apache.

ANSWER: **Navajo** language [or **Navaho** language; accept **Diné bizaad**]

[10] A 2008 proposal called for a merging of the Na-Dene languages of North America with the Yeniseian languages of this geographical region into a single language family. The word *shaman* originates from the Northern Tungusic (“tun-GOO-sick”) languages of this region.

ANSWER: **Siberia** [or **Sibír**; prompt on Asia; prompt on Russia]

<Social Science (Anthropology)>

13. Legends hold that this kingdom’s founder Kaundinya was a Brahmin who arrived from India and married the snake princess Soma. For 10 points each:

[10] Name this kingdom whose port of Óc Eo (“oke ow”) has been identified with Ptolemy’s description of Kattigara. This kingdom eventually fell to its vassal Chenla.

ANSWER: **Funan**

[10] The Khmer of Funan transmitted Hinduism to this coastal Vietnamese kingdom around the 4th century. A fast-growing drought-resistant strain of rice is named for this kingdom, which built a large temple complex at Mỹ Sơn (“mee sun”).

ANSWER: **Champa** [accept **Champa** rice]

[10] Khmer *barays* (“ba-RYES”) in this capital of Jayavarman II might have represented Hindu cosmological symbols. The large *wat* complex named for this Khmer capital represents the mythical Mount Meru.

ANSWER: **Angkor** [or **Angkor** Wat; or **Angkor** Thom]

<World History>

14. Meyer Schapiro supposedly shaped Fernand Léger's style by taking him to see a set of illustrations of this text that Belle da Costa Greene obtained for the Morgan Library. For 10 points each:

[10] Name this text often illustrated by medieval Spanish artists to accompany Beatus of Liébana's commentary on it. Those illustrations depict figures like the Four Horsemen from this apocalyptic book of the Bible.

ANSWER: Book of **Revelation** [do not accept or prompt on "Revelations"]

[10] The bold primary colors of the paintings in the Beatus codices ("KO-dih-seez") exemplify this art style, the complement of the Mudéjar ("moo-DEH-zhar") style. This term denotes the Islamic-art-influenced work produced by Iberian Christians.

ANSWER: **Mozarabic** [or **replación** art; or **repopulation** art]

[10] Meyer Schapiro also exposed this artist to the Morgan Beatus, likely influencing his "sectionals" paintings. The paintings that this artist created for the Four Seasons Restaurant in the Seagram Building were never installed.

ANSWER: Mark **Rothko**

<Painting/Sculpture>

15. An article by *New York Times* dance critic Gia Kourlas compared Joaquin Phoenix's bathroom dance from *Joker* to this dance style. For 10 points each:

[10] Name this avant-garde Japanese style of dance pioneered after World War II by Tatsumi Hijikata and Kazuo Ohno. This style involves ultra-slow movement, white makeup, and macabre or taboo subject matter.

ANSWER: **butoh** [or **butō**]

[10] Kourlas goes on to compare Phoenix's movements in *Joker* to that of Sergei Polunin and this other Russian dancer. This man often danced with Margot Fonteyn ("MAR-go fon-TAIN") during his time at Frederick Ashton's Royal Ballet.

ANSWER: Rudolf **Nureyev**

[10] Kourlas argues for the centrality of dance to Arthur's life by noting that *Shall We Dance*, a 1937 film starring this versatile dancer, is playing at his mother's apartment. This man starred in films like *Top Hat* and *Swing Time* alongside Ginger Rogers.

ANSWER: Fred **Astaire**

<Other Arts (Dance)>

16. These molecules are transported by the carnitine shuttle. For 10 points each:

[10] Identify these molecules that include a 16-carbon long "palmitic" one. Three of these molecules are attached to a glycerol to form triglycerides.

ANSWER: **fatty acids** [prompt on carboxylic acids; prompt on palmitic acids; prompt on lipids]

[10] With the exception of very-long-chain fatty acids, fatty acids are broken down in this organelle during beta-oxidation. The process of ketogenesis also primarily occurs in this organelle.

ANSWER: **mitochondrion** [or **mitochondria**]

[10] The beta-oxidation of fatty acids with this property produces a propionyl-CoA end product, which then undergoes a vitamin-B12-dependent conversion to succinyl-CoA.

ANSWER: **odd**-chain fatty acids [or equivalent answers like "the fatty acids have an **odd** number of **carbons**"]

<Biology>

17. An essay titled for this sort of event imagines an Englishman offering a cigarette to a POW to suggest that "if you can free the man from the machine, the seed does not fall upon altogether stony ground." For 10 points each:

[10] Virginia Woolf wrote an essay about "Thoughts of Peace" during what sort of wartime event? *The Lion, The Witch, and The Wardrobe* begins with the Pevensie ("PEV-en-see") children being evacuated from London due to these events.

ANSWER: **air raid** [or **bombing** raids; or **aerial attacks**; or **airstrikes**; or the **Blitz**; or equivalents]

[10] The last paragraph of “Thoughts of Peace in an Air Raid” quotes the phrase “The huntsmen are up in America” from this author’s treatise on the quincunx. Woolf praised this “greatest physician in Norwich” in her essay “The Elizabethan Lumber Room.”

ANSWER: Thomas **Browne** (The treatise is *The Garden of Cyrus*.)

[10] The protagonist sits down to read one of Browne’s “longest and most marvellously contorted cogitations” in this Virginia Woolf “biography,” whose title character is modeled on her lover Vita Sackville-West.

ANSWER: **Orlando**

<British Literature>

18. Answer the following about the Bestuzhev (“bih-STOO-zhiff”) family, for 10 points each.

[10] The Austrophilic diplomat Alexey Bestuzhev advised this monarch, whose death during the Seven Years’ War was termed the “Miracle of the House of Brandenburg.” Natalia Lopukhina had her tongue torn off by this empress after being framed for a plot to restore her predecessor Ivan VI (“the sixth”).

ANSWER: Empress **Elizabeth** of Russia [or **Elizabeth** Petrovna; or **Yelisaveta**; or **Elizaveta**]

[10] Alexey’s father Pyotr Bestuzhev effectively governed this duchy on behalf of Anna of Russia. Duke Jacob Kettler sent settlers from this duchy to colonize The Gambia and Tobago.

ANSWER: Duchy of **Courland** and Semigallia

[10] Alexander Bestuzhev edited the *Polar Star*, a journal of this movement named for a month. Nicholas I crushed this revolt of constitutionalist officers who rose up after his elder brother Constantine gave up the throne.

ANSWER: **Decembrist** Revolt [or **Decembrist** Uprising]

<European History>

19. Citing al-Rāzī, Yūsuf al-Qaradāwī’s influential tract *The Lawful and the Prohibited in Islam* claims that this practice distinguishes between believers and non-believers in the presence of non-*maharim*. For 10 points each:

[10] Name this practice that is prescribed for regions deemed ‘*awrah*. Women who partake in this practice may wear a *dupatta*, *chador*, *burqa*, or *ḥijāb*, since most Muslim scholars consider the *niqāb* excessive.

ANSWER: **covering** parts of the body [accept equivalents such as wearing **clothing** over body parts; accept covering specific body parts such as **hair** or **head**; prompt on **pardah**]

[10] Members of this Islamic sect may avoid strictly covering their bodies by pointing to verse 256 of Surah Al-Baqarah, which claims “there is no compulsion in religion.” This sect, which originated in Punjab and is now based in London, holds that Jesus was buried in the Roza Bal Shrine in Kashmir.

ANSWER: **Ahmadi** Muslims [or **Ahmadiyya** Muslim Community; or **Ahmadiyya** Muslim Jama‘at; or al-Jamā‘ah al-Islāmīyah al-**Ahmadiyyah**; accept the pejorative term **Qadiani**]

[10] Ahmadi Muslims pledge to follow “ten conditions” in a ceremony known by this Arabic term, which refers to initiations or oaths of allegiance. The Qur’an describes this type of ritual with the pledge of Ridwan under a tree before the Treaty of Ḥudaybiyyah (“hoo-die-BEE-yeh”).

ANSWER: **bay‘ah** [or **bai‘at**]

<Religion>

20. The action is defined as the time integral of this scientist’s namesake function. For 10 points each:

[10] Name this author of the treatise *Mecanique analytique* whose reformulation of classical mechanics relies on the function “ L equals T minus V .”

ANSWER: Joseph-Louis **Lagrange** [or Giuseppe Luigi **Lagrangia**; or Giuseppe Ludivico de **la Grange** Tournier; accept **Lagrangian**]

[10] Performing an involution named for this scientist on the Lagrangian allows for the derivation of the Hamiltonian formulation of mechanics. He also names a symbol useful when working with quadratic residues.

ANSWER: Adrien-Marie **Legendre** (“luh-ZHOND”) [accept **Legendre** symbol]

[10] In Hamiltonian mechanics, the phase space is this type of manifold, which can be described as a smooth manifold M with a closed, non-degenerate differential 2-form ω .

ANSWER: **symplectic** manifold

<Physics>

21. This piece was originally dedicated to Willy Burmester, who actually never ended up playing it. For 10 points each:

[10] Name this D minor concerto. It begins with the strings alternating between the eighth notes F and A before the soloist enters with the melody G, A, low D.

ANSWER: **Violin Concerto** in D minor by Jean **Sibelius** [or **Sibelius VC**; prompt on partial answers]

[10] The Violin Concerto in D minor was the only concerto composed by Jean Sibelius (“zhahn sih-BAY-lee-us”), who was from this country. Sibelius also composed an 1899 nationalistic tone poem partly named for this country.

ANSWER: **Finland** [accept **Finlandia**]

[10] Due to its rhythmically challenging and energetic nature, the third movement of Sibelius’s Violin Concerto was referred to as a “polonaise for polar bears” by this early 20th-century British musicologist in his *Essays in Musical Analysis*.

ANSWER: Donald **Tovey** [or Sir Donald Francis **Tovey**]

<Classical Music>