

HARI (Hari's Academic Regionals(-minus) Invitational): Harimoment generating function

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ROUND 1

Tossups

1. **An oft-misattributed painting by this artist depicts Jesus weeping as he wears the crown of thorns and carries the cross. Cambridge's Fitzwilliam Museum contains a version of a painting by this artist that depicts an organist next to a reclining nude. This artist's teacher likely helped him on a painting that depicts a lute player and a lyricist next to a nude woman, titled (*) *Pastoral Concert*. This artist's "poesie" paintings include one where a maid watches a gold cloud approach Danaë. A painting by this artist's teacher that depicts a nude reclining against a red pillow likely inspired him to paint a scene that depicts a maid rummaging through a chest behind a sleeping dog. For 10 points, name this artist who painted the Venus of Urbino.**

ANSWER: Titian [or Tiziano Vecellio]

<Visual Fine Arts, Parameswaran>

2. **In letters to her daughter, Suzy recalls falling in love with Sonny while fleeing this war in the 2015 novel *Dragonfish*. The protagonist of another novel believes that the director of a film about this war purposefully did not warn him about live explosives that land him in the hospital. A spy in this war learns that his "blood brother," Man, was the faceless man who had overseen his torture. The narrator is distressed by the death of (*) Kiowa in another work set during this war which includes the section "How to Tell a True War Story." Ted Lavender is the first to die in a collection set during this war, whose narrator Jimmy Cross recalls almost going to Canada to avoid being drafted. For 10 points, name this war, the backdrop of *The Sympathizer* and *The Things They Carried*.**

ANSWER: Vietnam War

<Long Fiction, Nageswaran>

3. **This colony's town of New Inverness was the site of multiple conversions of natives under Benjamin Ingham. In this colony, St. Catherine's Island was given to the mixed-race Mary Musgrove for her aid as an interpreter. Land used to build the capital of this colony was granted by Chief Tomochichi. Victories at the Battle of Gully Hole Creek and the Battle of (*) Bloody Marsh prevented an attempted Spanish invasion of this colony during the War of Jenkins' Ear. Charles and John Wesley were invited to preach in this colony by its founder. This American colony, located on Yamacraw land, was founded as a place to resettle English debtors. For 10 points, name this colony founded by James Oglethorpe that had its capital at Savannah.**

ANSWER: Georgia

<American History, Nageswaran>

4. To explain why so many systems display a power spectral density that depends inversely on this quantity, Bak, Wiesenfeld, and Tang proposed the concept of self-organized criticality. For a LTI system, a system's output in response to an input is given by a decaying exponential function of this quantity symbolized capital H called its "response." The reactance of a capacitor is inversely-proportional to capacitance and this quantity. This quantity is plotted against (*) time on spectrograms. The Fourier transform takes functions from the time domain into the domain of this quantity. For a LC circuit, "one over the square root of LC" is the value of this quantity at which resonance occurs. For 10 points, what quantity describes the number of oscillations per second of an AC signal?

ANSWER: frequency [accept frequency response; accept angular frequency]

<Physics, Parameswaran>

5. A set of duets and etudes for this instrument was collected in Jacques-François Gallay's *Méthode*. Robert Schumann wrote an F-minor *Konzertstück* for four soloists of this instrument. This was the primary instrument of Franz Strauss, whose son Richard wrote two concertos for it and used it to state the first theme of Till Eulenspiegel. After his mother's death, Johannes Brahms composed a trio that unusually uses this instrument. This instrument is found in both a wind quintet and a (*) brass quintet. Notes outside of this instrument's natural harmonic series can be played using hand-stopping, which involves putting one's hand in its bell. The most common form of this instrument is pitched in F. For 10 points, name this coiled brass instrument.

ANSWER: French horn [or natural horn; accept cor]

<Auditory Fine Arts, Zhang>

6. In a possible reference to the book of Genesis, this poem's speaker is told "you were the fruit" and "you were the miracle" after the speaker refers to them as "my own flesh." "Hungering teeth" and "entwined bodies" in this poem are used to embellish a "mad coupling of hope and force" implied to be sex. The speaker of this poem laments that "cold flower heads are raining over my heart" before invoking a (*) "pit of debris." This poem opens by stating "the memory of you emerges from the night around me" before its speaker observes "it is the hour of departure" and repeats the refrain "in you, everything sank!" For 10 points, name this poem which appears after "Twenty Love Poems" in a collection by Pablo Neruda.

ANSWER: "The Song of Despair" [or "A Song of Despair" or "Una canción desesperada" or "La canción desesperada"]

<Non-Epic Poetry, Schwartz>

7. The varying pronunciations of the nominative first-person singular pronoun in dialects of this language define the Uerdingen Line, which along with the Benrath line divides this language between Low, or "flat," dialects and High ones. Keyboards which swap the locations of the Y and Z keys are most frequently used by speakers of this language. After orthography reforms in 1996, short vowels in this language are followed in writing by a double (*) S rather than a sharp S, or *Eszett* (ess-TSET). The articles *den*, *dem*, and *des* are used for masculine nouns in this language's accusative, dative, and genitive cases. English is part of the family named for this language. For 10 points, name this language with three standard variants in Switzerland, Austria, and its largest native country, *Deutschland*.

ANSWER: German [accept Germanic languages]

<Social Science, Liu>

8. The frequency at which a form of this phenomenon produces an amplification factor of at least 3 over the square root of 5 is called this phenomenon's optical depth. A form of this phenomenon only detectable using statistical analysis is accounted for by convergence and shear. Upper limits on the mass of MACHOs are primarily constrained by observations of a lack of this phenomenon. Measurements of this phenomenon in the (*) Bullet Cluster is major evidence for the existence of dark matter. The "micro" form of this phenomenon can be used to detect exoplanets, while the "strong" form of this phenomenon produces "Einstein rings" and twin quasars. For 10 points, name this phenomenon predicted by general relativity in which a massive object bends light.
ANSWER: gravitational lensing [accept weak gravitational lensing or strong gravitational lensing or microlensing; prompt on gravity or gravitational force]
<Other Science, Schwartz>

9. Julius Oppert argued that this empire defeated a "King Ahab of Israel" based on the Kurkh Monoliths, which also makes one of the earliest references to "Arabs." Reliefs depicting this empire's ruler engaged in a lion hunt and another showing its victory at the Siege of Lachish were uncovered by Austen Layard. The Book of Isaiah recounts how an angel slaughtered 180,000 of this empire's troops during a siege of (*) Jerusalem. This empire constructed a palace at Dur-Sharrukin which featured a winged-bull motif known as a lamassu. Well-preserved copies of the Epic of Gilgamesh were found in the remains of a library in this empire's capital of Nineveh. For 10 points, name this ancient empire ruled by Tiglath-Pileser III and Ashurbanipal.
ANSWER: Neo-Assyrian Empire
<Ancient/Other History, Hong/Parameswaran>

10. Saint Luke legendarily created an artwork of this figure at Hodegon Monastery. "Te upermacho stratego" are the first words of an Akathist hymn addressed to this figure that is often recited on a March 25th feast day. The moment when two saints watch angels take this figure's soul away is known as the *koimesis*. Cyril of Alexandria corresponded with Pope Celestine over (*) Nestorius' heretical rejection of a title given to this figure. The Eastern Orthodox Church celebrates this figure's birth on the same feast day as St. Anne. The 12th and final Great Feast commemorates this figure's Dormition. At the Council of Ephesus, this figure was given the title *theotokos*. For 10 points, name this mother of Jesus.
ANSWER: Virgin Mary [prompt on Virgin; accept Theotokos before it is mentioned]
<Religion, Parameswaran>

11. The Ridley Plan, developed to combat these events, was produced in the aftermath of one that crippled the Heath government. Following the death of taxi driver David Wilkie during one of these events, Neil Kinnock supported it. When denying "mounting chaos" during a series of these events, a politician was quoted by The Sun as saying "Crisis? What crisis?" Those events ended in a (*) no-confidence vote against James Callaghan and got a collective name for coinciding with harsh snowstorms. The Battle of Orgreave occurred during one of these events that was led by Arthur Scargill's NUM, which had earlier participated in the "Winter of Discontent." For 10 points, the Thatcher ministry opposed what events organized by coal miners?
ANSWER: labor strikes [or coal miners' strikes]
<European History, Liu>

12. **Two answers required. One of these deities punished a bee named Melissa for requesting a mortal weapon at an event dedicated to both of these deities. One of these two deities embarrassed the other after transforming into a rain-soaked cuckoo. One of these two deities gave a figure the ability of prophecy after that figure was blinded by the other for claiming that men (*) enjoyed sex more than women.** The golden apples were first planted as a gift during the wedding of these two deities, which occurred in the Garden of the Hesperides. One of these deities convinced Semele to ask the other of these two deities to show their true form, instantly killing her. One of these two deities punished Leto for having an affair with the other. For 10 points, name this couple, the king and queen of the Olympians.

ANSWER: **Zeus** AND **Hera** [accept answers in either order]

<Mythology, Zhang>

13. **An island once predicted to be eroded away by 2020 still stands as the northernmost point of this country. A protein-rich yogurt-like staple in this country is called skyr (SKEER). Sites in this country include the valley of Haukadalur and Silfra, a pool between two tectonic plates. Visitors to this country can drive the Diamond and Golden Circles from a (*) ring road that circles the entire country. A concrete sphere is continually moved to mark the Arctic Circle on this country's island of Grímsey. In 2010, European air travel was slowed by the eruption of this country's volcano Eyjafjallajökull (AY-uh-FYAH-luh-yoe-kl). Geothermal energy powers much of this country and heats its Blue Lagoon. For 10 points, name this island Nordic country whose capital is Reykjavík.**

ANSWER: **Iceland**

<Geography, Zhang>

14. **A combination of this molecule, ascorbate, and hydrocortisone are used in an experimental treatment for septic shock. Since a derivative of this molecule is the cofactor for the E1 subunit of branched chain amino acid dehydrogenase, deficiencies in it can cause maple syrup urine disease. The only currently-known eukaryotic riboswitch binds a form of this compound derivatized by pyrophosphate. Alcoholism-induced (*) deficiency of this vitamin can often result in the development of Wernicke encephalopathy and Korsakoff syndrome. Deficiencies of this vitamin are often caused by diets of mostly white rice and are collectively known as beriberi. For 10 points, name this vitamin also known as thiamine.**

ANSWER: vitamin **B1** [accept **thiamine** before "thiamine"; accept **thiamine** pyrophosphate before "thiamine"; prompt on vitamin **B** with "which B vitamin?"]

<Biology, Schwartz>

15. **After his death, this character is praised with the lines "His life was gentle, and the elements / So mix'd in him that Nature might stand up / And say to all the world / This was a man." This character's wife cuts herself in the thigh to demonstrate her loyalty to him. A ghost appears to this non-Richard III character and says he will see the ghost again at a battle that occurs in Act V. This character initially wins over a crowd at a (*) funeral by saying "as he was valiant, I honour him: but, as he was ambitious, I slew him" but is immediately upstaged when a different character gives a speech beginning "Friends, Romans, Countrymen, lend me your ears." For 10 points, give this Shakespeare character who Julius Caesar asks "Et tu?" as he dies.**

ANSWER: Marcus Junius **Brutus**

<Drama, Berns>

16. David Griffiths, who published a history of this island in Welsh, had earlier developed a Latin script for its people that displaced the Arabic *sohrabe* script. Many Antaifasy were forced into slavery on this island and sold at its port of Toamasina. Prisoners on this island were forced to regurgitate a chicken to prove their innocence using the (*) tangena nut, a ritual outlawed by Radama II. The Lambert Charter was issued following the overthrow of this island's Merina Kingdom. Many French missionaries were executed on the order of this island's queen Ranavalona I, but it was eventually colonized by the French in the 1880s. For 10 points, the Malagasy people inhabit what island nation off of Africa's eastern coast?

ANSWER: Madagascar

<World History, Nageswaran>

17. The variance in this quantity in a system with partition function Z is given by the second derivative of the natural log of Z with respect to thermodynamic beta. A thermodynamic function symbolized πT (pi sub T) describes how this property of a gas changes under isothermal expansion. In a closed system, the differential of this quantity is equal to $TdS - pdV$ (T d S minus p d V). The molar constant volume heat capacity (*) gives the proportionality constant between this quantity per mole and temperature. The first law of thermodynamics states that the change in this quantity of a system equals the sum of heat and work done on the system. For 10 points, name this measure of the total energy possessed by the microscopic components of a system, symbolized U .

ANSWER: internal energy [prompt on energy or U before read]

<Chemistry, Tong>

18. Near the end of an opera from this country, a character asks his mother for "one more kiss" before bidding "farewell." In that opera from this country, villagers sing an Easter hymn whose melody is later played by the orchestra while the villagers enter a church. A tenor aria written by a composer from this country was the first record to sell over a million copies; in that aria from this country, a performer prepares for a play-within-a-play while singing "put on the costume." A frequently-excerpted (*) intermezzo from an opera from this country is often performed on a double bill with another opera from this country about a troupe of clowns. *Cavalleria rusticana* and *Pagliacci* are operas from—for 10 points—what country home to Pietro Mascagni and Ruggero Leoncavallo?

ANSWER: Italy

<Other Fine Arts, Zhang>

19. An essay by this author satirically claims that "Cain must have been a first-rate genius." The narrator of a work by this author dreams about being chased by a crocodile after offering drugs to a Malay sailor. In the "Dream Fugue" section of an extended essay, this author reminisces on almost running over a couple when the driver of the title (*) conveyance fell asleep. This author of "Murder, Considered as One of the Fine Arts" and "The English Mail-Coach" divided his memoir into the "pains" and "pleasures" of getting high on the title substance. For 10 points, name this romanticist who wrote about his experiences as an addict in his memoir *Confessions of an English Opium Eater*.

ANSWER: Thomas De Quincey

<Short Fiction/Other, Schwartz>

20. Philip Pettit explored another philosopher's "dilemma" involving situations when this concept produces legitimate but unjust outcomes. Agents act as game-theoretic constrained maximizers in a philosophy based on this concept developed in part by David Gauthier ("go-tee-ay"). This concept is composed of tenets that cannot be reasonably rejected, according to T. M. Scanlon. John (*) Rawls argued that the just principles of this concept should be developed from behind a "veil of ignorance." Locke's *Second Treatise of Government* is typically seen as arguing that people retain the rights of the state of nature under this concept. For 10 points, name this philosophical concept that titles a work beginning "man is born free, and everywhere he is in chains" by Jean-Jacques Rousseau.

ANSWER: social **contract** [or **contract**arianism; or **contract**ualism; accept *The Social Contract*; the paper in the first line is "Rousseau's Dilemma"]

<Philosophy, Berns>

Bonuses

1. The eighth of a set of pictures depicting one of these animals and a human is blank, to symbolize that they have transcended. For 10 points each:

[10h] Name this type of animal, which are depicted in that set of 10 pictures created by Kakuan. That set of pictures is a prominent pedagogical tool for reaching enlightenment in Chan Buddhism.

ANSWER: **bulls** [or **oxen**; prompt on **cows** or **bovines** or similar answers; accept *Ten **Bulls*** or the ***Ox**-Herding Pictures*]

[10e] This Japanese Buddhist school grew out of Chan Buddhism. This sect emphasizes meditation on statements called koans.

ANSWER: Japanese **Zen** Buddhism

[10m] The Chan Buddhist Linji Xiyuan described reality using three "mysterious" examples of these things. Many koans are collected in a book titled for a paradoxically named example of these objects that people must pass to reach enlightenment.

ANSWER: **gates** [or **mén**; accept *Three Mysterious **Gates*** or *Gateless **Gate***; accept **barrier** or *Gateless **Barrier***]
<Religion, Zhang>

2. The best-known work of architect Peter Behrens is an Art Nouveau building of this type. For 10 points each:

[10h] Name this type of building, an early modern example of which was co-designed by Walter Gropius and Adolf Meyer for Fagus.

ANSWER: **factory** [accept AEG Turbine **Factory**]

[10e] Walter Gropius was the founder of this German art school that survived from 1919 to 1933. This school's last director Ludwig Mies van der Rohe, developed the architectural maxim that "less is more."

ANSWER: Staatliches **Bauhaus**

[10m] Mies van der Rohe's modernist style is exemplified by this house whose walls consist entirely of plate glass and steel beams. This house, whose interior is hidden by a large curtain, inspired the design of Philip Johnson's Glass House.

ANSWER: **Farnsworth** House

<Other Fine Arts, Martin>

3. A person with this profession named Damon sang "With love of Juliana stung!" For 10 points each:

[10h] Name this profession of a character who addresses glow-worms as "living lamps" in another poem.

ANSWER: **mower** (those poems are by Andrew Marvell)

[10e] A "glow-worm golden / In a dell of dew" appears in this Percy Shelley poem that opens "Hail to thee, blithe Spirit!"

ANSWER: "**To a Skylark**"

[10m] A William Cowper poem is titled for a glow worm and one of these animals, which "sit[s] so late" in "The Mower to the Glow-Worms." Another poem titled for one of these animals that is "not born for death" describes where "youth grows pale, and spectre-thin, and dies."

ANSWER: **nightingale**

<Non-Epic Poetry, Lei>

4. This scholar compiled works by various African Islamic scholars into the *Nayl al-ibtihaj*. For 10 points each:

[10h] Name this Berber scholar, who criticized the enslavement of Africans by Arabs in his influential treatise *Mi'raj al Su'ud*. He compiled a dictionary of Maliki jurisprudence while in exile in Marrakech.

ANSWER: **Ahmad Baba** al-Timbukti [do NOT read the full answer if the team gets it wrong]

[10m] Ahmad Baba was forced into exile during the Moroccan invasion of this empire, which was defeated at the Battle of Tondibi. Askia I ruled this empire at its greatest height.

ANSWER: **Songhai** Empire

[10e] Ahmad Baba is considered to be the greatest scholar from this city. The Sankore Madrasah, one of this Malian city's foremost centers of learning, was constructed under Mansa Musa.

ANSWER: **Timbuktu**

<World History, Parameswaran>

5. In a cellular automaton developed by this man, an R-pentomino oscillates with order over 1000 and generates gliders. For 10 points each:

[10e] Name this inventor of the Game of Life and the surreal numbers, a Princeton mathematician who passed away in April 2020.

ANSWER: John Horton **Conway**

[10h] Conway refined a polynomial first discovered by James Alexander to describe these mathematical objects. These objects are equivalent if they can be transformed into each other via Reidemeister moves.

ANSWER: **knots**

[10m] Conway defined a function that takes in numbers in this base and replaces the digits A, B, and C with operators to disprove the converse of the intermediate value theorem. The highest digit in this base is represented by the letter C.

ANSWER: **13** [accept base **13** function]

<Math, Zhang>

6. James Montague's book *1312* examines the history of this sport's zealous fans, known as ultras. For 10 points each:

[10e] Name this sport. One of the most storied clubs in this sport, AC Milan, was the first to adopt the curva as a dedicated location for ultras to cheer on their team.

ANSWER: **soccer** [or **football**]

[10h] Ultras first came to Italy during this period, when the Roma-Lazio derby extended into clashes between right- and left-wing supporters. A clock reading "10:25" commemorates the Bologna train station bombing during this period.

ANSWER: **Years of Lead** [or **Anni di piombo**]

[10m] According to Montague, a team from this country was the first European one to create an ultra group based on Brazilian torcidas. Those ultras had earlier fought this country's Ustaše regime.

ANSWER: **Croatia**

<European History, Parameswaran>

7. Jean Crotti created a now-lost sculpture of this artist made out of wire and plastic eyeballs. For 10 points each:
[10h] Name this artist. He placed zinc templates of his silhouette against origami papers to create his own self-portraits, some of which are marked with "[this artist] tore this quickly."

ANSWER: Marcel **Duchamp**

[10e] A portrait of Duchamp as Rose Sélavy on a perfume bottle first appeared on the cover of New York City's magazine dedicated to this movement. This anti-materialist movement got its nonsensical name from a word meaning "hobby-horse."

ANSWER: **Dadaism**

[10m] The aforementioned photograph of Rose Sélavy was taken by this artist. Two F-holes appear on the back of Kiki de Montparnasse in one of this artist's other photographs.

ANSWER: Man **Ray** [or Emmanuel **Radnitsky**]

<Visual Fine Arts, Parameswaran>

8. An extended essay by this author gives 15 tips to the mother of Chizalum, including to beware "Feminism Lite" and "teach her to love books." For 10 points each:

[10m] Name this author of *Dear Ijeawele* who argues for the destigmatization of Feminism in her essay *We Should All Be Feminists*.

ANSWER: Chimamanda Ngozi **Adichie**

[10e] This artist sampled a TED talk by Adichie for her song "Flawless." Adichie later stated that lyrics by this artist such as "if you liked then you should have put a ring on it" were too male-centric to align with her idea of feminism.

ANSWER: **Beyoncé** [or Beyoncé Giselle **Knowles**-Carter]

[10h] Adichie's story "The Arrangements" follows this man's wife as she thinks through how best to please him. Journalist Tony Schwartz regretted co-writing a book with this man.

ANSWER: Donald **Trump** (The book is the *Art of the Deal*.)

<Short Fiction, Schwartz>

9. This company's headquarters in Verona, Wisconsin is compared to a Disneyland. For 10 points each:

[10h] Name this company whose software holds electronic health records of more than a third of U.S. hospitals. The Supreme Court ruled in favor of this company in a 2018 case that upheld the supremacy of arbitration over class-action lawsuits.

ANSWER: **Epic** Systems

[10e] The unrelated Epic Games sued Apple after the August 2020 removal of this popular battle royale game from the App Store for bypassing in-app purchases.

ANSWER: **Fortnite**

[10m] The Electronic Privacy Information Center (**EPIC**) unsuccessfully sued for the release of NSA documents under this act. Dr. Fauci's March 2020 emails regarding the COVID-19 pandemic were released under this act.

ANSWER: **Freedom of Information** Act [accept **FOIA**]

<Current Events, Zhang>

10. Treatment of aniline with sodium nitrite in acidic conditions yields this type of compound. For 10 points each:

[10h] Name these compounds. Aryl versions of these compounds are synthetically useful for their ability to undergo Sandmeyer reactions.

ANSWER: **diazonium** salts [accept **diazonium** compounds]

[10m] The Sandmeyer reaction of benzenediazonium with copper (I) oxide yields this aromatic alcohol. Despite not having any alpha protons, this compound is readily oxidized to form benzoquinone.

ANSWER: **phenol**

[10e] A similar reaction with a copper (I) salt can install cyanide groups onto aromatic rings, which have triple bonds between carbon and this element. The reactivity of diazonium compounds is due to the double bond between two atoms of this element.

ANSWER: **nitrogen**

<Chemistry, Tong>

11. This philosopher compared "being" to a continuous sphere in order to illustrate that gaps could not exist, as it is impossible to think of that which "is not" instead of "is." For 10 points each:

[10h] Name this philosopher who distinguished between "The Way of Truth" and "The Way of Opinion" in one of the many poems titled *On Nature*.

ANSWER: **Parmenides** of Elea

[10m] Parmenides appears as the unnamed "Eleatic Stranger" in a Platonic dialogue titled after these people. Protagoras and Gorgias were examples of these people.

ANSWER: **sophists**

[10e] Early philosophers like Parmenides of Elea and Thales of Miletus are described as 'pre' this philosopher, who died in 399 BC after he was forced to drink hemlock.

ANSWER: **Socrates**

<Philosophy, Martin>

12. Answer the following about the life and times of Schuyler Colfax. For 10 points each:

[10m] Although his term as Vice President was up anyways, Colfax saw his political career end as a result of this scandal, which involved the bribery of officials by a fake company set up by Union Pacific.

ANSWER: **Credit Mobilier** Scandal

[10e] Schuyler Colfax served as Vice President under this 18th President of the United States. During the Civil War, this general led the Union army and accepted Robert E. Lee's surrender at Appomattox.

ANSWER: Ulysses Simpson **Grant** [accept Hiram Ulysses **Grant**]

[10h] Before assuming the vice presidency, Colfax served as a congressman from this state. A governor of this state, Ed Jackson, was implicated by "little black boxes" of records kept by the murderer of Madge Oberholtzer.

ANSWER: **Indiana** (The murderer is D. C. Stephenson.)

<American History, Nageswaran>

13. After a meeting with two ambassadors, the protagonist of this novel calls his king the "only prince" and the two title concepts "of other kings." For 10 points each:

[10h] Name this novel published in 2020. As its protagonist is beheaded at the end of this book, he hears echoes of his father saying "so now get up."

ANSWER: *The **Mirror and the Light***

[10m] *The Mirror and the Light* completes this author's trilogy of historical fiction about Thomas Cromwell along with *Wolf Hall* and *Bring Up the Bodies*.

ANSWER: Hilary **Mantel**

[10e] Mantel is one of five authors to have won this prize for fiction multiple times. This prize originally awarded to only Commonwealth writers was expanded to any English-language writer in 2014.

ANSWER: **Booker** Prize [accept Man **Booker** Prize; accept **Booker** Prize for Fiction; do not accept or prompt on "Man Booker International Prize" or "International Booker Prize"]

<Long Fiction, Zhang>

14. For 10 points each, answer the following about breaking time barriers in running:

[10m] While a medical student at Oxford, this man became first person to run a mile under 4 minutes in May 1954, a feat which he repeated a month later against Australian John Landy in a race called the "Miracle Mile."

ANSWER: Roger **Bannister**

[10e] In October 2019, Kenyan Eliud Kipchoge ran the first sub two-hour time for this distance, though it was not counted as a record because it was not a race. This distance is defined as 42.195 kilometers.

ANSWER: **marathon**

[10h] The women's 100 meter dash record still stands at 10.49 seconds, set in 1988 by this American sprinter and gold medalist who also holds the 200 meters record.

ANSWER: Florence **Griffith-Joyner** [accept Florence Griffith-**Joyner**; accept "**FloJo**"]

<Other Academic, Zhang>

15. In the paraxial approximation, the value of this function is approximately equal to the angle of a light ray. For 10 points each:

[10e] Name this trigonometric function that equals zero at zero. The small angle approximation sets either tangent of theta or this function of theta equal to theta.

ANSWER: **sine** theta

[10m] The small angle approximation is not applicable for calculating this quantity of a torsional pendulum, which is equal to two pi times the square root of moment of inertia over torsional constant. For a simple pendulum, it is two pi times the square root of length over gravitational acceleration.

ANSWER: **period** [prompt on **T**]

[10h] Without small angle approximations, solving for the period of a pendulum involves the first kind of these integrals. They are often written in terms of Jacobi theta functions.

ANSWER: **elliptical** integrals of the first kind [or Jacobi **elliptical** functions]

<Physics, Zhang>

16. A 14th-century poet and composer with this first name has an unusually large number of surviving works since he preserved his own manuscripts. For 10 points each:

[10h] Give this first name of the medieval composer Machaut. This is the given name of a Burgundian composer of the motet *Nuper rosarum flores* who had the last name Du Fay.

ANSWER: **Guillaume** [accept **Guillaume** de Machaut or **Guillaume** Du Fay]

[10m] Machaut's most famous work is the earliest surviving one in this genre by a single composer. These settings of liturgy contain the *Kyrie*, *Gloria*, and *Agnus Dei* sections.

ANSWER: **mass**

[10e] Machaut's aforementioned mass is named for this place. Léonin and Pérotin were composers from a 12th to 13th century school centered at this Parisian cathedral, which produced some of the earliest polyphonic works.

ANSWER: **Notre Dame** [accept Messe de **Nostre Dame** or Mass of **Our Lady**]

<Auditory Fine Arts, Zhang>

17. This practice involved placing an extracted object in the cuauhxicalli bowl of a stone slab called a chacmool. For 10 points each:

[10m] Name this practice, which likely involved the construction of a rack called a tzompantli.

ANSWER: **human sacrifice** [accept answers referring to ripping out or tearing out someone's **heart**; accept, but do not reveal answers referring specifically to **human sacrifice** by the Aztec; prompt on answers equivalent to "appeasing gods," "summoning rain," or "ensuring the survival of the world" by asking "What specific ritual is being described?"]

[10e] Ritual human sacrifice was conducted by this Mesoamerican civilization to appease Huitzilopochtli and Tlaloc. They were defeated by Hernan Cortes in 1521.

ANSWER: **Aztecs**

[10h] Peter Glob proposed that these naturally mummified remains were evidence of human sacrifice in the Bronze and Iron Ages. The Koelbjerg Man and the Tollund Man were examples of these cadavers discovered in Denmark.

ANSWER: **bog bodies** [or **bog people**]

<Ancient/Other History, Chen>

18. In this novel, Chao Gai is not included in the Stars of Destiny despite being one of its founders, as he dies before the Grand Assembly can take place. For 10 points each:

[10e] Name this classic Chinese novel, in which Song Jiang leads a group of rebels consisting of 108 heavenly spirits and earthly fiends.

ANSWER: **Water Margin** [or **Shui Hu Zhuan** or **All Men Are Brothers**; accept, but DO NOT OTHERWISE REVEAL, **Outlaws of the Marsh**]

[10m] The 108 Stars of Destiny gather around one of these locations around Mount Liang. The title *Water Margin* is alternatively translated as *Outlaws of* one of these locations.

ANSWER: **marsh** [accept *Outlaws of the Marsh*]

[10h] Despite suffering no casualties in their previous campaigns, 68 of the 108 Stars of Destiny die in their campaign against this rebel. This man's own hierarchy includes Four Great Marshals and Eight Valiant Riders.

ANSWER: **Fang La** [prompt on **Fang**]

<Long Fiction, Zhang>

19. Paul Ekman theorized six discrete, universal examples of these states. For 10 points, each:

[10e] Name these psychological states, which include disgust, fear, and happiness.

ANSWER: **emotions**

[10h] In non-discrete classification systems, emotions are typically classified on a circumplex by their associated level of arousal and by this property. This property represents how "good" or "bad" an emotion is.

ANSWER: emotional **valence**

[10m] Paul Ekman also ran the "Wizards Project," which aimed to find people who could perform this task by reading microexpressions. This task is supposedly performed by a pseudo-scientific device that measures the heart rate, blood pressure, and galvanic skin response of subjects.

ANSWER: **lie detection** [accept answers which refer to determining whether someone is telling the **truth** or **lying**]

<Social Science, Chen>

20. A curious side effect of these structures called anticipation is that they tend to become more numerous the longer they are passed down in the gene line, causing its related disorder to become prevalent sooner. For 10 points:

[10h] Name these genetic sequences which cause overexpression of glutamine on the HTT gene.

ANSWER: **CAG repeats** [accept **cytosine, adenine, and guanine** in place of "CAG", prompt on trinucleotide repeats or TNRs; prompt on polyq or polyglutamine tracts by asking "which are encoded by what genetic sequences?"]

[10e] The accumulation of CAG repeats is the primary genetic cause for this autosomal dominant disorder. It passes through the gene line largely because its symptoms, like its namesake "chorea," often present only after the sufferer has kids.

ANSWER: **Huntington's** disease [or **Huntington's** chorea]

[10m] CAG repeats can cause DNA polymerase to undergo "slippage," causing these types of mutations. These highly deleterious mutations include the deletion or insertion of a single nucleotide.

ANSWER: **frameshift** mutations

<Biology, Schwartz>