

## FLopen 2020

Packet B: Finally, a tossup on a functional group in poetry

Edited by: Taylor Harvey and Jonathen Settle

Written by: Mateo Javier Acosta, Mike Bentley, Nicholas Dai, Anthony Delgado, William Grossman, Shawn Jarrard, Zachary Knecht, Leo Law, Lalit Maharjan, Tracy Mirkin, Khanh Nguyen, Grant Peet, Ani Perumalla, Jason Zappulla, and the editors

Tossups

1. *Two answers required. Neither of your answers should just be the name of a modern-day country. Shipments were certified as official tributes in the “tally trade” system between these two governments, which often exchanged silver for silk. The first isolationist haijin laws were passed by one of these dynasties primarily to deal with insurgents from the country of the other. After the sixth leader of one of these dynasties was assassinated by a disgruntled vassal, the resulting confusion led to an incident in which two rival trading clans trashed the other dynasty’s port in the (\*) Ningbo Incident. Yoshimitsu, the leader of one of these dynasties, sent letters to the leader of the other secretly referring to himself as “your subject” to foster trade. Neither of them were based in Korea, but the wokou pirates based in the ports of one of these dynasties would frequently raid the ports of the other. For 10 points, name these two governments that respectively ruled China and Japan in the 14th and 15th centuries.*

ANSWER: Ming Dynasty AND

Ashikaga Shogunate [accept Muromachi]

<World History, TH>

2. *In a book named for it, Jean-François Lyotard (“lee-oh-TAR”) divided this concept into two distinct kinds: the modern kind, which evokes a feeling of nostalgia for a return to stability, and the postmodern kind, which expresses excitement at the collapse of old language games. Slavoj Žižek’s work on the objects of ideology claims they take on this idea, making subjects loyal to an ideology while also excusing their inability to understand it. In the *Critique of Judgment*, Kant argued that only ideas of the (\*) Absolute produce this concept, while limited real world objects cannot. Edmund Burke helped reintroduce this concept into modern philosophy, arguing that it emerged from ideas of terror and awe, such as witnessing the unstoppable power of a thunderstorm. For 10 points, name this concept in aesthetics described as greatness beyond all imitation, which is frequently contrasted with beauty.*

ANSWER: the sublime [accept sublimity; accept *Lessons on the Analytic of the Sublime*; accept the sublime object of ideology]

<Philosophy, MJA>

3. *In “A Note on Masks,” Edward Gordon Craig declared that one of these objects is the only thing that “has ever served as the true and loyal interpreter of the poet.” In another essay titled for these objects, a friend tells the narrator a story about fencing with a bear owned by a Baltic noble family before concluding that grace appears most in objects that have no consciousness or infinite consciousness; that essay by Henrich von Kleist contrasts the movement of these objects with that of (\*) dancers. Waldo Lanchester established a company named for these objects, which produced George Bernard Shaw’s penultimate play *Shakes versus Shav*. Performers wear black robes and hoods while using these objects in an artform whose masterpieces include *The Battles of Coxinga*. For 10 points, what objects are manipulated by performers in *bunraku* plays?*

ANSWER: puppets [accept marionettes; accept *bunraku* puppets; prompt on dolls] (The von Kleist essay is “Über das Marionettentheater.”)

<Drama, TH>

4. *Description acceptable.* The final image in this scene of a force that “beats high mountains down” echoes an earlier description that describes a mountain as an object with “roots nobody sees.” An early part of this scene describes 30 white horses who “champ and stamp” on a red hill before standing still. One of the two characters in this scene focuses on single-word, abstract concepts such as time but is asked by the other to think of increasingly baroque images, like (\*) sunlight on daisies. An object described in this scene as “A box without hinges, key or lid” turns out to be an egg. The winner of a game in this scene slightly cheats by finally asking “what have I got in my pocket?” after which he is led out of the caves beneath the Misty Mountains. For 10 points, name or describe the fifth chapter of *The Hobbit*, in which Bilbo acquires the ring of power from Gollum after answering a series of verbal puzzles.

ANSWER: “**Riddles in the Dark**” [accept any answers indicating the **riddle** scene from *The Hobbit* or *The Lord of the Rings* series; accept **Gollum** or **Smeagol** quizzing or questioning **Bilbo** in *The Hobbit* before Bilbo; accept **Chapter 5** of *The Hobbit* until “fifth” is read]

<Pop Culture, TH>

5. The catalytic antibody 38C2 mimics these enzymes. Sodium boro-hydride inhibits these enzymes by reducing an intermediate to a stable secondary amine. Levels of CK, LDH, and one of these enzymes are used to assess myositis. These enzymes catalyze the formation of sedo-heptulose-1,7-bis-phosphate in the pathway that regenerates RuBP (“R-U-B-P”) in the Calvin cycle. Like transaminases, the interaction between a lysine residue in these enzymes’ active site and a substrate carbonyl forms a (\*) Schiff base intermediate. After a reaction catalyzed by phosphofructokinase, one of these enzymes catalyzes the cleavage of fructose-1,6-bis-phosphate into DHAP and G3P. For 10 points, name these enzymes that catalyze the condensation of an enol and a carbonyl.

ANSWER: class I **aldolases** [accept fructose-bisphosphate **aldolases**; accept **aldolase** A; accept **aldolase** B; accept **aldolase** C]

<Biology, JS>

6. Along with a figure known as *The Sitting Woman*, a Stone Age terracotta statuette discovered at the Romanian site of Cernavoda was given this nickname. A bronze sculpture by Hugo Rheinhold featuring an ape and a pile of books is noted for its resemblance to a more famous artwork with this name. Foundry workers gave this nickname to an artwork because of its resemblance to (\*) Michelangelo’s tomb sculpture of Lorenzo de Medici. In an Edward Steichen photograph, an artist in profile on the left faces an artwork with this name that is partly obscured by shadow. A sculpture with this name stood outside the Panthéon for decades before being moved to the Hôtel Biron. This sculpture was originally intended for the center of the lintel of its artist’s *The Gates of Hell*, where it depicted Dante. For 10 points, name this Auguste Rodin sculpture of a man resting his chin on his fist.

ANSWER: *The **Thinker*** [or *Le **Penseur***; accept *The **Thinker** of Cernavoda*]

<Painting/Sculpture, TH>

7. Using the news tensor to calculate this phenomenon's energy flux proved that it was not a coordinate effect, and, as Bondi said, "one can heat water with [it]." In the Newman–Penrose formalism, the Weyl scalars  $\phi_0$  and  $\phi_4$  describe this phenomenon. In a derivation of this phenomenon that starts with a linear metric perturbation satisfying the Lorenz gauge, a further gauge is chosen to make (read slowly) both the contraction of the metric and the amplitude, and the product of the wavevector and the amplitude equal zero, (end read slowly) thus making the amplitude (\*) transverse and traceless. This phenomenon with cross and plus modes is produced if the source's quadrupole moment is changing. An experiment with observatories in Livingston and Hanford first detected this phenomenon. For 10 points, binary black hole mergers produce what phenomenon detected by LIGO ("LY-goh")?

ANSWER: gravitational radiation [or gravitational waves; reject "gravity waves"]  
<Physics, JS>

8. This is the largest object featured alongside a bucket, a pair of melons, two oranges, and a cucumber in Sarah Lucas's piece *Au Naturel*. The idea that horizontality has been gradually replacing verticality in art was given a name by Leo Steinberg that is a portmanteau of the word for these objects and "flatness." This type of object titles an Anthony Gormley piece that features an imprint made into a set of nearly nine thousand slices of white bread. The motto "Carry That Weight" was associated with a 2014 piece in which (\*) Columbia student Emma Sulkowicz carried one of these objects around campus for nine months. A duo of half-naked Chinese artists disrupted an installation of one of these objects resulting from four days when Tracey Emin consumed nothing but alcohol. For 10 points, a black maid brings flowers to a woman reclining on what object in Edouard Manet's *Olympia*?

ANSWER: beds [or mattresses; accept flatbed picture plane; accept Mattress Performance; accept My Bed; accept couch or sofa; prompt on pillows by asking "what object is the pillow on top of?"]  
<Other Arts: Visual, AP>

9. *Description acceptable.* The ventriloquist Alexandre Vattemare collected expatriate signatures in support of this action, including that of William Wilberforce Mann, who designed the "linn" to assist with it. While transporting tools to facilitate this action, Joseph Dombey was captured by British privateers who held him hostage in Montserrat. The 1893 Mendenhall Order marked a step towards the completion of this policy, which was largely halted by (\*) Ronald Reagan on the advice of Lyn Nofziger and Frank Mankiewicz. This policy change was called "A Choice Whose Time Has Come" in a 1971 report by NIST. Melvin Dewey's obsession with a "magic number" led him to advocate this policy change, which would have gotten rid of conversions like 1,760 yards to a mile. For 10 points, the United States never fully accomplished which action that would have resulted in the replacement of the foot and the pound?

ANSWER: adopting the metric system in the United States [accept descriptive equivalents for adopt, such as implement, switching to, using, shifting to, etc; accept SI or International units in place of metric prompt on descriptive answers such as switching measurement systems, changing units, or replacing/abandoning the Imperial/customary/English unit system by asking "switching to which system?"; prompt on measurement standardization]

<US Hist, TM>

10. An Ali Smith book whose title alludes to this character closes by noting that though most of the other characters from his novel get a neat summary of their fate at the end, this character is not mentioned and “gives the story the slip.” This character uses bizarre phrases like “japanning my trotter-cases” to mean cleaning his boots, and later exclaims “I am an Englishman! Where are my privileges?” before being dragged out of a courtroom by the collar. This friend of (\*) Charlie Bates wears an oversized hat and shirt for most of the novel he appears in and remarks “Isn’t it a pity he isn’t a prig” when he realizes the title character will not succeed in his line of work. This boy is ultimately arrested for swiping a silver snuff box, robbing Fagin of his most gifted pupil. For 10 points, name this leader of a gang of pickpockets from *Oliver Twist*, nicknamed for his skill at avoiding capture.

ANSWER: The Artful Dodger [accept either underlined portion of Jack Dawkins; prompt on Artful] (The Ali Smith book is *Artful*.)

<Long Fiction, TH>

11. In a tale, a small animal of this type tricks a tiger into eating dung, a snake, and a wasp’s nest by claiming each item is prized by a king; that animal of this type is the most common trickster figure in Malayo-Indonesian folklore and is called the *kantjil*. Dongmyeong of Goguryeo legendarily defeated Songyang in an archery contest by shooting an image of one of these animals. A man-eating one of these animals called Orgoli was slain by the Tibetan culture hero Gesar. An (\*) iridescent and reclusive one of these animals saves a drowning man in a popular Jātaka tale. Many of these animals freely roam the grounds of the Kasuga Grand Shrine in Nara. The *Sarnath* in Benares is named for these animals, where one figure’s first sermon taught of the Four Noble Truths. For 10 points, name these animals that name a “park” where the Buddha legendarily taught.

ANSWER: deer [accept mouse deer; accept reindeer; accept Deer Park; accept sika deer; accept antelopes; accept stags or doe]

<Mythology, TH>

12. In a poem, this author remembers borrowing “Grandfather’s cane / carved with the names and altitude of Norwegian mountains” to lance “it in the fauve ooze for newts.” In another poem, this poet mentioned “Mother mooned in the window” of his deceased father’s “cottage at Beverly Farm.” This author of “Dumbarton” and “For Sale” included poems about Ford Madox Ford and George Santayana in the third section of a collection that also features a long prose piece made up of vignettes about his childhood home at (\*) 91 Revere Street. While listening to a car radio bleat “Love, careless love,” a narrator of one of this author’s poems states “I myself am hell” before observing an animal who “jabs her wedge-head in a cup of sour cream.” For 10 points, name this Massachusetts poet who kicked off the confessional movement with his collection *Life Studies*, which includes his poem “Skunk Hour.”

ANSWER: Robert Lowell [or Robert Traill Spence Lowell IV]

<Poetry, TH>

13. In a film, a character who is making a documentary about a woman in this profession goes on a double date where her date performs a very bad rendition of Minnie Riperton's "Lovin' You." That character, played by Cheryl Dunye ("doon-YAY"), visits the Center for Lesbian Images and Technology, or CLIT, for her project about Faye Richards, a woman of this profession in the film *The Watermelon Woman*. In another film, a woman in this profession is told a story about how evil entered the world when a little girl left her house by a creepy Polish woman shot with a low-quality (\*) digital camera in extreme closeup. In another film, two women in this profession go to a club where they watch a singer fake a performance of Roy Orbison's "Crying" in Spanish. For 10 points, Laura Dern in *Inland Empire* and Naomi Watts in *Mulholland Drive* play what sort of performers?

ANSWER: actor [or actress; accept film or movie or TV actor or actress]

<Other Arts: Film, AD>

*Note to moderator: read the answerline carefully.*

14. The "lightning in the sky" step fret design is found in Mound 195 of a Xoo phase secondary center of this region. Depictions of a lightning god from this region typically show them with projecting teeth, a forked tongue, and a headdress with Glyph C on it. Coqui-xonaxi ("KOH-kee sho-NAH-shee") couples shared rulership of queches ("KAY-chez") in this region, whose eastern arm includes the salt production center of Lambityeco. The primary center of this region contains more than 300 (\*) stone bas reliefs of rubbery figures with strange markings near their genitalia called either nadaores or danzantes based on their position. Ceramics from this region have been found in the Nochixtlán Valley in Mixteca Alta northwest of it. For 10 points, Monte Albán, a center of Zapotec civilization, is located in what valley in southern Mexico?

ANSWER: Oaxaca Valley [or Valley of Oaxaca; prompt on southern Mexico; prompt on Mesoamerica; prompt on Central America; prompt on Central Valleys or Valles Centrales; reject "Valley of Mexico" or "Valle de México"] (The god is Cocijo/Cociyo.)

<Histo / Archaeo, JS>

15. The Bayesian blocks algorithm is an adaptive framework for constructing these diagrams. The effect of the choice of origin on these diagrams is lessened by combining several of them into one Average Shifted [these diagrams]. Values calculated from these diagrams are adjusted by factors of the class interval squared with Sheppard's correction. Epanechnikov and optcosine functions are used in kernel density estimation to generate smooth versions of these diagrams. Freedman–Diaconis and (\*) Sturges rules are used to construct these diagrams. The number of groups in these diagrams is often set to the ceiling of the log of the number of data points all plus one. The bias-variance tradeoff is illustrated by varying a parameter for these diagrams and looking at how the estimated distribution changes. For 10 points, name these diagrams that display data grouped into bins.

ANSWER: histograms [prompt on graphs of probability distributions]

<Other Science: Math, JS>

16. The narrator constantly tries to get rid of one of these animals he hauls around with his truck throughout Rudy Wurlitzer's novel *Nog*. An encounter with one of these creatures near Nova Scotia inspires the title former Barbadian Slave to move to London in Esi Edugyan ("eh-DO-jen's") novel *Washington Black*. In *Gravity's Rainbow*, one of these animals named Grigori is conditioned to kidnap the double agent Katje. While trying to salvage a steam engine, Gilliatt ("GEEL-ee-awt") battles one of these creatures in (\*) Victor Hugo's *Toilers of the Sea*. The railroad is compared to one of these animals in the first novel of the *Epic of Wheat Trilogy*. Shortly after entering the Atlantic Ocean, a school of these animals attack the *Nautilus* at the climax of *20,000 Leagues Under the Sea*. For 10 points, name this cephalopod that titles a Frank Norris novel.

ANSWER: octopus [accept squid; accept giant octopus or giant squid; accept cuttlefish; accept poulpe; accept kraken; prompt on cephalopods until read]

<Other Literature, TH>

17. Claude Shannon's mathematical theorem of a simple form of this activity involves the "dwell" and "vacant" times. A discussion of "genius" follows from a description of this activity performed by an Indian in an essay from William Hazlitt's *Table-Talk*. Anthony Gatto and Michael Moschen are known for performing this activity, which is represented by siteswap notation and whose alliteratively-titled forms include "Burke's Barrage" and "Mill's Mess." W. C. Fields got his start in (\*) vaudeville by performing this activity while dressed as a tramp. Basic patterns of this activity include cascades, fountains, and showers. New practitioners of this activity often use the term "pin" to describe clubs, which along with rings are popular props for this activity. For 10 points, name this activity in which several objects are thrown and caught simultaneously in the air.

ANSWER: **juggling** [accept toss **juggling** or contact **juggling**; prompt on tossing or catching; anti-prompt on showers, fountains, cascades, claws, passes, boxes, messes, windmills, siteswaps, or any other juggling patterns]  
<Other Academic, AP>

18. This ruler invaded the land of the Polotsk when their princess Ragnhild rebuked his marriage offer shortly after his brother was trampled to death by his own troops while crossing a drawbridge. This ruler was born of his father's affair with the slave Malusha, who according to legend became a hundred-year old cave dwelling prophetess. After fleeing to Scandinavia, this ruler returned south with a cadre of Varangian guards and killed his brother (\*) Yaropolk. This ruler sent troops in support of Basil II in his conflict against Bardas Phocus, and in return married Basil's sister Anna. According to the *Primary Chronicle*, this ruler oversaw the destruction of icons of Perun and a mass baptism in the Dnieper after rejecting Islam supposedly because of its ban on alcohol. For 10 points, name this one-time Prince of Novgorod who converted his kingdom to Christianity as ruler of the Kievan Rus.

ANSWER: **Vladimir the Great** [accept **Vladimir I**; accept **Vladimir Sviatoslavich**; accept **Saint Vladimir**]  
<Post-500 European History, TH>

19. *Specific term required.* Epstein and Axtell's Sugarscape is made up of a system of these entities, another one of which was used by Kirman and Vriend to model customer loyalty in the Marseille fish market. The belief-desire-intention software model is used in simulating systems made up of these entities. Bengt Holmström won the 2016 Economics Nobel largely on the strength of his derivations of how these entities can be better controlled by changing the incentive and monitoring structures of contracts. In a widely-studied example of (\*) moral hazard, entities described by this word, such as managers, act on behalf of another staked entity, such as shareholders; that situation is a "problem" named for principals and these entities. For 10 points, a branch of computational economics that studies emergence patterns from rule-based decisions is named for what kind of economic decision maker?

ANSWER: **agents** [accept the principal-**agent** problem; accept **agent** based simulation or models; accept multi-**agent** systems; prompt on ABMs; prompt on MASs; prompt on managers before mentioned]  
<Social Science: Economics, TH>

20. A passage for this instrument begins with four low B-flats over a bassoon drone during the latter half of Václav ("VAHT-slav") Nelhýbel's *Symphonic Movement*. The portly Teddy Brown played this instrument, as did the composer of "Log Cabin Blues," George Hamilton Green, who arranged Fritz Kreisler's *Tambourin Chinois* ("sheen-WAH") for it and piano. After a *presto* melody beginning with the notes G-D-G-C is repeated by the strings and flute, this instrument shares that melody with the brass before ending with 32 repetitions of the same notes in (\*) *Appalachian Spring*. This instrument's performer is the only one who stands to play the rapid 16th notes that open the overture to *Porgy and Bess*. Players of this instrument often use hard acrylic mallets, unlike the softer ones used for its lower-pitched cousin, the marimba. For 10 points, name this percussion instrument that has wooden keys.

ANSWER: **xylophone** [reject "marimba"]  
<Classical Music, TM>

21. The bond between carbon and the L substituent is anti-*peri*-planar to a newly forming bond in a model of this type of reaction that assumes the M substituent has little effect. The stereochemistry of this type of reaction is reversed when B·O·M is used as a protecting group because it participates in chelation. A base-catalyzed reaction of this type forms cyano·hydrin. A species takes a non-perpendicular approach close to the small group in the Felkin–Anh model of asymmetric induction during this type of reaction.

**Enolates (“EEN-oh-layts”)** attack (\*) Michael donors in a reaction of this type that forms 1,4-products rather than 1,2-products. In the Wittig reaction, an elimination follows this type of reaction involving a phosphonium ylide (“IH-lid”). For 10 points, in what type of reaction does an electron-rich species form a new bond with the electrophilic carbon of a ketone or aldehyde?

ANSWER: **nucleophilic additions** [accept 1,2-**nucleophilic additions**; accept 1,4-**nucleophilic additions**; accept nucleophilic **conjugate additions**; prompt on **addition** with "what kind of molecule is being added?"]

<Chemistry, JS>

22. Five stone-cut monuments resembling these objects make up a complex at Mahabalipuram. A metaphor in the *Katha Upanishad* (“CUT-uh oo-puh-nee-shud”) emphasizing the passivity of *ātman* refers to the body as one of these objects. A festival named for and centering on these non-idol objects is the source of the English word “juggernaut.” A “flowery” object used by Rāvana and returned to Kubera by Rāma called a (\*)

“vimāna” is most commonly depicted as one of these objects and often used by pseudo-historians to argue for the existence of ancient flying technology. A festival in Puri that centers on these objects is the most famous example of the Rath Yatra. An archer asks for one of these objects adorned with a Hanumān flag to be moved between two armies immediately before the Kurukshetra War. In the *Bhagavad Gītā* Krishna pilots, for 10 points, what sort of vehicle?

ANSWER: **chariot** [accept *ratha*; accept **cart**; accept parade **float**; accept *ther*; accept *anas*; accept **Rath Yatra**; prompt on **vehicles**; prompt on Pushpaka *vimāna* before it is read by asking “vimānas are most commonly depicted as what type of object?”]

<Religion, TH>

## Bonuses

1. The pooling effect occurs in this technique when stationary phase accumulating in the corners of rectangular microcolumns causes band broadening. For 10 points each:

[m] Name this analytical technique whose detectors include TCDs, which measure the difference in thermal conductivity between the carrier and the effluent.

ANSWER: **gas chromatography** [or **GC**; prompt on chromatography; prompt on gas analysis; prompt on trace vapor analysis] (A TCD is a thermal conductivity detector.)

[h] SNL's micro hot plate coated with a surfactant-templated sol gel adsorbent was the first of these components for microGC. In conventional GC, these components are heated to inject analyte into the column in a narrow plug.

ANSWER: **preconcentrators** [accept microfabricated **preconcentrators**; accept **preconcentrator**-focuser; accept **preconcentrator**-injector] (SNL is Sandia National Labs.)

[e] A graphitized form of this element is the stationary phase in packed microcolumns. Empirical formulae are determined using combustion analysis to measure the relative amounts of oxygen, hydrogen, and this element.

ANSWER: **carbon** [or **C**; accept graphitized **carbon** black]

<Chemistry, JS>

2. This politician exclaimed "Show my head to the people, it is worth seeing" after losing a show trial largely orchestrated by Robespierre and Saint-Just ("**sahn-zhoost**"). For 10 points each:

[m] Name this leader of the Indulgents who was executed alongside his secretary Camille Desmoulins ("**day-moo-LAHN**").

ANSWER: Georges Jacques **Danton**

[e] Robespierre's opponents cried "the blood of Danton chokes him!" at his execution during this month. The Directory replaced the Committee of Public Safety with a coup in this month of the French Republican calendar.

ANSWER: **Thermidor** [accept **Thermidorian** Reaction; or Réaction **thermidorienne**; or Coup of **Thermidor**; prompt on July or August with "please give the month of the French Republican calendar"]

[h] After initially refusing to take a position within the Directory, this politician eventually replaced Jean-François Rewbell and established control over the Directory in the Coup of 30 Prairial VII ("**seven**"). After the establishment of the Consulate, this politician served as second Consul alongside Napoleon and Roger Ducos.

ANSWER: Abbé **Sieyès** [or Emmanuel Joseph **Sieyès**]

<Post-500 European History, SJ>

3. *Zayar*, a form of torture that involves crushing one's toes between two wooden rods, is a key part of this practice. For 10 points each:

[h] Name this inhumane practice in which young girls are repeatedly force-fed camel's milk and millet until obese, purportedly to improve their desirability among men of marrying age. Following a 2008 coup, this practice saw a resurgence in Mauritania, where it affects as many as 75 percent of women in rural areas.

ANSWER: **leblouh** [prompt on gavage]

[e] In Victorian England, whalebone was typically used to produce these waist-tightening garments, which often induced organ damage and rib cage deformation in their mostly female wearers.

ANSWER: **corsets** [accept whalebone **corsets**; accept hourglass **corset**]

[m] Prior to its 1870 ban, the practice of *ohaguro* saw many Japanese women use an acidic iron-based mixture to dye this body part black. Various unhealthy surgeries involving this body part are central to the modern Japanese trend of *yaeba*.

ANSWER: **teeth** [accept **smile**; accept specific types of teeth such as **canines**]

<Other Academic, TM>

4. Carol Zaleski's book *Otherworldly Journeys* reports that these experiences tended to be unpleasant and tortuous in medieval times but generally pleasant and peaceful in modern times. For 10 points each:

[e] Name or describe these experiences in which people often report seeing a light at the end of a dark tunnel or see an accelerated series of flashbacks of their life. These often spiritual experiences frequently occur during surgeries.

ANSWER: **near death** experiences [accept **NDEs**; accept answers like **almost dying** but coming back to life; prompt on **dying** or **death**]

[m] Near death experiences are often studied in this field of inquiry, which uses observable brain data to answer questions about spiritual or religious experiences. Andrew Newberg's work in this field has found that religious contemplation coincides with unique brain states.

ANSWER: **neurotheology** [accept **neuroscience of religion**; accept **spiritual neuroscience**; prompt on **neuroscience**]

[h] This book by Todd Burpo relates the story of a four-year-old Nebraskan boy who had a near death experience in which he met his miscarried sister and was able to view his parents during an out of body episode.

ANSWER: **Heaven is for Real: A Little Boy's Astounding Story of His Trip to Heaven and Back**  
<Religion, TH>

5. A 2017 NPR article likens Donald Trump's comments about buying Greenland to a scene in which this character buys all the water in the Caribbean Sea and transports it to the Arizona desert. For 10 points each:

[h] Name this extremely elderly title character who is obsessed with the beauty queen Leticia Nazareno. Several versions of his death appear at the beginning of each of the six stream of consciousness sections of a 1975 novel about his rule.

ANSWER: the **General** [or el **general**; or **Zacarias**; accept the **Patriarch** or el **patriarca**; accept the **dictator** from *The Autumn of the Patriarch*; accept el **dictador** from *El otoño del patriarca*]

[e] *The Autumn of the Patriarch* is an archetypal Latin American dictator novel by this author, who also wrote *Love in the Time of Cholera*.

ANSWER: Gabriel **García Márquez**

[m] In a disturbing scene from *The Autumn of the Patriarch*, the General rapes a mulatto servant girl in one of these buildings. In a García Márquez short story, a very old man with enormous wings is imprisoned in one of these structures before it collapses.

ANSWER: chicken **coop** [or **gallinero**; accept **hen house** or any type of structure for **chickens**]  
<Other Literature, TH>

6. This site was the capital of the Saudeleur dynasty, and it is believed to be the only pre-modern city built atop a coral reef. For 10 points each:

[h] Name this UNESCO World Heritage site located on the island of Pohnpei in the Federated States of Micronesia. This "Venice of the Pacific" consists of buildings atop a series of artificial islands joined by canals.

ANSWER: **Nan Madol**

[m] Another example of megalithic stonework in Micronesia is the heavy, doughnut-shaped, calcite Rai stones used as currency on this island. The master navigator Mau Piailug ("pee-EYE-lug") was born on Satawal in the Micronesian state named for this larger island.

ANSWER: **Yap**

[e] Commoners living in Nan Madol paid tribute to the chieftain in this fruit, a South Pacific staple food. The HMS *Bounty* was on an expedition to gather this starchy cousin of the jackfruit when its famous mutiny happened.

ANSWER: **breadfruit** [or **dugdug**; or **tipolo**; accept **breadnut**]

<World History, TH>

7. A leitmotif alternatively known as “Consternation” or named for this character is an inversion of a liefmotif for another character’s “honor.” For 10 points each:

[m] Name this bass operatic character who sings “Tot denn alles” over the body of his “truest friend.” This character earlier discovers a tryst at daybreak with the assistance of Melot.

ANSWER: King **Marke** (“MAR-kuh”)

[e] King Marke appears in this Richard Wagner opera, which focuses on the potion-induced love between a Cornish hero and a captive Irish Princess.

ANSWER: ***Tristan und Isolde*** [or ***Tristan and Isolde***]

[h] The leitmotif for “Marke’s Grief,” a descending minor key melody that plays in between Marke’s first lines in Act II, is played by this instrument. This instrument plays a solo during the Act IV marriage scene of Meyerbeer’s *Les Huguenots*.

ANSWER: **bass clarinet** [reject “clarinet”]

<Other Arts: Auditory, TH>

8. A Fredric Jameson essay for the *London Review of Books* discusses how the “first command” granted to this novella’s protagonist represents both a sentimental experience and a transition from labor to management within the superstructure of imperialism. For 10 points each:

[h] Name this 1915 novella in which the narrator abruptly quits his position aboard “an Eastern ship” and returns to London before immediately taking command of a ghastly disease-ridden ship.

ANSWER: *The **Shadow-Line***

[e] *The Shadow-Line* was written by this Polish-British author. Jameson notes that a central theme of his work is the historical material implications of the transition from sailing ships to steam ships, particularly in *Heart of Darkness*.

ANSWER: Joseph **Conrad** [or Józef Teodor Konrad **Korzeniowski**]

[m] Jameson states that “the experience of being looked at is profoundly ontological” after quoting a passage from this Conrad story. This story describes Charles Marlow’s first journey to Asia aboard the *Judea*.

ANSWER: “**Youth**”

<Short Fiction, TH>

9. In the Gibbs paradox, the mixing of two ideal gases with this property causes a decrease in entropy as given by the Sackur–Tetrode equation. For 10 points each:

[m] Name this property. In quantum mechanical systems of particles with this property, the exchange operator leaves the Hamiltonian unchanged.

ANSWER: **indistinguishable** [or **identical**; or **indiscernible**]

[e] The Sackur–Tetrode entropy is obtained from a derivative of this function of the partition function, a common theme in statistical mechanics. Boltzmann’s equation relates entropy to this function of the number of microstates.

ANSWER: natural **log** [accept **ln**]

[h] Another common theme in stat mech is performing this mathematical action when calculating partition functions. The validity of this action relies upon the fact that each state occupies a very small phase space volume.

ANSWER: **replace a sum** with an **integral** [accept **approximating a sum** with an **integral**; accept any descriptions indicating that a **summation** is being **changed** to an **integral**; accept word forms of integral like **integrate** or **integration**; accept word forms or descriptions of sum like **summing** or **addition**; prompt on **integration** alone]

<Physics, LL>

10. Patients using this apparatus are asked to make symmetric movements like clapping or mock music conducting to provide a type of visual feedback named for them. For 10 points each:

[h] Name this type of apparatus developed by V. S. Ramachandran to alleviate neuropathic pain in the missing limbs of amputees.

ANSWER: **mirror box** [prompt on mirrors]

[e] Mirror box therapy is a common treatment for the pain resulting from this “syndrome,” in which amputees feel pain or discomfort in their missing limb.

ANSWER: **phantom** limb syndrome [accept **phantom** limb pain]

[m] Pharmacological treatment of phantom pain often involves a mix of sodium channel blockers and the tricyclic type of these drugs, such as Amitriptyline. MAOIs are most commonly used as this type of drug.

ANSWER: **antidepressants** [accept tricyclic **antidepressants**; prompt on TCAs]

<Social Science: Psychology, TH>

11. Answer the following about the career of American conductor Michael Tilson Thomas, for 10 points each:

[m] Tilson Thomas’s classical music PBS series *Keeping Score* has been compared to this educational TV series. Leonard Bernstein hosted this CBS program from 1958 to 1972, dedicating episodes to Ives and Hindemith.

ANSWER: ***Young People’s Concerts***

[e] Tilson Thomas is a leading interpreter of this Austrian Romantic composer who wrote symphonies nicknamed “Titan,” “Resurrection,” and “Symphony of a Thousand.”

ANSWER: Gustav **Mahler**

[h] Tilson Thomas is the primary champion of this hypermodernist American composer and recorded his brief *Complete Works* with the Buffalo Symphony Orchestra. That recording features several examples of this composer’s “dissonant counterpoint” style, such as his pieces *Evocations* and *Sun-treader*.

ANSWER: Carl **Ruggles** [or Charles Sprague **Ruggles**]

<Classical Music, TH>

12. Entomological illustrator Anna Comstock became a leader of this pedagogical movement after her “handbook” of the same name became a surprise standard science textbook for the first few decades of the 20th century. For 10 points each:

[h] Name this pedagogical movement that attempted to reconcile scientific knowledge with personal, emotional connections with the environment and de-emphasized book learning in favor of encounters with tangible objects. It was championed by Louis Agassiz and Liberty Hyde Bailey.

ANSWER: **nature study** movement [accept “**study nature**, not books”]

[e] Kevin Armitage’s book on the nature study movement notes its influence on this later conservationist, who wrote about DDT’s adverse effects on bird eggs in *Silent Spring*.

ANSWER: Rachel **Carson** [or Rachel Louise **Carson**]

[m] Another proponent of the nature study movement, Mabel Osgood Wright, was also an early leader of this institution. Along with a lab at Cornell, this institution organizes a yearly “census” on Christmas Day in a widely-cited recurring instance of citizen science.

ANSWER: National **Audubon** Society

<US History, TH>

13. Many of these institutions in Guatemala were closed after a fire at one called Hogar Seguro left 41 people dead. For 10 points each:

[h] Name these institutions. In the early 1990s, the *20/20* program “Shame of a Nation” called attention to the horrible state of these institutions in Romania.

ANSWER: **orphanages** [or **children’s homes**; prompt on **care homes**; reject “foster homes”]

[e] Some developing countries keep their orphanages running so that children can be saved by people doing the “volunteer” form of this activity. The oxymoronic “eco” form of this activity might involve visiting the Galápagos Islands.

ANSWER: **tourism** [accept **voluntourism** or **ecotourism**]

[m] Maestral International found that 97% of the children brought to orphanages in Indonesia following this event were not orphans, but instead were sent by parents in hopes of getting better educations. The DART system was greatly expanded following this event to reduce the damage from future such events.

ANSWER: **2004** Indian Ocean earthquake and **tsunami** [or **2004** Asian earthquake and **tsunami**; or **Boxing Day Tsunami**; or **Sumatra-Andaman earthquake**; accept **December 26th** earthquake and **tsunami**; prompt on answers mentioning an Indian Ocean or Asian **tsunami** or **earthquake** by stating “either give the year or the date it occurred.”]  
<Zeitgeist, MB>

14. This character composes a poem on his deathbed that rues a lover’s suicide resembling a cult sacrifice they had watched together and addresses that lover as “Little soul, gentle and drifting, guest and companion of my body.” For 10 points each:

[h] Name this elderly narrator of a French novel framed as a reflective epistle to his grandson, who he addresses with the nickname “Mark.”

ANSWER: **Hadrian** [or **Hadrien**; or accept Caesar Traianus **Hadrianus**; accept *Memoirs of Hadrian* or *Mémoires d’Hadrien*; accept Emperor **Hadrian**] (*Memoirs of Hadrian* is by Marguerite Yourcenar, and the poem in the lead-in is “Animula, vagula, blandula.”)

[e] This Roman emperor ascends to power despite his stammer and meek demeanor in a Robert Graves novel framed as his autobiography.

ANSWER: **Claudius** [or Tiberius **Claudius** Caesar Augustus Germanicus; accept **I. Claudius**]

[m] Only the last few of the letters that comprise this author’s novel *Augustus* are written by Octavian. Anna Gavalda’s 2011 French translation of a 1965 novel by this author about a University of Missouri English professor helped make it a surprise best-seller in Europe.

ANSWER: John **Williams** (The unnamed novel is *Stoner*.)

<Long Fiction, AP>

15. The right to be taken care of and exemption from typical social responsibilities are among the rights given to people described by this term. For 10 points each:

[h] Give this two word term from medical sociology coined by Talcott Parsons to refer to people deemed to possess a “sanctioned deviance” by medical professionals.

ANSWER: **sick role**

[e] Relations of individuals in sick roles with society at large are analyzed in this broad sociological framework that views society as a complex mechanism that leads to stability. This social approach is usually contrasted with conflict theory and symbolic interactionism.

ANSWER: structural **functionalism** [accept word forms; accept **structuralism** or word forms]

[m] Mechanic and Volkhart’s illness behavior model suggest that higher levels of this variable in individuals make them more readily adopt the sick role. The death of a spouse and divorce are among the highest inducers of this phenomenon in a scale developed by Holmes and Rahe.

ANSWER: psychological **stress** [accept biological **stress**; accept **stress**; accept Holmes and Rahe **stress** scale]

<Social Science: Sociology/Anthropology, TH>

16. Eccentric Civil War veteran Captain William Fowler founded a dinner club dedicated to this number, in which members gleefully ate at tables in imitation of the Last Supper. For 10 points each:

[e] Give this two digit number, considered unlucky in many Western superstitions. Thomas W. Lawson’s novel about a stock market manipulator is likely the origin of a superstition about Fridays that land on this date.

ANSWER: **thirteen** [accept Friday the **Thirteenth**]

[h] In Italy, this number holds a similar superstitious position as thirteen in the US. The superstition surrounding this number derives from the fact that the Roman numeral spelling of this number can be rearranged to spell the Latin word for “I have lived,” or “My life is over.”

ANSWER: **seventeen** (The Latin word is “vixi.”)

[m] Prohibitions stemming from nighttime activity in the trenches of World War I may be the origin of the superstition that lighting this many cigarettes with one match is unlucky.

ANSWER: **three**

<Other Academic, TH>

17. While working in this city, Al-Khwarizmi published the first astronomical text of the Muslim world, his *Zij al-Sindhind*, or *Astronomical Tables from India*. For 10 points each:

[e] Name this Abbasid capital city where astronomers worked in the House of Wisdom.

ANSWER: **Baghdad**

[h] This 13th-century Persian astronomer was the first to correctly hypothesize that the Milky Way was made up of a mass of densely packed stars. This polymath critiqued the notion of circular planetary motion by using his namesake couple.

ANSWER: Nasir al-Din al-**Tusi** [or Muhammad ibn Muhammad ibn al-Hasan al-**Tūsī**; accept **Tusi** couple]

[m] Another medieval Muslim astronomer, Ibn Al-Haytham, has been called the father of this scientific discipline for his *Kitab al-Manazir*. Along with the *Almagest* and the *Geography*, this discipline titles one of the three scientific texts by Ptolemy widely studied by Muslim scholars.

ANSWER: **optics** [accept *Book of Optics*; prompt on **physics**]

<Other History, TH>

18. A three-column diagram used in the medieval period to organize the various genera and species of being is known as this thinker's "tree." For 10 points each:

[m] Name this logician who wrote the *Isagoge* and edited his teacher's writings into the *Enneads*.

ANSWER: **Porphyry** of Tyre [accept **Porphyrian** tree]

[e] Porphyry and his teacher Plotinus were exponents of this school of philosophy that sought to further develop the thought of the ancient Greek author who wrote the *Symposium*.

ANSWER: **Neoplatonism** [accept word forms; prompt on **Platonism**]

[h] The terms on the outer edges of a Porphyrian tree are referred to by this Latin term, which are descriptions that characterize a species inside its genus. For the species human in the genus animal, this thing might be "having the ability to reason."

ANSWER: **differentia** [prompt on **diaphora** by asking "what is the Latin term?"]

<Philosophy, TH>

19. Two butterflies "waltzed above a farm" and encounter an "Ether sea" in a poem whose first line notably uses this word. For 10 points each:

[h] Name this word, supposedly the favorite word of Emily Dickinson because of its symmetry and the hollowness in its middle. This word names an annual collection of avant garde feminist writings edited by Diane Williams in homage to Dickinson's frequent use of it.

ANSWER: **noon**

[e] The speaker wishes to "be Noon to Him" in a Dickinson poem in which the sound of some of these objects "tell him that it is Noon abroad." Edgar Allen Poe coined the term "tintinnabulation" in a poem titled for these things.

ANSWER: **bells** [accept "The **Bells**"] (The Dickinson poem is number 498.)

[m] In Dickinson's poem "The Soul has Bandaged moments," a "prowling" one of these animals "[Touches] Liberty - then knows no more - / But Noon, and Paradise." A John Greenleaf Whittier poem titled for these creatures references a folk custom in which they must be informed of major human life events to have good luck.

ANSWER: **bees** [accept "Telling the **Bees**"]

<Poetry, TH>

20. At these structures, the electrical signal of an action potential is converted to a chemical signal. For 10 points each:

[e] Name these junctions between one neuron's dendrites and another neuron's axon.

ANSWER: **synapses**

[h] Sodium's conductance, which rapidly increases, and then rapidly decreases during an action potential, is proportional to this expression of  $m$  and  $h$  in the Hodgkin-Huxley model. Give your answer as a function of  $m$  and  $h$ , keeping in mind that  $m$  and  $h$  are the probabilities that activation and inactivation gates are open, respectively.

ANSWER:  **$m$ -cubed times  $h$**  [or  **$m$ -to-the-third times  $h$** ; or  **$m^3h$** ; accept answers in either order since multiplication is commutative]

[m] During depolarization, the membrane potential increases away from this value, which is about negative 70 millivolts in a typical neuron. This is the value of the membrane potential when a neuron is inactive.

ANSWER: **resting** membrane potential

<Biology, JS>

21. This building was designed by Jacob van Campen and had its neo-classical Citizen's Hall outfitted with sculptures by Artus Quellinus. For 10 points each:

[h] Name this building whose Burgomaster's chamber contains Ferdinand Bol's *Fabritius and Pyrrhus*. This building also contains a series of lunette history paintings on the subject of the Batavian Revolt.

ANSWER: **Amsterdam Town Hall** [or *Koninklijk Paleis van Amsterdam*; accept the New **Town Hall** of **Amsterdam**; accept **Royal Palace** of **Amsterdam**; accept *Paleis op de Dam*; prompt on just **Town Hall** or **Royal Palace** by asking "of what city?"]

[e] This Dutch painter's *Conspiracy of Claudius Civilis* was removed from the Amsterdam Town Hall, likely for clashing with the style of the other paintings in the building. He also painted *The Anatomy Lesson of Dr. Nicolaes Tulp*.

ANSWER: **Rembrandt** van Rijn [or **Rembrandt** Harmenszoon van Rijn]

[m] This other Dutch Golden Age painter depicted a red curtain and a small assembly in his painting *The Council Chamber in Amsterdam Town Hall*. This genre painter is known for serene domestic scenes featuring open doors, like in his *The Little Street in Delft*.

ANSWER: Pieter de **Hooch** ("hoh")

<Painting/Sculpture, TH>

22. A simple 2-approximation for this algorithm greedily adds both endpoints of any unused edge. For 10 points each:

[m] Name this problem whose solution set must contain at least one endpoint of each edge in the underlying graph.

ANSWER: **vertex cover** problem [accept descriptions of finding the minimum **vertex cover**; prompt on **cover**; prompt on **set cover**]

[e] The vertex cover problem is one of Richard Karp's 21 of the hardest problems in this complexity class. A famous open problem asks if this class is equivalent to the class of decision problems solvable in polynomial time.

ANSWER: **NP** [accept **NP**-complete; accept **NP**-hard]

[h] Letting  $k$  be the vertex cover size and  $n$  be the graph size, this branch of complexity theory places vertex cover in class FPT because it runs in big-O of "some function of  $k$  times some polynomial of  $n$ ." This branch of complexity theory fixes an input variable to see if some instances of NP problems can be solved efficiently.

ANSWER: **parameterized** complexity (FPT is fixed-parameter tractable.)

<Other Science: Computer Science, JS>