

2023 IQBT Undergraduate Championship

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Round 7 – Tossups

1. Giacomo Becattini re-popularized this economist’s political-economic idea of communities and firms forming “industrial districts.” This economist described surplus generated by non-land factors as “quasi-rent,” and analogized asking whether supply or demand determines a price to asking whether the upper or lower blade of a pair of scissors does the cutting. A function named for this non-French economist takes the prices of two goods and (*) consumer income as its arguments, thus not compensating the consumer for wealth effects. Building on the work of William Jevons (“JEV-uns”), he popularized terms such as “consumer surplus” and “marginal utility” in his textbook *Principles of Economics*. For 10 points, what economist names a demand function contrasted with Hicksian (“HICKS-ian”) demand?

ANSWER: Alfred Marshall [accept Marshallian demand]

2. After the narrator of a story by this author keeps hallucinating a man sitting in his armchair facing the fire, he decides to get married so as not to be alone at night. This author of “The Terror” wrote a story in which a monk first tells of local fishermen who believe in human-headed goats and then compares the supernatural to unseen wind. In that story by this author, which is framed as diary entries beginning “May 8th,” the protagonist burns down his (*) house with his servants still inside while under the sway of a vampire spirit from a Brazilian ship. The revelation that the title object was worth only five-hundred francs ends a story by this man in which Mathilde Loisel (“Iwah-ZEL”) loses a borrowed piece of jewelry at a ball. For 10 points, name this French author of “The Horla” and “The Necklace.”

ANSWER: Guy de Maupassant

3. P/L ratios and W-values quantify tenacity, extensibility and energy requirements for a material used in this process; those values are determined using a Chopin alveograph. Voronoi (“vuh-ruh-NOY”) diagrams and 3D printing were combined by Dinara Kasko to control the shapes produced by this process. 6-acetyl-2,3,4,5-tetra-hydro-pyridine is most commonly produced during this process and can be detected by humans below 0.06 nanograms per liter. An early step in some types of this process involves the formation of a visco-elastic matrix partially based on (*) gliadins (“GLY-uh-dins”). In Germany, immersion in lye is often used prior to this process to enhance the Maillard (“mye-YAR”) reaction on a surface. For 10 points, what process often uses tartaric acid and sodium bi-carbonate combined as a leavening agent, in its namesake “powder”?

ANSWER: baking [prompt on cooking; accept baking bread; prompt on “making bread”; prompt on “making dough” with “what process is this part of?”]

4. This is the first title word of the song that closes the album *Interplay for 2 Trumpets and 2 Tenors*. That song, whose title begins with this word, follows “Out of This World” on John Coltrane’s self-titled album. This is the first title word of an album that includes the songs “Split Feelin’s” and “Dig Dis” by its bandleader, Hank Mobley. This word ends the six-word title of the opening track of *Mingus Ah Um*, which begins with the word “Better.” This is the last title word of a standard whose 1939 recording by (*) Coleman Hawkins is singled out as a forerunner of bebop. Erykah Badu is called the “Queen” of a genre in which this word is preceded by “neo,” and which is a subtype of R&B. For 10 points, Ray Charles pioneered a musical genre named for what word, which a jazz standard pairs with “Body”?

ANSWER: soul [accept “Soul Eyes”; accept Soul Station; accept “Better Git It in Your Soul”; accept “Body and Soul”; accept neo-soul]

5. In 1918, part of this organization responded to a British request to form the DNOG, which patrolled a triangle based in Sierra Leone. After the excessive flogging of a Black member of this organization, its Black members revolted against White superiors in the Revolt of the Lash. “Iron Marshall” Peixoto (“pay-SHOH-too”) suppressed a revolt of this force, which had earlier forced the resignation of Deodora de Fonseca. Eduardo Wandenkolk won prestige for a key role in this group’s daring “Passage of (*) Humaitá (“ooh-mye-TAH”).” Uruguayan volunteers and members of this organization joined the *maragatos* during the Federalist Revolt. This force won the 1864 Battle of Riachuelo (“REE-uh-CHWAY-loh”), turning the tide of the War of the Triple Alliance. For 10 points, an arms race was triggered by what force’s construction of the *Minas Gerais* (“zhay-RICE”) dreadnought?

ANSWER: Brazilian navy [or Marinha do Brasil; or answers mentioning the navy or naval forces of the Empire of Brazil or the Republic of Brazil; prompt on Brazilian military; prompt on Armada]

6. To thwart a prophecy that he will be killed by this hero, a giant locks his own daughter in a tower and steals a cow of plenty from this hero’s father. This hero’s spear returns to his hand on command and must be kept in a cauldron to not set its surroundings ablaze. This hero wins the right to be king by playing the harp and winning a flagstone throwing contest. This legendary inventor of *fidchell* (“FID-kell”) was fostered by the sea god Manannán. He uses a (*) sling to knock out the powerful eye of his grandfather Balor (“BAH-lor”) during battle with the Fomorians. August 1st is the traditional date of a harvest festival named for this hero plus the word *nása*. His epithets include Lámfada (“LAH-wuh-duh”) or “of the long arm.” For 10 points, what warrior-king of the Tuatha Dé Danann (“TEW-uh-huh day DAH-nun”) fathered Cú Chulainn (“koo KULL-in”)?

ANSWER: Lugh (“loo”) [or Lú; accept Lughnasa or Lugh of the Long Arm or Lugh Lámfada or Lugh Samildánach]

7. This book claims that civil disobedience necessarily includes an appeal to the majority, but “conscientious refusal” doesn’t. This book imagines a man whose major pleasure comes from counting blades of grass, in order to argue that “the good” is the plan that a person rationally chooses from sufficient choices, which this book calls “The Aristotelian Principle.” Individual-based jealousy is distinguished from class-based jealousy in this book’s chapter “The (*) Problem of Envy.” This book invents a scenario in which people define the title concept without knowing what social and personal characteristics they will possess; people in that “original position” are behind the “veil of ignorance.” For 10 points, the title concept is defined as “fairness” in what magnum opus of John Rawls?

ANSWER: A Theory of Justice

8. **James D. Mooney was an executive at this company, whose career basically ended after a *Saturday Evening Post* article accused him of being a Nazi sympathizer. This company was led by James Roche, who apologized to Congress for hiring a prostitute to try to seduce a man in a Safeway. One of this company's products is the focus of a book chapter noting its lack of a front stabilizer bar. During Senate confirmation hearings in 1953, its former president and future (*) Secretary of Defense Charles Wilson said that for years he "thought what was good for the country was good for" this company. In Ralph Nader's book *Unsafe at Any Speed*, he described the dangers in this company's Corvair product. For 10 points, name this automobile company whose brands include Buick and Chevrolet.**

ANSWER: **General Motors** [or **GM**; prompt on **Chevrolet** or **Chevy**]

9. **These regions are strengthened by U·P elements. "Escape" from these regions follows the formation of the closed and open complexes. One of these constructs called C·A·G has components from rabbit beta-globin, chicken actin, and the cyto·megalo·virus. A tissue-specific one of these regions is junctioned to Cre ("cree") to create tissue-specific knockouts. One of these regions is between the CAP binding site and the operator of the *Lac operon*. In *E. coli*, most of these regions are bound by the housekeeping (*) sigma factor. In prokaryotes, they contain minus-10 and minus-35 sites, and in eukaryotes, they have a TATA box. G·T·Fs recruit RNA polymerase to these sequences. For 10 points, name these segments of DNA at the beginning of a gene, which initiate transcription.**

ANSWER: **promoter**

10. **This poet punned on the surname of a hated rival with a line comparing a bad poet to "a cackling goose among melodious swans." This poet created a character who declares "Time bears away all things, even our minds" to explain why he has forgotten too many songs to allow him to compete in a singing contest. This writer instructs a child to "begin to greet [their] mother with a smile" in a poem addressing Asinius Pollio, which begins by invoking a (*) "Sicilian Muse." This poet coined the phrase "omnia vincit amor" ("OHM-nee-ah WEEN-keet AH-mor") in a collection of ten poems imitating Theocritus, whose fourth entry was interpreted by medieval readers as a Christian prophecy. An epic in which the Rutulian Turnus goes to war for the hand of Lavinia was written by, for 10 points, what Latin poet of the *Eclogues* ("EK-logs") and the *Aeneid* ("ih-NEE-id")?**

ANSWER: **Virgil** [or Publius **Vergilius** Maro]

11. **A very large nonlinear response in a type of these materials can be exploited to generate a spatial soliton named for that type of this material. The average value of 3 cosine-squared-theta minus one, all over two, determines the behavior of these materials. A columnar "banana phase" type of these materials unusually displays ferroelectric switching despite being a·chiral ("AY-kye-ral"). The director rotates during the Fréedericksz ("FREE-der-icks") transition as these materials (*) twist, bend and splay. The thermo·tropic class of these materials includes their smectic and nematic phases. Applying an electric field to some of these materials causes them to untwist and allow passage of plane-polarized light in separate pixels. For 10 points, name these materials, a state of matter that behaves like a fluid with long-range order and is often used in electronic displays.**

ANSWER: **liquid crystals** [or **mesogens**; accept **liquid crystal** displays; accept nematic, smectic or thermotropic **liquid crystals**; prompt on "**LCDs**"]

12. These events sometimes made use of a man in a pit holding ropes connected to vertical stakes, a device called the *hýsplex* (“HISS-plecks”). The people of Croton destroyed a statue honoring a man who excelled at these events, Astylos, after he switched allegiances to serve the Syracusan tyrant Hieron (“HYE-ron”). One of these events comprised the female-only Heraia (“heh-RYE-uh”). Michel Breal (“bray-AL”) suggested the staging of one of these events based on the feat of a famed (*) *hemero-dromos*. These events include the armored *hoplito-dromos*, the *di-aulos* (“dee-OW-loss”), and the earliest form, the *stadion*; together, these three make up the *tri-astes* (“try-ASS-teez”), a feat accomplished by Leonidas of Rhodes. Miltiades’s (“mill-TYE-uh-deez’s”) victory over Datis’s Persian forces names one of these events based on a feat accomplished by the messenger Pheidippides (“fye-DIP-puh-deez”). For 10 points, name these athletic events, one of which is named for the Battle of Marathon.

ANSWER: race [accept hoplito-dromos, di-aulos, stadion, and marathon before mention; accept horse race; prompt on Olympic Games; reject “chariot race”]

13. In a play by this author, a man demands to raise his illegitimate child because he wants “a scandal to cover the papers,” leading another character to turn to the audience and say, “Prophetic.” In that play by this author, the protagonist has an affair with a Danish student who has the feminine form of his first name. In a play by this author, a racist reporter called Name Withheld on Advice of Counsel covers a real-life congressional investigation into the bank owned by this author’s father. Two of this author’s plays are inspired by the (*) casting of Jonathan Pryce in *Miss Saigon*. In another play by this man, diplomat René Gallimard (“gah-yee-MAR”) discovers that the opera singer he has been having an affair with, Song Liling, is a spy and a man. For 10 points, name this Asian-American author of *M. Butterfly*.

ANSWER: David Henry Hwang

14. Seventeen depictions of this conductor make outsized, flamboyant gestures in Hans Schliessmann’s caricature “A Hypermodern Conductor.” This conductor is the only person to have died while serving as official music director of the New York Philharmonic, with whom he conducted his re-orchestrated version of Beethoven’s Ninth Symphony. This man was forced to convert to Catholicism to become music director of the Vienna Court Opera in (*) 1897. This composer quoted his own song “Ging heut’ Morgen über’s Feld” (“ging hoyt MOR-gun OO-ber’s felt”) in the first movement of his first symphony, which originally included a movement titled “Blumine,” and which features a minor-key version of “Frère Jacques” in its third movement. For 10 points, name this Austrian composer whose first symphony is nicknamed “Titan.”

ANSWER: Gustav Mahler

15. In Bali, a holiday honoring this deity marks the last day of the Pawukon calendar. School uniforms are eschewed for colorful clothing on a day honoring this deity. Children write letters to symbolize starting their education in *hate khori* (“HAH-tay KOH-ree”), a ceremony that occurs during a holiday named for this deity. A festival honoring this deity occurs on the fifth day of the waxing moon in Magha, which is 40 days before Holi, and marks the arrival of spring. Musical (*) instruments and textbooks are placed next to an idol of this deity at their namesake Puja. This deity is usually depicted holding a veena in one of her four arms, alongside a peacock and a swan, wearing white and sitting on a white lotus. For 10 points, name this Hindu goddess of wisdom and wife of the creator god Brahma.

ANSWER: Saraswati [or Sarasvati]

16. In 2021, Musgum fishermen and Shuwa Arab herders in this country clashed over the construction of ditches on the Waza Logone (“WAH-zah loh-GOH-nay”) floodplain. Except for the Adamawa region, all of this country’s provinces have generic geographic names such as “East,” “Central,” and “Far North.” Via the 2006 Greentree Agreement, this country’s western neighbor formally ceded it the oil-rich peninsula of (*) Bakassi. Angry at marginalization by French speakers, English-speaking separatists in this country’s northwest led the breakaway republic of Ambazonia. In 1986, a limnic eruption of carbon dioxide suffocated over 1,700 people around this country’s Lake Nyos (“NEE-ohss”). Douala (“doo-AH-lah”) is the chief port of, for 10 points, what African country whose capital is Yaoundé (“yown-DAY”)?

ANSWER: Cameroun [or Republic of Cameroun or République du Cameroun]

17. Taking the auto-correlation of this phenomenon as a time series gives the Dirac delta function, since its auto-correlation at nonzero lag is zero. The integral of this phenomenon gives a Wiener process, or equivalently, a generalized time derivative of Brownian motion gives this phenomenon. Adding the constraint that samples of this phenomenon have zero mean and are normally distributed creates its “additive Gaussian” type, which is used as a channel model for (*) deep space communication. The discrete time version of this phenomenon is a series of i.i.d. random variables. This phenomenon has flat power spectral density. An FM radio set to a nonexistent station estimates, for 10 points, what type of noise with equal intensity across frequencies, named in analogy to light containing all colors?

ANSWER: white noise [prompt on noise or Gaussian noise before “Gaussian”]

18. Georges Rouault’s (“roo-WOH’s”) work in this medium as a teenager inspired the style of his mature paintings, such as *The Old King*. In 1952, an elderly Henri Matisse (“muh-TEESS”) produced a cut-out to serve as a design for a work in this medium entitled *Christmas Eve*. A work in this medium that visually represents parts of Beethoven’s Ninth Symphony in honor of Dag Hammarskjöld (“HAMMER-shuld”) is located in the UN Headquarters. Gerhard (*) Richter drew on his earlier work *4096 Colors* to design a work in this medium in Cologne. Works in this medium nicknamed “Peace” and “America” were created by Marc Chagall (“shuh-GAHL”). A namesake shade of blue produced with cobalt oxide was used to create many works in this medium at Chartres (“SHART-ruh”). For 10 points, name this medium used to make colorful windows in medieval churches.

ANSWER: stained glass [prompt on glass]

19. A ruler of this empire established a series of courts to enforce his “Perpetual Public Peace” policy to curb vendettas between quarreling nobles. The ruler of this empire could place areas under direct control through an “immediacy” that granted special privileges, including the ten cities that formed the Decapole. At the beginning of the 16th century, this empire became organized in a series of administrative (*) “circles.” Two different forms of urban self-governance led by stewards and bishops converged into this empire’s Free Imperial City status. In 1356, a ruler of this empire signed a Golden Bull at the Diet of Metz that designated seven states as his prince-electors. For 10 points, name this empire with hundreds of fragmented states ruled by Hohen-staufen (“HOH-en SHTAO-fen”) and Habsburg emperors.

ANSWER: Holy Roman Empire [or Heiliges Römisches Reich; or Sacrum Imperium Romanum]

20. In a novel set during this war, a character who kills his own lieutenant to avoid being court-martialed for scalping enemy soldiers is killed by a friend who believes him to be possessed by a windigo. A man who served in this war is beheaded in an accident at a piano factory and falls in love with the librarian Louisa in the story "Carried Away." This war is the setting of Joseph Boyden's novel *Three Day Road*. A poem written during this war declares, "To you from (*) failing hands we throw / the torch." The speakers of that poem, set during this war, declare "We are the Dead," who "lived, felt dawn, saw sunset glow." That poem from this war describes poppies that are "Between the crosses, row on row." For 10 points, name this war during which John McCrae wrote "In Flanders Fields."

ANSWER: World War I [accept First World War; accept Great War]

Round 7 – Bonuses

1. In the Hückel method, all of these quantities are set equal to alpha to simplify the secular determinant. For 10 points each:

[10h] Name these always-negative quantities, which represent the average electron-to-nucleus interaction energy when exchange is discounted. They are specifically the diagonal terms of the Hückel method's Hamiltonian matrix.

ANSWER: **Coulomb integrals** [prompt on partial answer; reject "overlap integrals" or "resonance integrals"]

[10m] Hückel theory uses Coulomb integrals to predict orbitals for molecules with this property, where adjacent pi systems are linked. Butadiene's ("BEW-tuh-DYE-eeen's") series of alternating single and double covalent bonds give it this property.

ANSWER: **conjugation** [accept word forms such as conjugated]

[10e] Hückel theory can be used to predict the de-localization energy of this simplest aromatic hydro-carbon, which has formula C₆H₆ and a ring structure predicted in a dream by August Kekulé ("KAY-kuh-lay").

ANSWER: **benzene**

2. In one work, this character befriends Ali Sefa's stallion, who was sold to buy land but runs away. For 10 points each:

[10h] Name this character who joins a band of outlaws in the Cukurova plain and fights the machinations of the cruel landlord Abdi Ağa. *They Burn the Thistles* is part of a tetralogy named for him.

ANSWER: İnce **Memed** [or **Memed** the Slim; accept **Memed, My Hawk**]

[10e] Yaşar Kemal's İnce Memed tetralogy is a cornerstone of this country's literary tradition. This country is home to Nobelist Orhan Pamuk.

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

[10m] A character with the first name Kemal is the protagonist of this Pamuk novel, in which he converts Füsün's home into the title place after her death.

ANSWER: *The **Museum of Innocence*** [or **Masumiyet Müzesi**]

3. Using double exposure, William Mumler created a number of photographs purporting to depict this type of subject. For 10 points each:

[10m] Name this type of subject that appears in Mumler's highly-discussed photographs, one of which depicts Mary Todd Lincoln. Arthur Conan Doyle defended the veracity of William Hope's photographs of these subjects.

ANSWER: **ghosts** [or **spirits**; accept **spirit** photography]

[10h] In another hoax, Doyle was taken in by pictures of fairies taken by Elsie Wright and Frances Griffiths, residents of this village. The doctored photos are commonly named for this village.

ANSWER: **Cottingley** [or the **Cottingley** fairies]

[10e] A widely-circulated altered photo of John May Warren purported to depict this world leader as a baby. This world leader commissioned Leni Riefenstahl's ("REEF-en-sh'tahl's") film *Triumph of the Will*.

ANSWER: Adolf **Hitler**

4. One of these structures at Navesink (“nav-eh-sink”) was the first US site to test an invention of Augustin-Jean Fresnel (“oh-GU-stin zhean fruh-NELL”) because it was too big for the influential octagonal one of these structures at nearby Sandy Hook. For 10 points each:

[10m] Name these structures. John McComb Jr. designed the first federal works project, one of these structures in Virginia.

ANSWER: **lighthouse** [or Sandy Hook **Lighthouse** or Navesink **Twin Lights** or Cape Henry **Lighthouses**]

[10e] Two watercolors of the Cape Henry Lighthouse were made by Benjamin Latrobe, who is more famous for designing this seat of the US Congress.

ANSWER: US **Capitol** Building

[10h] Latrobe’s son John Hazellhurst invented one of these items popular in the 1870s. Benjamin Franklin invented a namesake one of these that became popular after improvements made by David Rittenhouse.

ANSWER: **stove** [accept Latrobe **Stove** or Franklin **Stove**; prompt on **Baltimore Heater**]

5. This time period is celebrated in Portuguese parades where people hit each other with hammers and give out garlic flowers. For 10 points each:

[10m] Name this time period. It names a celebration often considered the national holiday of Sweden, in which people hold great feasts around maypoles.

ANSWER: **Midsummer** [or **Midsommar**; accept **Midsummer Eve** or **summer solstice**; DO NOT REVEAL OTHERWISE BUT accept **Saint John’s Eve** or **Feast of Saint John**; prompt on **summer** or **solstice**]

[10e] Midsummer celebrations traditionally occur on the eve of this saint’s feast day on June 24th. This saint was beheaded on the orders of King Herod.

ANSWER: **John** the Baptist [or Saint **John**, or **Iohannes**, or **Yochanan**; accept **Saint John’s Eve** or Feast of **Saint John**]

[10h] In Greece and Bulgaria, Midsummer feasts include *Anastenária*, in which people ecstatically dance and take this dangerous action. In the *thimithi* (“TIM-uh-tee”) ritual from Tamil Nadu, people take this action to seek blessings from Draupadi (“DROH-puh-dee”). A description is fine.

ANSWER: **fire-walking** [accept answers which refer to **walking** on **fire**, or **walking** on burning **coals**; accept any answer indicating that one’s **feet** are being placed on something **burning** or **hot**]

6. Bertolt Brecht frequently stole the work of others, mostly his lovers. For 10 points each:

[10e] One of the at least half dozen plays Brecht co-wrote with Margarete Steffin is partly titled for this canteen woman who tries to survive the Thirty Years War’ with her children.

ANSWER: Mother **Courage** [or Mutter **Courage**; accept *Mother Courage and Her Children*; accept *Mutter Courage und ihre Kinder*]

[10h] Besides Steffin and Rita Berlau, Brecht’s main uncredited collaborator was this woman, who co-wrote the text of *The Threepenny Opera* and *The Rise and Fall of the City of Mahagonny*. John Fuegi controversially claims that she wrote at least 80% of the former.

ANSWER: Elisabeth **Hauptmann**

[10m] Four songs in *The Threepenny Opera* were lifted by Brecht from Karl Anton Klammer’s translations of this French poet, who asked “Where are the snows of yesteryear?” in his “Ballad of the Ladies of Bygone Years.”

ANSWER: François **Villon**

7. This object's name can refer to about 3.5 grams of drugs, most often cocaine. For 10 points each:

[10e] Name this object. In the most common version of professional pool, the goal is to hit this object into a pocket after eliminating stripes or solids.

ANSWER: **eight-ball** [prompt on **ball** or **black ball**]

[10h] The original magic eight-ball was marketed as a product with this function, but became much better known for its use in fortune-telling. Collectors of objects with this function, such as Bill Clinton, particularly prize 19th century crystal ones made by Baccarat.

ANSWER: **paperweights** [accept answers which refer to **holding down paper** or **weighing down paper**]

[10m] According to this paradox, you can decompose an 8-ball, or really an n -ball of any dimension 3 or greater, into pieces that can be re-assembled into the same ball in a different manner.

ANSWER: **Banach–Tarski** paradox

8. In their correspondence, one of these two men argued that mathematics is founded on the principle of contradiction, but natural science is founded on the principle of sufficient reason. For 10 points each:

[10h] Name these two men who exchanged letters debating what Isaac Newton meant by “sensorium,” why and how God perceives things, and how to define what space is. Their correspondence was cut short by one man's death in 1716.

ANSWER: Gottfried Wilhelm **Leibniz** (“LYBE-nitz”) and Samuel **Clarke** [accept names in either order]

[10m] In his correspondence with Clarke, Leibniz repeatedly claims that he already settled some of the issues they are discussing in this book by him, which argues against Pierre Bayle that the problem of evil is solvable.

ANSWER: **Theodicy** (“thee-ODD-uh-see”) [or **Théodicée**; or *Essais de **Théodicée** sur la bonté de Dieu, la liberté de l'homme et l'origine du mal*; or *Essays of **Theodicy** on the Goodness of God, the Freedom of Man and the Origin of Evil*]

[10e] In the correspondence, Leibniz also refers to his theory of “pre-established harmony,” a compatibilist approach to this concept. Determinists deny that humans have this volitional capacity.

ANSWER: **free will** [or **freedom of the will**; or **free choice**; prompt on **freedom** or **free** by asking “of what?”]

9. This genus's *quintana* and *henselae* species causes bacillary angiomatosis, an infection that looks like Kaposi's sarcoma, but isn't. For 10 points each:

[10h] Name this genus of intracellular gram-negative bacteria. This genus includes the causative agents of Oroya fever, verruga peruana, and trench fever.

ANSWER: **Bartonella**

[10e] *Bartonella henselae* is the most common cause of a fever caused by the scratch of this animal. This domestic animal also carries the parasite that causes toxoplasmosis.

ANSWER: **cat** [or **Felis catus** or **F. catus**]

[10m] Most members of the genus Bartonella are this kind of intracellular parasite, meaning they are not completely dependent on their host cells. This term is usually contrasted with “obligate.”

ANSWER: **facultative**

10. This project drained the entirety of the Ooldea (“YOOL-dee-uh”) Soak, which had been supplying water for nearby populations for centuries. For 10 points each:

[10h] Name this project which spanned the Nullarbor (“NULL-er-bor”) Plain. Its construction began during the government of Andrew Fisher.

ANSWER: **Trans-Australian Railway**

[10m] The Railway ended at Kalgoorlie so as to provide service to this larger city. This capital of the Swan River Colony is served by a port at Fremantle (“free-mantle”).

ANSWER: **Perth**

[10e] Workers were supplied by a weekly train named for tea and this other commodity, which was grown in British colonies like Jamaica and Barbados.

ANSWER: **sugar** [accept Tea and **Sugar** Train]

11. The KKT conditions generalize the namesake method using these quantities. For 10 points each:

[10m] Name these quantities used to solve constrained optimization problems. In their namesake method, one of these quantities, times the gradient of the constraint function, is set equal to the gradient of the function being constrained.

ANSWER: **Lagrange multipliers** [or **Lagrangian multipliers**]

[10e] Lagrange multipliers are symbolized with this Greek letter, which also symbolizes eigenvalues (“EYE-gun-values”). In physics, it symbolizes wavelength.

ANSWER: **lambda**

[10h] The KKT conditions are satisfied when LCQ is met, which occurs when the constraints have this property. This adjective describes transformations preserving parallel relationships, but not necessarily angles.

ANSWER: **affine** [or wordforms such as **affinity**; accept **affine transformation**]

12. The goddess Atargatis and the *apkallu* sages are among the many Near Eastern examples of humans who have features of these animals. For 10 points each:

[10m] Name these animals. In Greek myth, Glaucus uses a magic herb to revive these animals and, after eating the herb, becomes a god with the features of them.

ANSWER: **fish** [accept **Pisces** or **Ichthyes**]

[10e] Triton, a son of Amphitrite (“am-fih-TRY-tee”) and this god is usually depicted as a merman with a fish’s tail. This Greek sea god was often depicted carrying a trident.

ANSWER: **Poseidon** [or **Neptune**]

[10h] The star Formulhaut-b (“FOR-mul-hot B”) in Piscis Austrinus (“PIS-kiss ow-STREE-nuss”) is named for this Near Eastern god of fertility. This husband of Shalash is often identified as a fish god, since his name is similar to the Hebrew for “fish,” but this is highly contested.

ANSWER: **Dagon** (“DAH-gon”) (“Dag” is a Hebrew word for fish.)

13. In the 1990s, Betye (“Betty”) Saar denounced this artist’s work as “revolting and negative” for its deployment of racial stereotypes. For 10 points each:

[10m] Name this Black artist. This woman parodied *Gone with the Wind* in her series *Gone*, which, like much of her work, uses silhouettes to present disturbing scenes from the antebellum South.

ANSWER: Kara **Walker**

[10h] As part of this installation, Kara Walker used polystyrene and sugar to sculpt a giant black woman in the form of a sphinx. This installation is titled after sugar sculptures used as table decorations in Renaissance Europe.

ANSWER: A **Subtlety** [or *The **Marvelous Sugar Baby***; or A **Subtlety**: *An Homage to the unpaid and overworked Artisans who have refined our Sweet tastes from the cane fields to the Kitchens of the New World on the Occasion of the demolition of the Domino Sugar Refining Plant*]

[10e] Walker referenced artworks like Dana Schutz’s *Emmett Till* painting in a sculpture of this type for the Tate Modern. An obelisk towers over a project of this type that Gianlorenzo Bernini created for the Piazza Navona.

ANSWER: **fountains** [or **Fons Americanus**; or **Fountain of the Four Rivers**; or **Fontana dei Quattro Fiumi**]

14. While hiding in shrubbery to listen to a rich couple’s radio, a character hears this piece, part of which is described as “like the whole world was dead and black and there was no use thinking how it was before.” For 10 points each:

[10h] Name this piece that is also described as “like the greatest people in the world running and springing up in a hard, free way.” It inspires a character to restring a cracked ukulele with parts from a violin, guitar, and banjo.

ANSWER: **Eroica Symphony** [or **Beethoven’s Symphony No. 3** in E-flat major, Op. 55]

[10e] The tomboy Mick Kelly is captivated by the *Eroica Symphony* in this author’s novel *The Heart Is a Lonely Hunter*.

ANSWER: Carson **McCullers**

[10m] Mick Kelly resembles Frankie Addams, the tomboyish protagonist of this other McCullers novel, in which Frankie dreams of following her brother to Alaska.

ANSWER: *The **Member of the Wedding***

15. Kagal was formed to oppose this policy, an early sign of which was the Post Office Manifesto of 1890. For 10 points each:

[10h] The Constitutionalist and Compliant factions arose after a dispute over responding to what policy? The February Manifesto began this policy, which Nikolai Bobrikov was tasked with implementing.

ANSWER: **Russification** of (the Grand Duchy of) **Finland** [or **Sortokaudet**; prompt on **russification**]

[10m] Kagal included Carl, a member of this family. Another member of this family issued the Sword Scabbard Proclamation, pledging to annex East Karelia, as leader of Finnish forces during the Continuation War.

ANSWER: **Mannerheim** [or Carl **Mannerheim** or Carl Gustaf Emil **Mannerheim**]

[10e] The most intense period of Russification in Finland happened under this last Russian Tsar.

ANSWER: **Nicholas II** [prompt on **Nicholas**]

16. This composer used his trademark technique of “metric modulation” in his *Eight Etudes and a Fantasy* for woodwind quartet and his fifth and final string quartet, which he wrote in 1995. For 10 points each:

[10m] Name this hyper-prolific American modernist composer who died at the age of 103.

ANSWER: Elliott **Carter** [or Elliott Cook **Carter** Jr.]

[10e] One of Carter’s college recommendations was written by this American composer and next-door neighbor, who wrote *Three Places in New England* and the *Concord Sonata*.

ANSWER: Charles Edward **Ives**

[10h] Carter wrote two symphonies, one titled *Symphonia: sum fluxae pretium spei* and a single-movement written for this unusual sort of ensemble.

ANSWER: **three orchestras** [prompt on **multiple orchestras** by asking “how many?”]

17. This book discusses a man identifying the scientific name *asplenium* for a fern after picking up two lizards. For 10 points each:

[10m] Name this 1899 book, which was inspired by an event the writer connected to wish fulfillment. This book contrasts manifest content and latent content of certain experiences.

ANSWER: The *Interpretation of Dreams* [or *On Dreams*]

[10e] *The Interpretation of Dreams* introduced ideas about sexuality and parental relationships that its author, Sigmund Freud (“froyd”), would later tie to a complex named for this mythological character.

ANSWER: Oedipus [accept Oedipus complex]

[10h] In this early dream interpretation case, a young lawyer had nightmares of his father and his lover being subjected to a bizarre torture method. Lacan (“luh-KAN”) heavily based his work “The Neurotic’s Individual Myth” on this case.

ANSWER: Rat Man [or Rattenmann]

18. Tim Clissold’s memoir *Mr. China* details his time during this decade spent helping Jack Perkowski invest and subsequently lose 400 million dollars into China. For 10 points each:

[10e] Name this decade, the first of Japan’s “Lost Decades.” The Asian financial crisis struck at the end of this decade, shortly after Hong Kong was transferred to China.

ANSWER: 1990s [prompt on 90s]

[10m] Nick Leeson bankrupted Barings Bank after one of these events tanked the Nikkei (“NICK-kay”) in 1995. The Japanese army massacred 6000 Koreans after one of these events in 1923.

ANSWER: earthquake [or Great Hanshin Earthquake or Kanto Earthquake]

[10h] Economic struggles contributed to Socialist Tomiichi Murayama’s election, interrupting Japan’s one-and-a-half-party system named for this year. The Liberal Democratic Party and Socialist Party were created by party mergers in this year, whose general election was then won by Ichiro Hatoyama’s Liberal Democrats.

ANSWER: 1955 [prompt on ‘55]

19. This effect occurs due to a perceived decrease in frequency due to time dilation. For 10 points each:

[10m] Name this effect confirmed by the Ives–Stilwell experiment, in which there is a small wavelength shift when an emitter moves very fast past a detector pointed perpendicular to its motion.

ANSWER: transverse Doppler effect [prompt on Doppler effect or relativistic Doppler effect]

[10e] The transverse Doppler effect, time dilation, and length contraction are all consequences of this theory postulated by Einstein. This theory posits that the speed of light is a universal speed limit.

ANSWER: special relativity [or SR; prompt on relativity; reject “general relativity”]

[10h] The motion of the emitter and receiver can be analyzed on a Minkowski diagram. The 45-degree lines on that diagram represent events separated by this kind of interval, in which delta-*s* is equal to zero.

ANSWER: lightlike interval

20. An influential essay by T. S. Eliot claims that the wit “which pervades the poetry of” this author “is more Latin, more refined, than anything that succeeded it.” For 10 points each:

[10h] Name this author who wrote “Thy love was far more better then / The love of false and cruel men” in the poem “The Nymph Complaining for the Death of her Fawn.”

ANSWER: Andrew **Marvell**

[10e] Eliot’s essay “Andrew Marvell” praises the “variety and order of the images” of this Marvell poem, quoting its opening line, “Had we but world enough and time.”

ANSWER: “**To His Coy Mistress**”

[10m] Eliot notes the “proper degree of seriousness” of Marvell’s wit in treating subjects such as this person, whom Marvell compared to “three-fork’d lightning” and described as unable to “cease / In the inglorious arts of peace.”

ANSWER: Oliver **Cromwell**