Tossups

1. **A member of this tradition pointed out that athletes don't discuss "whether the ball is good or bad, but only how to strike it and receive it." This school's three disciplines of desire, action, and assent were connected by Pierre Hadot ("ah-DOH") to its division of philosophy into physics, ethics, and logic. A thinker of this school proposed the alternatives of "either Providence or blind atoms," and rejected the latter. A member of this school claimed that the only thing "in our (*)** power" is *prohairesis*, or volition, in a treatise compiled by his student Arrian as the *Discourses*. This school's ideal of the perfectly virtuous sage is discussed in the *Meditations* of a Roman emperor. For 10 points, Roman thinkers such as Seneca, Epictetus, and Marcus Aurelius belonged to what school that stressed detachment from worldly fortunes?
ANSWER: **Stoic**ism
<JB Philosophy>

2. **In Tom Wolfe's *The Bonfire of the Vanities*, the poet Aubrey Buffing compares this story's meaning to AIDS. This story references Victor Hugo's play *Hernani* to describe the "piquancy and phantasm" of a certain event. One figure in this story is said to have "out-Heroded Herod" and is asked "who dares insult us with this blasphemous mockery?" by a person who draws a dagger at him. The hourly (*)** chiming of a "gigantic clock of ebony" in this story makes everyone stop dancing in an array of colorful rooms. The title character of this story, which holds "illimitable dominion over all," is revealed to be an intangible form that strikes Prince Prospero dead on sight. For 10 points, name this short story about the visit of the title plague to a ball, written by Edgar Allen Poe.
ANSWER: "The **Masque of the Red Death**"
<AP American Literature>

3. **Anna van Schurman, the "Learned Maid" of this city, attended the university lectures of Gisbertus Voetius from behind a curtain. A regent of Spain from this city accidentally set fire to Medina del Campo while trying to put down the Comuneros revolt and later became Pope Adrian VI. Religious tolerance was mandated by a 1579 "Union" named for this city, which was signed in reaction to the Union of Arras. Robert Harley's twelve "Tory Peers" ratified a treaty named for this city, by which Britain** (*) gained a monopoly on the slave trade called the *asiento*, as well as the territories of Minorca and Gibraltar. That treaty named for this city confirmed the will of the sickly Charles II by making Philip V the King of Spain. For 10 points, name this Dutch city, the namesake of the treaty that ended the War of Spanish Succession.
ANSWER: **Utrecht**
<JB European History>

4. **One species of bacterium in this genus uses two fibronectin-binding proteins to invade host cells. Various species of bacteria in this genus can be distinguished using the coagulase test. One bacterium in this genus contains the mobile SCCmec element, which contains the gene mecA. Many patients receiving implanted foreign bodies like artificial valves and catheters fall victim to infection by the *epidermidis* species of these bacteria. Bacteria in this genus can cause an infection associated with use of super-absorbent (*)** tampons; that disease is toxic shock syndrome. This genus of Gram-positive spherical bacteria tends to grow in clusters, in contrast to the chains formed by *Streptococcus*. For 10 points, name this bacterial genus whose *aureus* species has an incredibly dangerous "methicillin-resistant" variant known as MRSA.
ANSWER: _**Staph**ylococcus_
<SR Biology>

5. **It's *not* in key order, but Telemann wrote a set of 12 fantasias for this instrument. This instrument plays 64 variations on a 4-bar sarabande theme that begins with a D minor triad on beat 2. Fifteen sonatas for this instrument, each with a different tuning and paired religious engraving, plus a long passacaglia, make up Heinrich Biber's *Rosary Sonatas*. A sonata for this instrument in G minor has a key signature of one flat only, and opens Bach's set of 6 solo pieces for it that alternates (*)** sonatas and partitas. A long chaconne in D minor ends the fourth of those pieces for this instrument, which Joseph Joachim ("YO-zef YAW-khim") revived. Tartini has it play many double stops in his *Devil's Trill Sonata*. Fritz Kreisler and the composer of 24 *Caprices*, Niccolò Paganini, played this instrument. For 10 points, name this high-pitched string instrument.
ANSWER: **violin**
<OL Music>

6. **This monarch once refused to allow his subjects to draw his carriage, declaring that "I know that my blood is the same color as that of the Negroes." This monarch abruptly abdicated after the "night of the broken bottles," during which this monarch's supporters attacked the Exaltados. This husband of Maria Leopoldina defied the Cortes by giving the "Fico" speech, which declared his intent to (*)** stay in a certain country. This monarch deposed Miguel I, who had previously married and seized power from this monarch's daughter Maria da Glória. This monarch unsheathed his sword and proclaimed "Independence or death!" in his Cry of Ipiranga. For 10 points, name this son of John VI, who secured independence from Portugal as the first emperor of Brazil.
ANSWER: **Pedro I** [or **Pedro IV**; accept **Peter** in place of "Pedro"]
<WC World History>

7. **The narrator dedicates part of this work to his examination of a painting of Julius Caesar in the Museum of Fine Arts in Boston. Two characters in this work dress up as women on Boxing Day and dance in order to earn money. Several scenes of this work are set at Parkin Farm and follow Catherine Weldon. "Professor Static" appoints a character in this work the Party Distributor for his political campaign. A character in this work dies after (*)** crashing his taxi, which he nicknamed the Comet. Afolabe is renamed after helping to haul a cannon up a cliff in this poem, in which his son sails on the boat *In God We Troust*. Achille and Hector fight for the affections of Helen in this epic poem. For 10 points, name this epic poem, an adaptation of the *Iliad* that takes place on St. Lucia, by Derek Walcott.
ANSWER: _**Omeros**_
 <ES Other Literature>

8. **During baby showers in this religion, husbands part their pregnant wives' hair upward three times with a blade of grass. A ritual of this religion involves the telling of a story of a merchant whose goods are turned into leaves after he lies to a holy man. During some rituals of this religion, a coconut is placed in a water-filled jug and covered with a cloth to serve as an idol. Young boys of this religion are known as "twice (*)** born" after they undergo a ceremony that bestows them with a sacred thread. Members of this religion often ring a large bell before entering the inner sanctum of their places of worship, where *mūrthys* are worshipped. Over the course of their lives, devotees of this religion must perform 16 *samskāras*. For 10 points, devotees of what religion take ritual baths in the Ganges River?
ANSWER: **Hindu**ism [or **Sanātana Dharma**]
<AP Religion>

9. **The diastereoselectivity resulting when a nucleophile reacts with this functional group can be modelled via steric and inductive effects given that the nucleophile approaches this functional group at about 105 degrees; that model is the Felkin–Anh model, which utilizes the Burgi–Dunitz angle. Maleic anhydride is a great dienophile because it possesses two of these highly-electron withdrawing functional groups. They're not imines, but acid catalysts (*)** "activate" this functional group by causing its central carbon atom to have a partial positive charge due to resonance. Grignard ("green-YARR") reagents reduce this general class of compounds to form *either* primary or secondary alcohols. For 10 points, aldehydes and ketones contain what functional group, which is a carbon-oxygen double bond?
ANSWER: **carbonyl**s [prompt on aldehydes or ketones]
<BB Chemistry>

10. **While trading this commodity, Jonathan Thorn provoked local Native Americans into a battle that ended with his ship, the *Tonquin*, being blown up in a powder explosion. Sylvia Van Kirk's book *Many Tender Ties* documents the custom of "marriage after the custom of the country" practiced by men who worked with this good, who also met in yearly fairs called *rendezvous*. The *coureurs des bois* ("koo-RURR day bwah") and the (*)** *voyageurs* were French Canadians who transported this good. Jim Bridger and Jedediah Smith were among the "mountain men" whose work involved obtaining this good. A namesake city in Oregon was built by a businessman who became the richest man in America by selling this good, John Jacob Astor. For 10 points, name this good obtained by trappers who caught and skinned beavers.
ANSWER: **fur** [or **pelt**s; accept **beaver** fur or **beaver** pelts until "beavers" is read]
<JB American History>

11. **This concept is viewed as a control system with a standard, an input, a comparator, and an output in a theory put forth by Peter Burke. An experiment in which boys formed in-groups and out-groups over alleged preferences for Kandinsky or Klee paintings was used to develop a theory of this concept's social form by Henri Tajfel ("TIE-fell"). This concept can be "diffused" or "foreclosed" depending on commitment level in James Marcia's model. An outburst in a (*)** choir is used as evidence of a conflict over this concept in the psychohistory *Young Man Luther*. A condition in which this concept is fragmented, or disassociated, is also called multiple personality disorder. Cohesion of this concept conflicts with role confusion in the fifth stage of Erikson's model of development. For 10 points, Erikson defined the "crisis" of what concept, a person's self-image?
ANSWER: **identity**
<JB Social Science>

12. **Act 3 of this ballet includes a Neapolitan dance and a Hungarian *csárdás* ("char-dosh"). In a hunt ending Act 1 of this ballet, the oboe introduces the motif F-sharp [pause] B C-sharp D E F-sharp [pause] D F-sharp, over harp and string tremolos. Orchestrations of 3 piano pieces by the composer of this ballet were inserted by Riccardo Drigo for an 1895 revival prompted by (*)** Lev Ivanov's impressive choreography of Act 2, which includes a *pas de quatre* danced by four young ballerinas with arms interlinked. Petipa, the original choreographer of this ballet, added 32 *fouetté* ("fwet-TAY") turns in a row for Pierina Legnani ("len-YAH-nee") after her similar feat in *Cinderella*, and created her double role that is now danced in white and black costumes. For 10 points, name this Tchaikovsky ballet in which Prince Siegfried loves Odette, who Von Rothbart turns into the title bird.
ANSWER: *Swan Lake* [or *Lebedinoye ozero*]
<OL Other Arts (Dance)>

13. **An approximate version of this task is carried out by an algorithm developed by Baeza-Yates and Gonnet that relies on bitwise operators, called the bitap algorithm. In an algorithm for this task, the numerical value of a "window" is calculated, that value modulo q is computed, and the window is shifted by one position. An algorithm for this task works backwards, using precomputed tables for the "good suffix rule" and the "bad (*)** character rule." Another algorithm for this task operates as a DFA, using a "failure function" to provide its transition rules. Manber and Wu improved an algorithm for a fuzzy version of this task using Levenshtein distances for their "A-grep" tool. Algorithms for this task include Boyer–Moore, Knuth–Morris–Pratt, and Rabin–Karp. Regular expressions are used for it. For 10 points, name this task of finding a pattern within a string of text.
ANSWER: string **search**ing [or string **match**ing; accept either answer with "approximate" or "fuzzy" until read; accept "substring" or "text" in place of "string"; accept descriptions like "finding a pattern in a string" until read]
<JB Other Science (Computer Science)>

14. **This story's protagonist is disgusted when an acquaintance interrupts him to declare "the sturgeon was too strong tonight!" While walking his daughter to school, a character in this story explains how snow can fall when it is three degrees above freezing on the ground. This story's inconclusive last sentence states "it was clear to both of them that they had still a long, long road before them, and that the most complicated and difficult part of it was only just beginning" after the main characters are reunited at a provincial (*)** opera performance. In this story, the wife of the government official von Diderits encounters the protagonist, an aging womanizer, in Yalta and begins a romance with him. For 10 points, name this Anton Chekhov story about Gurov's affair with the title woman, who has a pet Pomeranian.
ANSWER: "The **Lady with the Dog**" [accept "a" in place of "the"; accept "**Lady with Dog**"; accept "**Lapdog**," "**Pet Dog**," or "**Little Dog**" in place of "Dog"; or "**Dama s sobachkoy**"]
<JB European Literature>

15. **This country's cultural heritage agency is symbolized by an H with a stroke, a character only used in the alphabet of this country's language. David Hilary Trump helped excavate the Xagħra ("SHAH-ra") Stone Circle and Skorba Temples in this country. This country contains an island where people often scuba dive in Dwejra Bay's Blue Hole and dive off the Azure Window. This country's prehistory is separated into phases like the (*)** Ġgantijan ("juh-gahn-TEE-en"), during which its many Megalithic Temples were built on islands like Gozo. This country's flag displays the George Cross, and Fort Saint Elmo was built in this country by a French nobleman who founded its capital to defend against an Ottoman attack. For 10 points, name this Mediterranean island nation whose capital is Valletta.
ANSWER: **Malta** [or the **Maltese** Islands]
<AP Other (Geography)>

16. **Karl Kajetan von Gaisruck ("KYE-tahn fon GUYS-rook") arrived at a meeting too late to exercise his right to exclude this person from coming to power. This leader's government abducted a six-year-old Jewish boy after it had discovered that he had been baptized; that boy was Edgardo Mortara. This pope, who unilaterally rejected the Law of Guarantees, promulgated the encyclical (*)** *Quanta cura*, to which a document listing eighty "principal errors of our times" was attached; that document was the Syllabus of Errors. After the withdrawal of a French garrison, Italian troops entered Rome, turning this pope into a "prisoner in the Vatican." For 10 points, name this pope who defined the Immaculate Conception and convened the First Vatican Council, which defined papal infallibility.

ANSWER: **Pius IX** [or Giovanni Maria **Mastai-Ferretti**]
<WC European History>

17. **In one text, a person of this occupation boasts of slaying werewolf women and claims Sif has a man visiting her. A god with this role performs it to help an old woman reach a council, but that falcon god of this role has his talons cut off when Seth recognizes the woman as Isis. Thor has a flyting contest with a person of this occupation named "Grey beard," or Harbard. A person with this role carries out his work with the help of the Stone Things and the *urnu*-snakes, both of which (*)** Gilgamesh destroys before that person with this role, Urshanabi, helps him visit Utnapishtim. A figure of this role was a son of Nyx and Erebus who would take an *obol* from the mouth of those who used his service. For 10 points, name this role of Charon, who performed it to bring dead souls across the Styx into the underworld.

ANSWER: **ferry**man [or **boat**man; or word forms such as **ferry**ing; prompt on being a psychopomp or equivalents of bringing souls to the underworld]
<JB Mythology>

18. **Either particle number or this quantity is the conserved quantity corresponding to the internal vector symmetry of the Dirac Lagrangian. A Majorana ("ma-yo-RA-na") spinor is invariant with respect to changes in this quantity. The impact of this quantity's spatial distribution on elastic scattering cross-sections is given by the form factor. Particles are categorized by their values for strangeness and this quantity on an (*)** Eightfold Way diagram. The weak force has been found to violate the combined symmetry of parity and this quantity. For quarks, this quantity is either positive two-thirds or negative one-third. Flipping the sign of this quantity distinguishes matter from antimatter. For 10 points, name this quantity symbolized q that is measured in coulombs.

ANSWER: electric **charge** [accept q until read]
<SR Physics>

19. **This poet wrote "For every day they die among us, those who were doing us some good" in a poem for an "important Jew who died in exile." He removed lines noting that "Time… will pardon Paul Claudel, Pardons him for writing well" from a poem that states "Poetry makes nothing happen" and tells its subject "You were silly like us; your gift survived it all." That poem by this author, which is similar to his elegy for Sigmund Freud, claims "What instruments we have agree / The day of his death was a dark cold day" and (*)** memorializes a man who "disappeared in the dead of winter." A poem by this author laments "He was my North, my South, my East and West" and gives instructions such as "Stop all the clocks, cut off the telephone." For 10 points, name this poet of "In Memory of W. B. Yeats," "Funeral Blues," and "September 1, 1939."

ANSWER: W. H. **Auden** [or Wystan Hugh **Auden**]
<JB British Literature>

20. **This artist painted himself staring at the viewer in a Gustave Doré-inspired painting that depicts prisoners walking in a circle in a courtyard. Francis Bacon created several versions of a self-portrait of this artist carrying an easel and walking on a road, called *Painter on the Way to Work*. In a self-portrait by this artist, the Japanese print *Geishas in a Landscape* hangs on the wall. In 2011, researchers determined that one of his self-portraits actually depicts his (*)** brother Theo. One of this artist's self-portraits features him wearing a fur hat and smoking a pipe. This artist wears a straw hat in several of his self-portraits, while several others depict him with a bandage which he wore after cutting off part of his ear. For 10 points, name this Dutch artist of *Starry Night*.

ANSWER: Vincent **van Gogh**

<JB Painting>

Bonuses

1. In this ad, a voice intones "We must either love each other, or we must die" over footage of a nuclear explosion. For 10 points each:
[10] Identify this influential attack ad that Lyndon Johnson's 1964 campaign used to target Barry Goldwater's willingness to wage nuclear war. It depicts a girl picking the petals of a flower.
ANSWER: "**Daisy**" ad [or "**Daisy Girl**"; or "**Peace, Little Girl**"]
[10] Tony Schwartz, the creator of the "Daisy" ad, also created an ad in which the words "[this man] for vice president" are met with laughter. This man accepted over 100,000 dollars in bribes as Governor of Maryland.
ANSWER: Spiro **Agnew**
[10] A much later attack ad released by the 2004 Bush campaign showed John Kerry engaged in this sport to illustrate his "flip-flopping" on issues like the Iraq War, Education Reform, and increasing Medicare Premiums.
ANSWER: **windsurf**ing
<JH American History>

2. Dendrimers exhibit this phenomenon to a heavy degree. For 10 points each:
[10] Name this phenomenon that is not present in amylose, but *is* present in amylopectin due to the formation of 1,6-glycosidic linkages. This phenomenon is characterized by a non-linear sequence of monomers.
ANSWER: **branch**ing [accept word forms like **branched** polymers]
[10] This material exhibits branching due to the formation of sulfur cross-links in a process called vulcanization. Its "synthetic" form is made from petroleum byproducts, while its "natural" form is latex extracted from trees.
ANSWER: **rubber**
[10] Rubber is an example of this class of materials, which are formally defined as a cross-linked polymer which undergoes a glass transition below room temperature. Their name reflects the fact that they tend to have low values of Young's modulus.
ANSWER: **elastomer**s
<BB Chemistry>

3. In a book titled for this sort of feature, Mitchell Duneier described his time with the book vendor Hakim Hasan. For 10 points each:
[10] Name these structures. Their "ballet" is discussed by Jane Jacobs in *The Life and Death of Great American Cities*, which claims that active use of these things improves an area's safety.
ANSWER: **sidewalk**s [accept **footpath**s or **pavement**s; prompt on walkways or similar answers]
[10] Mitchell Duneier conducted the participant observation study described in *Sidewalk* in this city. *The Life and Death of Great American Cities* helped defeat Robert Moses's plan for a Mid-Manhattan Expressway in this city.
ANSWER: **New York** City [or **NYC**]
[10] In another participant observation study, a sociologist with this surname spent months visiting bars on Chicago's South Side. Another thinker with this surname wrote about the growth of nationalism in *Imagined Communities*.
ANSWER: **Anderson** [or Benedict **Anderson**; or Elijah **Anderson**]
<JB Social Science>

4. A hollow cylinder covered with grief messages was erected near one of these buildings in Atocha, Madrid to commemorate terrorist attacks on that building of this type. For 10 points each:
[10] Name this type of structure. Paul César Helleu ("ay-loo") painted a mural of the night sky on the roof of one of these buildings; Walter Gropius and Pietro Belluschi designed the Pan Am Building next to that building of this type.
ANSWER: **rail**way **station**s [or **train station**s; accept **rail**way **hub**s; prompt on Grand Central <u>station</u> or Grand Central <u>terminal</u>; prompt on <u>terminal</u> or <u>station</u> building or <u>transport</u>ation <u>hub</u>]
[10] The Musée d'Orsay ("myoo-ZAY dor-SAY") in this city was converted from a train station into a museum to serve as a median between the Centre Pompidou and the Louvre.
ANSWER: **Paris**
[10] This Spanish architect built an underground arcade beneath the Zürich Stadelhofen and a "forest" of steel trees above Lisbon's Gare do Oriente. This creator of many cantilever bridges was criticized for his poorly-functioning World Trade Center transportation hub.
ANSWER: Santiago **Calatrava** Valls
<AP Other Arts (Architecture)>

5. The protagonist recalls a dream in which this character's voice tells him "We shall meet in the place where there is no darkness." For 10 points each:
[10] Name this member of the Thought Police, who tricks the protagonist into trying to join Goldstein's resistance movement and later threatens him with a cage of hungry rats in Room 101.
ANSWER: **O'Brien**
[10] Richard Rorty claimed that O'Brien's statement that "the purpose of torture is torture" is the central sentence of this dystopian George Orwell novel about Winston Smith, titled for the year when it takes place.
ANSWER: *1984*
[10] After O'Brien claims the stars are a few kilometers away, Winston tries to think of the name of this philosophical position. O'Brien supplies the name of this belief, but notes he is discussing its "collective" type.
ANSWER: **solipsism**
<JB British Literature>

6. The Peruvian anchoveta suffered a drastic reduction in population during one of these events in 1972. For 10 points each:
[10] Name this phase of the Southern Oscillation characterized by unusually warm ocean temperatures in the southern and eastern tropical Pacific Ocean. It usually occurs around Christmas.
ANSWER: **El Niño** [accept **El Niño** Southern Oscillation or **ENSO**; do not accept or prompt on "La Niña"]
[10] This other climate oscillation occurs six to twelve months before an El Niño event and lasts 30 to 60 days. It contributes to Pineapple Express events along the Pacific coast.
ANSWER: **Madden–Julian** oscillation [accept **MJO**]
[10] El Niño events can be exacerbated by Kelvin waves, which are derived by solving the continuity and momentum equations in the presence of the Coriolis force where the velocity in *this direction* is zero at the boundary. That means that Kelvin waves can only propagate in the zonal direction.
ANSWER: **meridional** [or **north–south**]
<SR Other Science (Earth Science)>

7. During a trial over this book, Mervyn Griffith-Jones embarrassed himself by asking "is it a book… you would wish your wife or your servants to read?" For 10 points each:
[10] Name this book that was the subject of a 1960 trial in which Penguin Books was accused of violating the Obscene Publications Act.
ANSWER: Lady *Chatterley's Lover*
[10] Tony Judt's *Postwar* notes that the "decline of the moral authority of the British establishment" began with the trial, and continued with this party's legalization of abortion under Home Secretary Roy Jenkins. This party lost the 1979 general election to the Conservatives.
ANSWER: **Labour** Party
[10] A later British obscenity trial targeted a magazine from this country for publishing a schoolboy's drawing of Rupert the Bear with a massive penis. Robert Hughes's *The Fatal Shore* discusses this country.
ANSWER: **Australia** (The magazine was *Oz*.)
<JB European History>

8. Answer the following about appearances of creative writing workshops in American fiction, for 10 points each.
[10] Mark Nechtr is enrolled in Professor Ambrose's workshop in this author's parody of metafiction, "Westward the Course of Empire Takes its Way." This author of the massive novel *Infinite Jest* committed suicide in 2008.
ANSWER: David Foster **Wallace** [or **DFW**]
[10] Swenson falls in love with Angela Argo, a student in his workshop, in a Francine Prose novel titled for an angel of this color. The Swede is accused of cheating at cards in a Stephen Crane story set at a hotel of this color.
ANSWER: **blue** [or *The **Blue** Angel*; or "The **Blue** Hotel"]
[10] Timothy Monahan returns from the writer's conference at Breadloaf near the beginning of this author's campus novel *Moo*. This author won the 1991 Pulitzer for a retelling of King Lear set in the Midwest.
ANSWER: Jane **Smiley**
<JB American Literature>

9. Anemone flowers grew where this figure's blood touched the ground after he was killed by a bull. For 10 points each:
[10] Name this man, whose mother Myrrha was turned into a tree after her incestuous relationship with her father was discovered. He was the central subject of a cult of women on Lesbos.
ANSWER: **Adonis**
[10] Aphrodite made an agreement to share Adonis with this other goddess, a daughter of Demeter who became queen of the underworld after being kidnapped by Hades.
ANSWER: **Persephone** [or **Kore**]
[10] This father of Adonis lost to Apollo in a music contest, after which his fifty daughters were turned into birds.
ANSWER: **Cinyras**
<JS Mythology>

10. Jeanne de Montbaston and her husband painted amusing marginalia, such as a nun harvesting penises from a tree, in their many works of this type. For 10 points each:
[10] Identify this term for medieval books that were decorated with elaborate border designs and miniature illustrations.
ANSWER: **illuminated** manuscripts
[10] One of the best surviving illuminated manuscripts is this devotional book painted by the Limbourg brothers for the Duke of Berry. This book's calendar pages feature images of the months accompanied by zodiac signs.
ANSWER: *Très **Riches Heures*** du Duc de Berry [or *The **Very Rich Hours*** of the Duke of Berry; or *The **Very Sumptuous Book*** of Hours; prompt on *The Book of Hours*]
[10] The January scene from *Très Riches Heures* ("tray reesh URR") features the Duke greeting courtiers in front of one of these works depicting the Battle of Troy. A depiction of the Battle of Hastings in this medium is housed in Bayeux.
ANSWER: **tapestry** [or **tapestries**; prompt on embroidery or textiles or weaving]
<JB Painting>

11. This equation states that the derivative of *L* with respect to a generalized coordinate minus the time derivative of the derivative of *L* with respect to the time derivative of the generalized coordinate equals zero. For 10 points each:
[10] Identify this equation used to find extrema of functionals in the calculus of variations. In Lagrangian mechanics, this equation is used to derive the equations of motion describing a system.
ANSWER: **Euler–Lagrange** differential equation
[10] The calculus of variations is also used to solve this problem, which seeks to find the curve for which the time taken for an object moving only under the influence of gravity is independent of the starting position.
ANSWER: **tautochrone** curve [or **tautochrone** problem; do not accept or prompt on "brachistochrone problem"]
[10] Lagrangian mechanics applies to systems described by conservative forces, which can by definition be written as the gradient of this quantity. For an object near the earth, this quantity equals mass times little *g* times height.
ANSWER: **potential** energy [accept U or V]
<SR Physics>

12. Though no Chinese sources mention this man, he claimed to have been governor of Yángzhōu ("yong-joh") for three years. For 10 points each:
[10] Name this 13th-century Venetian traveler who visited the court of Kublai Khan.
ANSWER: Marco **Polo**
[10] This Turkic-Chinese Nestorian monk is sometimes called the "Reverse Marco Polo," since he left an account of his journey from China to Europe on a mission to forge a Franco-Mongol alliance.
ANSWER: Rabban **Bar Sauma** [or Rabben **Swama** or Rabben **Cauma**]
[10] Another medieval world traveler was this Moroccan man, who described his journeys and his time as a judge in the service of Sultan Muhammad bin Tughluq of Delhi in his *Rihla*.
ANSWER: Ibn **Battuta**
<JH World History>

13. One thinker created the phrase "fog of" this subject to explain the uncertainty felt by participants in this activity. For 10 points each:
[10] Name this activity discussed by Carl von Clausewitz. The ancient Chinese philosopher Sun Tzu wrote a treatise on the "art" of this activity.
ANSWER: **war** [or human **war**fare]
[10] This Dutch jurist put forth his ideas on the right causes and the right conduct of war in his *On the Law of War and Peace*.
ANSWER: Hugo **Grotius** [or Hugo de **Groot**]
[10] A thinker from this school influenced Grotius's theories by arguing that enslavement of Indians was not "just war." Another thinker from this school discussed natural law in *De legibus* and wrote about "beings of reason" in his *Metaphysical Disputations*.
ANSWER: School of **Salamanca** [prompt on Spanish Thomism; prompt on Second Scholasticism or Early Modern Scholasticism] (The thinkers are Francisco de Vitoria and Francisco Suarez.)
<ES Philosophy>

14. Answer some questions about the intellectual movement known as transhumanism, which advocates the research and development of human-enhancing technologies. For 10 points each:
[10] As part of a special report for *Foreign Policy*, this political theorist denounced transhumanism as "the world's most dangerous idea." He claimed that liberal democracy had triumphed in *The End of History and the Last Man*.
ANSWER: Francis **Fukuyama**
[10] This word names an important theoretical event in transhumanism, during which an artificial intelligence's self-improvement leads to an "intelligence explosion." This word also names the point at the center of a black hole.
ANSWER: **singularity** [accept technological **singularity** or gravitational **singularity**]
[10] This man is a pioneering transhumanist who invented a print-to-speech reading machine for the blind and described a future with intelligent machines in his 1999 book *The Age of Spiritual Machines*.
ANSWER: Raymond **Kurzweil**
<WC Other (Academic)>

15. In Alan Trueblood's translation, this poet's 145th sonnet is helpfully titled "She Disavows the Flattery Visible in a Portrait of Herself, Which She Calls Bias." For 10 points each:
[10] Name this 17th-century Mexican nun, a poet who championed women's right to education in a letter to Sister Filotea.
ANSWER: Sor **Juana** Inés de la Cruz [prompt on Inés; prompt on de la Cruz]
[10] Contemporaries of Sor Juana called her "The Phoenix of Mexico," as well as the tenth one of these people. Many epic poems begin by invoking these Greek goddesses of the arts.
ANSWER: the **Muse**s [or "**musa** decima"]
[10] A later female Latin American poet named Juana, Juana de Ibarbourou, was from this country. Jules Laforgue and the Count de Lautréamont were among the French symbolist poets born in this country.
ANSWER: **Uruguay**
<JB Other Literature>

16. GLIMMER is an example of a method to perform this task in prokaryotes. For 10 points each:
[10] Identify this task that can make use of k-mer frequencies in statistical *ab initio* methods, or programs like N-SCAN in comparative methods that look for similarities in the namesake structures in different species.
ANSWER: **gene predict**ion [or **gene find**ing; accept synonyms for "find" such as **locating gene**s]
[10] An easy-to-identify signal used for gene finding in eukaryotes is this region, which consists of a sequence of purines added to the 3-prime end of an mRNA transcript.
ANSWER: **poly(A) tail**
[10] Compositional analysis of a DNA sequence often entails computing the percentage of the sequence consisting of these two bases. The melting point of a DNA sequence increases with the amount of these two bases, since they form three hydrogen bonds with each other, while adenine and thymine only form two.
ANSWER: **guanine** AND **cytosine** [or **G** AND **C**; accept percent **GC content**]
<SR Biology>

17. Richard Wagner based five compositions of this type on poems by Mathilde Wesendonck, his patron's wife. For 10 points each:
[10] Name this genre of music in which Hugo Wolf and Max Reger composed hundreds of examples each.
ANSWER: **lied**er [prompt on art <u>song</u>s]
[10] In late Romantic lieder, this ensemble replaced the piano as the voice's accompaniment. Mahler's song cycles *Des Knaben Wunderhorn*, *Songs of a Wayfarer*, and *Kindertotenlieder* are for voices plus this large ensemble used in *The Song of the Earth* and nine other major Mahler works.
ANSWER: **orchestra** [or **symphony**]
[10] This final work of Richard Strauss reflects on death and prominently features the French horn. It uses three texts by Hermann Hesse, while "Im Abendrot" quotes the composer's tone poem *Death and Transfiguration*.
ANSWER: *Four Last Songs* [or *Vier letzte Lieder*]
<OL Music>

18. Answer some questions about the role of angels in the Bible. For 10 points each:
[10] In the chariot vision, these angels work together with the cherubim to transport Ezekiel to God's throne. These angels take the form of a wheel within a wheel, hence their name, and their rims are covered with eyes.
ANSWER: **ophan**im
[10] The Book of Genesis describes how the "sons of God," sometimes interpreted as a reference to angels, came to the "daughters of man," who gave birth to this class of beings.
ANSWER: **giant**s [accept **nephilim** or **naphil**]
[10] This archangel is a messenger of God who was sent both to Daniel to explain the vision of the ram and the he-goat and to the Virgin Mary to announce the birth of Jesus.
ANSWER: **Gabriel**
<WC Religion>

19. Emperor Claudius wrote a letter to the inhabitants of a city in this province about Jewish freedom of worship. For 10 points each:

[10] Name this region that became a Roman province a decade after its Queen Arsinoë was executed in Rome.

ANSWER: Roman **Egypt** [or **Aegyptus**]

[10] During these wars, the Egyptian magician Harnuphis supposedly saved a besieged Roman legion by calling down a rainstorm. These wars are named for a Germanic tribe that allied with the Iazyges and Qadi during them.

ANSWER: **Marcomanni**c Wars

[10] Egypt was Rome's largest supplier of this commodity. Since this commodity was provided for free to Rome's poor, Juvenal described the masses as being solely concerned with a product of this commodity and circuses.

ANSWER: **grain** [or **wheat**; or **corn**; or **bread**; or **frumentum**; or **panem**]

<JB European History>

20. In one of this author's poems, the title character leaves King Arthur's court on a white horse with a fairy woman whom he had earlier encountered in a silk pavilion. For 10 points each:

[10] Name this 12th-century author of narrative poems such as *Lanval*, *Laustic*, and *Bisclavret*.

ANSWER: **Marie** de France

[10] *Bisclavret* ends by noting that the descendants of the title werewolf's unfaithful wife were born without this body part since he bit hers off. Edmund Rostand's Cyrano de Bergerac has a large one of these body parts.

ANSWER: **nose**s [or *__nez__*]

[10] A translation of *Eliduc*, another Breton lay by Marie, appears in this author's collection *The Ebony Tower*. This British author wrote *The Magus* and *The French Lieutenant's Woman*.

ANSWER: John **Fowles**

<JB European Literature>