1. Welsh immigrants to this region founded a settlement called Y Wladfa (oh lad-vah). Early explorers of this region wrote sensationalized accounts of its native Tehuelche (tay-HWAIL-chay) people. A country's strategy of displacing this region's natives with European immigrants was called "the conquest of the desert." A popular myth about this region originated in Antonio Pigafetta's account of traveling through it with the Magellan expedition. This region was said to be inhabited by a race of huge barbarians called its "giants." This region to the south of Araucania (ah-rau-kah-NEE-ah) is an ancestral homeland of the Mapuche people and the southernmost region inhabited by "gaucho" cowboys. For 10 points, name this frontier region of far southern South America that includes Tierra del Fuego.
ANSWER: **Patagonia** [accept **Patagonian** Giants; prompt on "South America" before "desert"]

2. A character in this profession imitates Barnes by smoking crack cocaine while trying to be "Time's first human author of perfection." A man with this job named Casi (CAH-see) corresponds with the mentally disabled Jalen Kingg and is convinced by Dane to defraud the police and a drug kingpin in Sergio De La Pava's *A Naked Singularity*. Harry Lutz and Harold Basie are characters in this profession who spar over Oscar Crease's play *Once at Antietam* in William Gaddis's novel *A Frolic of His Own*, a satire of this profession. In a novel published in 2015, a pamphlet titled "The Black Plague" is found in the study of a man with this job who defends Zeebo, a son of Calpurnia. For 10 points, name this profession of Jean Louise's father Atticus in Harper Lee's *Go Set a Watchman*.
ANSWER: **lawyer**s [or **attorney**s; or **legal** profession; accept **public defender**s or **litigator**s]

3. This protein has a PHP domain in prokaryotes joined to its normal "finger," "thumb," and "palm" domains. A reaction catalyzed by this enzyme is assayed by the delta–delta–C method. NEB markets the Q5 form of this protein, which is used in Gibson assemblies as a fusion protein called Phusion, with a "P-H." Arthur Kornberg won a Nobel Prize for discovering this protein. PCNA clamps this enzyme to its substrate to enhance processivity. In the lab, this protein is mixed with magnesium chloride and d·N·T·Ps and then thermally cycled between 72 degrees Celsius, 98 degrees Celsius, and the primer annealing temperature. *Thermus aquaticus* is the source of a heat-stable form of, for 10 points, what protein that elongates Okazaki fragments and amplifies DNA during a namesake "chain reaction"?
ANSWER: **DNA polymerase** I [or **DNA polymerase** II; or any other number or Greek letter after it; or **Taq** polymerase; accept **polymerase** after "DNA"; prompt on "polymerase" before "DNA"]

4. This country has implemented the "Prevent" strategy, which forces schools to report students who exhibit signs of terrorist activity. An alleged attempt by conservative Muslims to take over a public school system in this country was nicknamed "Operation Trojan Horse." The hijab-wearing stand-up comic Shazia Mirza is from this country, where a political advertisement overlaid a photograph of Muslim refugees with the words "Breaking Point." Before joining ISIS, "Jihadi John" lived in this country, where the Brazilian man Jean Charles de Menezes (meh-NEE-zis) was wrongly killed by police after a 2005 terror attack. In 2016, this country's capital city elected its first Muslim mayor, Sadiq Khan. For 10 points, in what country did fear over Muslim refugees partly motivate the Brexit campaign?
ANSWER: **United Kingdom** of Great **Britain** and Northern Ireland [accept either underlined portion; or **U.K.**; accept **England**]

5. In Act II of the work this character appears in, he notices a buzzard flying over his hometown and sings for it to fly away. He asks his partner to "sing and dance for two instead of one" in a duet with the refrain "morning time and evening time and summertime and wintertime." Whenever this character is happy, a leitmotif reminiscent of his song "I Got Plenty o' Nothing" plays. The work this character appears in ends with him loading his goat cart and vowing to go to New York City. This character repeats the phrase "you is" in an aria that tells his lover "you is my woman now." A DuBose Heyward novel and play are titled for this resident of Catfish Row, who loses his lover to the drug dealer Sportin' Life. For 10 points, name this title character of a George Gershwin opera who loves Bess.
ANSWER: **Porgy**

6. The horns on a Pake (payk) doublet occur where this quantity is either parallel or perpendicular to the EFG tensor. In the lab frame, the tip angle is defined with respect to this quantity, which, by convention, points along the z-axis. In continuous wave spectroscopy, this quantity is varied at constant frequency. Shimming homogenizes this vector quantity. Di·polar broadening is minimized when the angle between it and a solid sample is 54.74 degrees, or the magic angle. The energy difference between two spin states is this quantity times the gyromagnetic ratio times h-bar. The local value for this quantity decreases in aromatic compounds, giving them high chemical shifts since their protons are shielded. Nuclear spins precess about this vector in NMR. For 10 points, name this quantity measured in teslas.
ANSWER: external **magnetic field** [or **B**; or **H**; or **B-nought**; or **H-nought**; prompt on field strength; prompt on external field strength]

7. A man not known for writing in this language used it in a letter stating a desire to "drill one hole after another" into language until "that which lurks behind" begins "seeping through." This language, which is not French, was used to write a play in which M, W1, and W2 appear in "funeral urns." Eric Bentley translated into English a play written in this language that centers on a dispute following the insurrection of the "Fat Prince," with the dispute being resolved when Azdak orders two women to pull a child. Samuel Beckett's *Play* was written in this language, which was used for a play in which Swiss Cheese dies during the Thirty Years' War. For 10 points, in what language were *The Caucasian Chalk Circle* and *Mother Courage and Her Children* written by Bertolt Brecht?
ANSWER: **German** language [or **Deutsch**]

8. The Biblioteca Ambrosiana in Milan holds a lock of this woman's hair from which Lord Byron stole a single strand. Allegations of an affair involving this woman that may have produced the *Infans Romanus* led to her maid Pantiselia and the chamberlain Perotto Calderon being found dead in a river. Johann Burchard chronicled events in the life of this woman, who was widowed when Micheletto Corella assassinated her husband, a prince of Naples named Alfonso of Aragon. This daughter of Vannozza dei Cattanei (kah-tah-NAY-ee) feuded with Isabella d'Este while married to Alfonso I, Duke of Ferrara. She was rumored to own a hollow ring that she used to poison her enemies. Cesare (chuh-ZAH-ray) was the brother of, for 10 points, what woman whose father, Rodrigo, was better known as the scandalous Pope Alexander VI?
ANSWER: **L**ucrezia **Borgia** [prompt on "Borgia"]

9. One of these structures is sometimes depicted on the head of a syncretic form of Saraswati known as Benzaiten (ben-zye-ten). One of these structures sits atop a large rock that is "married" to a smaller rock by a large, elaborately knotted rope. Depending on the tradition, the beginning of a *sando* (sahn-doh) is marked by either a *sanmon* (sahn-mohn) or this similar but simpler structure. These structures, which are typically either unpainted or painted vermilion and black, may have evolved out of the tradition of hanging rice straw rope. They are named for "sacred birds" and typically consist of two pillars topped by an upper lintel and a lower tie beam. For 10 points, what structures, which provide a transition to the sacred environs of a Shinto temple, are traditional Japanese wooden gates?
ANSWER: **torii** gates [prompt on "gates" before "gates"]

10. The writing of this text is depicted in the right panel of an altarpiece housed in a hospital in Bruges, in which its author looks at an inset circle showing a red-cloaked man. A painting once titled *Profane Love* was retitled for an event from this text and was cut down to a relatively square shape, removing an upper portion that may have depicted divine love. An entry in a set of 15 prints inspired by this text depicts two disembodied pillars that are positioned to look like the legs of a ray-encircled face that commands a man to eat a book. Various depictions of "Death on a pale horse" and El Greco's *Opening of the Fifth Seal* depict events from, for 10 points, what biblical book, which inspired Albrecht Dürer's engraving *The Four Horsemen of the Apocalypse*?
ANSWER: Book of **Revelation** [prompt on "Bible" or "New Testament" before "biblical"; do not accept or prompt on "(Book of) Revelations"]

11. In 1933, Daniel Katz and Kenneth Braly documented these constructs in "one hundred college students" who were asked to sort a list of 84 adjectives. Greg Walton and Geoffrey Cohen demonstrated the namesake "lift" or "boost" of these constructs in an experiment in which students were told information about other students. Joshua Aronson and Claude Steele conducted a study to see whether students would react to these constructs when taking a verbal GRE test that was described as either a diagnostic of intellectual ability or a laboratory study. A situation in which a person feels pressured to conform to these intergroup attitudes is known as their namesake "threat." For 10 points, name these beliefs or thoughts about a particular group of individuals, which can be positive or negative.
ANSWER: **stereotype**s [accept **stereotype** threat; accept more specific answers mentioning **stereotype**s such as racial **stereotype**s or national **stereotype**s; do not accept or prompt on "prejudice" or other putative synonyms]

12. Lisel Mueller wrote that, among postwar Germans who did this activity, she was "a Briar Rose, a Rip Van Winkle, / a stranger to the beginnings / they make from the stench of evil." W. H. Auden wrote that this activity only "survives / in the valley of its making" and "makes nothing happen." In the same work, Auden wrote that "Mad Ireland hurt" the title person into doing this activity, allowing that man to "teach the free man how to praise." A work titled for this activity claims that, if you demand both its raw material "in all its rawness" and that which is genuine, you are interested in this activity. Its performers are described as "literalists of the imagination" who create "imaginary gardens with real toads in them." Marianne Moore wrote "I too dislike it" about, for 10 points, what type of writing?
ANSWER: **poetry** [accept word forms such as writing **poem**s; accept equivalents such as writing **verse**; prompt on "writing" or equivalents/word forms before "titled" and do not accept or prompt thereafter]

13. The "shaft" type of this quantity is the amount of this quantity over and above its "flow" type. For a polytropic process with "n equals one," (read slowly) "P V natural log of V2 over V1" is the "boundary" type of this quantity. In statics, the total virtual example of this quantity is zero if a system in equilibrium undergoes a virtual displacement. In thermodynamics, the magnitude of this quantity can be defined as pressure integrated with respect to volume. Planck's constant times the frequency of incident light minus the value for a function denoted by this term is the maximum kinetic energy of an electron emitted from a metal in the photoelectric effect. For a conservative force acting on an object, it is equal to the negative of the change in potential energy. For 10 points, what quantity is defined as the dot product of a force acting through a displacement or, more simply, as force times distance?
ANSWER: **work** [accept shaft **work** or flow **work** or **work** function]

14. After Cúchulainn (koo-KULL-en) broke one of these objects belonging to Scáthach's (SKAH-tahk's) daughter Uathach (WAH-tahk), Cochar Croibhe (KOH-kar CROY-vuh) challenged him to a duel and was quickly killed by Cúchulainn's javelin. In the *Mabinogion*, Taliesin tricks Rhun into taking one of these body parts from a maid in order to prove the infidelity of Elphin's wife. Objects of this type belonging to the Inuit goddess Sedna became seals and whales when her father Anguta forced her off his boat. An epithet for the dawn goddess Eos describes these body parts as "rosy." An Irish hero gained wisdom after burning one of these body parts while cooking the Salmon of Knowledge. In Greek mythology, these body parts name a race of smiths and magicians called the Dactyls. For 10 points, name these body parts, examples of which include Finn MacCool's thumb.
ANSWER: **finger**s [accept specific fingers such as index **finger**; accept rosy-**finger**ed; accept **thumb**s before "thumb"]

15. A ballet dedicated to this composer opens with a section titled "Preghiera" (preh-gee-"AIR"-ah) with music based on Franz Liszt's transcription of this composer's *Ave verum corpus*. Chopin wrote a set of variations based on one of this composer's works that inspired Robert Schumann to exclaim "Hats off, gentlemen! A genius!" This composer's third of five known violin concertos is in G major and is sometimes nicknamed for its "Strasbourg" theme. This composer of an A-major clarinet concerto for Anton Stadler wrote a sacred work with a second movement *Kyrie* (KEER-ee-ay) that contains a D-minor double fugue. He wrote only eight bars of that piece's *Lacrimosa*, which was finished by Franz Süssmayr. For 10 points, name this Austrian prodigy who composed 27 piano concertos and an unfinished *Requiem*.
ANSWER: Wolfgang Amadeus **Mozart** [or Johannes Chrysostomus Wolfgangus Theophilus **Mozart**]

16. Overly dense regions in the primordial plasma are surrounded by spherical shells of acoustical oscillations denoted by this term that serve as standard rulers. Sphaleron transitions can convert a fraction of a number denoted capital L into a number named for this term. WMAP (w-"map") set as 0.024 the critical energy density described by this term times the square of the dimensionless Hubble parameter, small h. The abundance of elements due to big bang nucleosynthesis is determined using the eta parameter, the ratio of particles of this type to photons. Only about 4% of the universe's energy density is from matter made of particles of this type, whose creation is the subject of the Sakharov conditions. For 10 points, what type of particles contain three quarks and are exemplified by protons and neutrons?
ANSWER: **baryon**ic [accept **baryon**s or **baryonic** matter; prompt on "normal (matter)"]

17. An essay about this country anecdotally defines its archetype of the "Ultimate Peasant" before describing how changes in this country's culture affected the essayist Richard Cobb. The careers of three singers from this country are detailed in the essay "Spending Their Deaths on Holiday," which is included in a collection about this country's culture entitled *Something to Declare*. The word "howcanaystinksotho" ("how can ay stink so though") is Barbara Wright's attempt at translating the first word of a novel from this country. Gilbert Adair's translation of a novel from this country preserves its lipogram of avoiding the letter "e." In a novel by Julian Barnes, Geoffrey Braithwaite travels this country in search of a certain author's stuffed parrot. For 10 points, name this home country of Raymond Queneau (kuh-noh), Georges Perec, and Gustave Flaubert.
ANSWER: **France** [or **French Republic**; or *République française*]

18. At Ville-sur-Ancre (VEEL-soor-AHN-cur), Frederick Spring had Harry Farr executed for this offense, but modern-day historians believe that Farr may have been suffering from hyperacusis ("hyper"-ah-KYOO-sis). This offense titles a "brief history" written by Chris Walsh. Of the 346 men commemorated by the Shot at Dawn Memorial, 18 were executed for this offense, which was symbolized by white feathers. In 2006, the United Kingdom posthumously pardoned soldiers who were executed during World War I for desertion, forms of disobedience, and this offense. During the Sicily campaign of World War II, George Patton slapped soldiers hospitalized for shell shock because they were supposedly exhibiting the trait associated with this offense. For 10 points, name this failure to display courage in the face of the enemy.
ANSWER: **cowardice** [accept word forms such as being **coward**s or **cowardly**; accept *Cowardice: A Brief History*; prompt on "shell shock" or "refusing to fight" or equivalents]

19. Fred Dretske (DRET-"ski") used the example of the possibility of a zebra being a cleverly disguised mule to illustrate his "relative alternatives" theory of this concept. Like Dretske, Saul Kripke (KRIP-"key") contended that this concept is not "closed" under a closure principle and critiqued another philosopher's reliabilist theory of this concept, which was put forth in the book *Philosophical Explanations*. The definition of this concept is questioned in a scenario in which a job applicant believes that a man with ten coins in his pocket will get the job but doesn't realize that the man is himself. Robert Nozick developed a "truth-tracking" theory of this concept, which is the subject of "Gettier problems" that question Plato's definition of it as "justified true belief." For 10 points, name this concept studied in epistemology.
ANSWER: **knowledge** [accept **knowing** or other answers mentioning forms of the word **know**]

20. The so-called "Robin Hood" of this river led an 1859 uprising that was put down by Captain "Rip" Ford's militia. Two states argued over the course of this river in the Country Club dispute. The Cortina disturbances occurred in this river's valley, which is also where Seth Thornton's patrol was ambushed. A regiment of buffalo soldiers stationed on this river allegedly killed a white bartender and were dishonorably discharged by Theodore Roosevelt. In the 1960s, a section of this river was forced into a concrete channel to resolve the Chamizal border dispute. A skirmish near this river inspired Abraham Lincoln's "Spot Resolutions." Zachary Taylor's army marched to this river in order to provoke a war with Santa Anna's country. For 10 points, what river separates Texas from Mexico?
ANSWER: **Rio Grande** [or **Rio Bravo** del Norte; do not accept or prompt on the "Nueces River"]

TB. A Norrish–Yang photoreaction forms a ring containing this many carbons. When UV light reacts with pyrimidines, it forms rings of this size. Ring D of taxol contains this many atoms. Counting the metal, the mechanism of a Ziegler–Natta catalyst forms a ring of this many atoms. The cyclo·alkane of this size puckers between two "butterfly" configurations. Rings of this size are the smallest described by the Woodward–Hoffmann rules. Tri·phenyl·phosphine oxide is formed by the rearrangement of a cyclic intermediate of this size in the Wittig reaction. The simplest antiaromatic hydrocarbon is a ring with this number of atoms. Beta-lactam antibiotics have a reactive central ring of this many atoms. Steroids have this many fused rings. For 10 points, give this number of carbons in cyclobutane.
ANSWER: **four**

1. *It's All True,* the MoMA's recent retrospective of Bruce Conner, included a film titled *Crossroads* that depicted the explosion of one of these objects, with footage taken from unmanned military cameras. For 10 points each:
[10] Name these weapons, one of which Major Kong rides to his death at the end of *Dr. Strangelove,* a film subtitled for "how I learned to stop worrying and love" this kind of weapon.
ANSWER: **atom**ic **bomb**s [accept **atomic weapon**s or **A bomb**s or **nuclear weapon**s or **nuclear bomb**s or **hydrogen bomb**s or **H bomb**s or similar equivalents; prompt on "**bomb**s" or "the **bomb**"]
[10] Music by this minimalist composer appears in *Crossroads* as well as in *Looking for Mushrooms,* in which Conner wanders through hillsides in search of psilocybin (sill-oh-"SIGH"-bin). He also wrote *In C* and *A Rainbow in Curved Air.*
ANSWER: Terry **Riley** [or Terrence Mitchell **Riley**]
[10] Conner's *Report* is a montage of found footage about this event, interspersed with newsreel countdowns. In *Full Metal Jacket,* Gunnery Sergeant Hartman boasts that the perpetrator of this event was a former Marine.
ANSWER: **assassination** of John F. **Kennedy** [accept equivalents mentioning the **killing** or **death** of John Fitzgerald **Kennedy** or **JFK**]

2. This construct can be defined using alternating Turing machines designated "big sigma sub k" and "big pi sub k." For 10 points each:
[10] The union of all complexity classes in what construct constitutes the class PH? This construct collapses completely if P equals NP.
ANSWER: **polynomial hierarchy** [or **polynomial-time hierarchy**]
[10] If P does equal NP and the polynomial hierarchy collapses, then NP must equal co-NP, which contains all the problems that hold this relationship to the problems in NP. In logic, this operation on P gives "not-P."
ANSWER: logical **complement** [or **negation**]
[10] Using De Morgan's laws, what is the equivalent expression for the (read slowly) complement of the conjunction of propositions P and Q? Be sure to clearly indicate which operations apply to which variables.
ANSWER: the **disjunction of** the **complement of P** and the **complement of Q** [or **not P or not Q**; or obvious equivalents such as the **disjunction of** the **negation of P** and the **negation of Q**; do not accept "the complement of the disjunction of P and Q" or "(the disjunction of) not P and Q" or "not P and not Q" alone]

3. This philosopher wrote that most men waste their time pursuing meaningless things in his essay "On the Shortness of Life." For 10 points each:
[10] Name this Stoic philosopher who tried to teach Nero the difference between a good ruler and a tyrant in his *De Clementia*. Nero eventually repaid this man by having him executed.
ANSWER: **Seneca** the Younger
[10] Seneca's *De Clementia* is often considered one of the first "mirrors" for people in this position. This is also the title rank of a Machiavelli tome that was also about being a good ruler.
ANSWER: **prince**s [accept mirror(s) for **prince**s or The *__Prince__* or Il *__Principe__*]
[10] "On the Shortness of Life" is one of the "moral letters" that Seneca addressed to this man, to whom Seneca also wrote letters discussing "asthma and death" and the "allegiance to virtue."
ANSWER: **Lucilius** [accept **Lucilium** or *__Moral Letters to Lucilius__* or *__Epistolae morales ad Lucilium__*]

4. Like the Phoenix Park murders, this event was linked to Charles Parnell through a set of forged letters that Richard Pigott published in *The Times*. For 10 points each:
[10] Name this subject of Christy Campbell's *Fenian Fire*, a conspiracy in which Clan na Gael member Francis Millen was likely recruited by the British secret service to orchestrate a false-flag bombing of Westminster Abbey.
ANSWER: **Jubilee** Plot
[10] The bombing of Westminster Abbey would have targeted this British queen as she celebrated her Golden Jubilee, 26 years after the death of her husband, Prince Albert.
ANSWER: Queen **Victoria** [or Alexandrina **Victoria**]
[10] This earlier event occurred when Lord Melbourne tried to resign as prime minister, forcing Victoria to ask Robert Peel to succeed him; Peel eventually refused after demanding that Victoria dismiss a number of her ladies-in-waiting.
ANSWER: **Bedchamber Crisis** [prompt on "**Bedchamber**"]

5. Answer the following about the eco·criticism movement in literature, for 10 points each.
[10] Many trace the modern ecocriticism movement to the publication of this 1962 book by Rachel Carson, which describes the environmental impacts of the indiscriminate use of pesticides like DDT.
ANSWER: ***Silent Spring***
[10] This proto-ecocritical author was a longtime professor at the University of Wisconsin who advocated for a "land ethic" in his 1949 book, *A Sand County Almanac*.
ANSWER: Aldo **Leopold**
[10] This Welsh Marxist literary critic said that "nature" was "perhaps the most complex word in the [English] language" in his 1976 book *Keywords*. His 1973 text *The Country and the City* is central to the ecocritical aim of making pastoral nature writing politically radical rather than conservative.
ANSWER: Raymond **Williams** [or Raymond Henry **Williams**]

6. In the wake of the Fourth Crusade, Othon de la Roche (oh-"TONE" "de la" ROHSH) set up a state based around this city, from which his son fought the War of the Euboeote (YOO-bee-oht) Succession. For 10 points each:
[10] Name this Greek city that was captured by the Catalan Company after the Battle of Halmyros. This city became the Greek capital in 1834 and remains the capital today.
ANSWER: **Athens** [accept Duchy of **Athens**]
[10] While serving as Despot of the Morea, this Byzantine ruler subjugated Athens by defeating its ruling Florentine Acciaioli (AH-chee-"eye"-OH-lee) family. As emperor, he died defending Constantinople from the Ottomans in 1453.
ANSWER: **Constantine XI** Dragases Palaiologos [accept **Constantine Palaiologos** or **Constantine Palaeologus**; prompt on "**Constantine**"]
[10] Much earlier, the Byzantines fitted this Athenian marble structure with a church bell. Andronicus of Cyrrhus (KEE-russ) built this meteorological station that featured a water clock and is named for the figures that appear on its frieze.
ANSWER: **Tower of the Winds** [accept **Aerides**; prompt on "**Horlogion**" of Adronikos Kyrrhestes]

7. This poem's speaker vows not to "cease from mental fight" until we have built the title city "in England's green and pleasant land." For 10 points each:
[10] Name this poem that denounces the country's "dark Satanic Mills" and opens "and did those feet in ancient time / walk upon England's mountains green?" It was written as a preface to its author's epic *Milton: A Poem*.
ANSWER: "**Jerusalem**"
[10] This English poet and artist wrote "Jerusalem." Northrop Frye's study of this author, *Fearful Symmetry*, takes its title from this man's poem "The Tyger."
ANSWER: William **Blake**
[10] In the third stanza of "Jerusalem," the speaker calls on the addressee to bring to him "my bow of burning gold," "my arrows of desire," "my spear," and this object, which is denoted by a three-word phrase taken from 2 Kings 2:11 ("Second Kings chapter 2, verse 11").
ANSWER: **chariot of fire** [accept **chariots of fire**; prompt on "**chariots**"]

8. By one account, this object was broken when Tristan struck the Irish knight Marhaus (mar-OHS) in the head, leaving a piece of steel in the man's skull that was later used by Iseult (is-OOLT) to discover Tristan's identity. For 10 points each:
[10] Name this crown jewel of the U.K., a sword notable for having a blunt and squared end. A different account of its shape is that an angel broke off the tip as Ogier the Dane was about to strike Charlemagne's son.
ANSWER: **Curtana** [or **Cortana**; accept **Sword of Mercy**]
[10] In the matter of France, Curtana was forged from the same material as Joyeuse (zhwah-"USE"), the sword of Charlemagne, and Durendal, which belonged to this paladin. In his namesake *chanson de geste* (shahn-SOHN de ZHEST), he dies blowing his olifant horn.
ANSWER: **Roland** [or **Hruodland**; accept **Orlando**]
[10] A broken sword in the matter of Britain was owned by the Fisher King and repaired by this knight, whose imperfections left a fracture in the mended blade. Like Bors and Galahad, this knight achieved the Grail quest.
ANSWER: Sir **Percival** [or Sir **Percivale**; or Sir **Parzival**]

9. *Note: do not read alternate answers.* This technique can be used to solve the integral over all reals of "sine of x over x" by introducing a factor of "e to the minus b x" and trimming the integral to be between zero and plus infinity. For 10 points each:
[10] What technique uses the fact that you can take the total derivative of an integral of a two-parameter function by taking the integral of the partial derivative of the integrand?
ANSWER: **differentiation under the integral** sign [accept equivalents such as taking the **differential under the integral sign**; or **differentiation with respect to a parameter**; or **Leibniz** integral **rule**; or **Feynman integration**]
[10] Differentiation under the integral sign was praised in this physicist's memoir. He developed diagrams that depict the interactions of subatomic particles using arrows and squiggly lines.
ANSWER: Richard **Feynman** [or Richard Phillips **Feynman**]
[10] A photon would be represented as a squiggly line on a Feynman diagram in what field theory?
ANSWER: **quantum electrodynamics** [or **QED**; prompt on "QFT"]

10. Seiji (SAY-jee) Ozawa served as the longtime music director for an orchestra based in this city, which has summer performances at Tanglewood. For 10 points each:
[10] Name this city home to an orchestra now headed by Andris Nelson. A second orchestra in this city was at one point led by film conductor John Williams.
ANSWER: **Boston**
[10] This surname is shared by a longtime conductor of the Boston Pops named Arthur and a conductor of the Boston Symphony Orchestra named Max. Despite sharing a surname, they were not related.
ANSWER: **Fiedler** [accept Arthur **Fiedler** or (August) Max **Fiedler**]
[10] This American conductor studied at Tanglewood under Serge Koussevitzky (SAIRZH koo-seh-VIT-"ski") He composed music for the operetta *Candide* and the musical *West Side Story*.
ANSWER: Leonard **Bernstein**

11. This woman was elected president of the Indian National Congress in 1917, after which she traveled to the U.S. with an adopted Indian son whom she claimed was both the Messiah and the reincarnated Buddha. For 10 points each:
[10] Name this coauthor of the book *Occult Chemistry*. She led a splinter faction of a mystical religious group after the death of Helena Blavatsky (blah-VAHT-"ski").
ANSWER: Annie **Besant** (BESS-unt) [or Annie **Wood**]
[10] Besant was an influential modern leader of this occult religious sect, which is based on Blavatsky's *The Secret Doctrine* and draws on ancient eastern wisdom.
ANSWER: **theosophy** [accept word forms such as **theosophical**; accept **Theosophical** Society]
[10] The Theosophical Society's emblem includes a six-pointed star surrounding this symbol, which is the Egyptian hieroglyph for "life." Coptic Christians occasionally use this symbol, which looks like a cross with a loop on top.
ANSWER: **ankh** [or **crux ansata**]

12. Around 250 protesters advocating this country's independence were killed in the Santa Cruz cemetery massacre. For 10 points each:
[10] Name this modern-day country where FRETILIN (freh-tee-leen) and its military wing, Falintil, resisted a foreign occupation. This country finally achieved independence in 2002.
ANSWER: **East Timor** [or Democratic Republic of **Timor-Leste**]
[10] The Indonesian occupation of East Timor began during the rule of this dictator. He overthrew his predecessor, Sukarno, in a 1965 CIA-backed coup.
ANSWER: **Suharto** [or Haji Muhammad **Suharto**]
[10] As FRETILIN's permanent representative to the U.N. during the Indonesian occupation, this activist brought East Timor's cause to global attention. This cowinner of the 1996 Nobel Peace Prize was president of East Timor from 2007 to 2012.
ANSWER: Jose **Ramos-Horta** [or Jose Manuel **Ramos-Horta**]

13. Answer the following about trap houses in rap music, for 10 points each.
[10] This one-eyed artist raps that he's "in love with the money" and "ain't never letting go" in his 2014 hit "Trap Queen."
ANSWER: **Fetty Wap** [accept either underlined portion; or Willie **Maxwell** II]
[10] This man's debut album, *Trap House*, contains the single "Icy," a collaboration between Boo, Young Jeezy, and this man.
ANSWER: **Gucci Mane** [prompt on partial answer; or Radric Delantic **Davis**]
[10] This artist called himself the "Rubber Band Man" on a single that appeared with "Be Easy" and "24's" on his 2003 album, *Trap Muzik*.
ANSWER: **T.I.** [or **Tip**; or Clifford Joseph **Harris** Jr.]

14. The constant reappearance of circus posters in this short story prefigures the death of two of the central characters in an accident with a circus truck. For 10 points each:
[10] Name this short story in which the narrator, Victor, relates his memories of a fleeting love affair with a woman named Nina, whom he encounters after several years in a Mediterranean resort town.
ANSWER: "**Spring in Fialta**" [or "**Vesna v Fial'te**"]
[10] This author, whose early novels include *King, Queen, Knave* and *The Luzhin Defence*, wrote the story "Spring in Fialta."
ANSWER: Vladimir **Nabokov** [or Vladimir Vladimirovich **Nabokov**]
[10] Nabokov included a discussion of Russian poetic meter titled *Notes on Prosody* as an appendix to his translation of and commentary on *Eugene Onegin*, a poem by this Russian author of *The Bronze Horseman*.
ANSWER: Alexander **Pushkin** [or Alexander Sergeyevich **Pushkin**]

15. Answer the following about cancer staging, for 10 points each.
[10] The widely used TNM staging system considers the number of these structures that have been invaded by the cancer. B and T cells congregate in these structures, which characteristically swell when the body is infected.
ANSWER: **lymph node**s [prompt on "**node**s" or "**lymph**atic system"]
[10] Staging for this cancer uses the FIGO (FEE-go) system rather than TNM. Henrietta Lacks had this cancer, which is the source of her immortalized HeLa (HEE-luh) cells. Unusually, this cancer is almost always caused by a viral infection.
ANSWER: **cervical** cancer [accept answers such as cancer of the **cervix**]
[10] A non-invasive liquid biopsy for cancer staging that is growing in popularity uses this substance as a biomarker. This substance, which is extracted from the serum, can be rapidly screened with Next-Gen sequencing.
ANSWER: **circulating tumor DNA** [or **ctDNA**; or **cell-free DNA**; or **circulating DNA**; prompt on DNA or deoxyribonucleic acid; prompt on tumor DNA; prompt on cDNA]

16. For 10 points each, answer the following about eugenics in the U.S.
[10] This state's forced sterilization policies were upheld by the Supreme Court's decision in *Buck v. Bell*. Its antimiscegenation laws were overturned in a 1967 case brought by Richard and Mildred Loving.
ANSWER: **Virginia** [or Commonwealth of **Virginia**]
[10] This activist defended eugenics in her speech "The Morality of Birth Control." This cofounder of Planned Parenthood was fined under the Comstock Act for sending information about abortion through the mail.
ANSWER: Margaret **Sanger** [or Margaret **Higgins** Sanger; or Margaret Sanger **Slee**]
[10] In the 1942 *Skinner* case, the Supreme Court ruled that this state's compulsory sterilization laws violated the 14th Amendment's equal protection clause. It was governed for most of the Great Depression by "Alfalfa Bill" Murray, who fought the "Toll Booth War" with its southern neighbor.
ANSWER: **Oklahoma** [accept *Skinner v. **Oklahoma***]

17. Rajnish Mehra and Ed Prescott coined the name for a "puzzle" referring to the fact that, historically, there has been an anomalously higher return on stocks than on government bonds. For 10 points each:
[10] That puzzle is named for this quantity, which can be defined as the difference between the expected return on a stock and the risk-free rate. It is generally accepted to be in the range of 3-7% per year.
ANSWER: **equity premium** [or equity **risk premium**; accept market **risk premium** or **equity premium** puzzle or **equity risk premium** puzzle]
[10] The risk premium on the market is an important input in this model, which uses a measure of volatility called "beta" to calculate the rate of return.
ANSWER: **capital asset pricing** model [or **CAPM**]
[10] The CAPM can help accomplish this process, in which a portfolio's assets are varied to reduce risk.
ANSWER: **diversification** [accept forms of the word **diversify**; do not accept or prompt on "hedging"]

18. In this novel, a publisher named Rick Vigorous receives a story about a man with "second-order vanity," meaning that, in addition to being vain, he is also "vain about appearing to have an utter lack of vanity." For 10 points each:
[10] Name this novel about Lenore Beadsman, who owns a talking bird named Vlad the Impaler and tries to find out what happened to her missing grandmother, who has escaped from her nursing home.
ANSWER: The ***Broom of the System***
[10] In *The Broom of the System*, Lenore travels to this state to visit her brother, who is nicknamed "Antichrist." In another novel, this state is home to a radio show hosted by the Prettiest Girl of All Time, Joelle van Dyne, as well as to the Enfield Tennis Academy.
ANSWER: Commonwealth of **Massachusetts**
[10] Both *The Broom of the System* and the other aforementioned novel, *Infinite Jest*, were written by this American author, whose *The Pale King* was published posthumously in 2011.
ANSWER: David Foster **Wallace** [accept **DFW**]

19. This artist is the subject of the memoir *Joe* by Ron Padgett, who grew up with him in Tulsa, Oklahoma. For 10 points each:
[10] Name this American visual artist who wrote the memoir *I Remember* and was the lover of the poet Kenward Elmslie. He created many assemblages and collages before dying of AIDS in 1994.
ANSWER: Joe **Brainard**
[10] Brainard and Padgett were both members of an artistic and literary movement named for this city. Andy Warhol's studio, The Factory, was located on East 47th Street in this city.
ANSWER: **New York** City [or **NYC**; accept **New York** School]
[10] Several of Brainard's paintings and collages, including one that includes depictions of Good 'n Fruity candies and wrappers, depict this artistic subject, who is called *Theotokos* in Byzantine art.
ANSWER: **Madonna** [or Virgin **Mary**]

20. The prototypical example of these equations estimates the rate of ionization of a benzoic acid derivative and was used as the basis for Hammett's acidity scale. For 10 points each:
[10] Name this class of equations that predict the rate of a reaction to be directly proportional to constants representing substituents and the type of reaction. Brønsted's catalysis equation is another example of one.
ANSWER: linear **free-energy relationship**s [or L**FER**s]
[10] A substituent with Hammett rho greater than zero is one of these groups. Nitro and carboxyl are examples of these highly electronegative groups that decrease electron density in the ring and act as meta-deactivators in EAS.
ANSWER: **electron-withdrawing** groups [or **EWG**s]
[10] In Brønsted's equation, the ionization rate is linearly related to this quantity symbolized K. By the law of mass action, it equals the molarity of the products over the molarity of the reactants, where each concentration is raised to its stoichiometric coefficient.
ANSWER: **equilibrium constant** [or **acid dissociation constant**]

Extra. In this novel, the artist Jed Martin begins a relationship with Olga Sheremoyova after telling her that he has taken over 800 photographs of Michelin travel guides. For 10 points each:
[10] Name this novel in which Jed becomes famous by painting his Series of Simple Professions. One portrait in the series depicts this novel's author, Michel Houellebecq (whell-beck), who is murdered in his home by a thief using a laser cutter.
ANSWER: The **Map and the Territory** [or La **carte et le territoire**]
[10] In a story by this author, Roberto Michel takes a photograph of what he believes to be a blonde woman seducing a teenage boy. This Argentinian author of "Blow-Up" also wrote the stories "Continuity of Parks" and "Axolotl" (AX-uh-LOT-ull).
ANSWER: Julio **Cortázar** [or Jules Florencio **Cortázar**]
[10] In Ian McEwan's *Amsterdam*, Vernon Halliday obtains photographs of Julian Garmony cross-dressing. Garmony is preparing to vie for this governmental position, which was held by Tony Blair when *Amsterdam* was published.
ANSWER: **prime minister** of the United Kingdom [accept **PM**]