

1. In this play, a painted rose, a room painted yellow, and a cave are used to represent three different homes. Early in this play, a young character hears a lullaby that describes the "dagger-pinioned eyeballs" and "bleeding hooves" of a dying horse who is drinking from the stream of death. Two violins screech as Death, disguised as a beggar-woman, extends her coat at this play's climax to cover up the male leads (*) stabbing each other. Those two leads were brought together thanks to the light of the moon, which is represented by "a young woodcutter with a white face". Leonardo Felix runs off with the Bride during the title event of this play. For 10 points, name this first entry in the "Rural Trilogy" of plays by Federico Garcia Lorca.

ANSWER: Blood Wedding [or Bodas de Sangre]

<Bentley>

2. Palmitoylation most often occurs on this amino acid in proteins. Proteases that act on this residue include papain and a group of aspartate-directed enzymes that force the proteolytic cascade during apoptosis. PDI oxidizes this amino acid. Zinc fingers are especially rich in histidine and this other amino acid. In Anfinsen's experiment, beta-mercaptoethanol reduced this amino acid, causing proteins to unfold reversibly. This compound can be synthesized from (*) methionine and is nearly equivalent to serine, except its side chain is a thiol, not an alcohol. Tertiary structure of proteins relies on covalent bonds between these amino acids, called disulfide bonds. For 10 points, name this amino acid symbolized by a C.

ANSWER: cysteine [or Cys; or C before it is read]

<Silverman>

3. This man examined the modifying effects of autoclitics in a book that described speech acts that demand a characteristic consequence, called "mands". This man designed a rejected missile system driven by pecking birds for "Project Pigeon". This author of *Verbal Behavior* denied the existence of "autonomous man" in a book that argues for "cultural engineering" through a scientific (*) "technology of behavior". Another work by this inventor of the air crib describes a group of "planners, managers, workers, and scientists" living in a utopian community vaguely inspired by Thoreau. For 10 points, name this author of *Beyond Freedom and Dignity* and *Walden Two*, an American psychologist who developed a namesake box for operant conditioning.

ANSWER: B.F. Skinner [or Burrhus Frederick Skinner]

<Spencer>

4. This person used relativistic invariance as the basis for his proof of the spin-statistics theorem. A statement of this man is often proven by considering that the wavefunction for some particles must be antisymmetric with respect to the exchange of some variables. The pressure that opposes gravitational collapse in white dwarfs is due to that statement. This scientist proposed that the energy, momentum, and spin of (*) beta decay could be conserved by the introduction of an additional particle: the neutrino. His best known statement does not apply to bosons, but rather particles with half-integer spin. For 10 points, name this scientist whose most famous statement requires that electrons in the same orbital have different spin quantum numbers, which is his "exclusion principle".

ANSWER: Wolfgang Pauli

<Voight>

5. This man's only fully extant work for four strings is his *Chacony in G minor*, and many of his songs were collected posthumously in the publication *Harmonia Sacra*. His brother Daniel completed his opera *The Indian Queen*, which adapted music from his ode *Come Ye Sons of Art*, written for Queen Mary's birthday. A rondeau from his incidental music to (*) *Abdelazar* served as the basis for Benjamin Britten's *Young Person's Guide to the Orchestra*. This pupil of John Blow used a libretto by Nahum Tate for his most famous opera, which contains the aria "Ah, Belinda" and the lament "When I am Laid in Earth" and was inspired by Virgil. For 10 points, name this English Baroque composer of *Dido and Aeneas*.

ANSWER: Henry Purcell

<Rosenberg>

6. This philosopher argued that the real essences of substances can never be known, and that our "species" and "genus" terms are nominal essences. One book by this philosopher uses the example of light falling on porphyry rock to argue that colors are observer-dependent secondary qualities. That book by this man was refuted chapter-by-chapter in Gottfried Leibniz's *New Essays on Human Understanding*. This man's work (*) *Some Thoughts on Education* drew from his earlier contention that the human mind is born without innate ideas, introduced in *An Essay Concerning Human Understanding*. For 10 points, name this English philosopher who argued that the mind at birth is a *tabula rasa* and wrote *Two Treatises of Government*.

ANSWER: John Locke

<Kothari>

7. One character in this novel wants to create an exotic dance act in which her pet cockatoo helps her undress. A policeman in this novel is forced by his sergeant to sit in a stall in the bus station every day, wearing a different ridiculous costume, while searching for suspicious characters. In this novel, the pornography ring run out of the Night of Joy nightclub by Lana Lee is busted by Officer Mancuso. A character in this novel corresponds regularly with (*) Myrna Minkoff, and after being fired for starting a strike at the Levy Pants factory, the obese, green hunting, cap-wearing protagonist becomes a hot dog vendor. For 10 points, name this novel about the comic misadventures in New Orleans of Ignatius J. Reilly, by John Kennedy Toole.

ANSWER: A Confederacy of Dunces

<Lawrence>

8. This man's envoys to Germanic kingdoms included Bishop Willibrord and Saint Boniface. In his youth, he was imprisoned by his stepmother Plectrude. This man raised an army in the mountains and defeated his enemies at Ambleve and Vincy after he lost at Cologne to Chilperic II and this man's Neustrian counterpart, Ragenfrid. After this leader's close ally Odo of (*) Aquitaine was overrun at the Battle of the River Garonne, he answered a call for aid. This son of Pepin of Herstal, a "mayor of the palace", commanded an infantry square against cavalry when he defeated Abd-ar-Rahman Ghafiqi and halted the Islamic incursion into Europe. For 10 points, name this father of Pepin the Short, a Frankish leader who won the 732 Battle of Tours.

ANSWER: Charles Martel [or Charles the Hammer]

<Liu>

9. This concept is the namesake of a monk whose eighteenth vow promised that anyone who called on his name ten times would be reborn in the Pure Land. This term, which names the monk who became Amitabha Buddha, is embodied as Yudhisthira's father in the *Mahabharata*. Along with the *sangha* and the Buddha, it is one of the Three Jewels. It is often represented as a namesake (*) "chakra," a wheel whose eight spokes represent the eightfold path. This term can be roughly translated as "right way of living." For 10 points, name this cosmic principle of duty, which is, like karma, central to many Indian religions.

ANSWER: dharma [or dhamma]

<Bollinger>

10. One instance of this problem correlated with a ship called the *Hankey* as it sailed the Atlantic. Early 20th-century experiments at Camp Lazear worked to solve this problem, which was treated in early America at the Bush Hill building by free black nurses after Haitian immigrants apparently brought it to the US. William Gorgas worked on addressing this medical condition at the (*) Panama Canal zone. During Washington's presidency, physician Benjamin Rush advocated purging and bleeding patients of this disease as an outbreak swept Philadelphia in 1793. For 10 points, name this disease which was later traced back to bites of the *Aedes aegypti* mosquito by Army surgeon Walter Reed.

ANSWER: yellow fever epidemic

<Jackson>

11. In the second movement polka of a string quartet by this composer, the viola is asked to play a melody "like a trumpet." A tone poem by this man depicts a woman who lures men to their death by tying herself to a tree, drugging them with mead, and sounding a hunting horn to signal maiden warriors. Another tone poem by this composer begins with the same D minor chords that end the preceding *Tabor* movement. This composer's (*) deafness is represented by a high E in the first violin in his first string quartet, which is nicknamed "From My Life." For 10 points, name this Czech composer whose tone poem collection *Ma Vlast* contains a piece depicting the Vltava river called *The Moldau*, and who also composed the opera *The Bartered Bride*.

ANSWER: Bedrich Smetana

<Lee>

12. The negative sixth power of a counterion's charge determines the CCC of these systems, according to the Schulze-Hardy rule. A critical parameter for these systems is proportional to the square root of permittivity times temperature over density times ionic strength. A model for these thermodynamically unstable, kinetically stable, systems proposes they have electrostatic repulsions from a shell of mobile ions which form a (*) double layer. Peptization stabilizes these systems, though, at high separations, they also have local minima in energy due to flocculation. Blue light is strongly reflected by them in the Tyndall effect. For 10 points, name these systems in which particles are dispersed in another medium, which include sols, gels, and emulsions.

ANSWER: colloids [prompt on dispersions; prompt on emulsions; prompt on gels; prompt on sols or aerosols; prompt on foams]

<Silverman>

13. A modern-day tour of this system's remains was described in a 1955 book by Victor Wolfgang von Hagen. Granaries called *qollqa* and administrative buildings called *tambo* were constructed as a part of this system, which was used by professionals who carried a pututu, or conch-shell trumpet. The Qhapaq Ñan was the central corridor in this system, which was begun by the Wari Empire. Commoners were banned from this system, on which *chasquis* relayed colored (*) strings of knots called *quipu* to transmit messages. For 10 points, name this network including rope bridges and areas paved to accommodate llamas, which connected sites in a South American empire such as Cuzco and Machu Picchu.

ANSWER: Incan roads [accept Incan trails, the Incan highway system, or other equivalents; accept Tawantinsuyu in place of "Inca"]

<Hart>

14. Perotine Massey gave birth to a live child as one of these events affected her and two other women in Guernsey in 1556. A book was chained to Michael Servetus's leg prior to another, and a third provoked the exhortation "Play the man, Master Ridley" from Hugh Latimer. This fate befell a Neapolitan friar who wrote that an infinite God must have created a cosmos with (*) infinite worlds. This was the most common conclusion of a Spanish auto-da-fe. Giordano Bruno suffered this ultimate fate, as did a person who testified about her vision-inspired relief of Orléans in men's armor. For 10 points, name this fate suffered at age nineteen by Joan of Arc, an execution method in which heretics usually fell unconscious from carbon monoxide fumes.

ANSWER: burning at the stake [or public burning; or being burnt alive; prompt on "execution"; prompt on "execution for heresy;" prompt on "martyrdom"; prompt on "carbon monoxide poisoning"]

<Jackson>

15. In the *Odyssey*, the Scherians possess a group of these objects that respond to their owners' thoughts, and Poseidon turns one of these objects to stone after Odysseus reached Ithaca. Homer notes that ten mouths and ten tongues would not suffice to describe a group of these things in a passage that doubles as a (*) list of the Greek commanders. A poem by Apollonius of Rhodes notes that one of them had a component that could speak prophetically because its material was taken from Dodona. King Aegeus committed suicide because his son forgot to change color of a part of these objects from black to white. For 10 points, name this type of vessel that Theseus used to return from Crete to Athens.

ANSWER: boats [or ships, accept more specific answers such as triremes]

<Jose>

16. A bell tower named for this man collapsed in 1902. This man's body was wrapped in pork to hide it from Muslim custom agents when it was smuggled out of Alexandria in the 11th century to a new city, where he superseded St. Theodore. According to Acts, a conflict over whether to forgive this man caused a split between Paul and Barnabas. This man's namesake book is the only one to relate the Parable of the (*) Growing Seed and was the first Gospel to be written. This man's symbol, the lion, was adopted for a city that built a basilica for him on the Grand Canal. For 10 points, name this patron saint of Venice and author of the second book of the New Testament.

ANSWER: Saint Mark the Evangelist [or Marcus]

<Bentley>

17. These creatures are the subject of Edwin Landseer's *High Life* and *Low Life*. Norman Rockwell depicted these nonhumans in *Stowaway* and *Boy on Stilts*. One of these animals stands in front of an oval self-portrait resting on three books in a painting by William Hogarth. The most expensive work ever sold by a living artist is an orange version of a balloon one of these animals by Jeff (*) Koons. A woman's blurred feet are shown at the top of a Futurist depiction of the "Dynamism" of one of these creatures by Giacomo Balla. An animal of this type rests on the foot of the bed in Titian's *Venus of Urbino*. For 10 points, name this type of pet that represents fidelity and stands in the foreground of the *Arnolfini Wedding*.

ANSWER: dogs [or pugs or puppies; accept other synonyms; accept *Dynamism of a Dog on a Leash* or *Dinamismo di un cane al guinzaglio*]

<Bentley>

18. This play's author was sufficiently angered by Herbert Beerbohm Tree's changes to its ending to append the essay "What Happened Afterwards" to printed versions. It opens with a mother nagging her son for not trying hard enough to get a cab, forcing him to go back out into the rain to look for one. During that rainstorm, a man in this play is accused of working for the police because he is taking notes on the behavior of a girl selling (*) flowers in Covent Garden. This play's protagonist famously exclaims "Not bloody likely!" while the Eynsford-Hill family is visiting her mentor's mother. For 10 points, identify this play in which Henry Higgins make a bet that he can rid Eliza Doolittle of her Cockney accent, a work of George Bernard Shaw.

ANSWER: Pygmalion

<Schindler>

19. E.R. Dodds claimed that "human happiness is built on an illusion" in an essay about "Misunderstanding" this play. It ends with the advice to "count no mortal happy" until his death, and it opens with a priest giving a speech about an ongoing plague, after which the protagonist announces the return of a man sent to Delphi. At a climactic moment in this play, a messenger is revealed to have once been a (*) shepherd on Mount Cithaeron, where he found a baby which was later raised by Polybus and Merope. It precedes a play set at Colonus in its author's Theban trilogy, and it centers on a man who blinds himself after learning of his true relation to Laius and Jocasta. For 10 points, name this Sophocles play about a man who kills his father and marries his mother.

ANSWER: Oedipus Rex [or Oedipus the King; or Oedipus Tyrannus, or Oidipous Turannos]

<Carson>

20. When the flow of this substance is too high, over-pressurization may lead to a hard start. Germany often used a mixture of triethylamine and xylidine as a type of this substance named "tonka" while Russia used an expensive chemical named "syntin". The amount of work that can be extracted from the consumption of this substance is given by the Tsiolkovsky equation. If two types of this substances are hypergolic, they spontaneously ignite when coming into contact. In most configurations, turbopumps mix this kind of substance with an oxidizer in a cylinder called a (*) combustion chamber. Examples of this kind of substance, which can be liquid or solid, include hydrazine and liquid oxygen. For 10 points, name this type of propellant used to provide thrust for spacecraft.

ANSWER: rocket fuel [or rocket propellant until "propellant" is read]

<Jose>

21. **Description acceptable. After a few years of "armed peace", the Surprise of Meaux sparked a conflict of this type. The election of a duke as king of Poland helped relieve a siege of La Rochelle in one of these conflicts. A cavalry clash at Coutras decided another one, in which the sitting king was driven from his capital on the Day of the (*) Barricades. A spark for these conflicts was an attempt to abduct the young king called the Conspiracy of Amboise. A commander in these wars, Gaspard de Coligny, was murdered by supporters of the Guise family. These conflicts included the War of the Three Henrys and a massacre orchestrated by Catherine de Medici. For 10 points, name these struggles ended by the Edict of Nantes, which pitted Huguenots against Catholics.**

ANSWER: **French** Wars of **Religion** [prompt on "French civil wars" or "religious wars"; accept any answer indicating wars between **religious** affiliations in **France**; accept answers such as "wars between French **Catholics** and **Huguenots**" before "Huguenots" is read; do not accept "French revolutions"]

<Bentley>

22. **For an estuary, the residence time can be estimated by multiplying the replacement time by the quantity one minus this variable over 35, a standard reference for it. When turbulence induces the formation of a mixed layer, the mixed layer has a higher value for this variable. Although it is often expressed in terms of PSU, it is more often expressed as a dimensionless ratio of the conductivity of a sample to a reference sample. This quantity is proportional to density because the mass of (*) ions is greater than water. Along with temperature, this variable drives thermohaline flows. It is high for brine. For 10 points, name this quantity that is the amount of dissolved solids in water, which is much higher for seawater than freshwater.**

ANSWER: **salinity** [accept **saltiness** or equivalents before mention]

<Jose>

23. **In this novel, Mr. Lloyd and Maria Temple help clear the protagonist of a lying charge. A character in this novel meets her employer after his horse slips on some ice and later commissions a gravestone for a friend that bears the inscription "Resurgam." The protagonist of this novel is sent to the "red room" at Gateshead by Mrs. Reed, who later sends her to Mr. (*) Brocklehurst's Lowood School, where she meets Helen Burns. After refusing to go to India with her cousin St. John Rivers, the protagonist of this novel returns to the place where she had been hired by Mrs. Fairfax to tutor Adele Varens. In this novel, Bertha Mason burns down Thornfield Hall. For 10 points, name this novel by Charlotte Brontë about a governess who loves Edward Rochester.**

ANSWER: **Jane Eyre**

<Mehigan>

24. **Duff's device is commonly used to remove these items from a piece of code. The removal of statements from these structures is called hoisting or scalar promotion. An empty type of this structure is used to implement a busy-wait scheme. During compilation, they are typically removed through a process called unrolling. In most languages, including Java and C, the continue keyword passes control to the "nearest" of these structures. When using a type of these structures, the (*) control variable is declared when it is initialized and only has local scope. These structures are evaluated at least once when both the keywords "do" and "while" are used. For 10 points, name these pieces of code that are usually executed several times until a condition is met.**

ANSWER: **loops** [or **repitition**; or **iteration**]

<Jose>

1. This composer wrote a *Piano Concerto for the Left Hand* for the one-armed pianist Paul Wittgenstein and dedicated his *Jeux d'eau* to his teacher Gabriel Fauré. For 10 points each:

[10] Name this French composer of *Gaspard de la nuit* and the repetitive *Boléro*.

ANSWER: Maurice **Ravel** [or Joseph-Maurice **Ravel**]

[10] Ravel included movements titled "Blues" and "Perpetuum mobile" in a work of this type. Albert Dietrich, Johannes Brahms, and Robert Schumann collaborated on a work of this type inspired by the motto "Frei aber einsam" that uses the musical cryptogram "F-A-E".

ANSWER: **violin sonata** [prompt on partial answer]

[10] Ravel wrote an "antique" one of these dances for solo piano. This dance was normally used for the third movement of a Classical symphony, until it was replaced with the scherzo.

ANSWER: **minuet** [or **minuetto**]

<Lawrence>

2. These quadrilaterals have only one pair of parallel sides. For 10 points each:

[10] Name these shapes used to numerically integrate functions by approximating the function as a series of linear functions.

ANSWER: **trapezoids** [or **trapezoidal**; or **trapezium**]

[10] This mathematician's method of numerical integration uses parabolas instead of trapezoids. He also names a three-eighths rule that instead uses cubic polynomial for the interpolation.

ANSWER: Thomas **Simpson**

[10] This person developed a set of formulas, which he co-names with Isaac Newton, for numerical integration. The trapezoid rule, Simpson's rule, and Simpson's three-eighths rule are examples of that set of formulae for functions of degrees one through three.

ANSWER: Roger **Cotes**

<Reinstein>

3. This philosopher distinguished between political society and civil society in *The Philosophy of Right*. For 10 points each:

[10] Name this German philosopher who examined the progress of consciousness towards absolute knowledge of the "other" in *The Phenomenology of Spirit*.

ANSWER: Georg Wilhelm Friedrich **Hegel**

[10] In his *Lectures on the Philosophy of History*, Hegel described Alexander, Caesar, and this figure as "men of action" necessary for the progress of humanity. Hegel also called this man a "world-spirit ... who stretches over the world and dominates it" when witnessing this man's entry into Jena.

ANSWER: **Napoleon** Bonaparte

[10] Hegel was influenced by this other German philosopher, who he succeeded as philosophy chair in Berlin. This man argued that self-consciousness requires *anstoß*, a repulsive awareness of its limitations in *Foundations of Natural Right* and his *Wissenschaftslehre*.

ANSWER: Johann Gottlieb **Fichte**

<Spencer>

4. Answer the following about international economics, for 10 points each.

[10] One way to compare economic performance of different countries is to examine this statistic, which is the value of all goods and services produced by a country in a fiscal year.

ANSWER: **GDP** [or **gross domestic product**]

[10] Another way to compare is through currency values. According to the twin deficit hypothesis, a fiscal deficit and a current account deficit leads to this phenomenon, in which a currency has lost its worth relative to other currencies.

ANSWER: **depreciation** [or **devaluation**; or word forms]

[10] This theory, which assumes the law of one price is true, attempts to explain the changes in exchange rates by arguing that a unit of any given currency should be able to buy the same quantity of goods in any different economy.

ANSWER: **PPP** [or **purchasing power parity**]

<Jose>

5. Answer the following about Deuterocanonical Biblical books, for 10 points each.

[10] Bel feeds a dragon a concoction that makes it explode, and Susanna resists the advances of two punning, lecherous old men, in the additions to this book, about a prophet who survives a lion's den.

ANSWER: Book of **Daniel**

[10] A "Paean for Wisdom" and a message to those in captivity appear in a Deuterocanonical book named for this scribe and friend of Jeremiah. This common Jewish first name means "blessed" in Hebrew.

ANSWER: **Baruch**

[10] The first of the two books dedicated to this historical group details the repressive attempts at Hellenization by Antiochus IV Epiphanes. Both books describe the story of Hanukkah.

ANSWER: **Maccabees**

<Gupta>

6. A constant representing this phenomenon is subtracted from the atomic number to determine effective nuclear charge in Slater's rules. For 10 points each:

[10] Name this phenomenon by which electronic repulsion counteracts nuclear attraction, which generally causes atoms with more electrons to be larger in size. 4f electrons are especially bad at contributing to this effect.

ANSWER: **shielding** effect [or electronic **shielding**; or word forms; prompt on **screening**]

[10] The inability of 4f electrons to shield causes a "contraction" among these elements on the Periodic Table. These elements are located above the actinides.

ANSWER: **lanthanides** [or **lanthanide** contraction]

[10] Lanthanide electrons demonstrate this other electronic effect much more strongly. In this effect, moving electrons generate a magnetic field that interacts with electron spin, causing energy levels to split.

ANSWER: **spin-orbit** coupling [or **spin-orbit** interaction]

<Silverman>

7. Answer these questions about the medieval tournament, from which modern competitions of all sorts get that name, for 10 points each.

[10] In this centerpiece sport of a tournament, two mounted knights charged each other with lances to try and unseat one another.

ANSWER: **jousting** [or **tilting**]

[10] Tournaments also featured these mock battles, often in free-for-all form, between larger numbers of knights at close quarters.

ANSWER: **melees**

[10] This king, a signatory of the treaty of Cateau-Cambresis with the Habsburg Philip II, died at a joust in Paris when a lance went through his head.

ANSWER: **Henry II** of France [or **Henri II**]

<Jackson>

8. In this poem, the poet claims that he and his love will "build in sonnets pretty rooms." For 10 points each:

[10] Identify this poem beginning "For God's sake hold your tongue, and let me love," asking the addressee to rather "with wealth your state, your mind with arts improve".

ANSWER: "The **Canonization**"

[10] "The Canonization" is by this poet of the Holy Sonnets, the tenth of which begins "Death, be not proud." One of his *Devotions upon Emergent Occasions* instructs the reader "never send to know for whom the bell tolls."

ANSWER: John **Donne**

[10] This Donne poem says that even though he must part, his soul and that of his love "endure not yet a breach, but and expansion, like gold to airy thinness beat" before drawing a comparison to a pair of "stiff twin compasses."

ANSWER: "A **Valediction: Forbidding Mourning**"

<Mehigan>

9. The first head of this organization, Jonathan Postel, was nicknamed "God." For 10 points each:

[10] Identify this organization responsible for managing the Domain Name System, a fundamental component of the Internet.

ANSWER: **ICANN** [or **Internet Corporation for Assigned Names and Numbers**]

[10] In March of 2014, this cabinet department declined to renew its contract with ICANN. Penny Pritzker heads this department.

ANSWER: Department of **Commerce** [or **Commerce** Department]

[10] Several critics have called for this organization, headed by Ban Ki-Moon, to take over control of domain name management.

ANSWER: **United Nations** [or **UN**]

<Bentley>

10. The title creature of this poem is described as a "blood-red thing that writes out from the scenic solitude." For 10 points each:

[10] Name this poem which ends by revealing that "the play is the tragedy, 'Man'" and that the title creature is the hero. It was later incorporated into the short story "Ligeia."

ANSWER: "The **Conqueror Worm**"

[10] "The Conqueror Worm" is a poem by this American author of "The Haunted Palace." A man who has "sorrow for the lost Lenore" and is bedeviled by a bird that says "Nevermore" is the speaker of his poem "The Raven".

ANSWER: Edgar Allan **Poe**

[10] The speaker of "The Raven" shrieks at the bird to "get thee back into the tempest" and to the night's shore, which he describes using this mythologically-inspired adjective.

ANSWER: "the Night's **Plutonian** shore"

<Bentley>

11. This process occurs last in the central dogma. For 10 points each:

[10] Name this process in which mRNA is decoded to make proteins in the ribosomes.

ANSWER: **translation**

[10] tRNAs bind to mRNAs because they have this three-base-pair sequence opposite the acceptor stem. This sequence is the reverse complement of the corresponding mRNA.

ANSWER: **anticodon** [do not accept or prompt on "codon"]

[10] During translation, the degeneracy of the genetic code is accounted for by this phenomenon, in which guanine can make a non-standard base pair with uracil in RNA at the 5' end of the anticodon.

ANSWER: **wobble** base pairing

<Silverman>

12. Answer these questions about ancient Sumerians, for 10 points each.

[10] Sumerian scribes pioneered this writing system, which made imprints in clay tablets with a wedge-tipped stylus. It was used well into the Persian days of Darius.

ANSWER: **cuneiform**

[10] Sumerians moved this resource with a pole-like device called the *shadoof*. Later in Mesopotamian history, the Abbasids moved this resource uphill with Archimedes' screw.

ANSWER: **water** [accept **rivers** or similar answers]

[10] This archaeologist made a name for himself by discovering the Great Ziggurat and other buildings at Ur, a Sumerian city then thought to be the world's oldest.

ANSWER: Sir Leonard **Woolley**

<Jackson>

13. One of this object's three roots extends to the well Hvergelmir. For 10 points each:

[10] Name this world tree from Norse mythology.

ANSWER: **Yggdrasil**

[10] This dragon, which chews on the corpses that end up in Nastrond, gnaws at one of the roots of Yggdrasil.

ANSWER: **Nidhoggr**

[10] One of these animals named Vedrfolnir sits in between the eyes of an eagle on top of Yggdrasil; the eagle exchanges insults with Nidhoggr via the squirrel Ratatosk.

ANSWER: a **hawk**

<Bollinger>

14. This historical region between the Dniester and Prut rivers was split off of Moldavia when Moldavia united with Wallachia to become Romania in the mid-19th century. For 10 points each:

[10] Name this region of the Russian empire. While Romania controlled it between the world wars, it is now largely coterminous with the nation of Moldova.

ANSWER: **Bessarabia**

[10] An 1878 conference in this European capital ensured Russian control of southern Bessarabia as it resolved Turkish cessions in the Balkans. An 1885 conference in this city touched off the "Scramble for Africa".

ANSWER: **Berlin** [accept Congress of **Berlin**; accept **Berlin** Conference]

[10] Bessarabia became the Moldovan Soviet Socialist Republic in the wake of this pact, which pre-emptively split up Poland. It was violated by the invading armies of Operation Barbarossa.

ANSWER: Nazi-Soviet **Non-Aggression** pact [or **Molotov-Ribbentropp** pact; or **Hitler-Stalin** pact]

<Jackson>

15. Constantin Stanislavsky chose to direct this play as a tragedy, despite its author having written it as a comedy. For 10 points each:

[10] Name this play that centers on an auction, eventually won by Trofimov to the chagrin of Trigorin and others, which decides the fate of a feature of Madame Ranevskaya's estate.

ANSWER: *The* **Cherry Orchard** [or **Vishnevyy sad**]

[10] This Russian short story master and playwright wrote *Three Sisters*, *Uncle Vanya*, and *The Cherry Orchard*.

ANSWER: Anton Pavlovich **Chekhov**

[10] In this Chekov story, Dr. Rabin is bankrupted by a trip taken with the postmaster Mikhail and ousted from his position by Dr. Khobotov, after which he finds himself incarcerated with the realist Gromov in the title institution.

ANSWER: **"Ward No. 6"** [or **"Palata #6"**]

<Carson>

16. A field of floating, disconnected blocks makes up the bottom of this painting, which was inspired by its creator's interest in quantum mechanics. For 10 points each:

[10] Name this painting, a reimagining of an earlier work by its artist, in which a melted clock hangs on a disconnected branch of an olive tree in the upper left while bullet-like objects strike a fish on the right.

ANSWER: *The* **Disintegration of the Persistence of Memory** [or *The Chromosome of a Highly-coloured Fish's Eye Starting the Harmonious* **Disintegration of the Persistence of Memory**]

[10] The *Disintegration of the Persistence of Memory*, like its non-disintegrated precursor, is a work of this Spanish surrealist, who depicted 28 Venus de Milos in his painting *The Hallucinogenic Toreador*.

ANSWER: Salvador **Dalí** [or Salvador Domingo Felipe Jacinto **Dalí** Domènech]

[10] Dali's *Dream Caused by the Flight of a Bee...* and *Temptation of Saint Anthony* both feature extremely long-legged versions of these quadrupeds carrying things on their backs. These non-horse creatures appear in a lake as the reflections of a trio of swans in another Dali painting.

ANSWER: **elephants** [or **elefantes**; prompt on *Swans Reflecting Elephants*]

<Karas>

17. Answer the following about the U.S. space program in the years just after the first moon landing, for 10 points each.

[10] This program, which launched three astronauts at a time atop Saturn V rockets, included all successful moon landings. Its dramatic mission numbered 13 was termed "a successful failure."

ANSWER: Apollo Program [or Project Apollo; accept equivalents mentioning "Apollo"]

[10] This pilot of Freedom 7, the first manned Mercury mission, later became the oldest man on the moon as commander of Apollo 14. He used a scoop to hit golf balls on the lunar surface.

ANSWER: Alan Bartlett Shepard, Junior

[10] This last set of manned Soviet missions teamed up with the Apollo program for a 1975 Test Project illustrating detente. The APAS docking mechanism was designed for the nineteenth mission of this name, letting Tom Stafford and Alexey Leonov shake hands.

ANSWER: Soyuz [or Soyuz 19; or Apollo-Soyuz Test Project; or Apollo-Soyuz mission; or Eksperimentalniy Polyot Soyuz-Apollon; prompt on "ASTP"; prompt on "Union"]

<Wasserman>

18. This character is detained and forced to work on a railroad track during a journey he undertakes, involving bringing first his mother, then her ashes, from Cape Town to Prince Albert. For 10 points each:

[10] Name this cleft-lipped gardener whose "life and times" title the first Booker Prize-winning novel by a South African author.

ANSWER: Michael K. [or *Life & Times of Michael K.*; prompt on partial answer]

[10] *The Life and Times of Michael K.* was written by this author of *Waiting for the Barbarians*, who described the collapse of David Lurie's life in his novel *Disgrace*.

ANSWER: John Maxwell Coetzee

[10] A quote from *Disgrace* was used to title the novel *The Rights of Desire* by Andre Brink, who writes in English and this other language. Breyten Breytenbach and Ingrid Jonker were members of an anti-apartheid movement that used this language.

ANSWER: Afrikaans [prompt on "Cape Dutch" or "kitchen Dutch" but do not accept or prompt on "Dutch" alone]

<Carson>

19. In quantum mechanics, every observable is associated with a self-adjoint linear one of these quantities. For 10 points each:

[10] Name these quantities that include the kinetic energy and the Lagrangian. They are defined as functions over a system's physical states.

ANSWER: operators

[10] One application of Heisenberg's uncertainty principle is that this operator and momentum cannot be fully specified in tandem. More generally, taking the time-derivative of a vector quantity named for this term yields the velocity.

ANSWER: position [or x; or r; or s]

[10] This other operator is defined as the sum of kinetic and potential energies. In classical mechanics, this quantity allows one to recast Newton's laws through the use of generalized coordinates.

ANSWER: Hamiltonian

<Jose>

20. The protagonist of this film breaks out of jail in a delirious haze after accidentally eating cocaine but gets rearrested after meeting an orphan girl played by Paulette Goddard and eating a huge amount of food. For 10 points each:

[10] Name this silent film whose most famous scene shows the Little Tramp pulled into the gears of a giant machine while working on a hectic assembly line.

ANSWER: **Modern Times**

[10] This writer, director, and star of *Modern Times* and *City Lights* was, along with Harold Lloyd and Buster Keaton, one of the most famous silent film-era comedians.

ANSWER: Charlie **Chaplin** [or Charles Spencer **Chaplin**]

[10] The increasingly political nature of Chaplin's films came to a head with this 1940 attack on Hitler, Chaplin's first talkie. In it, Chaplin plays Adenoid Hynkel, also known as "Der Phooey".

ANSWER: *The* **Great Dictator**

<Carson>

21. A polylinker on these structures allows them to be used as cloning vectors. For 10 points each:

[10] Name these circular pieces of DNA in bacteria that are replicated independently of the chromosomal DNA.

ANSWER: **plasmids**

[10] This term refers to cells that can uptake plasmid DNA during transformation. Calcium chloride can be used to induce bacteria to have this property.

ANSWER: **competent** cells [or **competence**; or word forms]

[10] Another method of making bacteria transform plasmid DNA is this one, in which the cell is rapidly shocked, which increases the membrane's permeability for a short duration.

ANSWER: **electroporation** [or word forms]

<Silverman>

22. The Ostend Company was dissolved in return for the recognition of this document, which Charles Albert of Bavaria rejected. For 10 points each:

[10] Name this 1713 edict by which Holy Roman Emperor Charles VI declared that his daughter could inherit the dominion of the Habsburgs if no son were born to him.

ANSWER: **Pragmatic Sanction** of 1713

[10] This mother of fifteen, Charles's daughter, benefited from the Pragmatic Sanction and held her throne through the War of the Austrian Succession.

ANSWER: **Maria Theresa** Walburga Amalia Christina [prompt on "Maria"]

[10] Charles VI was supported an Elector of Saxony of this name against Stanislaw Leszczynski in the War of the Polish Succession. A huge elector of Saxony of this name died before that war broke out in 1733.

ANSWER: **Augustus** [or **Augustus III**; or **Augustus II**; or **Augustus the Strong**; or **Frederick Augustus I**; do not accept or prompt on "Frederick"]

<Gupta>

23. Historical plays by this man include a "world drama in two parts" about Julian the Apostate called *Emperor and Galilean* and a play set during the time of Eric Bloodaxe called *The Vikings at Helgeland*. For 10 points each:

[10] Name this second-most-commonly-performed playwright in the world, whose more famous works include *The Wild Duck*, *The Master Builder*, and *Hedda Gabler*.

ANSWER: Henrik Johan **Ibsen**

[10] Helen Alving discovers that her son Oswald has inherited syphilis from her philandering late husband, who she had stayed with due to the bad advice of Pastor Manders, in this Ibsen play.

ANSWER: **Ghosts** [or **Gengangere**; or *The Revenants*]

[10] Another Ibsen character who suffers a debilitating disease that is blamed on his father's sexual indiscretions is this rich friend of the Helmer family, who reveals that he has always been in love with Nora in *A Doll's House*.

ANSWER: Dr. **Rank**

<Carson>