

1. **One witness at this trial testified about the obstinate refusal to pay the town of Oscoda, Michigan one dollar a year for use of a field. Dwight Morrow may have timed the release of the findings of his investigative board to coincide with this trial. It was the subject of a 1955 Otto Preminger movie starring Gary Cooper. The defendant in this trial was represented by Illinois Congressman Frank Reid, who called Fiorello La Guardia and Hap Arnold as witnesses. (*)** Douglas MacArthur likely cast the lone dissenting vote in this trial, which was sparked when the defendant alleged treasonable administration of the national defense after the dirigible *Shenandoah* crashed on a publicity tour. For 10 points, name this trial in which an outspoken advocate of air power in the American military was stripped of command.

ANSWER: the court martial of Billy Mitchell

2. **An author with this surname wrote a novel in which Tom's wife Mary steals a baby after being left sterile by an abortion, and Tom's mentally handicapped brother Dick kills Freddie, thinking he is the one who impregnated Mary. Another author with this surname created a computer-like device called The Engine, which is one of the scientific devices found in the Academy of (*) Projectors in Lagado. That author may or may not have been secretly married to Esther Johnson. The author of *Waterland* shares this surname with an author who created two neighboring islands who are at war over the correct way to crack open an egg. Those islands are Blefuscu and Lilliput. For 10 points, give this surname of the satirist who wrote *Gulliver's Travels*.**

ANSWER: Swift

3. **Autolycus instructed Heracles in this activity, which Cyrene was performing when Apollo abducted her to North Africa. In the *Iliad*, Achilles calls off a competition between Ajax and Odysseus in this activity and gives them both identical prizes. The king of Eleusis, Cercyon, won notoriety in this activity. A man famous for skill in this activity carried a (*) calf on his shoulders every day and built strength as it grew. A demigod built a temple to Poseidon with the skulls of victims he defeated at this activity, in which he was invincible as long as he touched the ground. To discover how to return home to Sparta, Menelaus had to overcome Proteus in this activity. For 10 points, name this activity in which Heracles killed Antaeus by grappling him in a bearhug.**

ANSWER: wrestling [or wrestling a lion until in this activity is read]

4. **The original version of this painting was damaged by a flood, so the artist made two other versions, which are now at the Art Institute of Chicago and the Musée d'Orsay. Mies van der Rohe-style chairs appear in a Roy Lichtenstein work based on this painting. The lack of shadows in this painting was inspired by Japanese art, as related in a letter the artist wrote to his brother. At the top right of one version of this painting are portraits of Eugène Boch and Paul Eugène Milliet. A yellow (*) hat hangs on a rack next to some shirts on the back wall of this interior scene. A blue door on this painting's left leads to a guest room in which the artist's friend Paul Gauguin slept. For 10 points, name this painting of the room in the Yellow House where its artist, Vincent Van Gogh, slept.**

ANSWER: Bedroom in Arles [or: Bedroom at Arles, La Chambre à Arles, Slaapkamer te Arles, The Bedroom, La Chambre à Coucher]

5. **This process is inhibited by performing a Stamey operation. When an organism perceives that it is in a safe environment, Barrington's nucleus receives a signal from the central gray to begin this process. The primary use of the anticholinergic drugs oxybutynin and tolterodine is to treat conditions affecting this process. The parasympathetic nervous system controls the (*) guarding reflex, which prevents this activity. The detrusor muscle contracts to accelerate this process while Kegel muscles contract to stop it. The frequency of this process is typically increased as a somewhat unwanted side effect of diuretics. For 10 points, name this act of emptying the bladder.**

ANSWER: urination [or: micturition, colloquial equivalents]

6. **A member of this organization warned that not even death will stop the avalanche that is coming during his promise to reveal his transactions. New York attorney Michael J. Garcia investigated this organization. A comedian named Simon Brodtkin, who claimed to be a representative for North Korea, approached a former head of this organization at a press conference and threw (*) dollar bills at him. A former vice president of this organization posted a video in which he held up a copy of an *Onion* article in his defense. *The Guardian* claims that up to 4,000 migrant workers will die while working to build venues for this organization in Qatar. For 10 points, name this organization embroiled in a massive corruption scandal that led to the arrest of Jack Warner and the resignation of Sepp Blatter.**

ANSWER: FIFA [or: Fédération Internationale de Football Association, International Federation of Association Football]

7. **The Bullen parameter quantifies the deviation of the density distribution of these structures from the Adams-Williamson equation. Song and Richards first showed evidence of anisotropy in a part of this structure, which is partially a result of differential rotation. A restriction on the age of formation of these structures can be determined by hafnium/tungsten dating because hafnium is a lithophile and tungsten is a siderophile. Seismic waves traversing this (*) entire structure are denoted with both a capital K and I. Above the upper boundary of this structure lies post-perovskite in the D-double prime layer. These structures are the location of the dynamo that supports a planet's magnetic field. For 10 points, name these structures that form as a consequence of iron and nickel being heavier than silicate minerals, concentrating them in the center of a rocky planet.**

ANSWER: planetary cores [or: outer core, inner core, Earth's core; prompt on: Earth's interior]

8. **Along with a friend who is in love with a woman named Esther, this character hatches a plan to take advantage of the fact that a wealthy baron is also in love with Esther to wring money out of him. This character stops Lucien de Rebumpré from committing suicide and takes him under his wing while disguised as a Jesuit priest named Carlos Herrera. He appears at the very end of *Lost (*) Illusions*, and in another appearance he tries to convince Rastignac to marry Victorine and have her brother killed in a duel. This character, whose real name is Jacques Collin, is based on the real-life criminal-turned-policeman Vidocq. For 10 points, name this criminal who appears in *Father Goriot* and several other parts of Balzac's *Human Comedy*.**

ANSWER: Vautrin [until it is read, accept: Jacques Collin, Abb Carlos Herrera]

9. The *Fossa Drusiana* connected Flevum to this river. Gnaeus Domitius Corbulo constructed his namesake canal southward from this river into an estuary to save ships a trip on the sea. This river, on which the city of Mogontiacum was founded, bounded the *Agri Decumates* to the south and west. Two pairs of wooden piles were driven obliquely into its riverbed with a winch, then protected with further pilings upstream, in a feat of military engineering. A Roman army subdued the Ubii by building a 300-foot (*) bridge over this river in ten days and demolishing it eighteen days later. The upper part of the Germanic *limes* is defined by this river, cities along which include Colonia Claudia Ara Agrippinensium, or modern Cologne. For 10 points, name this river that defined the boundary of the Roman empire along with the Danube.

ANSWER: Rhine River [or Rhenus]

10. Friedrich Ludwig studied examples of this musical genre that repeated different-length *talea* and *color* patterns, coining the term *isorhythm* for them well-known examples include those of Johannes Ciconia and Guillaume de Machaut. The *Bamberg Codex* contains 100 double examples of this genre. An exquisite example of this musical genre is Mozart's *Ave verum corpus*. By developing notation to arbitrarily subdivide the breve, Petrus de Cruce freed its *triplum* voices. The earliest examples of this genre added (*) upper voices to *discant clausulae*, a self-contained section of an *organum*. It adds upper voices to a *cantus firmus* tenor whose melody comes from Gregorian chant. For 10 points, name this early sacred, polyphonic genre that isn't entirely distinct from the madrigal.

ANSWER: motets [do not accept: madrigals]

11. Xie, et al. combined a near-IR version of this technique with optical tweezers to probe single biological cells, using the difference between two shifted excitations to screen out fluorescence. The accuracy of this technique is greatly improved by using an optical filter with a steep notch centered at the source wavelength. The interaction of an EM field with metallic nanostructures creates localized surface plasmons that greatly enhance the signal of this technique. This technique can give information about vibrational modes that's complementary to (*) IR spec. It measures the frequency of emitted photons from an anisotropically polarizable molecule, after anti-Stokes or Stokes scattering, and compares them to the frequency of a monochromatic source. For 10 points, identify this type of spectroscopy named for an Indian physicist.

ANSWER: Raman spectroscopy

12. In Catholic tradition, this man's feast is celebrated on the day of his birth in an exception to the general rule of feast days commemorating deaths. In Islam, he is said to have cried so much out of love for Allah that the tears marked his cheeks. The Mormons believe that this man descended in a cloud of light in 1829 to anoint Oliver Cowdery and Joseph Smith into the Aaronic priesthood. This man is the chief object of reverence in the Mandaean religion. The Gospel of Luke describes how this man's name is (*) written out by his father after his birth. The synoptic gospels describe this man dressing in camel hair and eating locusts and wild honey. This man's father Zacharias is rendered mute after disbelieving the Angel Gabriel's assertion that Elizabeth would give birth to him. For 10 points, name this itinerant preacher who baptized Jesus in the Jordan River.

ANSWER: John the Baptist [prompt on: John]

13. During an incident at this island, a yacht named *Glasgow* faced its much larger namesake. This island is the largest in an archipelago inhabited by Shirazis, the supposed descendants of Persian merchants. Barghash bin Said built a palace on this island that received the nickname **House of Wonders** because it used electricity. (*) Tippu Tip supplied several slaves to clove plantations on this island, which is often grouped with the nearby Pemba and Mafia islands. The sultanate that ruled this island began after Oman moved its capital to this island's Stone Town. The British received this island in exchange for German control of Heligoland. This island was the site of a 38-minute war in 1896. For 10 points, name this island that united with Tanganyika in 1964, forming Tanzania.
ANSWER: Zanzibar [or: Unguja]

14. This character's story is updated in a story translated by Gayatri Spivak in which she is captured by Senanayak. This character is described as having a fragrance which can be felt miles away. After humiliating this character, another character is threatened **I will tear your chest open and drink your blood** by a man who also threatens a man who flashes his thigh at this woman. This member of the (*) five virgins is born from a sacrificial fire. Dushasana drags her by her hair and tries to disrobe her after she is lost in a dice game, which is one of the causes of the Kurukshetra War. For 10 points, name this beautiful woman who marries all five Pandava brothers in the *Mahabharata*.
ANSWER: Draupadi

15. This novel inspired the title of Genesis's follow-up album to *A Trick of the Tail*, which includes two instrumental tracks titled **Unquiet Slumbers for the Sleepers** and **In That Quiet Earth**. A skit adaptation of this novel includes teasers for **Julius Caesar with an Aldis Lamp** and **The Gunfight at the O.K. Corral in Morse Code**. That Monty Python adaptation is performed entirely in semaphore. The chorus of a song inspired by this novel includes the lines **Come home, it's so cold / Let me through your window**. That song, which begins (*) out on the wiley, windy moors, is based on a Laurence Olivier film adaptation that begins with Lockwood finding a place to stay and stars David Niven as Edgar Linton. For 10 points, name this novel that inspired a song in which Kate Bush sings **Heathcliff, it's me, Cathy**.
ANSWER: Wuthering Heights

16. An essay by this author describes **one element which predominates** in each soul, calling that element **virt**. That twelve part essay includes its author's translation of the Old English poem **The Seafarer** and compares the poet's task to that of the goddess Isis. Another of his essays warns **don't chop your stuff into separate iambs and don't be viewy**. This author of **I Gather the Limbs of Osiris** wrote about Louis Agassiz repeatedly forcing a student to describe a sunfish in a parable which describes literature as **news that STAYS news**. He wrote the (*) vortex is the point of maximum energy in an essay which coined the term **vorticism**. This man's most popular criticism includes *How To Read*, *ABC of Reading*, and *A Few Don'ts by an Imagiste*. For 10 points, name this critic whose own poetry includes *Hugh Selwyn Mauberley* and *The Cantos*.
ANSWER: Ezra Pound

17. The newspaper *Egin* was shut down for being associated with this group, leading to the publication of *Gara*. This group, which extorts a **revolutionary tax** to fund its operations, promotes the practice of **kale borroka**. This group was once financially supported by the Batasuna political party. During a four-year period in the 1980s, the **anti-terrorist liberation group GAL** fought against this group. During **Operation Ogre**, this group sent the **car of Luis Carrero Blanco over a** (*) five-story building. This group, which officially established a ceasefire in 2011, lied about establishing a ceasefire five years earlier when one of their characteristic car bombs went off at Madrid's Barajas Airport. For 10 points, name this organization that violently campaigned for Basque autonomy.
ANSWER: ETA [or: Euskadi Ta Askatasuna, Basque Country and Freedom]

18. Azbel-Kaner resonance is used to measure the derivative $d-A$ over $d-E$ of this structure. The Harrison construction is used to visualize this structure when employing the nearly free electron model. Alfred Pippard studied this structure by measuring the surface impedance when the electron mean free path is much greater than the skin depth. A way to map it came from Onsager's derivation that $2\pi e$ over \hbar times the extremal cross-sectional area of this structure normal to the magnetic field is the period of the magnetic moment, in units of one over the magnetic field, when employing the (*) de Haas-van Alphen effect. For 10 points, name this 3-dimensional surface of constant energy in a crystal's reciprocal space, below which all available states are filled at absolute zero.

ANSWER: Fermi surface [after *surface* is read, accept: Fermi surface; prompt on: Fermi; do not accept: Fermi level, Fermi energy]

19. An arts and craft factory with this name was founded by Harold Rathbone and produced decorative pieces in Birkenhead. One artist with this surname worked with Santi Buglioni on a frieze cycle about the works of mercy in the Ospedale del Ceppo in the Tuscan town of Pistoria. Another artist with this surname mixed tin and antimony into a secret glaze that became his family's trademark. A third artist with this name crafted ten roundels of abandoned infants in swaddling clothes for Brunelleschi's (*) Hospital of the Innocents in Florence. The patriarch of this family, which was known for a proprietary style of enameled terra cotta, sculpted a cantoria or singing gallery for the Florence Cathedral. For 10 points, name this Italian family which included Giovanni, Andrea, and Luca.

ANSWER: della Robbia

20. A controversial book on this topic by Michael Ruse is subtitled *A Philosophical Inquiry*. This issue is discussed in relation to constitutional law in Martha Nussbaum's 2010 book *From Disgust to Humanity*. Plato's strict stance on this issue in the *Laws* contrasts with his more liberal stance in the *Phaedrus*. Foucault wrote that this concept was defined in the late 19th century as a (*) species, when before it had been defined only in terms of particular practices. In the *Symposium*, Aristophanes says that people who originally belonged to the male or female gender, as opposed to the androgynous gender, display this behavior because they are searching for their counterpart. For 10 points, name this sexual orientation which has been the subject of much philosophical debate.

ANSWER: the morality of homosexuality [or: obvious equivalents; prompt on: queerness]

1. A couple played by Emmanuelle Riva and Jean-Louis Trintignant deal with the wife's stroke in this director's film *Amour*. For 10 points each:

[10] Name this director of *Funny Games* and *The White Ribbon*.

ANSWER: Michael **Haneke**

[10] These are the names of the husband and wife in *Amour*. The central couples in Haneke's films *The Seventh Continent*, *Benny's Video*, *Funny Games*, *Code Unknown*, *Time of the Wolf*, and *Caché* also have these names.

ANSWER: **Georges** and **Anne** [instead of *Anne*, accept: **Anna**]

[10] In *Funny Games*, a character breaks the fourth wall by winking at the camera. The fourth wall is also frequently broken in this Woody Allen film about Alvy Singer's relationship with Diane Keaton's title character.

ANSWER: **Annie Hall**

2. Name some things about religious chanting, for 10 points each:

[10] Members of this religion chant *Namu Myoho Renge Kyo*, a name for the Lotus Sutra.

ANSWER: **Nichiren** Buddhism [prompt on: **Buddhism**, **Mahayana**]

[10] Members of the International Society for Krishna Consciousness repeatedly chant the sixteen word Maha Mantra, which consists of these three names.

ANSWER: **Hare**, **Krishna**, and **Rama**

[10] This sacred syllable, which frequently opens and closes chapters of the Vedas, is chanted in Hinduism, Buddhism, and other religions.

ANSWER: **Om**

3. Individuals of the *mjoebergi* and *annulipes* species of this crab who have a weaker regenerated claw are able to bluff individuals who have a smaller, non-regenerated claw. For 10 points each:

[10] Give the common name of this genus of crabs, which possess a greatly enlarged major claw used to attract females and fight males.

ANSWER: **fiddler** crabs [or: **calling** crab, **Uca**]

[10] Individuals of the *Photuris* genus of these organisms mimic the signals of females in the *Photinus* genus to capture and eat *Photinus* males. Luciferase acts on luciferin to produce their characteristic yellow bioluminescence.

ANSWER: **fireflies** [or: **lightning bugs**, **Lampyridae**]

[10] Recently molted individuals of the *Gonodactylus bredini* species of these crustaceans bluff potential opponents by extending their armoured second maxillipeds in a meral display to indicate they can attack successfully. The claws of these crustaceans move so fast that they generate cavitation bubbles.

ANSWER: **mantis shrimp** [or: **stomatopods**, **Stomatopoda**, **Unipeltata**]

4. The Gobelins factory produced these objects for Louis XIV. For 10 points each:

[10] Identify these objects, which were also manufactured in Beauvais under the control of Jean-Baptiste Colbert.

ANSWER: **tapestries**

[10] Probably the most famous tapestry, the Bayeux Tapestry, depicts the Norman conquest of England led by this king, whose forces killed Harold Godwinson at Hastings.

ANSWER: **William I** of Normandy [or: **William the Conqueror**, **William the Bastard**]

[10] Other tapestries were produced by Jacquard looms, which were also used by the *canut* silk workers in this city. It surpassed Marseille to become the second most populous city in France.

ANSWER: **Lyon** [or: **Lyons**]

5. A play formerly attributed to Seneca is about this man's divorce. For 10 points each:

[10] Name this emperor who ordered Seneca to commit suicide and executed the poet Lucan. He supposedly sang the lost epic *The Sack of Ilium* while Rome burned.

ANSWER: **Nero** Claudius Caesar Augustus Germanicus

[10] Another lost Greek epic is this one, the last in the Epic Cycle. It may also have been known as the *Thesprotis*, and is about a son of Odysseus.

ANSWER: **Telegony** [or: **Telegoneia**]

[10] The *Odyssey* opens with the *Telemachy*, named after another of Odysseus's sons, which comprises this many of the *Odyssey*'s 24 books. The *Little Iliad* consisted of this many books.

ANSWER: **four**

6. Answer the following about the science of describing the shape of a molecule with two or three letters, for 10 points each.

[10] Many, many rotation axes in molecules have C-sub-3 or C-sub-4 symmetry. An axis is C-sub-4 symmetrical when the molecule is rotated how many degrees, at minimum?

ANSWER: **ninety** degrees [or: **pi over two radians**; do not accept: pi over two , 180 degrees , 360 degrees , or other wrong answers]

[10] Improper rotations, denoted S-sub-n, involve performing a rotation of 360 over n degrees, then performing this transformation through the plane perpendicular to the rotation axis. Chiral molecules cannot belong to the S-sub-n group.

ANSWER: **reflection** [or: obvious equivalents]

[10] Walsh diagrams can be used with some symmetry and group theory to predict the weird bond angles in molecules that have two or three of these atoms bound to a central atom. For one well-known molecule, it reveals a bond angle of 107 degrees.

ANSWER: **hydrogen** [or: **H**]

7. David visits the Jungian psychoanalyst Johanna Von Haller in the second novel in this series. For 10 points each:

[10] Name this series of novels, whose characters include the magician Magnus Eisengrim and Dunstan Ramsay, who is the intended target of a snowball thrown by Boy Staunton which ends up hitting a pregnant woman.

ANSWER: the **Deptford Trilogy**

[10] The Deptford Trilogy is by Robertson Davies, an author from this country.

ANSWER: **Canada**

[10] Jungian psychoanalysis also figures in *Pilgrim*, a novel by this Canadian author. He coined the term Southern Ontario Gothic, and retold the story of Noah's flood in *Not Wanted on the Voyage*.

ANSWER: Timothy (Irving Frederick) **Findley**

8. This man and his brother-in-law Brent Bozell defended the anti-communist measures taken in the 1950s in the book *McCarthy and his Enemies*. For 10 points each:

[10] Name this American conservative commentator who hosted the television show *Firing Line* and founded the *National Review*.

ANSWER: William F. **Buckley, Jr**

[10] This president appointed Buckley as a delegate to the United Nations. He was president during the Apollo 11 landings and the establishment of the EPA.

ANSWER: Richard Milhous **Nixon**

[10] In 1965, Buckley lost the New York mayoral election to this man, who is sometimes credited with preventing a 1968 riot by talking down a gathered crowd after the Martin Luther King assassination.

ANSWER: John **Lindsay**

9. A business cycle model developed by Samuelson makes use of one of these effects as well as an accelerator effect. For 10 points each:

[10] Name these effects, in which a change in an exogenous variable results in a change in an endogenous variable, which can be quantified by a namesake factor.

ANSWER: multiplier effects

[10] Multiplier effects are a cornerstone of this man's namesake school of economic thought. He wrote *The General Theory of Employment, Interest and Money*.

ANSWER: John Maynard Keynes

[10] Samuelson's multiplier-accelerator model was inspired by this teacher of his, who wrote the book *Full Recovery or Stagnation?* and was known as the American Keynes.

ANSWER: Alvin (Harvey) Hansen

10. This author's *The Punishment of X4* concerns a robot that removes a bolt on a bridge between two planets, killing thousands. For 10 points each:

[10] Name this pseudonymous author whose *The Man With the Miniature Orchestra* begins "There were phrases of Beethoven's Ninth Symphony that still made Coe cry."

ANSWER: Dave Algonquin [prompt on: either name of Ken Cosgrove]

[10] Dave Algonquin is the pseudonym of Ken Cosgrove on this AMC TV show which followed advertising executive Don Draper.

ANSWER: Mad Men

[10] Lee Pace stars in this other AMC period drama which focuses on the personal computer revolution in Texas.

ANSWER: Halt and Catch Fire

11. Due to an error in calculating longitude, four Royal Navy warships crashed into this archipelago in 1707. For 10 points each:

[10] Name this small group of islands to the southwest of Cornwall. It fought a bloodless 335-year war with the Netherlands.

ANSWER: Isles of Scilly

[10] After invading the pro-Royalist Isles of Scilly, Robert Blake blew up King Charles's Castle and used some of the remaining stone to build another castle, which was named for this Lord Protector of England.

ANSWER: Oliver Cromwell

[10] According to Snorri Sturluson, a seer on the Isles of Scilly convinced this king of Norway to convert his kingdom to Christianity. He founded a capital at Trondheim and interrupted Sweyn Forkbeard's reign.

ANSWER: Olaf I [or: Olaf Trygvason]

12. Name some Renaissance painting techniques, for 10 points each.

[10] Leonardo da Vinci's use of "smoky" shading is referred to by this Italian term.

ANSWER: sfumato

[10] Caravaggio's tenebrism is characterized by this technique, in which there is a strong contrast between light and dark. This technique is used in the candlelit scenes of Gerard van Honthorst and Georges de la Tour.

ANSWER: chiaroscuro

[10] This technique involves changing from one color to another for the purpose of shading or highlighting, when the original color could not be made light or dark enough. Michelangelo was fond of this technique.

ANSWER: cangiante

13. The protagonist of this story falls in love with Kismine after visiting his classmate Percy Washington over the summer. For 10 points each:

[10] Name this short story told from the perspective of Hades, Mississippi resident John. T. Unger.

ANSWER: A **Diamond as Big as the Ritz**

[10] A Diamond as Big as the Ritz was written by this author of *The Great Gatsby*.

ANSWER: Francis Scott Key **Fitzgerald**

[10] Braddock Washington's hair turns white as he attempts this drastic measure to save his diamond before blowing it up. In attempting this action, he reasons that no cathedral or pyramid could compare to massive diamond.

ANSWER: **bribing God** with a diamond

14. The complex logarithm cannot be defined as a unique inverse of the complex exponential function because the complex exponential function has this period. For 10 points each:

[10] Name this quantity whose exponential equals one.

ANSWER: **two pi i** [do not prompt on partial answers; do not accept multiples]

[10] The reciprocal of two pi i appears as a constant in this mathematician's integral formula, which shows that the derivative of an analytic function is always analytic.

ANSWER: Augustin-Louis **Cauchy**

[10] The exponential of pi i plus one is equal to this value, according to Euler's identity.

ANSWER: **zero** [or: obvious equivalents]

15. This embodiment of Padmasambhava is sent down to earth by the Amitabha Buddha to end a war oppressing his people. For 10 points each:

[10] Name this culture hero who uses a song to subdue the demon Lutzen and wins a horse race to become the ruler of Ling. This hero's song is popular across Mongolia and Central Asia.

ANSWER: King **Gesar**

[10] The story of King Gesar is the national epic of this region. The traditional head of state for this region is regarded as the incarnation of Avalokiteshvara and proves himself by picking out artifacts that belonged to his predecessor.

ANSWER: **Tibet**

[10] In Tibetan myth, humanity is born from the union of one of these animals and a stone demoness. In the *Popol Vuh*, two gods of writing are transformed into these animals by their stepbrothers, the Hero Twins.

ANSWER: **monkeys**

16. A Markovian approximation and the rotating wave approximation can be used to cast one of these equations in Lindblad form. For 10 points each:

[10] Name these equations that govern the evolution of the reduced density matrix for an open quantum system. The Nakajima-Zwanzig projection operator method is used to derive them in non-Markovian dynamics.

ANSWER: quantum **master** equations

[10] Master equations often start from the von Neumann equation, in which this constant multiplies the time derivative of the density operator. In the canonical commutation relation, the commutator of position and linear momentum is equal to this constant.

ANSWER: **i h-bar** [or: **i times the reduced Planck constant**]

[10] i h-bar multiplies the partial time derivative of the wave function on the left-hand-side of the time-dependent form of this quantum mechanical equation, which describes the behavior of particles.

ANSWER: **Schrodinger** wave equation

17. This composer's *Cantus in Memoriam Benjamin Britten* is a canonical example of his tintinnabuli style. For 10 points each:

[10] Name this Estonian composer and holy minimalist probably best known for the compositions *Fratres* and *Spiegel im Spiegel*.

ANSWER: Arvo **Pärt**

[10] *Fratres* uses two sustained A and E in an example of this technique. It's a major component of Indian classical music, which is why stringed instruments often contain special *chikari* strings just for use with this technique.

ANSWER: **drone** [or: **pedal**]

[10] Arvo Pärt used this musical cryptogram in his composition *Collage sur [this motif]*. This motif was used in the last contrapunctus in *The Art of Fugue* as well as Liszt's *Fantasia and Fugue on the Theme of [this motif]* and Schumann's *Six Fugues on the Name of [this motif]*.

ANSWER: **BACH** motif [or: **B flat, A, C, B** natural]

18. Some of these things were damaged by lichen and black mold caused by two separate waves of tourists. For 10 points each:

[10] Name these things, one of which in the Great Hall of Bulls depicts a group of now extinct aurochs. Those examples were accidentally discovered by four teenage boys at Lascaux, France in 1940.

ANSWER: **cave paintings** [or: obvious equivalents for paintings]

[10] 25,000-year-old cave paintings that contradict the widely-accepted timeline of human migration can be found at a Brazilian park named after this large rodent.

ANSWER: **capybara** [the park is Serra da Capivara]

[10] Tassili n'Ajjer, a site in the eastern part of this country, includes art that progresses over millennia from depicting cows to horses and camels. Its western part is home to the refugee-friendly town of Tindouf.

ANSWER: **Algeria**

19. This poem commands the Lord to burn me with a fiery zeal of thee and thy house. For 10 points each:

[10] Name this poem whose speaker describes himself as having been betrayed to endless night by black sin, and burnt by the fire of lust and envy.

ANSWER: **I am a little world made cunningly** [accept, but do not otherwise reveal: **Holy Sonnet 5**]

[10] I am a little world made cunningly is part of this set of 19 poems, which also includes Batter my heart, three-person'd God.

ANSWER: **Holy Sonnets** [or: **Divine Sonnets, Divine Meditations**]

[10] The *Holy Sonnets* are by this metaphysical poet who also wrote the *Devotions upon Emergent Occasions*.

ANSWER: John **Donne**

20. This man once led the Latin American branch of International Red Aid. For 10 points each:

[10] Name this man who was shot after leading a peasant uprising crushed by Maximiliano Hernández Martínez called La Matanza. A group named for him competes with ARENA for electoral seats.

ANSWER: (Agustín) Farabundo **Martí** (Rodríguez)

[10] The FMLN fought in this country's civil war, in which the Atlacatl Battalion undertook the El Mozote and El Calabozo massacres. Previously, this country fought its neighbor Honduras in the Soccer War.

ANSWER: **El Salvador**

[10] This man broadcasted weekly sermons over Salvadoran radio during the civil war until he was shot by government soldiers while offering Mass.

ANSWER: Óscar (Arnulfo) **Romero** (y Galdamez)