

2021 ACF Regionals

Packet C by MIT A, NC State, Waterloo A, Oklahoma A

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Tossups

1. The Dretske–Tooley–Armstrong view of these things, and John Carroll’s “mirror argument,” oppose the application of Humean (“HUME-ee-in”) supervenience to these things, which Helen Bebee’s “non-governing conception” defends. Van Inwagen’s “consequence argument” holds that responsibility is incompatible with the thesis that the past and these things determine a unique future. Chapters 14 and 15 of *Leviathan* consist of a list of nineteen of these things. The first paragraph of the *Declaration of Independence* claims that these things and their domain’s God entitle people to a “separate and equal station.” Since “firm and unalterable experience” has established these things, no testimony can confirm their violation according to Hume’s “Of Miracles.” For 10 points, name these statements that include “*F* equals *ma*.”

ANSWER: **laws of nature** [accept **laws of science**, **laws of physics**, **scientific laws**, **physical laws**, **natural laws**, **universal laws**, or equivalents; prompt on laws or rules; prompt on nature]

<Philosophy>

2. In his autobiography, this author convinces a father to let his son become a hairdresser in New York by arguing that the hairdresser is the most influential man in any community. The line “once a bum, always a bum; I fear the disease is incurable” begins a travelogue by this man that probably fictionalized meeting a Shakespearean actor in the town of Alice. This author described riding the “Hansen Sea-Cow” to collect marine invertebrates with his friend, a biologist named Edward F. Ricketts, the inspiration for “Doc.” This author of *The Log from the Sea of Cortez* wrote a memoir describing his trip across the US in a camper named Rocinante with his poodle, where he stopped in Monterey and his hometown of Salinas. For 10 points, name this author of *Travels with Charley* and *Cannery Row*.

ANSWER: John **Steinbeck**

<American Literature>

3. The integral of this quantity from a point at infinity to a surface is set to zero in the first step of Michael Polanyi’s theory of adsorption. This quantity is computed from an *ab initio* screening charge density as the first step of modeling solvation in COSMO-RS. The difference between this quantity at actual and standard conditions equals *RT* times the natural log of activity. The differential change in this quantity is related to “negative *S dT* plus *V dp*” in the Gibbs–Duhem equation. It’s not concentration, but diffusion is driven by a gradient in this quantity and stops when this quantity is equal everywhere. This quantity is the partial derivative of Gibbs free energy with respect to particle number. For 10 points, name this change in energy when one particle is added to a system, symbolized μ .

ANSWER: **chemical potential** [prompt on partial molar Gibbs free energy until read; prompt on mu until read; do not accept or prompt on “potential”]

<Chemistry>

4. A Holy Roman Emperor born in this region threw his support towards Michael of Cesena (“chay-ZEN-ah”) over the issue of evangelical poverty and invited him to his royal residence. That emperor, Louis IV, signed the 1329 Treaty of Pavia to split his dynasty into three branches. In the 1300s, a house based out of this region feuded with the House of Luxembourg for control over Brandenburg. The 1777 death of Maximilian I Joseph, a ruler of this region, sparked the Potato War. Rulers of this region resided in the Alter Hof and the Baroque-style Nymphenburg Palace. A ruler of this region who constructed Neuschwanstein (“NOYSH-von-shtyne”) Castle was the “Mad King” Ludwig. For 10 points, name this German state that was ruled by the Wittelsbachs from Munich.

ANSWER: **Bavaria**
<European History>

5. Sophie Matisse baked a cake in homage to a work featuring one of these objects for an exhibition hosted by Francis M. Naumann. One photographer likened his image of a work with one of these objects to a cross between a “Veiled Woman” and a “Buddha.” Another of these objects was stolen from a 2019 exhibition at Blenheim (“BLEN-um”) Palace. A work featuring one of these objects may have been created by Elsa von Freytag-Loringhoven. Visitors at the New York Guggenheim used a golden example of these objects as part of Maurizio Cattelan’s *America*. A photo for *The Blind Man* shows one of these objects in front of Marsden Hartley’s *The Warriors*. That example of these objects was exhibited by Alfred Stieglitz and signed “R. Mutt.” For 10 points, Duchamp’s *Fountain* is what sort of object?

ANSWER: **toilets** [or **urinals**; prompt on *Fountain*; prompt on readymades before “Blenheim Palace”] (Sophie Matisse’s cake was appropriately titled *Urinal Cake*.)
<Painting/Sculpture>

6. In an article “Rethinking” this theorist’s work, Nancy Fraser proposed subaltern “counterdiscourses” arising in alternatives to areas hypothesized by this thinker. That critique is levelled against this thinker’s three “instrumental criteria.” In “A Kind of Damage Control,” this theorist criticized an “apologetic” tendency in the historiography of his nation. This man expanded Max Weber’s conception of “rationalization” to aesthetic, explicative, and therapeutic discourses. This thinker argued that markets and the objective system “colonize” the “lifeworld.” This theorist cited salons and coffeehouses as sites for the emergence of a bourgeois civil society in the 18th century. For 10 points, name this Frankfurt School author of *The Structural Transformation of the Public Sphere*.

ANSWER: Jürgen **Habermas**
<Social Science>

7. Ayn-al-Quzāt Hamadānī called this figure the gatekeeper who prevents those who only care about their *nafs* from passing beyond the word *la* to reach *illa’Llah*. He also linked imagery of the Beloved’s dark tresses and this figure’s Dark Light. This figure’s Beloved grants this figure respite until “the appointed day” in Surah al A’raf, after which this figure threatens to “wait in ambush on [His] straight path.” A dispute about this figure’s nature stems from the distinction between “light” and “smokeless fire.” Claiming fire as superior to clay, this figure refused to bow to Adam. Muslims throw pebbles at *jamarāt* during Hajj to reenact Ibrahim’s stoning of this figure. For 10 points, name this “accursed” figure whose “whispers” have led Muslims astray since Allah cast him out of heaven.

ANSWER: **Iblis** [or **Shaitan**; or **Satan**; or the **Devil** (in Islam); or **Eblis**; accept **Azazil**] (The Beloved referred to in the third line is Allah, as some Sufis hold that Iblis was Allah’s ultimate lover.)
<Religion>

8. Loss of autonomy following this process occurred as NUMT (“new-might”) and NUPT genes were transferred into chromosomes. This process explains why the innate immune system distinguishes f-Met released into the cytosol as “non-self.” Fossils of the glaucophyte *C. paradoxa* filled a “missing link” in evidencing secondary forms of this process with their phycobilin- and peptidoglycan-containing plastids. This process was hypothesized to explain the 9+2 arrangement of flagella in “On the Origin of Mitosing Cells,” a Lynn Margulis paper that also pointed to double membranes around autonomously-reproducing organelles. For 10 points, name this theory which suggests that eukaryotes arose from prokaryotes that had engulfed other cells, giving rise to mitochondria and chloroplasts.

ANSWER: **endosymbiosis** [or **endosymbiotic** theory; or **sybiogenesis**; accept primary **endosymbiosis** or secondary **endosymbiosis**; prompt on descriptions like “mitochondria going from independent unicellular organisms to organelles” or “external origin of mitochondria” or equivalents with “chloroplasts” in place of “mitochondria”]
<Biology>

9. For almost a millennium, this country's people have relied on ash salt from the village of Kibiro. The death of a sacred cow named Bihogo prophesied ("PROFF-uh-sighed") the demise of an empire founded in this country by the Chwezi people. In the 13th century, Kato Kintu established himself as *kabaka* of another kingdom in this country that later freed itself from the vassalage of Bunyoro–Kitara in the 20th century. During this country's Mengo Crisis, its first prime minister ordered an attack on Mutesa II's royal palace, forcing him to flee it in 1966. A later leader of this country established the State Research Bureau to persecute the Acholi people and led a 1971 coup d'état against Milton Obote. For 10 points, what country was ruled by the dictator Idi Amin?

ANSWER: **Uganda** [accept **Buganda**]

<World History>

10. A character with this profession puns on the dual meanings of the word "pryvetee" as both "secrets" and "genitalia" in urging husbands not to be inquisitive of "God's pryvetee nor of his wife." Another character with this profession is beaten by his wife when she mistakes the glint of moonlight on his bald head for a clerk's nightcap. In that story, a student moves a baby's cradle at night to trick the wife of one of these people into entering the wrong bed. The reeve Oswald tells a tale meant to mock a character of this profession; that man of this profession tells a tale in which Absolon brands a man's butt with a hot poker, and Alisoun and Nicholas claim that a flood is imminent to trick John into sleeping in a tub. For 10 points, give this profession of Robyn, who tells the bawdy second story of *The Canterbury Tales*.

ANSWER: **miller** [accept "The **Miller**'s Tale"; do not accept or prompt on "reeve" or "The Reeve's Tale"]

<British Literature>

11. In a 1992 model of this phenomenon based on cellular automata, Drossel and Schwabl found self-organized criticality. This phenomenon can be detected by a spike in the brightness of the 4-micrometer band of satellite imagery. Adam Pellegrini found that precipitation and this phenomenon were the main controls on bark thickness across many tree species worldwide. Fuel moisture content is a key variable in predicting the risk of this phenomenon. Suppression of this phenomenon in the US during the 20th century has led to overly dense forests and accumulated brush. In southern California, this phenomenon is often exacerbated by Santa Ana winds. For 10 points, identify this phenomenon, which can be started by lightning or by human pyrotechnics.

ANSWER: forest **fires** [or wild**fires** or wildland **fires** or rural **fires**]

<Other Science (Earth Science)>

12. A fast E minor piano piece by this composer starts with swirling left-hand sextuplets, over which the right hand enters with a quick martial-sounding "B, up to long G." This composer wrote two sets of études inspired by visual scenes such as "Little Red Riding Hood and the Wolf." The "Non allegro" first movement of an orchestral piece by this man includes an alto saxophone solo. He's not Schubert, but this composer wrote *Moments Musicaux* ("moh-MAWN myoo-zee-KOH") as well as *Études-Tableaux* ("ay-TOOD tab-LOW"). The films *Shine* and *Brief Encounter* prominently feature piano concertos by this composer, who suffered a mental breakdown after the disastrous premiere of his First Symphony. For 10 points, name this Russian composer of *Symphonic Dances* and *Rhapsody on a Theme of Paganini*.

ANSWER: Sergei **Rachmaninoff** [or Sergei Vasilyevich **Rachmaninoff**; or Sergei **Rachmaninov**]

<Classical Music>

13. Men going to fight in World War I left objects named for these things hanging in McSorley's Old Ale House. Offerings for guardian deities like Coventina may have originated a practice for acquiring these things. In a Charles Perrault ("pair-OH") story, a black pudding craving causes a couple to use these things ridiculously. In Jain cosmology, kalpavrikshas are trees that provide these things. Visitors tie these things to trees in a Yoko Ono project named for them, and the *senbazuru* is another method for obtaining them. In a Thanksgiving game, two people pull simultaneously to break an object named for these things. Sadako Sasaki began folding one thousand cranes to receive one of these things. For 10 points, children blow on dandelions to make what magical demands?

ANSWER: **wishes** [or equivalents like **hopes** or **desires**; accept **wishbones** or **wishing wells** or **Wish Tree** or “Les **Souhails** ridicules”; prompt on **bones** or **wells** by asking “what kind?”; prompt on **furcula** by asking “what is its common name?”; prompt on **tags** or **paper** by asking “what do they represent?”] (Wishbones still hanging in McSorley’s represent the men who never came back from World War I; the Perrault story is “Les Souhails ridicules”; the Yoko Ono installation is *Wish Tree*.)

<CE/Geo/Other/Pop Culture>

14. In this country, disputes over the “Mother and Child Scheme,” which sought to reform healthcare, led to the ouster of the First Inter-Party Government. This country hosted Eurovision in 1994, when an intermission performance modernized its traditional dance style. It’s not India, but this country’s government enacted strict censorship during World War II, which was known as “the Emergency.” In 2013, this country’s government announced compensation for women who had been interned in “laundries” run by religious orders. The passage of the Eighth Amendment and a 2018 referendum stopped this country’s women from traveling to England for abortions. For 10 points, what primarily Catholic country was dubbed the “Celtic Tiger” after rapid economic growth in the 1990s?

ANSWER: **Ireland** [or Republic of **Ireland**; do not accept or prompt on “Northern Ireland”] (The modernized form of dance is “Riverdance.”)

<Other History>

15. The role of one of these devices is filled by an open-circuit stub shorter than a quarter wavelength on a transmission line. In transmission line theory, these devices are added to move towards the lower half of a Z Smith chart, and the output branch of a bias tee contains one of them. Banks of these devices act as reactive “suppliers” in power factor correction, since they produce a reactance that varies inversely with AC frequency. One curved line appears in the symbol for the polarized electrolytic type of these devices, whose thin oxide layer acts as a permittivity-boosting dielectric. Their standard type is denoted with two parallel lines and has a strength rated in farads. For 10 points, name these circuit components that store charge on a pair of separated conducting surfaces.

ANSWER: **capacitors** [or **condensers**]

<Physics>

16. In a novel from this country, a woman reminisces about her “water family,” who dig a body up from the Cemetery of the Companionless and throw it into the ocean. The prostitute Tequila Leila thinks for the title amount of time after her heart stops in *10 Minutes 38 Seconds in This Strange World*, a novel from this country. In another novel from this country, a character distracts a man with drawings of horses before beating him with a rock. In that novel from this country, parables about style, time, and blindness are told to the apprentices Butterfly, Stork, and Olive, who are suspected of murder. That novel from this country is narrated in part by the corpse of the miniaturist Elegant Effendi. For 10 points, name this home country of Elif Shafak and the author of *My Name is Red*, Orhan Pamuk.

ANSWER: **Turkey** [or Republic of **Turkey**; or **Türkiye** Cumhuriyeti]

<World/Other Literature>

17. An account from this war describes a man in the center of a circle having his fingers cut off one by one; that description is included in Jill Lepore’s *The Name of War*. An account written during this conflict describes the death of the six-year-old Sarah. After leaving a fort built by Stonewall John, the members of a female-led group died at Warwick Neck during this war. Mary Rowlandson recorded this war, which began after the discovery of a body in Assawompset Pond belonging to the “Praying Indian,” Sassamon. In this war, the “Great Swamp Fight” was lost by Narragansett forces. This war’s namesake, the son of Massasoit, was killed by John Alderman. For 10 points, name this 1675 war between New England colonists and Metacomet, a Wampanoag “King” with an Anglicized name.

ANSWER: **King Philip’s War** [or **Metacomet’s War** until read; or **First Indian** War; prompt on **Narragansett** War until read; accept **rebellion** or synonyms in place of “war”] (The “female-led group” was led by Sachem Quaiapen.)

<American History>

18. A speech about this author praises his ability to “contain the genius of foreign lands” and claims that he “bore away with him a great secret into the grave.” An elegy to this man claims that he received “a crown of thorns entwined in laurel” and “fell, by rumor slandered.” That elegy to this poet ends “black blood won’t wash away / The poet’s sacred blood!” The hard-to-translate line “I remember that magic moment” begins a love poem that this author wrote to Anna Kern. A character created by this author says “learn to possess more self-control” in a condescending “sermon” given after receiving a love letter. A character created by this subject of Lermontov’s “Death of the Poet” rejects a love letter from Tatiana and kills Lensky in a duel. For 10 points, name this Russian poet of *Eugene Onegin*.

ANSWER: Alexander **Pushkin** (The speech is Dostoevsky’s Pushkin Speech.)

<European Literature>

19. Taboubu appears to Setna during one of these events after his theft of the Book of Naneferkaptah (“na-nefer-kap-tah”). During another of these events, goats drag their beards in the dust and a shepherd’s drinking cup falls from its peg, causing Geshtinanna to realize that *galla* demons are searching for Dumuzi. Another of these events sees Ninsun receive an axe that her son embraces as a wife. The axe and a falling meteorite appearing during these events precede Enkidu’s arrival. Later, a mountain appearing in one of these events is taken by Enkidu as a sign of Gilgamesh’s victory over Humbaba. During a period named for these events, Baiaame the Sky Father created the first initiation sites and songlines were carved by the Rainbow Serpent. For 10 points, give these visions delivered by Morpheus.

ANSWER: **dreams** [or **dreaming**; accept **illusion** until “goats” is read; accept *Dumuzid’s Dream* or **Dreamtime**; prompt on **sleep**; prompt on **omen** or **portent** or **vision**; prompt on a **walk** by asking “during what kind of event?”]

<Mythology>

20. A very long piece by this man for a 30-member jazz orchestra was first performed ten years after his death; that work, first conducted by Gunther Schuller, is called *Epitaph*. On this man’s album *Blues and Roots*, an unaccompanied baritone sax solo by Pepper Adams opens a song with an identical title to an Art Blakey song. The tracks on one album by this man are titled for the number of dancers that would perform each one if it were a ballet. A political song by this man about school desegregation is called “Fables of Faubus.” *Pithecanthropus Erectus* is by this man, who composed “Goodbye Pork Pie Hat.” For 10 points, name this bassist whose albums include *The Black Saint and the Sinner Lady* and one titled for this man’s last name and *Ah Um*.

ANSWER: Charles **Mingus** [accept **Mingus Ah Um**]

<Other Arts (Auditory)>

Bonuses

1. The long tremolo passages in this man's symphonies test the physical endurance of string players. For 10 points each:

[10m] Name this composer and organist whose namesake "problem" arises from the many different versions and editions of his eleven symphonies.

ANSWER: Anton **Bruckner** [accept **Bruckner** problem]

[10e] Bruckner's final three symphonies use a type of tuba named for this other composer, who created that instrument for his Ring Cycle of operas.

ANSWER: Richard **Wagner**

[10h] For brass and wind players, the common notation for tremolo is interpreted as this technique. Richard Strauss used this technique to depict bleating sheep in the second variation of his tone poem *Don Quixote*.

ANSWER: **flutter-tongue** [or word forms like **flutter-tonguing**; or **Zungenschlag** or **Flatterzunge**; or descriptions of the tongue or uvula being **fluttered** or **trilled**]

<Classical Music>

2. This country funneled millions of euros to Luca Volontè, the chair of the European People's Party group in the Council of Europe. For 10 points each:

[10h] Name this country that bribes European politicians to overlook its poor democratic record under its strategy of "caviar diplomacy."

ANSWER: **Azerbaijan** [or Republic of **Azerbaijan**; or **Azerbaycan** Respublikasi]

[10m] In September 2020, war broke out over this region that is internationally recognized as part of Azerbaijan, but governed by the ethnically Armenian breakaway state of Artsakh.

ANSWER: **Nagorno-Karabakh** [or **Dağlıq Qarabağ**; or **Yuxarı Qarabağ**; prompt on partial answer]

[10e] France banned the Grey Wolves, an ultranationalist group of this ethnicity, after the vandalism of an Armenian Genocide memorial in Lyon in November 2020.

ANSWER: **Turkish** [or **Turks**; or **Türkler**]

<CE/Geo/Other/Pop Culture>

3. J. Edgar Hoover claimed that this political organization, which offered a Free Children's Breakfast Program, "represents the greatest threat to internal security of the country." For 10 points each:

[10e] Name this Black self-defense organization that was founded in 1966 by Huey P. Newton and Bobby Seale.

ANSWER: **Black Panthers** [or **Black Panther** Party for Self Defense; or **BPP**]

[10h] The Black Panthers allied with the Young Patriots and Young Lords to create this group, which later recruited from SDS and AIM. The name of this group inspired a later group that merged with Operation PUSH.

ANSWER: **Rainbow Coalition** (The later group was by Jesse Jackson.)

[10m] This Black Panther activist brokered peace between Chicago gangs and founded the first Rainbow Coalition. He was assassinated by the FBI at the age of 21.

ANSWER: Fred **Hampton**

<American History>

4. This program's namesake files consist of multiple rules instructing how to create targets such as "all," "clean," or the name of the desired executable. For 10 points each:

[10h] Name this GNU ("guh-NEW") utility used to build C or C++ programs.

ANSWER: **Make** [or GNU **Make**; or **gmake**; accept **Makefile**; do not accept or prompt on "CMake"]

[10e] The first step of a Makefile often calls upon gcc or clang to perform this process, changing a ".c" ("dot-C") file to a ".o" ("dot-O") file. High-level code becomes machine language via this process, which is often contrasted with interpreting.

ANSWER: **compiling** [or word forms like **compilation**]

[10m] This process is typically the next step in a Makefile. This process, which follows compiling and assembly, combines libraries or object files into a binary executable. DLL files are named for the dynamic form of this process.

ANSWER: **linking** [accept dynamic **link** library]

<Other Science (Computer Science)>

5. In a novel, a character with this profession has an affair with a ballet expert who has never actually seen a ballet. For 10 points each:

[10m] Name this profession held by the author of a memoir titled for “Half a Lifetime of Pain and Struggle.” A woman with this job sued Arthur Golden after he interviewed her for his novel “Memoirs of” this profession.

ANSWER: **geisha** [accept *Autobiography of a Geisha*; accept **Geisha**, *Half a Lifetime of Pain and Struggle*; accept *Memoirs of a Geisha*; prompt on **dancer** or **entertainer** or synonyms; do not accept or prompt on “prostitute” or synonyms] (*Autobiography of a Geisha* is by Sayo Masuda.)

[10h] This fictional geisha, based on the real Matsuei, runs to carry Yoko’s body from the ruins of a silk warehouse after a fire. She practices the samisen with sheet music and is enraged at being called a “good woman.”

ANSWER: **Komako**

[10e] Komako appears in *Snow Country*, a novel by this author of *Thousand Cranes* and the story “The Dancing Girl of Izu.”

ANSWER: Yasunari **Kawabata**

<World/Other Literature>

6. Jessie Buckley’s character recites Pauline Kael’s scathing review of this film in a scene from Charlie Kaufman’s *I’m Thinking of Ending Things*. For 10 points each:

[10h] Name this 1974 film directed by John Cassavetes. It stars Gena Rowlands as Mabel, who is briefly institutionalized, and Peter Falk as her blue-collar husband Nick.

ANSWER: *A Woman Under the Influence*

[10e] Cassavetes is often considered to be the father of this type of film in America. This term refers to films made outside the major studio system.

ANSWER: **independent** film [or **indie** film]

[10m] Cassavetes played Guy Woodhouse, whose wife realizes that their neighbors are in a Satanic cult, in this 1968 film. A “curse” associated with this film is often linked to the murder of the director’s wife Sharon Tate a year later.

ANSWER: **Rosemary’s Baby** (by Roman Polanski)

<Other Arts (Visual)>

7. Answer the following about the Wars of Scottish Independence, for 10 points each.

[10e] This English king initiated the Wars of Scottish Independence and won the Battle of Dunbar in 1296. He was known as “The Hammer of the Scots” and likely received another nickname because he had long legs.

ANSWER: **Edward I** [or **Edward Longshanks**; prompt on **Edward**]

[10m] After the Battle of Dunbar, English forces seized this object from an abbey. Scottish kings were originally inaugurated on this object, which Edward incorporated into the Coronation Chair.

ANSWER: **Stone of Scone** (“skoon”) [or **Stone of Destiny**; or **Lia Fáil**; prompt on **Coronation Stone**]

[10h] The wars ended with a treaty at this border town on the River Tweed. As it was left out of the treaty ending the Crimean War, this northernmost town in England is sometimes said to have been at war with Russia until 1966.

ANSWER: **Berwick-upon-Tweed** [do not accept or prompt on “North Berwick”]

<Other History>

8. *Description acceptable*. This work complains about the inconvenience of a coup d’état that occurred on the day that the authors have published their first novel. For 10 points each:

[10h] Name this gossip-filled work written together by two siblings, until one of them went insane and slowly died from venereal (“vuh-NEER-ee-ul”) disease. It describes zoo animals being served at a restaurant during the Siege of Paris.

ANSWER: **journal** of the **Goncourt** brothers [accept **diary** in place of “journal”; accept **diary** of Edmund and Jules de **Goncourt**]

[10m] The Goncourts describe this author of *Consuelo* as smoking cigars “like an automaton” and claim that this author only worked from 1 to 4 a.m. The title character moves to a farm in Réunion in this author’s novel *Indiana*.

ANSWER: George **Sand** [or Amantine Lucile Aurore **Dupin**]

[10e] The Goncourts initiated a story that this author was actually Flaubert’s son. This author of “Ball of Fat” wrote about Mathilde Loisel (“mah-TEELD lwah-ZELL”) realizing that the title object was fake in “The Necklace.”

ANSWER: Guy de **Maupassant**

<European Literature>

9. The importance of this quantity is a consequence of a theorem co-named for its original creator and Claude Shannon. For 10 points each:

[10m] Name this highest frequency that can be faithfully reconstructed by a sampler, which is equal to half of the sampling rate. Above this frequency, aliasing occurs.

ANSWER: **Nyquist** frequency [or **folding** frequency; accept **Nyquist–Shannon** frequency; do not accept or prompt on “Nyquist rate”]

[10e] The Nyquist criterion is an important constraint when converting a continuous analog signal to this other type of signal, which is specified at a discrete set of values.

ANSWER: **digital** signal

[10h] In this encoding technique, nonlinearities often make the Nyquist criterion insufficient to avoid aliasing. This technique varies a pulse’s duty cycle, and can be used to reduce the power delivered to a motor.

ANSWER: **pulse-width modulation** [or **PWM**; or **pulse-duration modulation**; or **PDM**; prompt on **pulse modulation**]

<Physics>

10. Women demonstrate their skill as a potential spouse by threading needles in dim lighting during a festival dedicated to lovers separated by this place. For 10 points each:

[10m] The Qīxī (“chee-shee”) Festival honors the reunion of the Cowherd and the Weaver Girl on a magpie bridge over what place? In Navajo stories, Coyote disrupts the Black God as he lights and arranges this place’s constituents.

ANSWER: **Milky Way** [or **yínhéxì**; prompt on **sky**]

[10e] People hoping to find romantic partners might pray to Yuè Xià (“y’weh sh’yah”), an old man who ties couples together with threads of this color. Traditional Chinese bridal dresses and envelopes gifted for Chinese New Year are this color.

ANSWER: **red** [accept **red** envelope or **hóngbāo**]

[10h] Worshipers at Wēi-Míng temple pray to Tù’ér Shén (“TOO-arr SHUN”), a deity originating from this province, for romantic partners of the same sex. The sea goddess Māzǔ, also popular in Taiwan, originates from this Chinese province.

ANSWER: **Fujian** Province [or **Fújiàn** Shěng; or **Fukien** or **Hokkien**]

<Mythology>

11. Works like *The Arch* and *The Disciples See Christ Walking on the Water* display this artist’s namesake palette of “blues.” For 10 points each:

[10m] Name this artist who depicted a grandfather teaching a child on his lap in *The Banjo Lesson*.

ANSWER: Henry Ossawa **Tanner**

[10e] This Philadelphia painter of *The Gross Clinic* taught Tanner. He depicted male nudes jumping into the water in *The Swimming Hole*, and painted a rower on the Schuylkill (“SKOO-kull”) in *Max Schmitt in a Single Scull*.

ANSWER: Thomas **Eakins** (“AY-kins”)

[10h] Tanner painted a version of this scene that unusually depicts one character as a beam of light. His contemporary George Hitchcock painted a version of this scene representing that character as a field of lilies.

ANSWER: the **Annunciation** (Gabriel is the character unusually represented here.)

<Painting/Sculpture>

12. Prior to this empire’s formation, the Grand Trunk Road was known as the *Uttarapatha*, or “northern road.” For 10 points each:

[10e] Name this empire that the ambassador Megasthenes travelled through via the Grand Trunk Road. This empire was founded by Chandragupta and ruled by his grandson, Ashoka.

ANSWER: **Mauryan** Empire

[10m] Most of the Grand Trunk Road was built by Sher Shah Suri, who invaded the Mughal Empire while it was ruled by this emperor. This father of Akbar died while tripping on the stairs of a library.

ANSWER: **Humayun** [or **Nasir-ud-Din** Muḥammad]

[10h] These places, known as *baori* or *vav*, were frequently placed along the Grand Trunk Road and sometimes had temples carved inside them. One of these places called Chand Baori exemplifies their labyrinthine and zigzag shape.

ANSWER: **stepwells** [prompt on wells]

<World History>

13. Materials with high values for this property generally have a large number of slip systems and a high packing fraction. For 10 points each:

[10h] Name this property that is higher in wrought materials than in cast materials. It disappears below a temperature marked by a sharp drop in the energy absorbed during the Charpy (“shar-PEE”) impact test.

ANSWER: **ductility** [or word forms like **ductile**; prompt on plasticity; do not accept or prompt on “malleability”]

[10m] Most highly ductile metals, including aluminum, gold, and copper, form this close-packed crystal structure, which contains four atoms in each of its cubic unit cells.

ANSWER: **face-centered cubic** [or **FCC**]

[10e] Atoms in face-centered cubic and hexagonal close-packed structures have this highest possible coordination number. Diatomic oxygen has this many valence electrons, and benzene has this many [emphasize] *total atoms*.

ANSWER: **12**

<Chemistry>

14. This author created a character whose oddities may stem from eating a piece of mold or an encounter with the drug DMZ. For 10 points each:

[10m] Name this author who created Hal, a genius who memorizes the *Oxford English Dictionary* and smokes weed in tunnels beneath a tennis academy.

ANSWER: David Foster **Wallace** (The novel is *Infinite Jest*.)

[10h] In a play by this other David, Hal learns that a mathematical breakthrough attributed to his dead advisor Robert was really written by Robert’s daughter Catherine. That play, *Proof*, won the 2001 Pulitzer Prize for Drama.

ANSWER: David **Auburn**

[10e] Perhaps the most classic Hal/David pair, HAL 9000 and Dr. David Bowman, comes from this science fiction author’s *2001: A Space Odyssey*.

ANSWER: Arthur C. **Clarke** [or Arthur Charles **Clarke**]

<American Literature>

15. The sentence “The rat the cat the dog chased killed ate the malt” is difficult to parse because it exhibits this feature. For 10 points each:

[10h] Name this type of recursion. Fred Karlsson found that this feature of a sentence is bounded at three times for acceptable sentences in written Indo-European languages.

ANSWER: **center embedding** [prompt on partial answer]

[10m] “The horse raced past the barn fell” is a famous example of this type of sentence, which takes an unexpected turn that leads listeners to unintended conclusions.

ANSWER: **garden-path** sentence

[10e] Sentences like “More people have been to Berlin than I have” are examples of this type of “illusion.” Adjectives of this type include “better” and “less,” and indicate a lesser degree than the superlative.

ANSWER: **comparative** [or word forms like **comparison** or **comparing**; accept **comparative** illusion] (The comparative illusion is the perception that a sentence like “More people have been to Berlin than I have” is meaningful, when in fact it has no identifiable meaning.)

<Social Science>

16. After he was captured in Varennes (“vah-REN”), this king was kept hostage in the Square du Temple. For 10 points each:

[10e] Name this French king who was overthrown in the early stages of the French Revolution. The decision to execute him caused much disagreement between revolutionaries.

ANSWER: **Louis XVI** (“the sixteenth”) [prompt on **Louis**]

[10h] This man, the leading constitutional monarchist, was rivals with Antoine Barnave in the National Assembly. This former noble attempted to make amends with Jacques Necker (“neh-KAIR”) and Louis XVI, but ultimately failed.

ANSWER: Comte de **Mirabeau** [or Honoré Gabriel **Riqueti**]

[10m] Revolutionaries protesting Louis XVI’s pardon were massacred by the National Guard on this Parisian field in 1791. Named after a deity, this field was also the site of the Festival of the Supreme Being.

ANSWER: Champ des **Mars** [or Field of **Mars**]

<European History>

17. Celtic Reconstructionists celebrate this festival on the date of the first frost, when the ground is dry enough to have a fire. For 10 points each:

[10m] Name this Celtic festival held halfway between the fall equinox and the winter solstice, celebrating the end of the harvest season. This holiday was merged with All Saints’ Day to form modern Halloween.

ANSWER: **Samhain** (“SOW-in”) [or **sauin**]

[10e] Celtic Reconstructionism is one of these new religions, which derive from folkloric beliefs of pre-modern people, and intend on reviving traditional polytheistic faiths.

ANSWER: **Neopaganism** [or **Modern Paganism**; or **Contemporary Paganism**; prompt on **Paganism**]

[10h] Neopagans, such as Celtic Reconstructionists, have an annual cycle of seasonal festivals known by this name. This cycle generally contains festivals on the four solstices and equinoxes, and the midpoints between those events.

ANSWER: **Wheel of the Year**

<Religion>

18. A December 2020 article published by *Ecology* generated headlines about octopuses “punching” fish in a possible example of this kind of behavior. For 10 points each:

[10h] Name these behaviors in which an individual suffers a cost in order to either harm less related individuals of the same species, or to harm members of another competitor species to benefit an individual’s own species.

ANSWER: **spiteful** behaviour [accept, but DO NOT REVEAL, Hamiltonian **spite** or Wilsonian **spite**]

[10m] This man adjusted his predictions about kin selection in closely related individuals by proposing his namesake form of spite. He names a rule about predicting behaviors related to kin selection.

ANSWER: W. D. **Hamilton** [or William Donald **Hamilton**; accept **Hamilton**’s rule or **Hamiltonian** spite]

[10e] Hamiltonian spite has been suggested to explain why female larvae of one species of these hymenopterans kill off brothers more often than sisters. Other narrow-waisted insects of this sort include yellow jackets and hornets.

ANSWER: **wasps** [or ***Copidosoma floridanum***; prompt on **Apocrita**]

<Biology>

19. Elliot Sober's fishnet analogy for a form of this principle has been disputed with John Leslie's metaphor of a person who is surprised to have survived a firing squad of "fifty expert marksmen." For 10 points each:

[10m] What principle's "weak" form uses the observational selection effect to dispute the "fine-tuned universe"? In contrast, its "strong" form holds that the constants of the universe are restricted to a range that allows life.

ANSWER: **anthropic** principle [accept weak **anthropic** principle or strong **anthropic** principle or **WAP** or **SAP**]

[10e] The "fine-tuned universe" is used in a modern variant of the "argument from [this concept]" for God's existence. A popular form of creationism is named for the "intelligent" type of this concept.

ANSWER: **design** [accept intelligent **design**; accept argument from **design**]

[10h] John Leslie is also known for his theory of axiarchism, which is cited as a possible alternative to belief in God in this author's book *The Miracle of Theism*. He espoused moral error theory in *Ethics: Inventing Right and Wrong*.

ANSWER: J. L. **Mackie** [or John Leslie **Mackie**]

<Philosophy>

20. This author wrote about a particle who has lived in the bodies of many figures of state in *The History and Adventures of an Atom*. For 10 points each:

[10h] Name this author, whose medical experience informed a novel in which the hypochondriac Matthew Bramble complains about baths in many spa towns before finding his illegitimate son, who marries Winifred Jenkins.

ANSWER: Tobias George **Smollett** (The novel is *The Expedition of Humphry Clinker*.)

[10m] This author called Smollett "Smelfungus," which now means a complainer. This author also invented Hafen Slawkenbergius, the expert on noses, in a novel in which the title character's nose is flattened by Dr. Slop.

ANSWER: Laurence **Sterne**

[10e] This aforementioned novel by Sterne is narrated by a character who takes three volumes to reach his own birth, describes the "hobby horse" of his Uncle Toby, and is accidentally circumcised while peeing out a window.

ANSWER: **Tristram Shandy** [or *The Life and Opinions of Tristram Shandy, Gentleman*]

<British Literature>