

2021 ACF Nationals

Packet by Minnesota

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Tossups

1. A solenoidal valve is used as part of a Dean's switch in a multidimensional form of this technique. Varying the split ratio in this technique allows calibration of the flow rate, and increasing the splitless time allows volatile samples to be transferred completely. 1-octanol and 2,3-butanediol ("2-3-butane-diol") are used to measure exposed silanols to calibrate the apparatus in this technique as part of Grob's test mixture. Squalene is used as the reference point for calculating McReynolds constants for probes in this technique. 100 times the number of carbons in an n-alkane gives the Kovats index, which is used to normalize the results of this technique. The ramp rate can be varied in this technique as part of temperature programming, in which the temperature of the oven containing the column is slowly increased during the sample run. For 10 points, name this form of chromatography in which the sample is vaporized.

ANSWER: **gas chromatography** [or **GC**; accept just **gas** after "chromatography" is mentioned]

2. This thinker argued that the spirit of man has a "middle place between the extremes of bestial and angelic spirits" in one of his *Sermons on the Song of Songs*. In a letter, he called himself the "chimaera of his age" for being neither a cleric nor a layman. He failed to recite more scriptures than Gilbert de la Porrée during a trial this man brought against Gilbert for his trinitarian views. He gave a rousing speech at Vezelay where he tore off his robe to make crosses for the court of Louis VII, and at Speyer Cathedral he supposedly had milk lactated onto his lips by the Virgin Mary, after being ordered by Pope Eugene III to preach the Second Crusade. 800 years after this man's death, Pius XII gave the title of "Doctor Mellifluus" to this frequent opponent of Peter Abelard. For 10 points, name this French abbot who promoted the Cistercian order by founding a monastery at Clairvaux.

ANSWER: St. **Bernard** of Clairvaux

3. A model of this process is criticized with the example of John Jones taking his wife's birth control and not getting pregnant in a 1971 paper that pairs this process with "statistical relevance." That paper's author, Wesley Salmon, defined etiological and constitutive types of this action and claimed that this action situates events within a "causal nexus." This process relies on a small set of "argument patterns" in Philip Kitcher's unificationist model. A case involving the height of a flagpole and the length of its shadow is the definitive counterexample to Carl Hempel's deductive-nomological theory of this action. Gilbert Harman claimed that science relies on a type of abductive reasoning called "inference to the best" one of these actions. It's not prediction, but hypotheses that do this action well have a namesake type of "power." For 10 points, name this action of describing how an event occurred.

ANSWER: scientific **explanation** [accept word forms like **explaining**; accept **explanatory** power; accept specific types like statistical or mechanistic **explanation** or **MEx**; prompt on finding covering **laws** or laws of nature; prompt on creating a **theory** or **model**; prompt on answers referring to ascribing **causality** or the **cause** of something; prompt on **science** and word forms until "science" is read]

4. This author wrote about a biologist who returns to her native country from New Zealand to euthanize her terminally-ill high school boyfriend in the story “Godzone.” Paschalis, a monk who longs to be a woman, writes a biography of Kummernis, a nun God gave the face of a man, in a novel by this author. In another novel by this author, the hunter Big Foot is found dead by the animal lover Janina, a translator of William Blake. Annushka starts living on the Moscow Metro after learning about an Old Believers sect called the *beguny* in a novel by this author that Jennifer Croft translated into English. This author of *House of Day*, *House of Night* and *Drive Your Plow over the Bones of the Dead* won the Man Booker International prize for a “constellation novel” made up of 116 interlaced vignettes. For 10 points, name this Polish author of *Flights* who belatedly won the 2018 Literature Nobel.

ANSWER: Olga Tokarczuk

5. Traditional beliefs on this island hold that humanity was created by the brother-sister spirits Puntan and Fu’una at Fouha Rock near Umatac Bay on this island. The *belem-bao-tuyan*, a musical bow developed on this island, may be inspired by the African *berimbau*. The daughter of a Spanish captain and her lover tied their hair in a knot before jumping into the sea at Two Lovers’ Point at Tumon Bay, this island’s tourist center. A military construction plan will leave a 100-foot buffer around the last remaining Serianthes tree on this island. This island’s limestone forests were populated by its namesake flycatcher, which went extinct after the invasive brown tree snake was introduced here. With its largest city at Dededo, both this territory and the Northern Mariana Islands are home to the Chamorro people of Micronesia. For 10 points, name this island with its capital at Hagåtña (“ha-GOT-nya”) which, along with American Samoa, is a US Pacific territory.

ANSWER: Guam [or Guahan]

6. Terry Riley recorded four members of the Chet Baker quartet playing this piece, then manipulated the recordings to create his music for the play *The Gift*. Claude Debussy’s “Voiles” may have inspired the parallel piano chords in the opening to this piece. The breakthrough first single of acid jazz guitarist Ronnie Jordan was a cover of this standard. An inadvertently-too-loud cymbal crash by Jimmy Cobb kicks off a solo by the composer of this piece. Morton Gould’s “Pavane” inspired the chord structure of this composition, which John Coltrane drew on in turn for his “Impressions.” A quartal chord equivalent to playing the open strings of a guitar together is often referred to as this song’s namesake chord. Written in the Dorian mode in D and E-flat, this piece is introduced by a duet between Bill Evans and Paul Chambers. For 10 points, name this opening track off of Miles Davis’s *Kind of Blue*.

ANSWER: “So What”

7. Prior to symmetry breaking, the Lagrangian for interactions under this theory can be separated into four terms describing bosonic and fermionic components, gauge fixing, and counterterms used for renormalization. A baryon number violation found within the field equations governing this theory is accounted for by using a composite of 3 baryons known as a sphaleron. The number 0.222 is equal to 1 minus a ratio of masses squared in this theory, which is in turn equal to the sine squared of this theory’s namesake mixing angle. Higher-order corrections were used by Veltman and t’Hooft (“et hohft”) to prove that this theory is renormalizable. Spontaneous symmetry breaking within this theory reduces the $SU(2) \times U(1)$ (“S-U-2 cross U-1”) gauge symmetry to a simple $U(1)$ symmetry, allowing the W and Z bosons to acquire mass. The 1979 Nobel Prize in Physics was awarded to Glashow, Weinberg, and Salam for developing, for 10 points, what theory that unifies two fundamental forces?

ANSWER: electroweak theory [accept electroweak unification; accept Glashow-Weinberg-Salam theory until read, prompt afterwards]

8. One character in this novel is a radiant blonde who is referred to as “the woman who once spoke of ghosts.” The narrator of this novel fails to create an image of a woman with her hands clasped over her knee in his floral garden. The NYRB edition of this novel features a photograph of silent film star Louise Brooks, who partially inspired the protagonist’s love interest. A group of people in this novel dance to “Two for Tea” from *No, No, Nanette* in the museum where they reside. This novel’s protagonist discovers two identical dead fish in an aquarium and invokes Cicero to try to explain the presence of two suns and moons. The narrator of this novel keeps a diary of his experiences on the island of Villings where he falls in love with a woman named Faustine who turns out to be a projection of the title machine. For 10 points, name this novel written by Adolfo Bioy Casares.

ANSWER: *The Invention of Morel* [or La Invención de Morel; or Morel’s Invention]

9. This conflict may have been initiated by a request for aid sent by the ruler Verica after his territory was overrun by the successor of Epaticcus. Prior to this conflict, a group of soldiers chanted “Io, Saturnalia!” as a speech was being delivered to rouse the army by a man newly invited to camp. The familiar tactic of using a blue dye called woad to paint bodies was used by the resistance force of Togodumnus, whose death rallied the army under his brother. Many of the same soldiers who participated in this victorious operation had, three years earlier, retreated after bizarrely being ordered to kneel and gather seashells in their helmets. A speech delivered by the former slave Narcissus preceded this campaign, which saw four legions commanded by Aulus Plautius and a victorious charge by the future emperor Vespasian. For 10 points, name this campaign started in 42 CE by a certain clubfooted emperor seeking to add a far-flung island to the Roman Empire.

ANSWER: Claudian Invasion of Britain [accept similar answers such as “Invasion of Britain under Emperor Claudius”; prompt on answers that does not specify both Claudius and Invasion of Britain]

10. A temple located in this country was said to have a giant golden chain hanging over its roof, and a sacred grove where the corpses of living males from every species would be hung from trees. A king of this country was riding in a circle around the “Hall of the Dís” when his horse Raven tripped, smashing that king’s skull against a rock during the annual ritual called the Dísablót. That temple in this country could not be approached without crossing the marshy plain of the Fyris Wolds. In disguise as a vagrant, a woman came to this place and got its king to promise she could have all the land that could be plowed in a single day and night. She then summoned four giant oxen, her sons, and moved an entire plot of this country’s land into the sea to trick that king. The three Royal Mounds legendarily house descendants of the Yngling Dynasty in, for 10 points, what country once home to the Temple of Uppsala?

ANSWER: Sweden [accept Uppsala before “Uppsala” is read]

11. In the second movement of a septet by this composer, half the group plays at quarter note equals 144 while the rest plays one 6/8-bar per second; that movement is an “Etude in Controlled Chance.” The second movement of a piece by this composer opens “very dryly,” with the piano playing “quick and nervous” arpeggios as the double bass introduces the subject of a fugue. The 14th and 15th string quartets of this composer of *La cheminée du roi René* can be played simultaneously as a string octet. Louis Moyses founded a hip Parisian bar named after a ballet by this composer, which draws on Brazilian tangos and sambas. A short ballet by this composer opens with a saxophone solo and was inspired by jazz and African folk mythology. For 10 points, name this member of Les Six and composer of *The Ox on the Roof* and *La création du monde*.

ANSWER: Darius Milhaud

12. A description of 123 trainees for this job at an Atlanta headquarters is juxtaposed with a Karl Marx essay describing a child worker as an “instrument of labor” at the beginning of a Charles Cooley Award-winning book. The chapter “The Search for Authenticity” begins by claiming that, if Jean-Jacques Rousseau were to take this job, he would understand the newly institutionalized nature of a once-individualized “medium of competition.” Egon Ronay’s *Lucas Guides* are cited to support the recurring idea that people with this job need to work “with a smile.” People in this job were forced to be “nicer than natural,” as opposed to the “nastier than natural” bill collectors, according to a 1983 book by Arlie Hochschild. The book *The Managed Heart* based much of its concept of “emotional labor” on, for 10 points, what feminine-coded job whose major employers include American and Delta?
ANSWER: **flight attendants** [accept airline **stewardesses**]

13. After exclaiming that "while mentally blind, man is named wise," this man rejected a rite of passage ceremony in which he was offered the sacred *janeu* thread. Prior to his death, this man signified his successor by placing five coins and a coconut in front of him and subsequently bowing. Upon learning the Farsi alphabet, this man used the letter *alif* to depict the absoluteness of God. This man asked to "turn his feet" away from God after being scolded for sleeping with his feet pointed at the Kaaba. Four spiritual journeys this man took with Bhai Mardana to set up *dharamshalas* are documented in a collection of biographies of him known as the *Janamsakhis*. This man gave Bhai Lehna the name “Angad” and made him his successor. Upon reaching enlightenment in the Kali Bein baths, he declared, “there is no Hindu, there is no Muslim.” For 10 points, name this first Sikh guru.
ANSWER: Guru **Nanak** Dev

14. These things inspired Gheorge Paun to devise a model of computing in which a separator divides two regions that can only communicate selectively; such systems based on these things are often treated as P Systems. Another computer scientist tried to model the creation of these things using systems of PDEs, but his friend Stanislaw Ulam suggested he use a lattice instead. The paper “The Chemical Basis of Morphogenesis” discussed how “reactions and diffusion in a ring” of these structures gave rise to his namesake patterns. The reproduction of these structures inspired a type of dynamical system that can be used to produce the Gosper Gun pattern in John Conway’s “Game of Life.” For 10 points, what biological structures inspired John Von Neumann to create a discrete model of computing, known as a certain kind of automata?
ANSWER: biological **cells** [accept cellular **membrane**s until “PDEs” is read; prompt on **DNA** until “PDEs” is read]

15. This book uses Robert Browning’s “Le Byron de nos Jours” to illustrate the Greek-inspired ideals of Heiterkeit and Allgemeinheit. A passage from this book finds the “fancy of a perpetual life, sweeping together ten thousand experiences” constituted in a woman it discusses, who has “like the vampire, been dead many times.” For the second edition of this book, its author removed its controversial “Conclusion,” which recommends that one should get “as many pulsations as possible” out of one’s life. This book asserts that “success in life” is to “burn always” with a “hard gemlike flame.” The maxim that “all art constantly aspires towards the condition of music” originates from this book’s chapter on “The School of Giorgione.” For 10 points, name this collection by Walter Pater that includes critical essays on Sandro Botticelli and Leonardo da Vinci.
ANSWER: *The **Renaissance**: Studies in Art and Poetry* [or *Studies in the History of the **Renaissance***]

16. One mechanism for this scenario was first demonstrated using a lottery model where nonlinear demographic responses to variability cause a storage effect. In the absence of Allee effects, this scenario occurs when species are pairwise inviable according to the “modern” theory of it formalized by Peter Chesson. This scenario becomes more likely when niche differences increase or when relative fitness differences decrease, which are described as stabilizing and equalizing mechanisms. In two-species Lotka-Volterra competition, this scenario can only occur when intraspecific competition is greater than interspecific competition. The principle of competitive exclusion implies that this scenario is impossible when two species share the same niche. For 10 points, name this phenomenon in which two or more competing species are able to persist in a community.

ANSWER: stable **coexistence**

17. An artist with this surname created numerous sketches of clothing featuring text by Vicente Huidobro and Tristan Tzara called “dress-poems.” That artist with this surname placed a rainbow on the waist of a costume for the title role of Diaghilev’s ballet *Cléopâtre*. Another artist with this surname depicted a geisha in the background of his portrait of Jean Metzinger called *Man with a Tulip*. An artist with this surname purposely published enough copies of her long-format illustration of a Blaise Cendrars poem that they could be stacked to reach the height of a certain building; that artist, who was born as Sarah Stern, launched a boutique selling “simultanist” clothing. Two artists with this surname founded a movement with Frantisek Kupka which included a series of paintings centered on a red version of the Eiffel Tower. For 10 points, give this surname of Robert and Sonia, the married founders of Orphism.

ANSWER: **Delaunay** [accept Robert **Delaunay** or Sonia **Delaunay**; accept Sonia **Terk** or Sarah **Stern** before “geisha” and prompt afterwards]

18. This city’s Military Male Orphan Asylum led it to be the namesake of the “Bell-Lancaster” or “Monitorial” method of school education used by Andrew Bell. This city, which witnessed the Chingleput Ryots Case, was home to a political party named for Georges Clemenceau’s newspaper that released the Non-Brahmin Manifesto. That Justice Party won the first direct elections in this city’s Presidency and was the first to adopt the diarchical system of the Montagu-Chelmsford reforms. In 1882, the headquarters of the Theosophical Society moved to its neighborhood of Adyar. Elihu Yale was president at this city’s Fort St. George, called the White Town, which was the first British fortress in India. This city became the center of the Dravidian movement, and its suburb saw the assassination of Rajiv Gandhi. For 10 points, name this current capital of Tamil Nadu that in 1996 was renamed to Chennai.

ANSWER: **Madras** [or **Chennai** before “Chennai” is read]

19. A poem by this author alludes to stalking prey in a line contrasting “the blue panther with black eyes / the basalt panther with blue eyes.” A poem by this author references the Greeks who “resolve with benevolent conclusiveness ‘complexities which will still be complexities as long as the world lasts.’” This author calls men “monopolists of stars, garters, buttons, and other shining baubles / unfit to be the guardians of another person’s happiness” in a poem that ends “the book on the writing table / the hand in the breast-pocket.” That poem by this author, collected in her *Observations*, concerns “an institution... requiring public promises / of one’s intention.” A poem by this author begins “of ice. Deceptively reserved and flat” and uses the title creature to describe the peak of Mount Rainier. For 10 points, name this modernist poet of “Marriage” and “An Octopus” who wrote “I, too, dislike it” in “Poetry.”

ANSWER: Marianne **Moore**

20. Together with Dennis Montgomery and Tim Blixseth, this politician owned the software company Blxware, which insanely convinced the Pentagon that it could intercept Al Qaeda broadcasts. In a speech, this politician declared “diplomacy first, and don’t bomb before breakfast” to criticize air strikes against Saddam Hussein, and was blasted by Jewish groups for supporting Louis Farrakhan. This author of *An American Renaissance: A Strategy for the 1980s* dubbed himself the “bleeding heart conservative” while serving as Secretary of HUD for George H.W. Bush. Together with the namesake of the Roth IRA, Delaware senator William Roth, he co-authored the Economic Recovery Tax Act of 1981 that bears his name. He also names a 1995 Commission that supported the flat tax. For 10 points, name this man who played for the San Diego Chargers and Buffalo Bills as a quarterback, before running for Vice President in 1996 alongside Bob Dole.

ANSWER: Jack French **Kemp**

Bonuses

1. The composer of this piece stated “I was not aware of ‘Phrygian modes,’ ‘Gregorian chants,’ ‘Byzantinisms,’ or anything else of the sort, while composing this music.” For 10 points each:

[10] Name this piece that opens with an abrupt E-minor chord in the orchestra that is actually dominated by a G. Its second movement is a double fugue in C minor and its third movement opens with the chorus singing “Alleluia.”

ANSWER: **Symphony of Psalms**

[10] Stravinsky composed the *Symphony of Psalms* as part of his Period named for this twentieth-century genre in which composers drew from conventions of the Baroque and Classical eras.

ANSWER: **neoclassicism** [or **neoclassical**]

[10] One of Stravinsky’s earliest neoclassical works was this chamber piece whose second movement variations include a march, waltz, can-can, and a 5/8 (“five eight”) fugue. Its third movement is based on the 3+3+2 (“three plus three plus two”) rhythm of a *khorovod*.

ANSWER: **Octet** for wind instruments

2. This author originally intended to settle near the utopian Nashoba Community but was horrified by the climate and pestilence of rural Tennessee. For 10 points each:

[10] Name this novelist who had a very unpleasant three years in Cincinnati. She was reviled in the United States after publishing the travelogue *Domestic Manners of the Americans*.

ANSWER: Frances **Trollope** [or Mrs. Fanny **Trollope**]

[10] Trollope briefly sent her son Henry to an experimental school in New Harmony, Indiana, a utopian community based on the ideas of this industrialist. This man also established New Lanark in Scotland.

ANSWER: Robert **Owen**

[10] Trollope’s original plan was to set up an early version of one of these businesses in Cincinnati. More successful examples were created by John Wanamaker in Philadelphia and Marshall Field in Chicago.

ANSWER: **department stores** [or **bazaar**; or **emporium**]

3. This philosopher and sage built an empty ten-level temple where no human sacrifice was allowed, and wrote many poems about the quetzal bird. For 10 points each:

[10] Name this ruler of Texcoco who allied with Itzcoatl to retake his homeland and destroy the Tepanecs.

ANSWER: **Nezahual-coyotl**

[10] Itzcoatl was from this city. After the Triple Alliance’s defeat of Azcapotzalco, this city on an island in Lake Texcoco became the most powerful in the region and future site of Mexico City.

ANSWER: **Tenochtitlan**

[10] The Tepanec initially drove the Aztecs off this sacred hill. A namesake castle built here during colonial times was the residence of Emperor Maximilian I, and was defended by the Niños Héroes during a namesake 1847 battle.

ANSWER: **Chapultepec** [or **Chapoltepec**]

4. A study by Peale, Cassen, and Reynolds proposed that the molten interior of a certain celestial object is primarily driven by this phenomenon. For 10 points each:

[10] Name this phenomenon responsible for the cryovolcanism of Io, in which orbital energy in the interior of a celestial body dissolves due to a certain force acting on it.

ANSWER: **tidal heating** [or **tidal working**; or **tidal flexing**; or **tidal dissipation**; prompt on tides or tidal motion; do not accept or prompt on “tidal locking”]

[10] Tidal heating has been hypothesized to be responsible for melting the ice on the surface of this moon, giving rise to a subsurface ocean. This smallest Galilean moon is named after a Phoenician princess.

ANSWER: **Europa** [or **Jupiter II**; do not accept or prompt on "Jupiter" alone]

[10] For a spin-synchronous satellite, the rate of tidal heating is proportional to a second-order imaginary component from this set of parameters, which denote the potential of a planetary body to change shape when tidal events occur.

ANSWER: **Love** numbers

5. Characters in this novel include the slothful Mr. Listless and the pessimist Mr. Toobad, who believes that the world is being run by the devil. For 10 points each:

[10] Name this comic novel which satirizes the gloominess of contemporary literature. Its main character, Scythrop Glowry, is loosely based on the author’s close friend Percy Shelley.

ANSWER: **Nightmare Abbey**

[10] Thomas Love Peacock’s novel *Nightmare Abbey* also lampoons this author as the Kant-obsessed philosopher Mr. Flosky. His own gloomy poetry includes “Dejection: An Ode” and “Christabel.”

ANSWER: Samuel Taylor **Coleridge**

[10] Peacock especially hated this long poem, and accused it of “poisoning the mind of the reading public.” The “Bridge of Sighs” in Venice received its common English name from this poem’s fourth canto.

ANSWER: “**Childe Harold’s Pilgrimage**”

6. This temple priest is out fishing when the south wind Ninlil overturns his boat, so he breaks her wings, stopping the ocean breeze from blowing for seven days. For 10 points each:

[10] Name this wise sage who goes up to the sky, but on the advice of his father, refuses to drink the food of life, which explains why all mortals are fated to die.

ANSWER: **Adapa** [or **Adamu**]

[10] Before entering the sky kingdom, Adapa talks to this man who guards the gates with Gishzida. In a better known myth, this farmer fails to mourn the death of his wife Inanna, so she allows galla demons to drag him to the underworld, explaining the seasons.

ANSWER: **Tammuz** [or **Dumuzid**; or **Tamuzi**; or **Dumuzi**]

[10] The Sumerian Akitu festival saw Akkadian kings take on the role of Tammuz, while Babylonian rulers would reenact Marduk’s defeat of this water dragoness in the *Enuma Elish*.

ANSWER: **Tiamat**

7. Answer some questions about the poetry of Robert Creeley, for 10 points each:

[10] Creeley belonged to this group of North Carolina poets which also included Ed Dorn and Robert Duncan. They were sometimes called “projectivists” after Charles Olson’s manifesto “Projective Verse.”

ANSWER: **Black Mountain** school

[10] In Creeley’s most anthologized poem, “I Know a Man,” the narrator asks a friend with this given name whether he should buy a “goddamn big car.” This was the given name of the first rector of Black Mountain College, as well as a faculty member who published “mesostic” poems in his book *X*.

ANSWER: **John** [accept **John** Andrew Rice; accept **John** Cage]

[10] In a review of Creeley’s collected poems, Charles Simic said that his favourite interpretation of “I Know A Man” is that the speaker is this man. The first story collection by Denis Johnson is named for the *Son* of this figure, and the flashback sessions of *The Master and Margarita* depict this figure’s trial..

ANSWER: **Jesus** [or **Yeshua** Ha-*Nozri*]

8. Esther Delisle’s book *The Traitor and the Jew* chronicles the history of anti-Semitism by separatist intellectuals from this region. For 10 points each:

[10] Name this province, where Bill 101 defined French as the official language after the Quiet Revolution.

ANSWER: **Quebec**

[10] Anti-Semitic comments lined the writings of this French-Canadian historian and Catholic priest, who argued in works like 1919s *The Birth of a People* that the Canadian Confederation failed to protect the French-speaking minority. He also wrote *The History of French Canada Since Discovery*.

ANSWER: Father Lionel **Groulx** (“GROO”)

[10] Groulx’s cynicism was driven by the resolution of this political crisis about whether both Protestant and Catholic educational institutions in the namesake province would be publicly funded. This issue contributed to the Conservatives’ ousting in 1896.

ANSWER: **Manitoba Schools** Question [prompt on partial answer such as “Schools Debate”]

9. This quantity can be calculated as a function of the fine structure constant, the ratio of photon energies before and after collisions, and a certain “reduced” wavelength. For 10 points each:

[10] Name this specific quantity. This quantity, which measures the number of scattering events in a particular direction per unit solid angle, can be calculated for one process using the Klein-Nishina formula..

ANSWER: **differential cross section** [prompt on cross section]

[10] Under high frequencies, the Klein-Nishina formula yields the differential cross section in a process named for this man, in which a photon loses energy upon colliding with a free electron.

ANSWER: Arthur **Compton** [accept **Compton** scattering; accept **Compton** effect]

[10] In an experiment to test the bounds of absorption in the Klein-Nishina formula using gamma rays, C.Y. Chao discovered that the elevated “anomalous absorption” within the gamma ray and the existence of “additional scattered rays” corresponded to these two processes. Name both.

ANSWER: pair **production** AND pair **annihilation**

10. In a work in the *beffa* genre by this author, Filippo Brunelleschi pranks the title *Fat Woodworker* into thinking he has switched identities with a debtor named Matteo. For 10 points each:

[10] Name this biographer of Brunelleschi. He kicked off the study of Dantean cosmography with his efforts to map the dimensions and location of hell as described in *The Divine Comedy*.

ANSWER: Antonio **Manetti**

[10] Vasari credits Manetti with teaching geometry to this artist. Manetti's tutoring enabled this artist's infamous obsession with perspective, which Vasari claims led him to neglect his wife at night and drove him to poverty.

ANSWER: Paolo **Uccello**

[10] A painting at the Louvre often called *Five Famous Men* depicts Manetti, Uccello, Donatello, Brunelleschi, and Giotto as representatives of this city's role in the Renaissance.

ANSWER: **Florence** [or **Firenze**]

11. A student of this philosopher used his theory of the *trairūpya* to develop a table called the "wheel of reasons," or *hetucakra*, for evaluating inferences. For 10 points each:

[10] Name this brother of Asanga and teacher of Dignāga, who gave an "appearance-only" account of reality in works like *Twenty Verses* and *Thirty Verses* and co-founded the Yogācāra school of philosophy.

ANSWER: **Vasubandhu**

[10] Vasubandhu's Yogācāra school was part of this broader philosophical tradition, which contends that desire is the origin of suffering. Nagarjuna belonged to the Madhyamaka school within this religious tradition.

ANSWER: **Buddhism** [or **Mahayana** Buddhism]

[10] Another work of Buddhist philosophy in verse, Nagarjuna's *Fundamental Verses*, contends that all things have this property because they lack intrinsic nature, or *svabhāva*. This Sanskrit word is often translated as "emptiness."

ANSWER: **śūnyatā** [prompt on emptiness or voidness if given before "Sanskrit"]

12. In most cases of Leigh syndrome, mutations in the SURF1 gene cause genetic errors in the MITRAC complex that regulates the assembly of this enzyme. For 10 points each:

[10] Name this enzyme that receives four electrons used to cleave an oxygen-oxygen bond to create two molecules of water.

ANSWER: **cytochrome c oxidase** [or **Complex IV**; or **COX**]

[10] Cytochrome c oxidase is considered to be the last enzyme used in this process, which drives the synthesis of ATP using a proton gradient.

ANSWER: **electron transport chain** [or **ETC**]

[10] Early studies of the electron transport chain were often conducted using a bacterium in this genus that mimics mitochondria and has the ability to replicate when placed in hypergravity.

ANSWER: **Paracoccus** *denitrificans*

13. The fundamental welfare theorems may fail to hold if production sets display this property. For 10 points each:

[10] Identify this property of some production functions. In "new trade theory" models, there may be gains to trade even between identical countries if the production functions display this property.

ANSWER: **increasing returns** to scale [prompt on "non-convex" or "IRS"]

[10] Paul Romer relied on increasing returns in his "endogenous" models of this phenomenon. The neoclassical model of this phenomenon is usually named after Robert Solow and Trevor Swan.

ANSWER: economic **growth** [accept neoclassical **growth**; or endogenous **growth**; or Solow-Swan **growth** model]

[10] In 2015, Romer accused this Nobel Prize winner, and co-author Ellen McGrattan, of using "mathiness" to obfuscate an ideological agenda. With Robert Hodrick, this man names a filter used to smooth time series data.

ANSWER: Edward Christian **Prescott** [accept Hodrick-**Prescott** filter]

14. A suffix referring to this product, combined with the name of protagonist Leo Kall, provides the title for a dystopian Karin Boye novel set in the “Worldstate.” For 10 points each:

[10] Name this product. This product also titles a novel published in Paris under the name “M. Ageyev,” which was long rumored to be a pseudonym for Vladimir Nabokov.

ANSWER: **Cocaine** (The Karin Boye novel is *Kallocain*.)

[10] “Slug,” a drug that transports the user to a blissful artificial reality, is the subject of *The Final Circle of Paradise*, a novel by these authors of *Roadside Picnic*.

ANSWER: Arkady and Boris **Strugatsky** [or the **Strugatsky** brothers]

[10] The drug “soma” is used by citizens of the World State in this dystopian novel about John the Savage.

ANSWER: ***Brave New World***

15. This commodore built the town of Madisonville and fought at Typee Valley while serving as captain of the *USS Essex* in the Nuku Hiva Campaign during the War of 1812. For 10 points each:

[10] Name this American captain whose ship was captured at the Battle of Valparaiso. After being court martialed, he ran away and became the chief commander of the Mexican navy.

ANSWER: David **Porter**

[10] One of Porter's lieutenants in his Polynesian escapades was this man, who became the first US Navy Admiral, and gave the order "Damn the torpedoes" before attacking the Confederate fleet at Mobile Bay.

ANSWER: David Glasgow **Farragut**

[10] David Porter's son of the same name often clashed with this Secretary of the Navy under Abraham Lincoln, a man known as Father Neptune, whose attempt to relieve Fort Sumter was hamstrung by Porter's relief of Fort Pickens.

ANSWER: Gideon **Welles**

16. The opening shot of this film shows a procession of bridge beams from the side of a train passing over a river, where the protagonist's mother later refuses to bathe. For 10 points each:

[10] Name this film whose cinematographer pioneered the use of “bounce lighting” while shooting the *ghats* of Benares, where Hori works as a priest. Hori later dies from treating his illness with traditional medicine.

ANSWER: ***Aparajito*** [or *The Unvanquished*]

[10] Satyajit Ray once commented that his cinematographer Subrata Mitra had better camera work than Raoul Coutard, long-time cinematographer for this French New Wave director of *Alphaville* and *Breathless*.

ANSWER: Jean-Luc **Godard**

[10] Coutard was the cinematographer of *Lola*, the debut film of this French director and husband of Agnes Varda better known for the visually dazzling musicals *The Young Girls of Rochefort* and *The Umbrellas of Cherbourg*.

ANSWER: Jacques **Demy**

17. Abd-ar-Rahman I erected the Great Mosque of this city above the church of Saint Vincent, beginning the Emirate which lasted from 750 to 929 CE. For 10 points each:

[10] Name this city which remained the de facto capital of al-Andalus for almost 300 years. After rule by Hisham II and his chancellor Almanzor until 1031 CE, this city's Caliphate broke up into taifa kingdoms.

ANSWER: **Córdoba** [or **Cardova**; or **Cordova**]

[10] The Muslim capture of the Iberian Peninsula began at the Battle of Guadalete where Roderic, the last king of these people, was defeated. Their first king Alaric I sacked Rome in 410 CE.

ANSWER: **Visigoths** [prompt on **Goths**; do not accept "Ostrogoths"]

[10] This man, called the Blackbird, moved from Baghdad to be the court musician to Abd ar-Rahman II at Córdoba circa 825 CE. This polymath did everything from inventing toothpaste and the three-course meal, to designing new clothes and hair styles.

ANSWER: **Ziryab** [or Abu I-Hasan Ali Ibn **Nafi**; prompt on **Mirlo** or **Blackbird**]

18. This form of chemistry is commonly used for automated organic synthesis. For 10 points each:

[10] Name this type of chemistry that is contrasted with batch chemistry, in which fluids containing reagents are pumped together and reactions occur in the stream.

ANSWER: continuous **flow** chemistry

[10] An important problem that limits flow chemistry is the tubes being clogged by solids. The process of solids falling out of solution is given this name, and occurs for compounds with a low K_{sp} ("K-S-P").

ANSWER: **precipitation**

[10] In some reactors, flow focusing is used to generate these discrete objects. In digital microfluidics, these objects can be generated from a reservoir, and can serve as microreactors for generating nanoparticles or quantum dots.

ANSWER: **droplets**

19. In this novel, a dissident movement known as "The Voice of the People" protests a project by distributing plastic snakes among the general public. For 10 points each:

[10] Name this 2004 novel set in the fictional African country of Aburiria in which Kamiti and Nyawara adopt the title persona to disrupt the Ruler's attempts to build a modern-day Tower of Babel.

ANSWER: ***Wizard of the Crow***

[10] This author of *Wizard of the Crow* also depicted Kenya's fight for independence in *A Grain of Wheat*.

ANSWER: **Ngũgĩ** wa Thiong'o [or James **Ngũgĩ**]

[10] In his essay collection *Homecoming*, Ngũgĩ called this author the prime example of "peasant revolt in a white-dominated world." This author is best known for a semi-autobiographical novel that begins with a flood striking G's village on his ninth birthday, and ends with him leaving his home country for Trinidad.

ANSWER: George **Lamming** (That novel is *In the Castle of My Skin*.)

20. In a debate over one of these objects, a carob tree uproots itself, the walls of a study hall collapse, and God himself speaks from heaven to confirm the position of Rabbi Eliezer. For 10 points each:

[10] Name this type of object whose kosher status is debated by Rabbi Eliezer and Rabbi Joshua in a Talmudic story. By declaring that the Torah "is not in Heaven," Joshua successfully rebuts the miracles supporting Eliezer's position.

ANSWER: an **oven** [or the **Oven** of Akhnai; prompt on a **stove**]

[10] In the aftermath of the Oven of Akhnai debate, God reportedly told this man, "My children have bested me!" A cup of wine is reserved for this prophet during the Passover Seder.

ANSWER: **Elijah** [or **Elias**]

[10] During the dispute over the Oven of Akhnai, Gamaliel holds this title as leader of the Sanhedrin. A later rabbi with this title compiled the Oral Torah into the Mishnah.

ANSWER: **nasi** [or **prince**; accept Judah ha**Nasi** or Judah the **Prince**]