

2021 ACF Nationals

Packet 2 by the Editors

Edited by Matt Bollinger, Jordan Brownstein, Andrew Hart, Ike Jose, Jack Mehr, Eric Mukherjee, Derek So, Jerry Vinokurov, Ryan Westbrook, and Jennie Yang

Tossups

1. Brian Garfield described a conflict in this territory in *The Thousand Mile War*, which included a last stand at Engineer Hill. The Fourth Avenue Theater in this territory was built by a rich industrialist named Cap Lathrop. This place was the destination of a speaking tour called the “Voyage of Understanding,” which was undertaken by a man who died on the way back, possibly from ptomaine poisoning. 20,000 natives from this territory joined militias after a campaign by its governor Ernest Gruening. Franklin Roosevelt was reported to have left his dog Fala behind in this territory, and sent a Navy ship to retrieve him. This territory was the base for Project Hula, and natives on its Pribilof Islands were forced to hunt for seal fur. This territory’s island of Attu was one of the only parts of North America conquered by Japan during World War II. For 10 points, name this U.S. territory that also included the Aleutian Islands.

ANSWER: Territory of Alaska

2. “Fantastic” examples of these structures surround St. Augustine and a child trying to pour the ocean into a hole in a characteristic work of François de Nomé. Monks, Roma people, and soldiers appear between these structures in the painting *Banditti at Rest* by Alessandro Magnasco. An artist depicted “men playing dice” around these structures, and imagined a Grand Gallery as one of these structures. Depictions of these things made by the Italian masters Marco Ricci and Giovanni Panini inspired a book of etchings of them called *The Views* by Giovanni Piranesi. Pompeo Batoni frequently painted portraits of people on the Grand Tour standing near these structures. Hubert Robert was nicknamed for his depiction of these structures, which are often incorporated into landscapes called *capriccios*. For 10 points, Neoclassicists were often inspired by what remains of ancient buildings?

ANSWER: Roman ruins [or Roman remains; prompt on old buildings, temples, arches, or landmarks; prompt on Roman buildings]

3. An “analytic” form of this discipline was spearheaded by Brian Berry, who was one of the so-called “space cadets” studying under William Garrison, a pioneer in the use of computers to facilitate this discipline’s practice. In the 1950s, Fred Schaefer attacked the “orthodox” methods of Richard Hartshorne in a bitter debate that inaugurated a paradigm shift known as this discipline’s “quantitative revolution.” That shift led to the formulation of a statement that begins “everything is related to everything else,” which is known as Waldo Tobler’s “first law” of this discipline. In the 19th century, world leaders were influenced by an English practitioner of this discipline who outlined the “Heartland” theory in an article that dubbed Central Asia the “pivot of history.” For 10 points, Walter Christaller and Halford Mackinder were practitioners of what discipline, the study of places on Earth?

ANSWER: geography [or urban geography; or political geography; or human geography]

4. In zebrafish, *Bsx* controls the development of this structure’s namesake complex, which also contains an organ prefixed “para” that develops from cells migrating leftward from it. In this structure, 14-3-3 stabilizes *AANAT* in response to cAMP. In Japanese lampreys and catfish, this structure contains a bistable pigment called parapinopsin. Masses in this structure are the most common cause of a set of symptoms that includes Collier’s sign, convergence-retraction nystagmus, and the “setting-sun” sign; that is Parinaud’s syndrome. The corpora arenacea is a calcified “sand” in this organ. This organ gets input from the suprachiasmatic nucleus via the retinohypothalamic pathway. Its product is made from tryptophan via an n-acetyl-serotonin intermediate. It lies inferior to the thalamus between the cerebral hemispheres. For 10 points, name this gland that uses melatonin to regulate sleep–wake cycles.

ANSWER: pineal gland [or pineal complex; accept parapineal gland]

5. In a novel by this author, a persecuted scientist, working for a Flemish monastery during the Duke of Alva's reign, receives a death sentence after the monk Cyprian falsely implicates him in a sex cult called "The Angels." In another novel by this author, the narrator realizes he is "eagle and bull... phallus and brain" after watching a naked Brahmin immolate himself in the tent of Osroes. This author's longtime partner, Grace Frick, translated her novel about the alchemist Zeno of Bruges as *The Abyss*. A six-part novel by this author is written as a letter addressed to "Mark" and opens with the chapter "Animula Vagula Blandula." In this author's most famous novel, the title character recounts his love for Antinous ("an-tih-NOH-us") in a letter written to advise Marcus Aurelius. For 10 points, name this first woman elected to the Académie Française, the author of *Memoirs of Hadrian*.

ANSWER: Marguerite **Yourcenar**

6. A composer with this surname included the movements "Three Pierrots" and "Kandinsky" in a "21st-century" version of *Pictures at an Exhibition* titled *Picture Studies* and joined the Atlanta School of Composers in 2010. In a large chamber piece by a composer with this surname, the *adagio* section opens with a solo double bass playing ascending harmonics E, A, G, D, and the horn introduces the quartal "motto" of rising fourths starting on concert D. That composer of this surname employed "developing variation" in a one-movement chamber piece for 5 strings and 10 winds, and he conducted that Chamber Symphony No. 1 at the *Skandalkonzert*. A composer with this surname included flute, clarinet, violin, cello, piano, and a singer using the *sprechstimme* technique in a setting of "three times seven" poems by Albert Giraud. For 10 points, give this surname of the composer of *Pierrot Lunaire*.

ANSWER: **Schoenberg** [or Arnold **Schoenberg**; or Adam **Schoenberg**]

7. An island in this body of water is home to a museum purporting to be an "archive" that plays the heartbeats of its visitors. To revitalize the economies of a depopulated archipelago in this body of water, the Benesse Corporation puts on a namesake Triennial Art Festival held throughout the archipelago's abandoned villages. According to local tradition, this body of water was home to an island of demons defeated by a culture hero known as "Peach Boy." Visitors can venture to this body of water's "Rabbit Island," as well as Itsukushima island, which is home to a giant camphor wood *torii* that is said to be "floating." This body's largest island, Awajishima, was the epicenter of the 1995 Great Hanshin Earthquake. The two Naruto Whirlpools are often toured by visitors from Kobe, a port on this body. For 10 points, what so-called "sea" separates Shikoku, Kyushu, and Honshu?

ANSWER: **Seto** Inland Sea [or **Inland** Sea]

8. Many editions of this book reproduce a mistake in which a printer changed the meaning of a sentence by inserting the word "a" before "man" in the phrase "the permanent interests of man as a progressive being." This book mentions a recent writer who proposed not a crusade but a "civilisade" against Mormons in its discussion of Mormon polygamy. This book proposes yearly examinations of children on basic topics to ensure that they are receiving a proper private education, since the author was opposed to government-run education. This book argues that "self-regarding" defects, but not other-regarding defects, should be limited. In this book, a majority-Muslim society in which eating pork is banned is used as an example of an unjust restriction. For 10 points, name this book which argues that actions should only be restricted if they harm other individuals, written by John Stuart Mill.

ANSWER: **On Liberty**

9. The first application of 3D QSAR to asymmetric catalysis was performed by Lipkowitz et al. on this reaction with bisoxazoline catalysts. The AbyU enzyme, which is critical for the production of abyssomicin C, catalyzes this reaction. Above 1000 kelvins, this reaction may “roam” to a diradical mechanism from the usual concerted mechanism. Increasing hydrogen-bond ability of the solvent increases the proportion of pseudo-para over pseudo-meta products in this reaction. An alkadienyl radical cation is formed during mass spectrometry via the retro form of this reaction. This reaction proceeds suprafacially and is thermally allowed but photochemically forbidden. Replacing one reactant with a carbonyl produces dihydropyrans in its “oxo-” variant. For 10 points, name this reaction that usually proceeds through the endo transition state, a 4-plus-2 cycloaddition between a diene and a dienophile.

ANSWER: **Diels–Alder** reaction

10. Violet Bonham-Carter claimed that an election in this decade was “a contest between a man with sleeping sickness and a man with St. Vitus Dance.” During this decade, striking workers in Northumberland derailed the Flying Scotsman train. During this decade, a newspaper owner founded the Anti-Waste League to agitate for less government spending; a year later, the so-called Geddes Axe cut public spending. Britain’s economy was hurt in this decade by reintroduction of the gold standard at 4 dollars and 80 cents to the pound. The Samuel Report instituted pay cuts, leading to an event in this decade, staged by Arthur Pugh, in which a lockout by coal mine owners caused the Trades Union Congress to call a General Strike. For 10 points, Bonar Law replaced David Lloyd George as prime minister in what decade that ended with a Wall Street crash sparking the Great Depression?

ANSWER: **1920s**

11. In one poem, a suicidal man from this city flies to New York because this city’s buildings are too short to jump off. A poem comparing this city to Venice states “All the other cities ran ahead... won or lost, / and died” while this city “remained in the starting-crouch.” In a memoir about childhood in this city, the narrator is awed by the size of a book collection belonging to his great-uncle, the historian Joseph Klausner. The speaker of another poem set in this city declares “you killed me... and I forgot, like you, to die” to a “woman soldier.” The son of the mentally ill Fania Mussman recounted learning from the poet Zelda in this city, which is the addressee of the declaration “Let my tongue cling to the roof of my mouth” in another poem. For 10 points, name this birthplace of the author of *A Tale of Love and Darkness*, Amos Oz (“ah-MOSE OHZ”), and the subject of Yehuda Amichai’s (“yeh-HOO-dah AH-mee-khy’s”) poems “In the Old City” and “Damascus Gate.”

ANSWER: **Jerusalem** [or **Yerushalayim**]

12. The tenth Canto of Byron’s *Don Juan* opens with a proem that jokingly compares this man to Adam in the Garden of Eden. In a letter to Thomas Butt, another poet wrote an oft-quoted plea that “God us keep / from Single vision and [this man’s] sleep.” In *The Prelude*, Wordsworth contemplates a statue representing this man “voyaging through strange seas of thought, alone.” A passage in Keats’s *Lamia* that laments “clipping an Angel’s wings” and “unweaving a rainbow” is usually interpreted as a criticism of this man. In *Jerusalem*, William Blake frequently inveighs against this man, grouping him with Bacon and Locke. For this man’s epitaph, Alexander Pope wrote a couplet featuring the line “God said, let [this man] be! And All was Light.” For 10 points, name this English physicist who, in a story popularized by Voltaire, was inspired by a falling apple to invent the theory of gravitation.

ANSWER: Isaac **Newton**

13. Replacing the resonance effect present in this phenomenon with a relaxation time makes it possible to model this phenomenon in polar materials with the Cole–Cole equation. Cores with graded refractive indices are used in multimodal optical fibers to counteract a geometric form of this phenomenon. The rapid variation of the dielectric function over a narrow frequency range is known as the “anomalous” variant of this phenomenon. Transmission through a dissipative medium in the presence of this phenomenon is fully described by the Kramers–Kronig relations. In the presence of this phenomenon, the group and phase velocities differ and the angular frequency becomes in general a nonlinear function of the wave number. For 10 points, name this optical phenomenon in which the index of refraction is a function of the wave frequency.

ANSWER: **dispersion**

14. In the Book of Job, Eliphaz passes on a revelation about people living in houses of this substance who are “crushed before the moth.” In Romans, Paul introduces a predestinarian metaphor about this substance after quoting God’s statement “Jacob I loved, but Esau I hated.” In Second Corinthians, Paul writes that humans possess “treasure” in objects made of this material because “the surpassing power belongs to God.” In the Gospel of John, Jesus heals a blind man by touching his eyes with this stuff. Jeremiah takes the elders of Jerusalem to its garbage heap at Tophet after God compares Israel to this substance in his hand. Daniel predicts that a future kingdom will be “partly broken,” like iron mixed with this substance, in his interpretation of a dream of a statue made of four metals. For 10 points, that dream is the source of a proverb about having brittle “feet of” what material?

ANSWER: **clay** [or **mud**; prompt on **dirt** or **spit**]

15. Wye Jamison Allanbrook compared the main character of this opera’s imitative musical style to Odysseus, calling him a “No-Man.” In this opera’s overture, flutes and violins play an ascending and descending D minor scale, then eerily ascending major and melodic minor scales. In the final scene of this opera, a diegetic (“dy-uh-JET-ick”) group of musicians plays an aria from another opera by the same composer, to which the title character says “I know this only too well!” In this opera, a woman accused of infidelity mollifies her husband by asking him to beat her in the aria “Batti, Batti, o bel Masetto.” A teenage Frederic Chopin wrote a series of variations on the duet “La ci darem la mano” from this opera. In this opera’s final scene, the title character responds “no!” on a high D when ordered to “repent” by the Commendatore. For 10 points, name this opera by Wolfgang Amadeus Mozart.

ANSWER: **Don Giovanni**

16. This female ruler ordered the building of a basilica dedicated to St. John the Evangelist to give thanks for her survival in a sea storm with her son and daughter. She patronized the “Doctor of Homilies,” Saint Peter Chrysologus, giving him his surname of “golden-worded.” Cole Porter was inspired to write the song “Night and Day” after viewing the starry ceiling mosaic at this ruler’s mausoleum. This ruler appointed the general Bonifacius, or Count Boniface, to the highest military post of *magister utriusque militiae* (“ma-GISS-tair oo-TREE-oos-kweh mee-LEE-tee-eye”) prior to the Battle of Rimini, and the man she deposed from that post sought revenge against her by allying with Rua. After the death of her first husband, the Visigoth chief Ataulf, she re-wed to become mother and regent to the boy emperor Valentinian III. For 10 points, name this woman who ran the Western Roman Empire from Ravenna prior to the rise of Flavius Aetius.

ANSWER: Galla **Placidia** [prompt on **Galla**]

17. Frederick Crews interpreted this story as an illustration of the Freudian superego in the chapter “The Logic of Compulsion” from *The Sins of the Fathers*. Its ending notes that “a prayer, the first for years, went up to Heaven from the lips” of its protagonist. The protagonist of this story wonders “Whose guilt had blasted it?” when he sees an oak with an “excess of vegetation” on its trunk but “utterly dead” in its top bough (“bao”), where he once tied a bloody handkerchief. Two men rest under a tombstone-shaped rock whose veins “form an inscription in forgotten characters” at the beginning of this story, which is set after “Lovell’s Fight.” Eighteen years later, Dorcas utters a “wild shriek” after this story’s protagonist shoots their son Cyrus in the same place where the title character died. For 10 points, name this Nathaniel Hawthorne story about Reuben Bourne’s guilt for failing to inter his companion.
ANSWER: “**Roger Malvin’s Burial**”

18. A factor named after this quantity unusually has units of millimeters to the sixth power over meters to the third power and is equal to an integral with respect to particle diameter of a size distribution times diameter raised to the sixth power. The vertically integrated liquid is proportional to this quantity raised to the four-sevenths power. Since both an “equivalent factor” representing this quantity and a quantity symbolized capital R can be written as an integral over the Marshall–Palmer distribution, this quantity is related by a power law to R. A vertical region containing a local minimum in this quantity called a bounded weak echo region is indicative of supercell formation. This quantity is commonly written in a logarithmic form called decibels relative to Z, of which a value above 20 indicates precipitation. Velocity and this quantity are the two primary quantities measured by a pulse Doppler radar. For 10 points, name this quantity, the fraction of incident light that bounces off a target.
ANSWER: radar **reflectivity** [or radar **reflectivity** factor; accept **dBZ** or **Z** until “Z” is read]

19. An early president of this country led a secessionist movement called La Cosiata, named for being a “rebellion without a name,” also dubbed the Revolution of Los Morrocoyes. A later president of this country, José Monagas, remained in power after winning a fight at Los Araguatos. One of this nation’s greatest generals gave his famous “about face!” order, sending his army charging directly at the enemy through a cloud of dust after setting the grasslands on fire. That so-called “Centaur of the Plains,” Jose Paez, became the first president of this country, and originally controlled the Apure River in this nation. This nation won independence after Marshal Miguel de la Torre was crushed at the Battle of Carabobo. For 10 points, name this country where Francisco de Miranda fought for independence, several years before its native son Simón Bolívar.
ANSWER: **Venezuela**

20. A god of this phenomenon was expelled from Olympus after he criticized the gods for creating bulls that do not have eyes placed on the tips of their horns, and houses that do not have wheels. Honoratus claims that this phenomenon befell a man who, like the gored Argonaut Ancaeus, was told that he would never drink wine made from grapes that he had planted. The grammarian Parmeniscus supposedly regained his ability to perform this action after seeing a statue of Leto at Delos that he thought was just a piece of ugly wood. The Greek god of this action is the minor deity Momus. This action, which killed the seer Calchas, is performed by a goddess after she sees the human face in Baubo’s genitals. After getting a donkey drunk and observing it stumble, the Stoic philosopher Chrysippus died from this action. For 10 points, what phenomenon is associated with mockery and satire?
ANSWER: **laughter** [or word forms such as **laughing**; or **satire**; or **mockery**; prompt on **comedy**]

Bonuses

1. In French folklore, this type of person is known as a *marcou*, is marked with a fleur-de-lys (“flurr duh LEESE”), and is thought to be able to cure the king’s evil. For 10 points each:

[10] Name this specific type of person. Danny Gallagher and Finbarr Nolan work as faith healers because people defined by this familial relation are thought to have special healing powers in Ireland.

ANSWER: **seventh sons** [or **seventh son of a seventh son**; prompt on **son**]

[10] “The king’s evil” is a name for this disease, because monarchs in England and France were believed to be able to cure it by touch.

ANSWER: **scrofula** [or **tuberculous cervical lymphadenitis**]

[10] In Argentine folklore, a *lobizón* is a seventh son who becomes one of these creatures who suffer from lycanthropy.

ANSWER: **werewolf**

2. This composer proposed a “lyrical, haunting” theme from his Second Symphony, originally written for the 50th anniversary of the Boston Symphony, as the theme for the Interlochen Arts Camp. For 10 points each:

[10] Name this American composer of that symphony, which was nicknamed “Romantic.”

ANSWER: Howard **Hanson**

[10] This “dance” from Amilcare Ponchielli’s opera *La Gioconda*, originally a ballet interlude at a party, was set to camp-inspired lyrics by comedian Allan Sherman in the song “Hello Muddah, Hello Fadduh.”

ANSWER: “Dance of the **Hours**”

[10] John Barnes Chance, composer of a *Blue Lake Overture* for a music camp in Michigan, also wrote variations on this pentatonic folksong for concert band, which he first heard as a member of the Eighth U.S. Army Band.

ANSWER: “**Arirang**”

3. This approach entails subdividing a continuous space into discrete meshes, solving the problem piecewise on those meshes, and reassembling the partial solutions into a global one. For 10 points each:

[10] Identify this general formalism widely used in obtaining numerical solutions to problems like heat transfer and electromagnetic field analysis for complex geometries.

ANSWER: **finite element** method [or **finite element** analysis; or **FEM**; or **FEA**]

[10] This eponymous class of methods used in finite element analysis solves the relevant differential equations by transforming into a series of simultaneous equations written in terms of basis functions that span the finite elements. It is also sometimes called the method of weighted residuals.

ANSWER: **Galerkin** methods [prompt on **variational** methods]

[10] A common application of finite element methods is to numerically solve these fundamental general equations of fluid flow, which typically do not admit analytic solutions.

ANSWER: **Navier–Stokes** equations

4. This author created “P. Burke,” a character who remotely pilots the body of a fake teenage celebrity in the story “The Girl Who Was Plugged In.” For 10 points each:

[10] Name this author of the collection *Her Smoke Rose Up Forever*, a woman whose male pseudonym was removed from an award in 2019 due to allegations that she nonconsensually euthanized her disabled spouse.

ANSWER: James **Tiptree, Jr.** [or Alice **Sheldon**]

[10] From 1991 to 2019, the Tiptree Award was given to speculative fiction that explored this concept. Another science fiction author discussed her worldbuilding for the winter planet Gethen in an essay titled “Is [this concept] Necessary?”

ANSWER: **gender** [do not accept or prompt on “sex” or “sexual orientation”]

[10] Tiptree’s “The Girl Who Was Plugged In” has been cited as a precursor to this genre, which often features noirish atmospheres and virtual realities. William Gibson helped define this genre with his novel *Neuromancer*.

ANSWER: **cyberpunk**

5. Kay Gabriel has criticized Anne Carson’s comparison of the Trojan slave in Euripides’s *Orestes* to a “hysterical” version of this woman. For 10 points each:

[10] Name this trans woman who was found strangled in a hotel room in 1988 in an unsolved murder. She took her surname from a house founded by Hector Valle whose house mother was named Angie.

ANSWER: Venus **Xtravaganza**

[10] Venus Xtravaganza was killed during the shooting of this Jennie Livingston documentary about the drag ball culture of New York in the late ’80s.

ANSWER: ***Paris Is Burning***

[10] This thinker called Xtravaganza’s murder “a tragic misreading of the social map of power” in her book *Bodies That Matter*. She also wrote *Gender Trouble*.

ANSWER: Judith **Butler**

6. This movement was led by a mysterious figure called the “Master of Hungary,” a 60-year-old monk with a long beard named Jacob, who began preaching in 1251 CE. For 10 points each:

[10] Name this movement that formed an army of 30,000 men carrying a banner of the Blessed Virgin, which turned violent and began to attack priests and clerics, as well as the Jewish population in local towns.

ANSWER: the **Pastoureaux** [or the **Shepherds’** Crusade; or Crusade of the **Pastoureaux**]

[10] The movement originally formed to rescue this king supported by his wife Blanche of Castile. He’d gotten himself captured during the Seventh Crusade, and later became the only sainted French king.

ANSWER: **Louis IX** of France [prompt on **Louis** or Saint **Louis**]

[10] In Bordeaux, this Earl of Leicester quashed the Pastoureaux by throwing its second leader into the Gironde River. At the Battle of Evesham (“EEV-shum”), he was killed by the king’s forces.

ANSWER: Simon de **Montfort**

7. In one scene from this film, Ron Howard's character bickers with his girlfriend while everyone else watches them dance to the song "Smoke Gets In Your Eyes" by The Platters. For 10 points each:

[10] Name this nostalgic 1973 film in which Curt seeks Wolfman Jack's help in finding a woman in a white T-bird. It is the magnum opus of George Lucas.

ANSWER: **American Graffiti**

[10] Another pair of characters dance tensely to "Smoke Gets In Your Eyes" in the final scene of this 2015 film by Andrew Haigh. In this film, Charlotte Rampling's character worries that her husband is still in love with a former girlfriend whose body was recovered from a glacier.

ANSWER: **45 Years**

[10] Marlene and Petra dance disconsolately to "Smoke Gets In Your Eyes" in *The Bitter Tears of Petra Von Kant*, a film by this director who also made *The Marriage of Maria Braun*.

ANSWER: Rainer Werner **Fassbinder**

8. After a battle at Potonchán, this man added 20 female slaves to his retinue, including the former captive La Malinche, who translated for him. For 10 points each:

[10] Name this conquistador defeated the Aztecs and claimed Mexico for the Spanish crown.

ANSWER: Hernán **Cortés**

[10] Cortés was originally meant to lead a search party for the previous expedition to Mexico led by this man. When Cortés fought his first Mexican battle at Potonchán, he did it at the river named for this explorer.

ANSWER: Juan de **Grijalva**

[10] Cuban governor Diego Velázquez sent this man to capture Cortés and stop his invasion. Seven years later, in 1527, he led another failed expedition to Florida that ended with nearly all his men drowning near Galveston Island.

ANSWER: Pánfilo de **Narváez**

9. For a while, the Abbey National Building Society hired Nikki Caparn to answer mail addressed to a fictional character who lived on this street. For 10 points each:

[10] Name this street home to a group of ragtag child spies known as its "irregulars," who first appeared in *A Study in Scarlet*.

ANSWER: **Baker Street**

[10] In the documentary *Metro-Land*, this poet discusses the birth of the Metropolitan Railroad in a restaurant above Baker Street station. This poet also narrates a film based on his verse autobiography *Summoned by Bells*.

ANSWER: John **Betjeman**

[10] The Lorimer sisters run a Baker Street photography studio in a novel by Amy Levy, who is often linked with this two-word term referring to feminist liberation in the early 1900s. This term was coined by Henry James.

ANSWER: the **New Woman** [or **New Women**]

10. The Levins model of these things treats each subsection as occupied or unoccupied and does not take into account the number of occupants in each section. For 10 points each:

[10] Give this name used in community ecology to describe a collection of patches of habitat each connected by migration.

ANSWER: **metapopulation** [or **metacommunity**]

[10] The Levins metapopulation model reduces down to this mathematical model of population growth, which posits a sigmoid growth curve that levels off at the carrying capacity, forming a namesake sigmoidal shape.

ANSWER: **logistic** growth [or the **Verhulst** equation]

[10] The Levins metapopulation model posits that within each patch, the rate of this process is constant. Leigh Van Valen posited that the probability of this process is constant over time.

ANSWER: **extinction** [prompt on **death** or **dying**]

11. Some techniques for mathematical proofs are philosophically controversial. For 10 points each:

[10] In a paper on the four-color theorem, Thomas Tymoczko argued that computer-assisted proofs fail this criterion, which requires proofs to be verifiable by humans.

ANSWER: **surveyability** [or non-**surveyable** proofs]

[10] Proof by contradiction is rejected by approaches like intuitionism, which demand that proofs have this property. This type of proof demonstrates the existence of an object by either finding it or giving a method for finding it.

ANSWER: **constructive** proof [or proof by **construction**; or word forms such as **constructing** proof]

[10] Proof by contradiction is also rejected by logics that reject the law of the excluded middle. According to the law of the excluded middle, given a proposition P, either P is true or this statement is true, but not both.

ANSWER: **not-P** [or the **negation** of **P**]

12. This process is assumed to occur randomly and homogeneously in the Avrami equation. For 10 points each:

[10] Name this first step in the formation of a new phase. It typically occurs heterogeneously, as exemplified by the formation of bubbles at the surface of boiling chips.

ANSWER: **nucleation**

[10] When a seed crystal is added to a chemical solution with this property, the introduction of nucleation sites causes solute to immediately precipitate out.

ANSWER: **supersaturated** solution [or **supersaturation**; do not accept or prompt on “saturated”]

[10] Classical nucleation theory models the nucleation rate as an Arrhenius-like equation where the pre-exponential factor equals the product of the following terms: the number of nucleation sites, the rate at which molecules attach to a critical cluster, and this quantity, the probability that a critical cluster will cross the energy barrier to form a new phase.

ANSWER: **Zeldovich** factor

13. Answer the following about painting during the Qing dynasty, for 10 points each.

[10] The Qianlong (“ch’yen-lung”) emperor commissioned five of his court painters to recreate the Song-dynasty masterpiece of Zhang Zeduan (“jong dzuh-dwen”), which depicts the activities of the people of Bianjing during this observance.

ANSWER: the **Qingming** festival [accept *Along the River during the Qingming Festival*]

[10] The expressive painting of this “individualist” painter of the Qing dynasty is often compared to Western modern art. This artist wrote that “the single stroke is the source of all things” in his theoretical text, *Sayings of Monk Bitter Gourd*.

ANSWER: **Shitao** (“SHURR-tao”) [or **Zhu Ruoji**]

[10] Shitao’s painting *10,000 Ugly Inkblots* is compared to the work of this Abstract Expressionist, an American “action painter” who produced paintings like *Lavender Mist* by flinging paint onto canvases.

ANSWER: Jackson **Pollock**

14. Guerrillas in this uprising set up bases in the caves around Hallasan, an extinct volcano where remains of victims can still be found, and attacked paramilitary troops of the Northwest Youth League. For 10 points each:

[10] Name this massacre that lasted over a year from April 1948 to 1949, in a nation being occupied under Operation Blacklist Forty.

ANSWER: **Jeju** uprising [or **Jeju** massacre; or **Cheju** uprising]

[10] The Jeju uprising took place in this nation situated below the 38th Parallel, where President Syngman Rhee suppressed the rebels.

ANSWER: **South Korea** [prompt on **Korea**]

[10] Jeju Island has traditionally been home to a group of women called Haenyeo (“HEN-yuh”), who perform this action to obtain food and other material. The most common method of “trepaning” (“TREH-pang-ing”), practiced by indigenous Yolngu (“YOLE-ngoo”) people of Australia, involves this action.

ANSWER: sea **diving** [or **diving** for food in the ocean]

15. Spaced repetition is believed to improve this process, which, according to the transformation hypothesis, results in the loss of contextual information. For 10 points each:

[10] Identify this process in which memories are transferred from short-term to long-term. Unlike encoding, it occurs after the event has already occurred.

ANSWER: memory **consolidation**

[10] The standard model suggests that consolidation moves memories to the neocortex for permanent storage from short-term storage in this seahorse-shaped structure in the limbic system.

ANSWER: **hippocampus**

[10] A key part of consolidation is the late stage of this process, which was originally discovered by Terje Lømo (“TAIR-yeh LUH-mo”) in rabbits. The early phase of this process occurs via the insertion of AMPA receptors into the postsynaptic membrane.

ANSWER: **long-term potentiation** [or **LTP**; prompt on synaptic **plasticity** or **Hebbian learning**]

16. In a novel written in this language, the protagonist’s abusive husband builds a loft on their roof for pigeons, which the protagonist is forced to care for even while her children are starving. For 10 points each:

[10] Name this language of the short story collection *Ariadne in the Grotesque Labyrinth*. The protagonist, herself nicknamed “Pidgey,” kills herself and her children in a novel that, in this language, is titled for Diamond Square.

ANSWER: **Catalan** language [or **Valencian**; or **atalà**; or **valencià**]

[10] The Renaissance-era Catalan writer Bernat Metge (“bur-NAHT MET-juh”) was a prolific translator of this Italian humanist poet, whose lyrics are collected in the *Canzoniere*.

ANSWER: **Petrarch** [or Francesco **Petrarca**]

[10] The Valencian romance *Tirant lo Blanch* (“tee-RAHN lo BLAHNK”) is found in Don Quixote’s library when two of the Don’s friends, a priest and a man of this profession, decide to burn his books of chivalry.

ANSWER: a **barber** [or un **barbero**]

17. Answer the following about assumptions used in statistical testing, for 10 points each.

[10] In a standard *t*-test, the sample means are assumed to follow this distribution, which can be verified using the Shapiro–Wilk test.

ANSWER: **normal** distribution [or **Gaussian** distribution; or Laplace–**Gauss** distribution]

[10] In repeated measures ANOVA design, Mauchly’s *W* is used to verify this assumption, which requires that the variances of the differences of all combinations of within-subject conditions are equal.

ANSWER: **sphericity**

[10] The Mann–Whitney *U* test assumes that the data are of this type. Unlike nominal data, these data can be ranked, although the exact difference between each value on the scale is not known.

ANSWER: **ordinal** data

18. The feminine speaker of this poem makes a series of contradictory first-person declarations, such as “I am the whore and the holy one... I am shameless; I am ashamed / I am strength and I am fear.” For 10 points each:

[10] Name this enigmatic text seemingly influenced by aretalogies of the goddess Isis. This poem from the Nag Hammadi library has a divine feminine speaker who may be Eve or Sophia.

ANSWER: “The **Thunder, Perfect Mind**” [or “The **Thunder, Perfect Intellect**”]

[10] A collection of maxims from the Nag Hammadi library that begins “These are the secret words which the living Jesus spoke” is commonly known as the “Gospel” of this Apostle, who is also known as “Didymus” or “twin.”

ANSWER: **Thomas** the Apostle [or Doubting **Thomas**]

[10] Before the discovery of the Nag Hammadi library, the most detailed source on Gnosticism was the work of this 2nd-century Bishop of Lugdunum, who argued against Gnostic doctrines in his *Against Heresies*.

ANSWER: Saint **Irenaeus**

19. Answer the following about acoustic shadows, or areas in which the propagation of sound waves is blocked. For 10 points each:

[10] In 1862, in this U.S. state, an acoustic shadow prevented Edward Ord from realizing that the Battle of Iuka was happening a few miles away. This state was also the site of the Battle of Corinth and the capture of Vicksburg.

ANSWER: **Mississippi**

[10] Similarly, Joseph Johnston arrived late to this battle, the culmination of the Peninsula campaign, because of an acoustic shadow. Johnston’s injury at this battle led Robert E. Lee to take over as commander.

ANSWER: Battle of **Seven Pines** [or Battle of **Fair Oaks** Station]

[10] Fitzhugh Lee and George Pickett were away doing this activity with Tom Rosser at the beginning of the Battle of Five Forks, and didn’t hear the Union attack because of an acoustic shadow.

ANSWER: attending a **shad bake** [or **fish bake**; or **clambake**; accept **cookout** or outdoor **grilling** or **eating** food]

20. A popular story in this form of Japanese theater is the tale of Jugemu (“joo-gay-moo”), a boy whose ridiculous full name takes so long to say that he drowns before the situation can be described to a rescue party. For 10 points each:

[10] Name this frequently comedic performing art in which a single seated performer plays all the characters.

ANSWER: **rakugo** (“rah-KOONG-oh”)

[10] A popular non-comedic rakugo piece is the story “Botan Dōrō,” which is one of these ghost stories popularized in the west by Lafcadio Hearn. The most famous kabuki play in this genre follows Tamiya Iemon after he murders his father in law Yotsuya.

ANSWER: **kaidan** [or **kwaidan**]

[10] Yotsuya Kaidan was first staged as a double feature with the kabuki version of the Kanadehon Chūshingura, a play telling the story of this real-life group of samurai who avenged their lord after he was forced to commit seppuku circa 1700.

ANSWER: the **47 rōnin**