

1. Examples of these organisms include *Sordes Pilosus* , which is so-named because it is covered in pycnofibres. The *propatagium* and *brachiopattagium* are two types of membranes that comprise these organism's most notable features. Large examples of these organisms include *Rhamphorrhynchus* , and what is possibly the world's largest example, (*) *Quetzalcoatlus* . Fossilized remains of baby types of these animals are called flaplings, which were discovered alongside a species of *archaeopteryx* , an animal with which they are sometimes confused. For 10 points, name these dinosaurs whose wings are supported by their fingers.

ANSWER: pterodactyls [or pterosaurs or pteranodon or pterodactylus or pterodactyloids; prompt on "dinosaurs" and "flying dinosaurs"]

<Jose>

2. One religious group left this country to settle on Mount Athos and believed that the name of God is God himself. This is the easternmost country where the forged *Book of Veles* inspires neopaganism. Religious symbols from this country include a slanted beam at the low end of a three-bar cross. A historic schism in this modern-day country resulted from reducing the seven prosphora to five and the use of a two-fingered Sign of the Cross. The (*) Buryat shamans live in this country, which gave the term "shaman" to Europe. Old Believers were persecuted by Nikon, the Patriarch of its capital. Islam is still practiced by Kazan Tatars in this country. For 10 points, name this Orthodox Christian country where many onion domes sit atop Saint Basil's Cathedral.

ANSWER: Russian Federation [or Rossiyskaya Federatsiya; or Russian Empire]

<Jackson>

3. Both the menacing Doubtful Sound and Browne Falls can be found on this island's region of Fiordland. The Foveaux Strait separates this island from Stewart Island. Both the Heathcote and Avon River flow through this island's largest city, which sits near the Banks Peninsula. In 2011, this island's province of Canterbury was struck by a massive earthquake. This island, which is separated from its (*) northern counterpart by the Cook Strait, is known as the "canoe of Maui" in the Maori Language. The Southern Alps runs through portions of this island, and it is home to its country's second largest city, Christchurch. For 10 points, name this larger of New Zealand's two main islands.

ANSWER: South Island

<Jose>

4. This organism possesses GLR cells that aid in the development of its head muscles, and *daf-2* mutants of this organism are unusually long-lived. This organism unusually possesses holocentric chromosomes, and this organism expresses the *lin-4* micro RNA, which suppresses the expression of *LIN14* during development. Martin Chalfie's GFP experiments were originally done in this organism, as were Mello and Fire's experiments on (*) RNAi. Exactly 191 cells in this organism undergo apoptosis during its development, and this organism occurs in male and hermaphrodite sexes. Their use was popularized by Sydney Brenner, and they were the first organism to have their genome sequenced. For 10 points, name this model organism, a small nematode.

ANSWER: Caenorhabditis elegans [or C Elegans]

<Mukherjee>

5. E.P. Thompson identified these devices as the fundamental precursor of capitalism and the modern state. Julien Le Roy made these devices for King Louis XV, and Richard of Wallingford spent over 30 years creating one of these devices in St. Alban's. The earliest forms of these devices most likely made use of a verge-and-foiled escapement. John Harrison won a prize for designing these devices to solve the problem of (*) longitude. Digital forms of these devices make use of crystal oscillators, and Abraham-Louis Perrelet improved one of these devices to reduce the amount of winding necessary. For 10 points, name these devices, a large one of which can be seen on the face of London's Big Ben.

ANSWER: clocks [or watches; or chronometers; or astronomical clocks; or timepieces]

<Bentley>

6. While on a journey, this character encounters a drunkard who drinks to forget, but he has already forgotten what he wants to forget. Earlier, this figure meets a powerless king who is able to make the sun set, but only at 7:40 pm. Before climbing the tallest mountain on earth only to see how desolate it is, this character meets a snake who offers to bite him in the ankle. Three volcanoes can be found in this character's home, who meets and tames a fox who explains to him why his favorite (*) rose is special. The work in which he appears is framed largely as a conversation between him and a crashed pilot in the Sahara. For 10 points, name this boy who lives on a baobab-infested asteroid, the title character of a novella by Antoine de Saint-Exupéry.

ANSWER: the little prince [or le petit prince; prompt on "the prince"]

<Jose>

7. A massive imperial institution of this type, the *Siku Quanshu*, was created by Qianlong. Celsus founded one of these institutions with a still-extant facade in Ephesus. Local towns were given the tax authority to create these by an 1850 Act of Parliament. The popularity of the "triple-decker" in Britain is traced to the for-profit chain of them established by Charles Edward Mudie. Callimachus wrote the *Pinakes* as a (*) guide to one of these institutions established by the Ptolemies that may have been accidentally destroyed by Caesar. One of these institutions in the U.S. had to be replenished after the War of 1812 from the personal stock of Thomas Jefferson. For 10 points, name these scholastic institutions whose historical examples include a "Great" one of Alexandria.

ANSWER: Public Lending Libraries [or Public Library or Research Library; prompt on "book store" after "for-profit"; prompt on "treasury" ONLY before "Celsus" since *Siku Quanshu* is often translated as "Great Treasury," even though it means in the sense of holding treasure (ie knowledge) and was only ever a library]

<Bentley>

8. This novel's two epigraphs are from Eliot's *Family Reunion* and Melville's "Benito Cereno". In its first chapter, a "magnificent blonde" with an American flag tattooed on her stomach dances for a group of boys. One character in this novel is repeatedly mistaken for someone named "Rinehart" while heading to Brother Hambro's apartment after the funeral of (*) Tod Clifton. This novel's protagonist shows Mr. Norton the incestuous Jim Trueblood, angering Dr. Bledsoe, who expels him from a prestigious black college. This novel's narrator is injured in an explosion at Liberty Paints, lives in a room lit by 1,369 light bulbs, and works in Harlem for the Brotherhood, an organization opposed by Ras the Exhorter. For 10 points, name this novel by Ralph Ellison.

ANSWER: Invisible Man [do NOT accept "The Invisible Man"]

<Mehigan>

9. In a Phrygian scale on B, the only black key is this scale degree. Three movements of Bruckner's symphony of this number begin with pizzicato. Tchaikovsky's symphony of this number opens with a low clarinet solo in the home key of E minor. Mozart's violin concerto of this number is subtitled "Turkish". Diminishing an interval of this number produces a (*) tritone. The finale of Mendelssohn's symphony of this number opens with a solo flute playing "A Mighty Fortress Is Our God" and is subtitled "Reformation". Beethoven's symphony of this number ends triumphantly in C major, but begins with a "short - short - short - long" motif in C minor. For 10 points, name this number of a Beethoven symphony that opens with a "fate knocking on the door" motif.

ANSWER: 5 [or fifth]

<Lawrence>

10. A. J. Ayer analyzed this concept with the example of a serial lottery winner in his book titled for *The Problem of this concept*. The proper "growth" of this concept is assessed in Karl Popper's *Conjectures and Refutations*. A three-page paper about this concept examines such situations as Jones' ownership of a Ford and two people competing for a job application. *Theatetus* is a Platonic dialogue about this concept, whose definition causes "cow in the field" problems. Edmund Gettier refused to equate this thing with (*) justified true belief. Plato believed it always comes from the soul's recollection on previous lives. For 10 points, name this object of study in epistemology, a mental grasp on facts which Francis Bacon equated with power.

ANSWER: knowledge [accept justified true belief or justification until "justified" is read]

<Jose>

11. It's not the Deposition, but Pontormo painted a version of this scene split down the middle by an arched stained glass window and a tabernacle. A version of this scene by Botticelli features a pink floor with white grid lines and is called the *Cestello* version. This scene is the focus of the central panel of Robert Campin's *Merode Altarpiece*; it was also painted famously by (*) Fra Angelico. In most paintings of this scene, the performer of the title action is located on the left, and he often flies in on a cloud and holds a lily in his hand. For 10 points, identify this common scene in Christian art in which the archangel Gabriel informs the Virgin Mary that she will have a son.

ANSWER: Annunciation

<Rosenberg>

12. The oldest preserved poem in this language was apparently composed by an illiterate cowherd who learned to compose verse in a dream. Another poem written in this language is narrated by a dreamer who speaks to a piece of wood that praises the glory of God after it is used in the crucifixion. Caedmon's Hymn and *The Dream of the Rood* are written in this language. A different work written in this language details how the title figure's sword is (*) melted by the blood of a woman who is defeated when the protagonist dives into a lake and slays her. In that work in this language, a descendant of Cain continuously attacks the mead hall Heorot, which was constructed by King Hrothgar. For 10 points, identify this language used to write *Beowulf*.

ANSWER: Old English [prompt on "English", do NOT accept "Middle English"]

<Jose>

13. This animal's head was often seen on Saint Christopher in medieval icons. The nymph Maira was turned into a constellation depicting this animal. Their heads appeared with dolphin flippers on the bodies of the metalworking Telkhines. Zeus threw Mount Sipylus on Tantalus after Tantalus said he didn't have a golden one of these creatures, which was stolen by Pandareus. To resolve a paradox, one of these creatures was turned to (*) stone while chasing the Teumessian fox; that one was a gift from Zeus to Europa named Laelaps. Scylla's waist is ringed by six heads of this animal. Another of these creatures was captured for Heracles' twelfth labor. For 10 points, name these creatures, who include the underworld-guarding, three-headed Cerberus.

ANSWER: dogs [or hellhounds]

<Mukherjee>

14. A description of this place begins with an epigraph from Robert Burton's "Anatomy of Melancholy". Letizia Álvarez de Toledo has observed that this place is useless. This location was thrown into chaos by the search for the Vindications. Its denizens attach importance to the phrase "oh time thy pyramids" and bury the deceased by throwing them over railings. Items that can be found in this location include "The Combed Thunderclap" and (*) "Axaxaxas mlö". The narrator of a story about this place relates how the "Purifiers" destroyed objects while searching for the "Crimson Hexagon", one of its infinite number of hexagonal rooms containing all possible 410-page books. For 10 points, name this bookshelf-filled title locale of a short story by Jorge Luis Borges.

ANSWER: the Library of Babel [or La Biblioteca de Babel; prompt on "the Universe;" prompt on "the Library"]

<Mehigan>

15. Barker's equation is used to describe one phenomenon that occurs in this shape, and a rotating fluid in a container takes on this shape. In quantum mechanics, a potential of this shape gives rise to wavefunctions that are the product of a Gaussian function and a Hermite polynomial. In celestial mechanics, an object moving in this shape has velocity square root of two $G M$ over r , and capture orbits and escape orbits have this shape. A charge moving straight when entering a uniform electric (*) field will travel in this shape. Lenses in this shape so no spherical aberration, since they focus all parallel rays at a point. For 10 points, name this shape, which is also traced out by a projectile fired into the air at an angle with no air resistance.

ANSWER: parabolic [or parabola or paraboloid]

<Mukherjee>

16. Visitors can listen in on the Assembly Chamber in this city's City Hall while ascending its helical staircase; that hall resembles a misshapen egg. The headquarters for an insurance company in this city has its pipes and staircases on the outside according to a design by Richard Rodgers. Swiss Re commissioned the first ecologically-designed skyscraper in this city, whose cucumber shape earned it the nickname "the (*) Gherkin." Renzo Piano designed a 72-story pyramidal skyscraper in this city called the Shard. Norman Foster's architecture firm is based in this city, home to a column surrounded by four bronze lions and named for Horatio Nelson. For 10 points, name this city, home to such architectural landmarks as Trafalgar Square and Big Ben.

ANSWER: London, England

<Bollinger>

17. For a Möbius transformation onto the sphere, there are this many fixed points. For the function at the center of the Collatz Conjecture, inputting the value of four will yield this result. Disjoint neighborhoods exist for any pairs of distinct spaces according to the separability axiom of this number. This is the smallest known Sophie Germain prime. A vertex in the simple, but complete "K sub 3" graph will have this many edges that (*) connect it to another vertex. The Euler characteristic of a convex polyhedron is this value; that's because the number of vertices plus faces minus edges must equal this value. A prime number that is one less than a power of this number is a Mersenne prime. For 10 points, name this only even prime number.

ANSWER: two

<Jose>

18. In a 1946 article in *LIFE* magazine about these places, Albert Maisel claimed that long hours and low pay led to abusive staff in these locations. Frederick Wiseman's *Titicut Follies* takes place in one of these places for criminals. Thomas Szasz created a group to attack these places with Erving Goffman, who called them "total institutions" in a book based on his work with one in Washington, D.C. Nellie (*) Bly wrote about "ten days" spent in one of these places on Blackwell's Island. David Rosenhan created an experiment where assistants claimed to hear mysterious voices saying "thud" in order to be admitted to these places for treatment. For 10 points, name these places that seek to treat people suffering from conditions such as schizophrenia.

ANSWER: mental hospitals [or psychiatric hospitals; or mental asylums; or obvious equivalents]

<Bailey>

19. A blind Oklahoma Senator with this surname blew a 1908 filibuster when he attempted to pass a baton to William Stone, who had actually absconded to the cloakroom. The 1952 elections of Frank G. Clement and a Senator with this surname broke the political machine of E.H. Crump. That man with this surname proposed ending the Korean War by permanently irradiating the DMZ, and joined Estes Kefauver and (*) Lyndon Johnson as the only southern Democratic Senators not to sign the Southern Manifesto. After leaving politics, the son of that Tennessee Senator wrote *The Assault on Reason* and co-founded Current TV. For 10 points, give this surname shared by a running mate of Joseph Lieberman and global warming activist who served as Bill Clinton's Vice President.

ANSWER: Gore [accept any particular Gores, be they Thomas, Al Sr., or Al Jr.]

<Bentley>

20. An early victory for supporters of this cause came in Lord Mansfield's decision in *Somerset's Case*. To draw attention to this cause, the perpetrators of the *Zong* trial were charged with murder at the behest of Granville Sharp. This cause was backed by Henry Thornton and other members of the Clapham Sect, and realized by an act sponsored by Thomas Buxton in 1833. An image advocating this cause shows a kneeling figure pleading, "Am I Not a (*) Man and a Brother?". The leading British advocate of this cause was William Wilberforce, while it was realized outside of England by reforms like Brazil's Golden Law of 1888. For 10 points, name this cause advocated in America by William Lloyd Garrison and John Brown, the subject of the Emancipation Proclamation.

ANSWER: Antislavery [or Abolitionism or Abolition of Slavery; accept equivalents; accept more specific answers like Abolishing the Slave Trade or Abolition of Slavery in Great Britain]

<Bentley>

21. On a NFPA diagram, this property of a material is assigned a number in between one and four on the blue component. Along with metabolism, this property of an NCE is studied before phase 1 of development. For most compounds, an absolute form of this property is given by either the LD50 or LC50, the latter of which has the same units as concentration. The therapeutic index is the ratio of this quantity for a compound to its (*) benefits. The acute form of this property is measured relative to skin or oral exposure. For a compound, this property can be given in terms of teratogenicity and mutagenicity, the former of which is a measure how likely it is to cause a birth defect. For 10 points, name this measure of how poisonous a particular substance is.

ANSWER: toxicity [accept word forms; before mention, accept lethality, mutagenicity, teratogenicity, lethal dose, toxic dose, killing dose, poisonous dose etc]

<Jose>

22. A president of this country was photographed displaying the bandages on his burned hands after surviving a car bomb planted by agents of Dominican President Rafael Trujillo. During the Wars of Independence, Jose Tomas Boves fought for Spanish control of this country by commanding its grassland cowboys, the *llaneros*. Romulo Betancourt and Romulo Gallegos were presidents from the Democratic Action Party in this birthplace of (*) Simon Bolivar. A president of this country was once asked, "Why don't you just shut up?" by Juan Carlos of Spain, maintained a close alliance with Cuba, and used its oil wealth to effect a socialist "Bolivarian Revolution." For 10 points, name this Latin American country that in March 2013 was finally relieved of Hugo Chavez.

ANSWER: Bolivarian Republic of Venezuela

<Bollinger>

23. James Wood described this novel as "one large mental chamber" and claimed that in writing it, its author "novelizes the soliloquy". One character in this novel consults with the apothecary Mr. Perry in order to justify his opposition to the eating of cake. Anne Watson served as the childhood governess of this novel's protagonist, who complains about the talkative Miss Bates and refuses the (*) proposal of the vicar Mr. Elton, who later marries Augusta Hawkins. Its title character lives in Hartfield with her father, is surprised by the engagement of Frank Churchill and Jane Fairfax, and continually tries to engineer relationships for Harriet Smith. For 10 points, the title would-be matchmaker eventually marries George Knightley in which novel by Jane Austen?

ANSWER: Emma

<Morlan>

24. Sensationalized rumors of a Canadian soldier crucified on a tree in this country were included in the propagandist Bryce Report on supposed massacres here. Pigs feast on a young woman in a cartoon protesting the execution of Edith Cavell, a nurse who rescued troops trapped in this country. Wellington House seized on the dismissal of this country's neutrality treaty as "a scrap of paper" as part of a propaganda (*) campaign that promoted tales of mass rape and bayoneted babies to rally support for a British declaration of war. German forces took this country's fortress of Liege as part of the Schlieffen Plan during World War I. For 10 points, name this Low Country home to Antwerp and Brussels.

ANSWER: Belgium

<Bailey>

1. For 10 points each, answer the following about composers who created notable film scores.

[10] This Russian created the scores for such films as *Alexander Nevsky* and *Lieutenant Kijé*, but he is better known for his *Scythian Suite* and *Peter and the Wolf*.

ANSWER: Sergei (Sergeyevich) **Prokofiev**

[10] This is the most famous portion of Prokofiev's score for *Lieutenant Kijé*. Named after a Russian folk dance, this section, the fourth movement of five in the suite, prominently features sleigh bells.

ANSWER: "**Troika**"

[10] This unrelated American composer wrote the score for the experimental film *Koyaanisqatsi* and for *The Truman Show*, *The Hours*, and *The Fog of War*. One of his operas has acts titled for Leo Tolstoy and Rabindranath Tagore.

ANSWER: Philip (Morris) **Glass**

<Berend>

2. Answer these questions about Sir Galahad, the purest of all of King Arthur's knights, for 10 points each.

[10] Galahad successfully "achieved" this object, which Sir Percival also sought when he met the Fisher King. This artifact was taken to Britain after Jesus's crucifixion.

ANSWER: the Holy **Grail** [or **Sangreal**]

[10] This seat at the Round Table could only be sat in by Galahad, since it would immediately kill anyone who wasn't virtuous.

ANSWER: Siege **Perilous** [or **Perilous Seat**]

[10] This knight, who joins Galahad and Percival on the successful Grail hunt, is the only one to return to Camelot. Because he was tricked into sleeping with a daughter of Brandegoris, he wasn't pure enough to go straight to heaven.

ANSWER: Sir **Bors** [or **Bohort**]

<Silverman>

3. Ivy Pinchbeck argued that women preferred these types of businesses despite earning lower wages in them because they offered more control over child care. For 10 points each:

[10] Identify these businesses that arose from the putting-out system. They often involved women sewing goods in their own homes.

ANSWER: **Cottage Industries** [or **domestic system**]

[10] Cottage industries helped businesses expand their capacity beyond factories during the early part of this period. The second phase of this period is held to begin with the rise in steel production.

ANSWER: The British **Industrial Revolution**

[10] These troublesome individuals active during the industrial revolution were targeted by the 1812 Frame-Breaking Act, which made it a capital crime to destroy industrial machinery.

ANSWER: **Luddites**

<Bentley>

4. The demand function named for this man returns the package of goods bought that maximize utility for a given wealth level and set of prices. For 10 points each:

[10] Name this economist, who introduced the standard supply and demand diagrams to a wider audience in his 1890 textbook, *Principles of Economics*.

ANSWER: Alfred **Marshall**

[10] Marshall's marginalist theories of supply and demand come from this other English economist. This man considered the problem of a decreasing energy supply in *The Coal Question* and posited business cycles were due to sun spots.

ANSWER: William Stanley **Jevons**

[10] This first American to win the Nobel in Economics synthesized neoclassical price theory with Keynesian economics in his textbook *Economics*. He introduced revealed preference theory to explain consumer behavior without immeasurable utility functions.

ANSWER: Paul **Samuelson**

<Bailey>

5. On this scale, diamond scores a 10. For 10 points each:

[10] Name this scale of hardness, which assigns a score of 1 for talc and 2 for gypsum.

ANSWER: **Mohs** Scale of Hardness

[10] Taking its name from a Greek word meaning “deceit,” this mineral has a score of 5 on Mohs scale of hardness. These minerals are made up of calcium phosphate, which is the same substance that comprises bones and teeth.

ANSWER: **apatite**

[10] The Mohs’ scale of hardness is purely relative. An absolute score for hardness can be obtained from a reading of one of these devices, which uses a diamond tipped stylus to probe the hardness of a material.

ANSWER: **sclerometer**

<Jose>

6. This system required mastery of the eight-legged essay to receive the *jinshi* degree. For 10 points each:

[10] Identify this non-hereditary system for creating bureaucrats that reached its height under the Song dynasty.

ANSWER: **Imperial Examination** System [or **Keju**; accept **Chinese civil service** system; accept clear equivalents; prompt on partial answer]

[10] The Chinese civil service system was eventually abolished in the final days of this last Chinese dynasty, which succeeded the Ming.

ANSWER: **Qing** Dynasty [or **Ch'ing** Dynasty or **Manchu** Dynasty or **Manzu** Dynasty]

[10] China's civil service exam was imitated by the *gwageo*, an exam popular during this empire. Chogyae Buddhism flourished in this kingdom, which was founded by Taejo and fought a series of wars against the Khitans.

ANSWER: **Goryeo** Dynasty [or **Koryo** Dynasty]

<Bentley>

7. Identify the following about the Southern Agrarians, for 10 points each.

[10] This author contributed the essay "Remarks on the Southern Religion" to the Agrarian manifesto *I'll Take My Stand*, but his collection *Mr. Pope and Other Poems* contains his most famous work, the poem "Ode to the Confederate Dead".

ANSWER: Allen **Tate** [or John Orley Allen **Tate**]

[10] The title character of this John Crowe Ransom poem causes some geese to "rise from their noon-apple dreams" and is described as having "such speed in her little body, and such lightness in her footfall".

ANSWER: "**Bells for John Whiteside's Daughter**"

[10] This man, perhaps the best-known Southern Agrarian, wrote the textbook *Understanding Poetry* with Cleanth Brooks but is most famous for his novel about Jack Burden and Willie Stark, *All the King's Men*.

ANSWER: Robert Penn **Warren**

<Carson>

8. Answer the following about illustrated books, for 10 points each:

[10] Together with his wife Catherine, this writer and artist assembled a series of illustrations for his poetry collections *Songs of Innocence* and *Songs of Experience*. The creator being Urizen is a recurring character in his artwork.

ANSWER: William **Blake**

[10] This Frenchman created engravings of scenes from many works of classic literature like *Paradise Lost* and *The Divine Comedy*. His illustrations of the latter include one which shows Satan trapped in the ice at the bottom of hell.

ANSWER: Gustave **Doré**

[10] An important medieval European art form was the decoration of these handwritten books, whose text was decorated with gold and supplemented with beautiful miniatures. The Book of Hours created by the Limbourg brothers is an example of one of them.

ANSWER: **illuminated manuscript** [this is a specific term, so do not accept or prompt on general answers like "pretty books" or "illuminated books"]

<Rosenberg>

9. Identify the following about some science fiction authors, for 10 points each.

[10] This pioneering French author wrote such novels as *From the Earth to the Moon*, *Journey to the Center of the Earth*, and *Twenty Thousand Leagues Under the Sea*.

ANSWER: Jules Gabriel **Verne**

[10] This Polish author of a short story collection called *The Cyberiad* wrote a number of works about the space explorer Ijon Tichy. Kris Kelvin works on an observation station hovering above the title planet in his novel *Solaris*.

ANSWER: Stanislaw **Lem**

[10] Mstislav Los' and Alexei Gusev discover an advanced civilization on Mars in *Aelita*, a novel by a distant relative of *this* Russian author of *Hadji Murat* and *The Kreutzer Sonata*.

ANSWER: Leo **Tolstoy** [or Lev Nikolayevich **Tolstoy**]

<Bentley>

10. This reflex is often triggered by stroking the inner thigh, which stimulates the femoral branch of the genitofemoral nerve. For 10 points each:

[10] Name this reflex which draws the scrotum upwards. It is named for a muscle that covers the spermatic cord.

ANSWER: cremaster reflex

[10] The purpose of the cremaster reflex is to regulate the temperature of these male sex organs, which are the sites of spermatogenesis. Crypto-orchidism occurs when they don't descend properly.

ANSWER: testes [or testicles; prompt on cruder answers]

[10] This coiled tube lies behind each of the testes and connects the ducts of the testes to the vas deferens. Its lower portion serves as a reservoir for sperm.

ANSWER: epididymis

<Mukherjee>

11. Haydn's Symphony No. 103 opens with a solo for this instrument, players of which often employ the technique of "damping" to prevent notes from ringing for too long. For 10 points each:

[10] Name this instrument often partially made out of copper. Along with the bass drum, this instrument represents the hunters' gunshots in Prokofiev's *Peter and the Wolf*.

ANSWER: timpani [or kettledrums]

[10] This composer used timpani glissandi and xylophones as part of his "Night music" style in his piece *Music for Strings, Percussion and Celesta*. This Hungarian is better known for *Mikrokosmos* and *Duke Bluebeard's Castle*.

ANSWER: Béla Bartók

[10] Carl Nielsen's symphony of this number features a "battle" between two timpani. Another symphony of this number is in E-flat major, features a "Hunt Scherzo," and had its premiere conducted by Hans Richter, who supposedly received a tip afterwards for his services.

ANSWER: Symphony No. 4 [accept obvious equivalents like "Fourth"]

<Berend>

12. This novel's protagonist challenges Captain Segura to a drinking game involving playing checkers with miniature bottles of alcohol, then later avenges Dr. Hasselbacher's death by shooting Carter. For 10 points each:

[10] Identify this 1958 novel about James Wormold, who fakes his way through a job with the British secret service in order to supplement his income as a vacuum cleaner salesman.

ANSWER: *Our Man in Havana*

[10] *Our Man in Havana* was written by this English Catholic, whose other works include *The Quiet American*, *The Power and the Glory*, and the screenplay to *The Third Man*.

ANSWER: Graham Greene [or Henry Graham Greene]

[10] In this Greene novel, Major Henry Scobie struggles with a mounting pile of sins, including his decision to burn a letter found in the quarters of a Portuguese ship captain and his adulterous affair with Helen Rolt.

ANSWER: *The Heart of the Matter*

<Carson>

13. The Scorpions are the elite protection force for one of these organizations. For 10 points each:

[10] Name this kind of group in Mexico, which includes the Milenio, the Knights Templar, and the Gulf.

ANSWER: Mexican drug **cartels**

[10] This cartel, founded by former members of the Mexican army's special forces unit, controls the largest area of any Mexican cartel. Based in Nuevo Laredo, it engaged in a brief Internet war with Anonymous in 2011.

ANSWER: Los **Zetas**

[10] The Zetas are believed to be responsible for the mass graves first discovered in April 2011 near this city in west-central Mexico. Ongoing efforts to identify all the victims of these mass graves have largely proved unsuccessful.

ANSWER: **Durango**

<Weiner>

14. The order of events for this gathering, as laid out in a guidebook called the *haggadah*, is typically sung beforehand. For 10 points each:

[10] Name this religious meal whose youngest attendee asks the Four Questions. It also features the spilling of ten drops of wine to mourn victims of the ten plagues in Egypt.

ANSWER: **Seder** [NOTE TO MODERATOR: do not reveal that these alternate answers are acceptable; accept Passover **Seder**; accept Pesach **Seder**; do not accept or prompt on "Passover"; do not accept "Tu Bishvat Seder"]

[10] The Seder begins this eight-day holiday commemorating the Exodus, during which observant Jews eat an unleavened bread called matzah.

ANSWER: **Passover** [or **Pesach**]

[10] The Seder concludes with this proclamation, expressing hope that the Messiah will come to reunite the Jewish diaspora shortly.

ANSWER: **"Next year in Jerusalem"** [or **"L'shanah haba'ah b'Yerushalayim"**]

<Jackson>

15. One technique for doing this involves a prefix code and was developed by David A. Huffman. For 10 points each:

[10] Identify this operation which comes in "lossless" and "lossy" varieties.

ANSWER: Data **compression** [prompt on "encoding"]

[10] Problems over the licensing of the LZW compression algorithm used in one of these types of files led to the development of the PNG format. Pixels in these files are usually specified according to the RGB system.

ANSWER: **Image** files [accept equivalents like **picture** files and more specific answers like **gif** files or **Graphical Interchange Format**]

[10] Huffman codes improved on a method named for Robert Fano and this man. This pioneer of information theory also co-names a sampling theory with Harry Nyquist.

ANSWER: Claude Elwood **Shannon**

<Bentley>

16. A regiment of African American troops from this state fought in a namesake battle here in 1778. For 10 points each:

[10] Identify this state, where a political dispute devolved into Dorr's Rebellion.

ANSWER: **Rhode Island**

[10] This man was the governor of Rhode Island when Dorr's Rebellion started. This leader of the Charterites declared martial law and unsuccessfully petitioned John Tyler to send in federal troops to break up the rebellion.

ANSWER: Samuel Ward **King**

[10] Colonial Rhode Island was forbidden from joining a confederation of this name in 1643. This term is now used for states in that confederation like Massachusetts and Connecticut.

ANSWER: **New England**

<Bentley>

17. This phenomenon is typically modeled using a namesake equation, which is sometimes named for Householder. For 10 points each:

[10] Name this phenomenon in which electromagnetic waves encounter a different medium, leading the waves to change their direction, but still stay within the medium. The surface of water and a mirror both exhibit a type of it.

ANSWER: **reflection** [accept word forms]

[10] The two major types of reflection are diffuse, in which light is absorbed into the surface and redirected from all angles, and this one, which more closely models mirrors. This type of reflection is dependent upon the angle of incidence.

ANSWER: **specular** reflection

[10] The set of equations named for this man completely describe the properties of a wave encountering an interface, including both types of reflection and refraction. The Schlick approximation is one way to quickly compute it.

ANSWER: **Fresnel** equations

<Jose>

18. Answer these questions about various problems of identity in philosophy, for 10 points each.

[10] The simple statement "A is A" is not a problem in this woman's philosophy of Objectivism. This author of *The Virtue of Selfishness* inspired a libertarian following after fleeing Russia for the U.S.

ANSWER: Ayn **Rand** [or Alisa Zinovyevna **Rosenbaum**]

[10] One of these large objects belonging to Theseus is the subject of an identity puzzle asking if it's the same object after all its parts are replaced over time. Plato likens a state in tough times to one of these.

ANSWER: **ship** [or **boat**]

[10] This German logician argued that the sentences 'Hesperus is Hesperus' and 'Hesperus is Phosphorus' must have different cognitive value, though both names refer to the planet Venus, in his essay *Sense and Reference*.

ANSWER: Gottlob **Frege**

<Jackson>

19. Kim Philby and Anthony Blunt comprised two of the five Soviet spies named for this place in the 1950s. For 10 points each:

[10] Identify this British city, home to a university founded in 1209 by scholars fleeing the Town and Gown Riots.

ANSWER: Cambridge

[10] This man held the Lucasian Professorship for Mathematics at Trinity College for more than 30 years. He gave his first lectures on optics at Cambridge, and also published the *Principia Mathematica*.

ANSWER: Isaac Newton

[10] This other scientist debated Newton over the validity of his optics experiments. He included precisely drawn snowflakes in his *Micrographia* and proposed a wave-theory of light to explain diffraction, a phenomenon he discovered.

ANSWER: Robert Hooke

<Bentley>

20. In one adventure, this character stumbles upon the City of the Apes, while in another, he acquires a fortune in diamonds from an island inhabited by giant rocs. For 10 points each:

[10] Identify this rich merchant who regales a poor porter who shares his name with the stories of his seven voyages.

ANSWER: Sinbad the Sailor [or Sindbad]

[10] Sinbad's stories were included in Richard Burton's translation of this collection of Arabic and Persian stories told by Scheherazade to delay her execution. They include "Ali Baba and the Forty Thieves" and "Aladdin's Wonderful Lamp."

ANSWER: One Thousand and One Arabian Nights [or The Arabian Nights' Entertainment; or Kitab alf laylah wa-laylah]

[10] In one tale, this character has a number of adventures with Attaf only to find out that the book at which Haroun al-Rashid had been laughing described those exact adventures. This Barmakid vizier investigates the death of a young woman whose body is found in a chest in the Tale of Three Apples.

ANSWER: Ja'far ibn Yahya Barmaki [or Jafar al-Barmaki; or Giafar]

<Gupta>

21. The mutation of a glutamate to a valine in one of this molecule's eight alpha helices results in a "hydrophobic patch" in its typically hydrophilic surface. For 10 points each:

[10] Name this iron-containing protein found in red blood cells, which transports oxygen across the bloodstream.

ANSWER: **hemoglobin**

[10] Hemoglobin contains this many polypeptide subunits.

ANSWER: **four**

[10] Compared to the binding curve of oxygen for regular hemoglobin, this sort of change would have to be made to produce the binding curve for fetal hemoglobin. Carbon monoxide also changes the curve this way.

ANSWER: **shifts it left** [accept anything along the lines of the **curve moves left**]

<Gupta>

22. This man originally serves as the tutor of the narrator in *Sighet*, but is shipped off by the Hungarian authorities. For 10 points each:

[10] Identify this Talmud scholar who warns a young Elie Wiesel of massacres he saw in the Polish forests in the first section of Wiesel's autobiographical novel *Night*.

ANSWER: **Moshe** the Beadle

[10] Part of *Night* is set in Auschwitz, much like this Italian author's Holocaust memoir *If This Is a Man*, which was given the unimaginative title *Survival in Auschwitz* in the United States. This author also wrote *The Periodic Table*.

ANSWER: Primo Michele **Levi**

[10] This Amsterdam resident died of typhus in Bergen-Belsen. Her namesake diary, which was recovered by Miep Gies from the "secret annex" in which she and her family spent over two years", was published by her father Otto.

ANSWER: Anne **Frank** [or Annelies Marie **Frank**]

<Bentley>

23. This bill was agitated for by the Birmingham Political Union. For 10 points each:

[10] Identify this landmark bill which sought to provide a more representative government to the British people and address the issue of "Rotten Boroughs."

ANSWER: First **Reform** Act [or Great **Reform** Act or First **Reform** Bill or Great **Reform** Bill or 1832 **Reform** Act of 1832 **Reform** Bill]

[10] The First Reform Act was passed during the tenure of this Whig prime minister. He has come to be identified with a particular brand of tea.

ANSWER: Charles Grey, 2nd Earl **Grey** [or Baron **Grey** or Viscount **Howick**]

[10] Grey attempted to get this "Sailor King" to increase the number of peers in the House of Lords to pass the Reform Act. He was the successor of George IV.

ANSWER: **William IV**

<Bentley>