

ACF Nationals 2016

Editors' Packet 1

Tossups

1. While trying to determine this quantity for green tourmalines, C. J. Kerez observed multiple “shadow lines” instead of the normal number of two. For two minerals, relative values of this property can be determined by ascertaining the direction of the Becke line, in a namesake test. In gemology, a device used to measure this property, developed by BJ Tully, uses a hemisphere of lead glass to rotate a sample. This value can be relatively ascertained by submerging an object into oil or some other liquid and searching for “reliefs” in the immersion method. Since it is dependent on density, this quantity is usually two or greater for resinous minerals. For a uniaxial crystal, this value for one crystal axis is different than it is for the other two crystal axes. For 10 points, name this property that is dependent on the polarization of light in a birefringent material, and which can be calculated with Snell’s law.

ANSWER: index of refraction [or refractive index; do not accept or prompt on “index” or “refraction”]

2. A set of four of these pieces was posited to be a "sonata in disguise" by Robert Schumann, since the first and last are in F minor while the second and third are in A-flat major and B-flat major. Another piece in this genre opens with the left hand playing a G-G sharp augmented octave dyad before launching into rising and falling sextuplets, while the right hand plays a sixteenth-note melody. The first piece referred to by this term was composed by Jan Vaclav Vorisek, who collected six of them in his Opus 7. A B-flat major piece in this genre consists of variations on a theme from the composer's earlier Entr'acte No. 3 from *Rosamunde*. Schubert wrote two sets of four of these pieces, which are often paired with his *Six Moments Musicaux*. The melody of the *moderato cantabile* middle section of another of these pieces was reused in the song "I'm Always Chasing Rainbows". For 10 points, Chopin wrote a "Fantaisie" example of what genre of solo musical composition, whose name suggests extemporaneity?

ANSWER: impromptus [accept *Fantaisie-Impromptu*; accept Franz Schubert's impromptus until "dyad"]

3. Early in life, this general reportedly made a pledge to “be like a rat and gather up others, be like a black crow and gather great flocks.” The subject of a monograph by Richard Gabriel, this general deliberately left a gap in his circle of soldiers during one engagement, and built a bridge over a deep section of the Sajó River to bait the enemy into marching into a swamp, after he had fired off a row of catapults to allow his force to cross the Sajó. This son of a blacksmith and victor at the Battle of Mohi was first given his epithet “Bagatur” while serving in the bodyguard of the outlaw Temujin. He often commanded alongside Jebe, his fellow noyan, in battles such as Kalka River where he defeated the Cumans and Kievan Rus. After he defeated the forces of Bela IV, he protested in vain as he was ordered to retreat from Hungary due to the death of Ogedei Khan. For 10 points, name this great general under Genghis Khan.

ANSWER: Subotai [or Subutai; or Tsubodai Bagatur; or Subotai the Valiant; or Subotai the Brave]

4. This author once recalled seeing a squalid old woman resembling an ape in a sedan that he dubbed a “Duchess of Dunghill”. He wrote about seeing into a “core of an eternal fierce destruction” in a verse epistle to Joshua Hamilton Reynolds concerning “a mysterious tale” of which he “cannot speak.” One of this author’s epistles describes a room which causes its occupants to be “intoxicated with the light and the atmosphere” as the “Chamber of Maiden Thought”. After viewing Benjamin West’s *Death on the Pale Horse* with Charles Dilke, this poet asserted that William Shakespeare was content with “being in uncertainties, Mysteries, and doubts without any irritable reaching after fact and reason”. For 10 points, name this poet who discussed the concepts of the “Mansion of Many Apartments” and “negative capability” in letters that also concern his poems “Ode on Melancholy,” “Ode to Psyche,” and *Endymion*.

ANSWER: John Keats

5. In a painting created as an homage to Mark Rothko, this figure can be seen staring at the Sun over the Mediterranean Sea, but when viewed from 20 meters away, that portrait of this person transforms into a portrait of Abraham Lincoln. This person’s name appears in the title of a painting in which groups of four Arabs aiming their rifles at each other constitute the structure of the title molecule. The title character of a painting in which a seashell with an egg suspended below it hangs above an arch that has been cut into six pieces was modeled on this one-time wife of Paul Eluard. Another artist’s “nuclear mysticism” phase includes a painting depicting this subject as a mythological statue comprised of spheres that resemble atomic particles. This woman was the model for *The Madonna of Port Lligat*. For 10 points, name this model, the wife and muse of the painter of *The Persistence of Memory*.

ANSWER: Gala Dali [prompt on “Dali”; accept Gala Dali or Elena Ivanovna Diakonova]

6. A portion of this text describes how governmental entities called quintets, sextets, septets, and nonets were created to prevent certain politicians from introducing legislation. This document was copied by the journalist John Rettie during a drinking party, and published after Edward Crankshaw met with the editor of *The Observer*, as told in a biography by William Taubman. This document contains a full reprint of the declaration of Robert Eikhe, and discusses the phony papers that exposed a “Mingrelian nationalist organization.” The author of this text argues that “enemy of the people” was a concept developed to eliminate the possibility of ideological fight, and exposes the details behind Sergei Kirov’s murder. It was drafted for the 20th Party Congress and officially titled “On the Cult of Personality and its Consequences.” For 10 points, name this 1956 speech by Nikita Khrushchev.

ANSWER: the Secret Speech of Nikita Khrushchev [or “On the Cult of Personality and its Consequences” until it is read; or Khrushchev’s 20th Party Congress address until it is read; prompt on Khrushchev’s address]

7. This equation shares the same dynamics as a circle of equally spaced balls colored black or white, which move in a clockwise direction at the same speed and change color whenever they pass a mark on the circle; that construction is the Kac ring model. Applying time-reversal invariance to this equation can be used to show that it is only strictly valid when the integral over velocity space of f times the natural log of f is at a local maximum. The derivation of this equation assumes that the velocities and positions of molecules are statistically independent, a condition called “molecular chaos.” For a gas of particles which only interact via binary collisions, this equation gives an expression for the time evolution of the non-equilibrium distribution function. The H-theorem is derived using, for 10 points, what “transport equation” of statistical mechanics, named for a scientist who proposed a logarithmic formula for entropy?

ANSWER: **Boltzmann** transport equation

8. Along with Heining and Kline, this economist wrote several papers using matched employer-employee data to document firm-specific wage premia and endogenous sorting, challenging the Human Capital paradigm in labor economics. The “puzzle” named for this man is that labor demand is either perfectly elastic or perfectly inelastic, which is resolved by abandoning the assumption that the labor market is competitive. George Borjas disputes this economist’s finding about the effect of the Mariel Boatlift on wages for low-wage workers in Miami. This is the alphabetically-prior of two economists that James Buchanan implied were “camp-following whores” after they implemented a Difference-in-Difference procedure in New Jersey and Pennsylvania by conducting an original survey of fast food restaurants. For 10 points, name this Berkeley professor who, along with Alan Krueger, pioneered the New Minimum Wage research agenda.

ANSWER: David **Card**

9. An innkeeper in this book colludes with some bandits by breaking the bowstring of an escort, but those bandits are unable to steal the silver on a rich merchant’s mules when the escort uses his own hair to restring his crossbow. Immediately before a performance of the opera “Three Generations Glory” during a wedding in this novel, a rat falls into a bowl of bird’s nest soup and scalds the bridegroom. This novel includes a section in which a traveller tells the Abbot of Ocean Moon Monastery how he fended off two tiger attacks. This 1750 novel parodies *Outlaws of the Marsh* by having stars that represent the title characters fall from the sky. It opens by describing Wang Mien, a painter who chooses not to become an official even though he is ostensibly one of the title people. Author Jingzi Wu critiqued the civil service exam in, for 10 points, what novel named for people who are supposedly learned?

ANSWER: *The **Scholars*** [or ***Rúlínwàishǐ***; or *The **Unofficial History of the Forest of the Literati***]

10. One member of this family forced Edward Alsworth Ross to resign after his speech calling for America to turn its guns on any vessel bringing immigrants to its shores, because eugenics-advocate Ross believed it would lead to “race suicide.” That member of this family actually died of strychnine poisoning at the Moana Hotel in Waikiki, but many claimed her death was covered up by her rival David Starr Jordan. A better-known member of this family joined Collis Huntington, Mark Hopkins, and Charles Crocker in a certain group which hired Theodore Judah for a project. That man owned a horse named Sallie Gardner that was photographed by Eadweard Muybridge. That man, a member of the so-called “Big Four,” presided over the ceremony at Promontory Point where a golden spike was driven to mark the first transcontinental railroad. For 10 points, give the last name of that Governor of California, a tycoon who founded a university in Palo Alto.

ANSWER: **Stanford** [accept either Jane **Stanford** or Amasa Leland **Stanford**]

11. According to Rabbi Yochanan, reciting the Shema twice a day satisfies the Biblical requirement that Jews perform this action. Rabbi Eliezer compared allowing women to perform this action to “tiflut,” which prevented women from performing this action until the Haskalah. The Zohar outlines four levels of performing this action which are commonly referred to by the acronym “PaRDeS.” According to the Talmud, this action is the greatest mitzvot, since it contains the potential for all other mitzvot. Jews traditionally perform this action using the method of havruta, in which they divide themselves in pairs at a beit midrash. Many Haredi Jewish men spend their adult lives performing this action at a kollel or yeshiva instead of working. For 10 points, name this practice of interpreting the holiest books in Judaism.

ANSWER: **studying** the **Torah** [prompt on reading the **Torah** or equivalents - they must mention study or a synonym for study that implies they are doing more than just reciting its passages]

12. This author’s viewing of the frescoes of Luca Signorelli led him to examine the apocalyptic nature of Vladimir Solovyov’s writings in his essay “Science Fiction and the Coming of Antichrist.” In another essay, this author examined the philosopher Lev Shestov’s “purity of despair.” This man, who examined “modes of eccentric vision” in *Emperor of the Earth*, wrote a book that examines a writer’s novel about the dictator Murti Bing, who gives everyone a special pill to strip people of their resistance. This man’s poetry collection *Unattainable Earth* was the first of his collaborations with Robert Hass, who championed him while they were both at Berkeley. In a book about Beta the Disenchanted Lover and Delta the Troubadour, this author wrote about 4 intellectuals who are initially attracted to Communism. For 10 points, name this Polish author of *The Captive Mind*.

ANSWER: Czeslaw **Milosz**

13. A non-Sonny Rollins album titled for the “madness” of this instrument features Nick Brignola and Pepper Adams. The Mingus Big Band’s recording of “Moanin’” opens with a solo for this instrument played by Ronnie Cuber. Another player of this instrument composed “Young Blood” and “Walking Shoes” for the Stan Kenton big band, and arranged six tracks, including “Jeru,” for the album *Birth of the Cool*. This instrument plays the melody on Duke Ellington's original recordings of “Frustration” and “Sophisticated Lady.” Harry Carney and Gerry Mulligan played this E-flat tuned instrument, which sits in front of the fourth trombone and to the right of four higher-pitched instruments in the traditional jazz big band setup. A small loop is located in the top of the neck of, for 10 points, what woodwind instrument which is lower in pitch than the tenor saxophone?

ANSWER: **baritone saxophone**; [or **bari sax**; prompt on saxophone; do not accept or prompt on any other type of saxophone]

14. For a small spherical UME, this quantity attains a steady-state value. This quantity is found on the y-axis of a so-called “duck-shaped” curve that arises in a certain technique. This quantity is proportional to the one-half power of the angular velocity of an RDE according to the Levich equation. The fact that this quantity is directly proportional to concentration for diffusion-limited reactions is the basis behind the “linear scan” form of a certain technique. The two main modes used in scanning tunneling microscopy are constant height mode and constant *this quantity* mode. Quantum fluctuations in this quantity cause shot noise. Detectors used in spectrophotometers generate a value of this vector quantity proportional to the number of photons hitting the transducer. For 10 points, name this quantity given by the number of electrons passing through a detector divided by a given time interval.

ANSWER: electric **current** [UME and RDE stand for “ultramicroelectrode” and “rotating disc electrode”]

15. An anecdote about this man claims he freed a house servant dressed in the costume of Dionysius during a choir, because that servant was applauded as a god. After winning a battle at Corinth, this general unwittingly failed to bury two dead men, so he returned to the battlefield, giving up his right to erect a victory trophy. Together with a younger colleague, he secured the ostracism of Hyperbolus. During his best-known battle, he requested a relief force under Demosthenes and Eurymedon, but nonetheless, his co-commander Lamachus was slain and he was captured by Gylippus, who promised to spare his life but failed to do so. This man gives his name to an agreement that ended the Archidamian War, which he negotiated after the Battle of Amphipolis. For 10 points, name this Athenian politician who tried to speak against the Sicilian Expedition, but was opposed by the more brash Alcibiades, then died while leading that expedition.

ANSWER: **Nicias**

16. An aphorism states this person's ideas "straightaway become manias" since he is *tyrannized* by them, and that this man's "violent love" of "repetition" causes him to "bore us with his raptures." This man is attacked as being "thoroughly *feminini generis*" in a work that bizarrely calls him the "Cagliostro of modernity." This man, who is described as "the most triumphant creature alive," became a "cranky and desperate *decadent*" when he "suddenly fell helpless and broken on his knees before the Christian cross" according to an essay titled "The Case Of" this thinker. A dithyramb attacking this man called "On the Poverty of the Richest" ends a philosophical tract about him, whose influence on a certain philosopher is repudiated in the section "An Attempt at Self-Criticism." One of the *Untimely Meditations* discusses, for 10 points, Friedrich Nietzsche's relationship to what German composer?

ANSWER: [Wilhelm] Richard **Wagner**

17. This letter denotes a statistical "factor" used to evaluate the usefulness of a high-throughput screening assay. Individuals with copies of the M and S alleles of the SERPINA-1 gene produce more alpha-1-antitrypsin than individuals with the deleterious allele denoted by this letter. This letter denotes the increase in temperature required to give a 90 percent reduction in the time required to kill 90 percent of the microorganisms in a sample. The contractile ring that forms in bacterial cell division is named for this letter. A structure denoted by this letter contains alternating sugar pucker and alternating anti and syn conformations of adjacent nucleotides, producing a zig-zagging left-handed double helix. The flow of electrons through photosystems I and II is described by a "scheme" named for this letter. For 10 points, name this letter that is paired with W in the sex chromosomes of birds.

ANSWER: **Z**

18. This character claims that he will have one hand over his scrotum as he defends a "saloon in West Berlin where the barstools are five feet high," while his other free hand will be used to "battle ... to the death." At the beginning of a play, this character is unable to identify a Bette Davis film after another character states "What a dump!" This character was unable to publish his "memory book", a novel about a boy who accidentally killed both his mother, with a shotgun, and his father, in a car accident. Another character tells a story describing how this character fell into a huckleberry bush after she punched him squarely in the jaw; during that story this character pulls out a short-barrel shotgun and fires a yellow Chinese parasol out of it. He tells a story about "Mousie" to mock another character's hysterical pregnancy during a game of "Get the Guests". For 10 points, name this mean-spirited professor, the husband of Martha in *Who's Afraid of Virginia Woolf?*

ANSWER: **George**

19. In a romance, this man ventures to an island where he meets a dwarf and a son of a dwarf, who has turned into the “Giant without a Name” since he was suckled by a magical unicorn. This man journeys to the Amorous City on Pentecost in a humorous satire narrated by his talking, magical *papegeau*, which leads him to be called “The Knight of the Parrot.” In *Cliges*, the Greek Prince Alexander falls in love with this knight’s niece Soredamors and helps him retake Castle Windsor from a traitorous lord. In another romance, this character has a dream in which Gawain tells him to wait thirty days before fighting an usurper. Sir Bedivere twice ignores this warrior’s deathbed request to rid him of a certain object. This man is mortally wounded at Camlann by his illegitimate son Mordred, after which he is taken to the isle of Avalon. For 10 points, name this son of Uther Pendragon who wielded the sword Excalibur.

ANSWER: King Arthur

20. A legendary American practitioner in this industry was Jonathan Bourne. A group of people involved in this activity slaughtered all but two members of the local Gunditjmara people at the settlement of Portland, during an incident called the Convincing Ground Massacre in Australia. During the 1950s and early 60s, this industry was the primary concern of a company named for Christian Salvesen. When a local merchant, Constantino Davidoff, tried to remove that company’s property as part of Project Alpha, he unwittingly sparked a conflict at South Georgia, now known as the War of the Falkland Islands. An incident called the “Disaster of 1871” was a severe setback to this industry. The “City That Lit the World” became the motto for the town of New Bedford when it became a base for this industry after the American Revolution. For 10 points, name this industry, based in towns like Nantucket, in which products like baleen are harvested from certain sea animals.

ANSWER: whaling industry [accept any reasonable equivalent that references whales, such as “hunting whales” or “killing whales” – prompt for more specific on fishing or hunting]

Tiebreaker: Karl von Staudt unusually defined the set of these objects as being the point set of all absolute points of a polarity. In projective geometry, a transversal that intersects one of these objects that circumscribes a quadrangle will have three pairs of points that forms an involution by Desargues’s theorem. Another theorem in projective geometry states that if the six points that define a hexagon lie on one of these objects, the points of intersection of the opposite sides will lie along the Pascal line. In a treatise named for these objects which introduced the infinity symbol, John Wallis proved that these entities correspond exactly to the set of nondegenerate curves with degree 2. These objects, which can be imagined as quadrics of one dimension, are formed by intersecting a namesake 3D shape with a plane. For 10 points, name these shapes that includes the circle, hyperbola, ellipse and parabola.

ANSWER: conic sections [anti-prompt on circle, or hyperbola, or “ellipse,” or “parabola” before “nondegenerate” do not accept or prompt on any of those answers afterwards.]

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Bonuses

1. In the fifth of these poems, the author writes “I leaf through the works of the Ancients / with busy hands,” while the first of them exhorts “Tell me you stones, O speak, you towering palaces.” For 10 points each:

[10] Name this cycle of 24 poems dedicated to Christiane Vulpius, which were never published during its author’s lifetime due to their eroticism.

ANSWER: **Roman Elegies** [or **Erotica Romana**]

[10] This German author wrote the *Roman Elegies*, the second of which repudiates “those foolish pages” that comprise his novel *The Sorrows of Young Werther*.

ANSWER: Johann Wolfgang von **Goethe**

[10] Goethe described the grave of this author as a place where “the turtledove coos and where the cricket sings in delight.” This ancient Greek lyric poet is known for his verses about wine.

ANSWER: **Anacreon**

2. The combination drug Zosyn contains one of these drugs called tazobactam. For 10 points each:

[10] Name these drugs exemplified by clavulanate, which target enzymes which come in “extended spectrum” types and include TEM-1.

ANSWER: **beta-lactamase inhibitors** [do not accept or prompt on partial answers]

[10] Beta-lactamase inhibitors are used to attack enzymes which destroy the beta-lactam rings found in drugs based off of this antibiotic, which is often given to mothers during labor.

Alexander Fleming discovered this antibiotic, which gained widespread use in the 1940s.

ANSWER: **penicillin**

[10] A particularly nasty potential side effect of antibiotics is increased susceptibility to a colitis caused by a bacterium in this genus, whose species name is “*difficile*.” A spore-forming bacterium in this genus can grow in the GI tract of infants and release a paralytic neurotoxin which causes “floppy baby syndrome.”

ANSWER: **Clostridium** *difficile* or *botulinium*

3. Maurice, the Count de Benyovsky, gave himself this title after he founded a settlement near Antongil Bay. For 10 points each:

[10] Name this title whose holders ruled over the “twelve sacred hills” of Imerina. Holders of this title included two rulers named Radama, the second of whom agreed to the Lambert Charter.

ANSWER: **King of Madagascar** [prompt on “ruler” or “leader” of Madagascar - this requires the specific title King]

[10] A better known ruler, the Mad Queen Ranavalona, made people eat skins of this animal and then throw them up to prove they were loyal. The Herbert Hoover ad machine promised that there would be one of these in every pot and a car in every garage.

ANSWER: **chicken** [or **cock** or **rooster** or **hen**]

[10] This term refers to the Malagasy people who displaced the Vazimba in Madagascar in the 14th century. This word came to refer to a social class, along with the andriana and andevo, and is used to denote the two wars by which France turned Madagascar into a colony.

ANSWER: **Hova** [or the Franco-**Hova** Wars; accept **H to the izzo, V to the izzay**]

4. Among the people who claimed to have discovered this element are Fred Allison, who proposed to call it alabamium to honor his home state; Rajendralal De, who suggested a name of dakin to honor his home country of Bangladesh; and Walter Minder, who chose the name Helvetium to honor his Swiss heritage. For 10 points each:

[10] Name this element, the rarest naturally occurring element in Earth's crust.

ANSWER: astatine [or As]

[10] The nationalistic craze that fueled the naming controversy of astatine led Friedrich Paneth, the chair of this organization, to formalize rules for the naming of new elements. This organization's "Gold Book" is a compendium of chemical terminology.

ANSWER: IUPAC [or International Union of Pure and Applied Chemistry]

[10] The credit for the discovery of astatine goes to Dale Carson, Kenneth McKenzie and this sub-atomic physicist, also known for his discovery of technetium and the antiproton.

ANSWER: Emilio [Gino] Segre

5. Name these Italian artists who depicted the Medici, for 10 points each.

[10] This artist painted the *Medici Madonna* for the Medici Chapel, which he designed. His other paintings include *Separation Of Light from Darkness* and *The Last Judgment*, both of which can be found in the Sistine Chapel.

ANSWER: Michelangelo di Lodovico Buonarroti Simoni [accept either underlined answer]

[10] This artist's *The Confirmation of Franciscan Rule* shows Lorenzo emerging from a staircase with his entourage. This teacher of Michelangelo showed an old man with rhinophyma in his painting *An Old Man with his Grandson*.

ANSWER: Domenico Ghirlandaio

[10] A portrait of John VIII Paleologus as a wise man can be found in this artist's *Adoration of the Magi* in the Palazzo Medici. The Medici and their tutor Angelo Poliziano appear in his *The Tower of Babel*.

ANSWER: Benozzo Gozzoli

6. Answer the following about ecologically-inspired American literature, for 10 points each.

[10] This author profiled the title area's "quaking bogs" in his book *The Pine Barrens*. The nuclear designer Ted Taylor and the environmentalist David Brower are the subjects of his books *The Curve of Binding Energy* and *Encounters with the Archdruid*.

ANSWER: John McPhee [or John Angus McPhee]

[10] A line from John Keats inspired the title phrase of this Rachel Carson book, whose ideas led the US government to enforce nationwide ban on DDT in farms.

ANSWER: *Silent Spring*

[10] George Hayduke states "My job is to save the fucking wilderness" in this Edward Abbey novel named for a Luddite-inspired group that is trying to sabotage the Glen Canyon Dam.

ANSWER: *The* *Monkey Wrench Gang*

7. Name these investigative journalists in American history, for 10 points each.

[10] This schoolteacher and muckraker wrote a series in *McClure's Magazine* attacking John D. Rockefeller, which was published in book form in 1904 as *The History of the Standard Oil Company*.

ANSWER: Ida Minerva **Tarbell**

[10] Perhaps the first journalist to become an internet celebrity, this reporter for the San Jose Mercury News released a series called "Dark Alliance," alleging that the CIA caused the American crack cocaine epidemic in Los Angeles. His suicide in 2004 led to a wave of conspiracy theories.

ANSWER: Gary Stephen **Webb**

[10] This reporter published a story on "Project Jennifer" and wrote the book *The Target Is Destroyed* about Korean Air Flight 007. He may be better known for interviewing Lieutenant William Calley Jr. in a piece he published in Dispatch News Service.

ANSWER: Seymour Myron "Sy" **Hersh** [the Calley interview is his exposure of the My Lai Massacre]

8. An example of this philosophical concept can be seen in the word "aardvark," which has eight instances of letters, but which uses five distinct letters. For 10 points each:

[10] Identify this semantic distinction, first made by an American logician and philosopher, in which a concept and instances of the concept are distinguished.

ANSWER: **type-token** distinction [or obvious equivalents mentioning both **types** and **tokens**]

[10] This philosopher made the type-token distinction in an article for *The Monist* and championed the method of science over tenacity and authority in *The Fixation of Belief*. He coined the term "pragmatism".

ANSWER: Charles Sanders **Peirce** [or Charles Santiago Sanders **Peirce**]

[10] The idea that mental events are "tokens" of generalized "mental types," or type physicalism, runs counter to this theory of mind proposed by Jerry Fodor, which argues that one mental state can be an instantiation of any number of physical properties.

ANSWER: **multiple realizability** [or word forms; do not accept or prompt on partial answers]

9. Paul Barnes transcribed a suite for piano from this composer's opera *Orpheus*, and premiered this composer's second piano concerto. For 10 points each:

[10] Name this composer, whose other piano music includes "Mad Rush," "Modern Love Waltz," and five pieces called "Metamorphosis."

ANSWER: Philip **Glass** [or Philip Morris **Glass**]

[10] In 2014, Glass finished his twenty piano pieces in this genre, which are intended to allow pianists to practice a particular skill. Chopin composed ones nicknamed "Black Key" and "Revolutionary."

ANSWER: **etudes** [accept the *Black Key* **Etude** or the *Revolutionary* **Etude**]

[10] Vladimir Horowitz frequently performed this Russian composer's etude in D-sharp minor, his Opus 8 Number 12. Like Chopin, he followed the circle of fifths to progress through the keys of his 24 Opus 11 preludes.

ANSWER: Alexander **Scriabin** [or Alexander Nikolayevich **Scriabin**]

10. This result is often used to prove Fermat's little theorem. For 10 points each:

[10] Name this theorem which states that for a group P , any subgroup of P will have an order that divides the order of P .

ANSWER: **Lagrange's** theorem

[10] The proof of Lagrange's theorem relies on these structures, which are defined as the set of elements consisting of the elements of a subgroup times a single element of a group. For a normal subgroup, the "left" and "right" ones are equal.

ANSWER: **cosets** [or left **cosets**; or right **cosets**]

[10] Since the rational numbers are a normal subgroup of the reals under addition, one can define these non-Lebesgue measurable sets. These sets are defined as a subset of the interval from zero to one such that for all r , there exists exactly only one v such that " v minus r " is a rational number.

ANSWER: **Vitali** sets

11. In his *Fisal*, a book which is partly named for this concept, the Andalusian scholar Ibn Hazm states this concept is "occult, not literal, esoteric, not literal, and secret, not public." For 10 points each:

[10] Give this English word, which describes the act of promoting doctrines that contradict orthodoxy. People who practiced it in another tradition were often burned at the stake.

ANSWER: **heresy** [or **heretics**]

[10] This term, which refers to "innovation" in religious matters, is often used as a synonym for heresy, since a hadith states "every novelty is an innovation, every innovation is an error."

ANSWER: **bidah**

[10] This other Arabic word describes people who held doctrines that contradicted orthodox Islam. This term, unlike *kafir* and *munafiq*, also refers to people who tried to hide their heresy by passing themselves as Muslim.

ANSWER: **zindiq**

12. This critic's works include a volume of essays that take a sociological approach to analyzing modernist classics, *Signs Taken for Wonders*. For 10 points each:

[10] Name this author known for his quantitative approach to literary history, such as charting the popularity of British genres, or mapping a novel's events. That approach appears in his book *Graphs, Maps, Trees*.

ANSWER: Franco **Moretti**

[10] In the "Trees" section of *Graphs, Maps, Trees*, Moretti maps the usage of clues in detective stories to show that competitors to this author of "A Scandal in Bohemia" used clues much less effectively as a plot device than he did.

ANSWER: Sir Arthur [Ignatius] Conan **Doyle**

[10] In *Atlas of the European Novel*, Moretti shows that the "suspicion of foreign forms" and the closeness of Germany gave rise to this genre of fiction, exemplified by *The Battle of Dorking* and *The Riddle of the Sands*.

ANSWER: **invasion** literature [or the **invasion** novel; accept anything indicating, England is **invaded** by Germany]

13. For free space, this two-by-two matrix has the distance travelled in the top right corner and ones on the main diagonal. For 10 points each:

[10] Name these matrices which are used to describe the influence of optical elements acting on a paraxial ray.

ANSWER: **ABCD** matrix [or ray **transfer** matrices]

[10] ABCD matrices can be used to show how optical elements modify the complex q parameters of this idealized type of beam. Commonly used to describe lasers, it is named for the shape of its transverse profile.

ANSWER: **Gaussian** beam

[10] The C parameter in the ABCD matrix for a mirror equals negative two over this quantity.

For a spherical mirror, this quantity equals twice the focal length, and the focal length is expressed in terms of two values of this quantity in the lensmaker's formula.

ANSWER: **radius of curvature** [prompt on **R**, **radius**, or **curvature**]

14. In *The Shamanic Odyssey*, Robert Tindall argues that Circe should be identified with this Homeric title, since she “has a deep dwelling in the wild.” For 10 points each:

[10] Give this Greek title used by Homer which translates as “Mistress of the Animals.”

ANSWER: **Potnia Theron**

[10] It is thought that Homer used the phrase *Potnia Theron* to refer to this goddess of the hunt, the sister of Apollo.

ANSWER: **Artemis** [do not accept or prompt on "Diana"]

[10] The *Potnia Theron* aspect of Artemis is thought to have been a syncretization of Artemis with Britomartis, a goddess of this civilization. This civilization's mythology includes an unnamed “Snake Goddess.”

ANSWER: **Minoans** [or **Minoan** civilization]

15. An autobiography, titled for the wonderful adventures of this woman's life in many lands, was published in 1857. For 10 points each:

[10] Name this mixed-race Jamaican nurse who set up the British Hotel with Thomas Day to sell supplies and medicine to British soldiers in the Crimean War.

ANSWER: Mary [Jane] **Seacole** [or Mary Jane **Grant**]

[10] The British Hotel was established near this city, the site of a battle where Lord Cardigan infamously misinterpreted the orders of Lord Raglan.

ANSWER: **Balaclava** [or Battle of **Balaclava**]

[10] At around the same time, this man organized ramshackle hospitals using the slogan “All are Brothers.” His book *A Memory of Solferino* recounts his founding of the Red Cross.

ANSWER: Henry **Dunant** [or Jean Henri **Dunant**]

16. In an essay called “On the Battlefield of” this Concept, Noi Sawaragi argues that it emerged from a “double amnesia” of “two kinds of violence:” aggression against Asia, and the U.S.’s atomic bombs. For 10 points each:

[10] Name this concept, which another theorist stated is why the Japanese “find realism in the movements of a three dimensional polygon.” That theorist argues that anime “train[s] the American eye” to appreciate Japanese aesthetics through this concept.

ANSWER: **Superflat**

[10] The theory of Superflat was developed by this Japanese artist of the disquieting, gold leaf-covered sculpture *The Birth Cry of a Universe*. Common motifs in his work include mushrooms, smiling flowers, and pandas.

ANSWER: Takashi **Murakami** [accept names in either order]

[10] For thirteen years, Takashi Murakami collaborated with this fashion house, producing many handbags that feature the “LV” monograph on it. Its other models feature the *Final Fantasy* character Lightning.

ANSWER: **Louis Vuitton** Malletier

17. This concept is exemplified by the Corey-Seebach reaction, in which a di-thiane is reacted with n-butyllithium, and a carbonyl, causing the formation of a carbon-carbon bond between an acyl cation and a masked acyl anion. For 10 points each:

[10] Name this concept from organic chemistry in which a normally electrophilic functional group is made nucleophilic, or vice versa.

ANSWER: **umpolung** [prompt on polarity inversion; do not prompt on "polarity" or "inversion"]

[10] A classic example of umpolung reactivity is one of these reactions in which benzoin is synthesized using cyanide and two molecules of benzaldehyde. Another of these reactions requires that the reactant have two alpha hydrogens, since the product is stabilized by deprotonation via an alkoxide base.

ANSWER: **condensation** reactions [or benzoin **condensation**; or Claisen **condensation**]

[10] In the Claisen condensation, two of these compounds react together in the presence of an alkoxide base. They can be formed by the condensation of an alcohol and a carboxylic acid.

ANSWER: **esters**

18. Together with Baldwin V of Flanders, this woman served as regent for her son, the Capetian King Philip I. For 10 points each:

[10] Name this Ruthenian queen of France from 1051 to 1060, the second wife of Henry I, and founder of the Royal Abbey of St. Vincent in Senlis. She was the daughter of Yaroslav the Wise.

ANSWER: **Anne of Kiev** [or **Agnes of Kiev**; or **Anna Yaroslavna**, prompt on just her first name]

[10] Another of Anne’s sons was Hugh of Vermandois, whose vision of a lunar eclipse prompted him to join the First Crusade, after Pope Urban II delivered a speech at this church council in 1095.

ANSWER: Council of **Clermont**

[10] Meanwhile, Philip I of France was embroiled in a feud with this Bishop of Chartres, a jurist and saint who was imprisoned after criticizing Philip for repudiating his wife Bertha of Holland.

ANSWER: Saint **Ivo** of Chartres [or **Yves** or **Ives** or **Yvo**, or **Ivonis** Carnutensis]

19. Since 1947, this man's namesake medal has been awarded to an American economist under the age of forty who has made an important contribution to economic thought. For 10 points each:

[10] Name this economist whose writings were collected into the 1886 work *Philosophy of Wealth*. He created the concept of marginal productivity theory and developed the product exhaustion thesis.

ANSWER: John Bates **Clark**

[10] This man studied under Clark, but rejected his ideas and became a leader of the opposing "Institutionalist" school. He wrote "The Instinct of Workmanship" and coined the idea of "conspicuous consumption."

ANSWER: Thorstein Bunde **Veblen** [or Torsten Bunde **Veblen**]

[10] In 1954, Piero Sraffa kicked off the Cambridge Capital Controversy by critiquing Clark's ideas with his "re-switching" argument. Sraffa is often cited as belonging to a school named for the neo-version of this economist.

ANSWER: David **Ricardo**

20. This author collaborated with David Bowie and others to perpetuate his biographical hoax *Nat Tate*, a book released on April Fool's Day about an artist who never existed. For 10 points each:

[10] Name this Ghana-born Scottish novelist, who fictionalized the African campaign of World War I in *An Ice-Cream War*. His other books include *Brazzaville Beach* and *Solo*.

ANSWER: William **Boyd**

[10] William Boyd's novel *Solo* is a continuation of the work of this author, whose stories include "Risico" and "Quantum of Solace." His first novel was 1953's *Casino Royale*.

ANSWER: Ian **Fleming** [or Ian Lancaster **Fleming**]

[10] Boyd's novel *Any Human Heart* includes appearances from both Fleming and this author, who may have kissed the protagonist, Logan Mountstuart. This writer's descent into madness inspired his own novel *The Ordeal of Gilbert Pinfold*.

ANSWER: Evelyn **Waugh** [or Arthur Evelyn St. John **Waugh**]