Tossups

1. Beer magnate Thomas Loel Guinness rented this man his equipment for one dollar a year. Fidel Castro freed more than 80 political prisoners after this man reformed Cuba's lobster management program. This man installed a "false nose" with eight portholes into a former mine-sweeper that was destroyed in 1996 in Singapore. Louis Malle directed a 1956 film based on a book by this man that became the first documentary to win the Palme d'Or. This person's team added a mechanical claw to a new invention called a bathyscaphe ("BATH-uh-scaff"). Wes Anderson used this man as the real-life inspiration for Steve Zissou. *The Silent World* was written by this man, who co-created the Aqua Lung scuba tank with Émile Gagnan ("gan-YAWN") and captained the research ship *Calypso*. For 10 points, name this French oceanographer.
ANSWER: Jacques **Cousteau** [or Jacques-Yves **Cousteau**]
<CE/Geo/Other/Pop Culture>

2. Sulfur dioxide can inhibit the formation of this molecule by Proteobacteria like *Gluconobacter*. Ratios of this molecule, water, and butanol form common developing solutions for polar amino acids in thin-layer chromatography. A compound formed by vitamin E and this molecule may cause vaping lung injuries. Nitrocellulose was replaced by this molecule's less flammable cellulose ester in photographic film. Four equivalents of this molecule are found in the chelating ("KEE-late-ing") agent EDTA. This product of the Cativa and Monsanto processes is distilled to a concentrated "glacial" form. This acid is formed by fully oxidizing ethanol with an intermediate of acetaldehyde. For 10 points, baking soda can form carbon dioxide bubbles in a "volcano" by reacting with what carboxylic acid found in vinegar?
ANSWER: **acetate** [or **acetic** acid; or **ethanoic** acid; accept **CH3COOH**; accept cellulose **acetate**; accept **acetyl** group; prompt on vinegar; accept ethylenediaminetetra**acetate** or ethylenediaminetetra**acetic** acid] (*Gluconobacter* is an acetic acid bacterium that can spoil wine.)
<Chemistry>

3. After several critics compared a novel by this author to Jeanine Cummins's *American Dirt*, Myriam Gurba lambasted Cummins in an essay titled "Pendeja, You Ain't" this author. This author satirized the politics of Paris in *The Short Reign of Pippin IV*. Robert Capa photographed the Soviet trip this author recorded in *A Russian Journal*. Visits to Mexico informed this author's screenplay for *Viva Zapata!* and his novella about a Baja California fisherman whose baby Coyotito is stung by a scorpion and later shot by a tracker. A novel by this author ends with a starving man being breastfed by Rose of Sharon. That novel by this author follows the Joad family of "Okies" traveling to California during the Dust Bowl. For 10 points, name this author of *The Pearl* and *The Grapes of Wrath*.
ANSWER: John **Steinbeck** [or John Ernst **Steinbeck** Jr.; accept "Pendeja, You Ain't **Steinbeck**: My Bronca with Fake-Ass Social Justice Literature"]
<American Literature>

4. Near this river, Francis Chardon recorded an 1837 smallpox epidemic among people who built atuka firepits in circular earthlodges and staged the Okipa ceremony under Mato-tope. Journals of the carpenter Patrick Gass [emphasize] *first* discuss this river, which flooded Fort Kiowa ("KY-uh-wuh"). Scouting along this river by Hugh Glass and Jim Bridger inspired *The Revenant*. This river's "Three Affiliated Tribes" include the Arikara and Hidatsa. Sergeant Charles Floyd died on this river, where the Robidoux family traded furs from St. Joseph. At this river's Three Forks, the party of the dog Seaman and Black explorer York recruited the translator Toussaint Charbonneau. Near this river at Fort Mandan, the Corps of Discovery met the Lemhi Shoshone explorer Sacagawea. For 10 points, Lewis and Clark sailed up what river from St. Louis?
ANSWER: **Missouri** River [or **Pekitanoui**; or **Kícpaaruksti'**; or **Mnišoše**; accept the **Yellowstone** River; accept the **Heart** River; accept the **Knife** River; accept the **Grand** River; accept the **Jefferson** River; accept the **Marias** River] (The first sentence refers to the Mandan people.)
<American History>

5. Because they do not require signals with this property, Fourier-transform-based spectrometers gain a throughput advantage named for Jacquinot. Signals cannot truly have this property as it requires an infinite pulse duration according to Küpfmüller's formulation of the uncertainty principle. Devices for producing this property typically consist of a collimator and a series of mirrors, and either diffraction gratings or Littrow prisms. Light with this property has perfect temporal correlation and infinite coherence time. Spontaneous and stimulated emission produce photons that have this property because the photons are produced from the same transition. For 10 points, name this property of radiation such as light with a single wavelength, which for visible light results in a single color.
ANSWER: **monochromatic** [or **single wavelength** or **single frequency** or **equal energy** or equivalents until "single wavelength" is read; accept **zero** spectral **bandwidth**; prompt on answers indicating a single color]
<Physics>

6. Cynthia Eller criticized J. J. Bachofen's ("Bach-oh-fin's") "invented" "Urreligion" ("OOR-religion") involving these figures, which was popularized by Marija Gimbutas's books about their "language" and "civilization" in "Old Europe." One of these figures sits flanked by two leopards in a Potnia Theron motif in a clay statue from Çatalhöyük ("cha-TALL-hoo-yook"). In a Minoan cult image, one of these figures brandishes two snakes. Dancers called Corybantes ("cor-ih-BAN-tees") followed one of these figures venerated by Galli eunuch-priests in Phrygia. Asherah and Nǔwā are some of these figures, who often embody the earth in contrast to their counterparts' sky. One of these primordial figures may be depicted by the Venus of Willendorf, whose exaggerated breasts may represent her fertility. For 10 points, Cybele ("SIB-uh-lee"), Pārvatī, and Hera are examples of what divine matriarchs?
ANSWER: mother **goddess**es [or fertility **goddess**es; accept earth **goddess**es or **earth mother**s or **Mother Earth**; accept **matriarch**al religion until "matriarch" is read; accept **Cybele** or **Venus** figures or **Asherah** until read; prompt on earth gods or deities by asking "embodying what type of figure?"; prompt on mothers or women or Seated Woman of Çatalhöyük; accept Snake **Goddess**; prompt on Lady of the Animals; accept *The Myth of **Matriarch**al Prehistory: Why an Invented Past Won't Give Women a Future*]
<Religion>

7. The first movement of a symphony by this composer contains the cyclical theme [read slowly] "D, low A, D, E, F-sharp, G, A." The sixth movement of a large-scale work by this composer, meant to be played "without regard for the tempo," ends with the same word repeated seven times. An oboe countermelody accompanies a D minor theme first played by a muted double bass in the funeral march of this composer's first symphony. "Der Abschied" ("AP-sheet") is the last movement of an orchestral song cycle by this composer based on a collection of Chinese poems. This composer included klezmer-inspired music and a minor-key version of the song "Frère Jacques" in the first of his *Wunderhorn* ("VOON-der-horn") symphonies. For 10 points, name this Austrian composer of *Das Lied von der Erde* ("das LEET fon dair AIR-duh") and the "Titan" symphony.
ANSWER: Gustav **Mahler**
<Classical Music>

8. This author complains that he is "dancing in the dark" in a place that he falsely describes as being frozen all year round and full of barbarians. This author claims that he is "not recommending an expedition overseas or a gruelling march" in a book that recommends cooperating with maids. He's not Hesiod ("HEE-see-id"), but a poem by this writer describes four ages of man and ends with the deification of Julius Caesar. A work described by this author as a "poem and a mistake" includes recommendations on how to avoid gift-giving on birthdays and the best ways to seduce women. This author's exile to Tomis was described in his *Tristia* and *Letters from the Black Sea*. For 10 points, name this Roman writer of *Ars Amatoria* and *Metamorphoses*.
ANSWER: **Ovid** [or Publius **Ovid**ius Naso]
<World/Other Literature>

9. A book from this movement analogizes the transition between perspectives to a story about an enormous fish changing into an equally enormous bird. The "great" form of a concept most closely associated with this movement includes all past and future events. Anti-language arguments from this movement sometimes claimed that the correct guidance could not be put into words. This movement's quality of "naturalness" is often compared to an uncarved block. An eponymous text from this movement includes a passage in which its author dreams of being a butterfly. The central text of this movement emphasizes non-action, or *wú wéi*. For 10 points, what philosophical movement that centered on the teachings of Zhuāngzǐ ("JWONG-dzuh") and Lǎozǐ ("LAO-tsuh") is often contrasted with Confucianism?
ANSWER: **Tao**ism [or **Dao**ism; or **dào**jiā]
<Philosophy>

10. A dissident in this region known as Johnny Big Barn helped lead an insurrection in which workers cross-dressed and tore down tollgates to protest increased taxation. Ministers taught the native language of this region through "circulating schools" that moved every three months. Families from this region looking to escape declining wages immigrated to the Chubut region of Patagonia. Winston Churchill put down riots by workers protesting low wages in this region at Tonypandy. Elizabeth II initially refused to visit this region after a landslide of slurry killed 116 children in Aberfan ("AB-er-van"). This region was the birthplace of the last Liberal Party Prime Minister, who secured victory for Britain in World War I. The UK's "King Coal" was centered on collieries in this region at Merthyr and Cyfarthfa ("kuh-VARTH-va"). For 10 points, name this constituent region of the UK whose capital is Cardiff.
ANSWER: **Wales** [or **Cymru**; prompt on the United Kingdom or UK until read; prompt on Great Britain]
<Other History>

11. The number of these things can be reduced by Nagle's algorithm, which mitigates problems with large numbers of small examples of them. Wake-on-LAN relies on a so-called "magic" one of these things to wake up a computer. In the OSI model, these things are the layer-3 equivalent of an Ethernet frame, and layer-4 segments are also confusingly referred to as them. UDP does not require all of these discrete entities to arrive or be sequenced correctly, unlike a connection-oriented protocol that uses a "three-way handshake" to establish a connection for their delivery. Resilient networks are often described as "switching" these things by using many paths to route data. For 10 points, name these units of data sent between computers, which are "lost" in a common form of latency.
ANSWER: TCP/IP **packet**s [or **datagram**s; accept **segment**s until "segments" is read; accept **packet**-switching or **packet** loss; accept Ethernet **frame**s until read, since magic packets are frames; prompt on data by asking "what unit is that data sent as?"]
<Other Science>

12. Extensive overdubbing was used for Charlie Mariano's saxophone solo on an album by this artist whose liner notes include observations by his psychiatrist. This artist collaborated with Joni Mitchell on an album released just before his 1979 death on which he played alongside Jaco ("JOCK-oh") Pastorius, who used a similar instrument. "II B.S." ("two B-S") is the first song on an album whose title repeats this man's surname five times. Arkansas's segregationist governor is the subject of "Fables of Faubus," a song by this artist behind the album *The Black Saint and the Sinner Lady*. This musician wrote a tribute to Lester Young called "Goodbye Pork Pie Hat." For 10 points, name this jazz bassist who released an album titled for his surname and *Ah Um*.
ANSWER: Charles **Mingus** [or Charles **Mingus** Jr.]
<Other Arts>

13. A text named for this ethnic group recalls a time when its early rulers "had no one to fight beside them but [their] own shadows" while living on roots in the Khentii Mountains. Two men belonging to this ethnic group could make a pledge of brotherhood called an *anda*. A 1947 translation used these people's modern Khalkha dialect for a book written in their vertical script that describes a ruler who was born holding a blood clot. Although these people practiced sky worship, Islam spread in the lands they conquered from the Khwarazmian Empire. The Toluid Civil War led to their empire's division into realms ruled by descendants of Chagatai and Jochi. In the 13th century, these people's empire failed to invade Java and Japan. For 10 points, what steppe nomads were united by Genghis Khan?
ANSWER: **Mongol**s [or the **Mongol** Empire; or **Mongol**chuud; accept *The Secret History of the **Mongol**s*; accept the **Borjigin** or **Borjigid** clan; accept the **Kiyat** clan; accept the **Dughlat** or **Dolood** or **Dolugad** or **Dulğat** clan]
<World History>

14. In this city, a band "singing to guitar and mandolin" music stops playing after being given money in a hat. A performer in this city says that "the heat and the sirocco" are responsible for police regulations. In this city, "a deep incredible mirthfulness" overcomes the author of *The Abject* upon learning that his luggage has been lost, forcing him to stay at the Hotel des Bains ("day ban"). A man wearing makeup disgusts a character in this city who receives a free ride from an unlicensed boatman. That character falls victim to cholera in this city after he eats overripe strawberries and becomes obsessed with the Polish boy Tadzio ("TAH-joe"). For 10 points, Gustav von Aschenbach appears in a Thomas Mann novella titled for "Death in" what city?
ANSWER: **Venice** [or **Venedig** or **Venezia**; accept *Death in **Venice***]
<European Literature>

15. They aren't nuclear proteins, but a vimentin cage surrounds structures made of proteins with this property that form near the MTOC. Proteins with this property accumulate in the JUNQ ("junk") and IPOD ("iPod") complexes. The delta-f508 mutation causes CFTR to have this property, leading to its degradation in the ERAD ("E-rad") pathway. When PrP ("P-R-P") has this property, it is notated with a superscript Sc and is cytotoxic. In neurodegenerative diseases like Parkinson's, proteins with this property aggregate into amyloid plaques, a process driven by exposure of their hydrophobic residues due to presence of beta-sheets not present in their native form. Creutzfeldt–Jakob ("KROITS-felt YA-cup") disease and Kuru can result when this structural property is transmitted by prions to other proteins. For 10 points, name this property of proteins that didn't acquire the proper physical shape.
ANSWER: **misfolded** proteins [accept **unfolded** or **partially folded** proteins; accept **wrong isoform** or equivalents; accept **toxic conformation** or **wrong conformation** or equivalents; prompt on prions by asking "what structural property do they have?"; prompt on amyloid or amyloid plaques by asking "what structural property causes them to aggregate into plaques?"] (The first clue refers to aggresomes.)
<Biology>

16. On his deathbed, this man supposedly claimed "doctor, I die hard, but I am not afraid to go. Bring me my book." In one story, this man's cook allegedly tried to poison him with a tomato before committing suicide, due to the belief that tomatoes were poisonous. Isaac Potts claimed to have seen this man kneeling in prayer in the snow. Despite the fact that they didn't exist until near the end of his life, a popular legend claims that this man skipped a silver dollar across the Potomac River. In a story from Parson Weems's largely mythological biography of this man, he claimed "I can't tell a lie" after using a hatchet to chop down a cherry tree. For 10 points, name this man who is often believed to have had wooden teeth, and was America's first president.
ANSWER: George **Washington**
<Mythology>

17. A uniformitarian model of these languages is promoted by Michel DeGraff and Salikoko Mufwene ("moo-FWEN-ay"). Lexifiers provide vocabulary for these languages, which occur on a continuum from acrolect to basilect. The Saramaccan ("sarah-MAH-kin") example of these languages lacks derivational morphology, providing evidence for their unique genesis in a contentious "debate" outlined by John McWhorter. Sierra Leone's lingua franca is one of these languages, which formed abruptly in Seychelles and Mauritius. Maroons often speak these languages, which include Unserdeutsch, Singlish, Tok Pisin, and Gullah. These languages develop from pidgins. For 10 points, what kind of languages emerged from enslaved Africans' contact with French colonists in Haiti and Louisiana?
ANSWER: **creole**s [prompt on trade pidgins until read; prompt on contact languages until "contact" is read; prompt on mixed languages; accept **creolization** or **creolistics** or word forms; accept **Criollo** or **Krio** or **Kriol** people; accept **Kouri**-Vini; accept creoles with any specific superstrate such as French-based **creole**s; accept The **Creole** Debate; prompt on patois]
<Social Science>

18. This is the [emphasize] *first* title figure in a painting that depicts a man in green robes holding a rosary in one hand while reaching with the other for a bag of gold proffered by a demon. A self-portrait depicts this figure holding a violin and looking over the shoulder of a man holding a palette in an Arnold Böcklin painting. This figure is standing in a doorway and holds an arrow in a Hieronymous Bosch painting titled for this figure *and the Miser*. In a 1513 engraving, a snake coils around this figure's crown while he holds up an hourglass toward a rider with a foxtail tied to his lance. This figure is invoked in paintings that belong to the *memento mori* genre. For 10 points, identify this figure that is depicted along with a Knight and the Devil in an Albrecht Dürer engraving.
ANSWER: personified **death** [prompt on skeletons, skulls, or similar]
<Painting/Sculpture>

19. This character is compared to an impatient child with new robes before receiving news that causes her to bemoan a "Dove-feathered raven." This character was born on the same day as Susan, the deceased daughter of a woman who tells this character to "seek happy nights to happy days." This character's father describes her as "the hopeful lady of my earth." In an attempt to delay another character's journey, this character claims "it was the nightingale, not the lark" and earlier refuses an oath sworn on the inconstant moon. This character "hath not seen the change of fourteen years" when Lord Paris asks for her hand in marriage. After this character's cousin Tybalt is killed in a duel, she uses a potion from Friar Laurence to fake her death. For 10 points, name this Shakespearean character who loves Romeo.
ANSWER: **Juliet** Capulet [prompt on Capulet]
<British Literature>

20. An advisor to a king of this name nicknamed the "Blue Nun" reportedly teleported to settlements of the Jumona people with the help of angels. Short-term liquidity crises led a king with this name to default on loans known as the "Neapolitan Sums." A military unit known as the "third" lost its prestige under a king of this name after losing at Rocroi ("ro-KWAH"). The Bourbon Reforms were introduced by a king with this name who succeeded to the throne after the Treaty of Utrecht. The "age" of a monarch with this name titles a history of the Mediterranean by Fernand Braudel. That monarch of this name sent the Duke of Medina-Sidonia to captain a naval invasion of Elizabeth I's domain. For 10 points, give this name shared by many Spanish kings, including the one that sent the Spanish Armada.
ANSWER: **Philip** [or **Felipe**; accept **Philip** II, **Philip** III, **Philip** IV, or **Philip** V]
<European History>

21. A character in this play is scolded for spending an afternoon at "the cinema with a man" and seeing "a film with some women." Another character in this play claims that he cannot visit the Durands because they are only naturalized citizens. In this play, a meeting in coach number 8, compartment 6 of a train leads to the conclusion that two characters are a married couple named Elizabeth and Donald. A character in this play declares that she is Sherlock Holmes and recites a poem concluding "Everything caught fire." The maid Mary appears in this play, which mentions a family of Bobby Watsons. The Fire Chief comes to visit during a dinner with the Smiths and the Martins in, for 10 points, what absurdist play by Eugene Ionesco?
ANSWER: The **Bald Soprano** [or La **Cantatrice Chauve**; accept The **Bald Prima Donna**]
<European Literature>

Bonuses

1. The first film thought to be directed by a woman, *The Cabbage Fairy*, was made in this country. For 10 points each:
[10] Name this country. A director from here included an iconic shot of the Moon with a rocket in its eye in the early short film *A Trip to the Moon*.
ANSWER: **France**
[10] The director of *A Trip to the Moon*, Georges Méliès ("male-YES"), made a 1900 film about this historical figure. Closeups on Falconetti's face make up much of a film about this person from a Danish-born director.
ANSWER: **Joan** of Arc [or **Jeanne** D'Arc; or *The Passion of **Joan** of Arc*; or *La Passion de **Jeanne** d'Arc*]
[10] The title boy befriends Méliès's daughter Isabelle in this director's 2011 film *Hugo*. He also directed *Taxi Driver*, *Goodfellas*, and *The Irishman*.
ANSWER: Martin **Scorsese** ("scor-SAY-zee") [or Martin Charles **Scorsese**]
<Other Arts>

2. Ronald Knox wrote 10 commandments governing fiction that involves these people. For 10 points each:
[10] Name this profession, one member of whom examines the life of Richard III in *The Daughter of Time*. Alan Grant and Albert Campion are members of this profession created by Josephine Tey and Margery Allingham, respectively, who are known as "Queens" of the Golden Age of literature centered on these people.
ANSWER: **detective** [accept **sleuth** or private **investigator** or **PI**]
[10] Ronald Knox states that this character occupies a role in which his "intelligence must be very slightly below that of the average reader." This doctor is the companion of the detective Sherlock Holmes.
ANSWER: Dr. John **Watson**
[10] Arthur Conan Doyle wrote contradictory accounts of the location of this feature of Dr. Watson, prompting theories about how Watson obtained a second one of these features. Sherlock Holmes ascertains the presence of this feature by noting that Watson held his arm in a "stiff and unnatural manner."
ANSWER: Watson's **war wound**s in his shoulder or leg [accept jezail **bullet wound**s or **gunshot wound**s; prompt on injury or wound by asking "how did he get it?"; accept "injury" or "scar" or equivalents in place of "wound"]
<British Literature>

3. A recent biography by Anya Jabour highlights an activist with this surname who established Chicago's School of Social Service Administration and taught America's first women's studies course. For 10 points each:
[10] Give this surname of the trade unionist and Women's Peace Party leader Sophonisba. A Kentucky senator with this surname fled to Cuba and Europe after the Civil War, since he was the final Confederate Secretary of War.
ANSWER: **Breckinridge** [accept Sophonisba Preston **Breckinridge**; accept John Cabell **Breckinridge**]
[10] Sophonisba Breckinridge represented the US at a Pan-American Conference created by this Secretary of State after the War of the Pacific. The song "Good Democrats" and cartoon "Phryne ("FRY-nee") Before the Chicago Tribunal" mocked this Maine Republican.
ANSWER: James G. **Blaine** [or James Gillespie **Blaine**]
[10] This sometime-rival of Blaine became a national hero in Paraguay after arbitrating the Chaco in the War of the Triple Alliance. Reconstruction ended after the Compromise of 1877 elected this man president over Samuel Tilden.
ANSWER: Rutherford B. **Hayes** [or Rutherford Birchard **Hayes**]
<American History>

4. This light-based geodetic technique is one of the four used to establish the International Terrestrial Reference Frame, or ITRF. For 10 points each:
[10] Name this technique that measures light reflected by retroreflectors attached to satellites to determine their distance and orbit, unlike LIDAR, which uses reflections off ambient particles. It has a lunar counterpart that relies on the Apollo and Luna retroreflectors on the moon.
ANSWER: satellite **laser ranging** [or **SLR**; accept lunar **laser ranging** or **LLR**]
[10] Another technique used to determine the ITRF is DORIS, which measures this phenomenon to determine the position of a satellite. Radars can use this phenomenon to measure the velocity of objects they detect.
ANSWER: **Doppler** effect [accept **Doppler** radar or **Doppler** Orbitography and Radiopositioning Integrated by Satellite]
[10] The other two techniques that determine the ITRF are Very-Long-Baseline Interferometry and this one, which is also used in everyday life for navigation. It is implemented in many cars and phones.
ANSWER: **GPS** [or **Global Positioning System**]
<Other Science>

5. Maya Angelou voices a woman who leads a group of boys in a rendition of the Sinner's Prayer at the end of "Sing About Me, I'm Dying of Thirst," a song that belongs to this musical genre. For 10 points each:
[10] Identify this musical genre. Nikki Giovanni's poem "All Eyez on U" was written as an elegy for Tupac Shakur, who produced songs in this musical genre.
ANSWER: **hip-hop** [accept **rap** music; do not accept or prompt on "R&B"]
[10] This young adult novel is titled for a saying by Tupac Shakur that addresses the effects of systemic racism on "little infants." This 2017 novel by Angie Thomas centers on Starr Carter's attempts to get justice for her friend Khalil after he is murdered by police.
ANSWER: The **Hate U Give** [prompt on T.H.U.G.]
[10] This book's sixth chapter ends with a list of African American men involved in then-recent police shootings, including Trayvon Martin. Various forms of media are interspersed throughout this Claudia Rankine ("RANK-in") book, subtitled *An American Lyric*.
ANSWER: **Citizen**: *An American Lyric*
<American Literature>

6. A speech titled for these two substances criticizes Bavaria, Württemberg, and Baden ("BAH-din") for their propensity to "indulge liberalism." For 10 points each:
[10] Name these substances that title an 1862 speech that denounced the consolidation of power by "speeches and majority resolutions" in favor of expansion through the two title concepts.
ANSWER: **Blood and Iron** Speech [or **Blut und Eisen**]
[10] This German statesman and author of the Blood and Iron Speech pushed for military expansion by the state of Prussia. He was dismissed unceremoniously by Kaiser Wilhelm II.
ANSWER: Otto von **Bismarck**
[10] After two assassination attempts against Wilhelm I, Bismarck outlawed this left-wing political party. Karl Marx wrote a critique of this party's Gotha Program.
ANSWER: **SPD** [or **Sozialdemokratische Partei Deutschlands**; or **Social Democrat**ic Party of Germany; or **SDP**]
<European History>

7. In *Drosophila* ("druh-SOFF-ill-uh"), this process can be performed by the Brahma complex and trithorax and polycomb proteins. For 10 points each:
[10] Name this set of processes that can alter gene expression, some of which can be carried out by the SWI/SNF ("switch-sniff") and RSC complexes. One method of doing this action is translocating DNA among certain octameric complexes.
ANSWER: chromatin **remodeling** [or nucleosome **remodeling**; accept, but DO NOT REVEAL, **histone** remodeling]
[10] Chromatin remodeling can increase accessibility to genes by changing how tightly the chromatin is wound, which is the difference that distinguishes between these two forms of chromatin. Name both.
ANSWER: **eu**chromatin AND **hetero**chromatin [accept in either order]
[10] Different modifications of these proteins by enzymes like HATs is another method of controlling gene expression. Chromatin consists of DNA wrapped around these proteins.
ANSWER: **histone**s
<Biology>

8. This model appeared on the cover of a 1987 issue of *Time* magazine titled for her artist's "Stunning Secret." For 10 points each:
[10] Name this woman who was painted nude in paintings such as *Lovers* and *Letting Her Hair Down*.
ANSWER: Helga **Testorf** [or **Helga** Testorf; accept *The **Helga** Pictures* or similar]
[10] Helga Testorf was painted by this American artist. He also painted Anna Olson lying in a field facing a house in *Christina's World*.
ANSWER: Andrew **Wyeth** [or Andrew Newell **Wyeth**]
[10] Wyeth painted Testorf near his home in Chadds Ford in this state. Another artist who primarily worked in this state painted *The Swimming Hole* and *Max Schmitt in a Single Scull*.
ANSWER: **Pennsylvania** [or **PA**] (The other artist is Thomas Eakins.)
<Painting/Sculpture>

9. A man receives this thing as a gift along with a horn that can defeat any attacker and a peacock in a basket of jewels who keeps time. For 10 points each:
[10] Identify this automaton made of a certain material that has the power to fly anywhere. In a story told by Scheherazade, Kamar uses this thing to elope with the princess Shams, and eventually the science-loving King Sabut has it destroyed.
ANSWER: **ebony horse** [or the **brass horse**; prompt on horse by asking "what material is it made of?", but do not accept or prompt on "enchanted horse"]
[10] Scheherazade tells many folk tales in this collection, which includes the story of Ali Baba and the forty thieves.
ANSWER: *The **Arabian Nights*** [or ***One Thousand and One Nights***; or ***Kitab alf laylah wa-laylah***]
[10] In one of those stories, Sinbad tricks a man known by this name, who rides around on travelers' shoulders and never lets go. In Greek mythology, Menelaus manages to capture a figure known by this multi-word epithet who constantly transforms to try and get away from him.
ANSWER: the **Old Man of the Sea** [or **Shaykh al-Bahr**; prompt on Proteus by asking "what epithet was he known by?"; prompt on Old Man]
<Mythology>

10. In 2019, the European Competition Commission fined this company 1.7 billion dollars over the "abusive" online monopoly of its service AdSense over third-party websites. For 10 points each:
[10] Name this company that was the target of a multibillion-dollar lawsuit stemming from violations of the Sherman Antitrust Act in October 2020. This company's CEO, Sundar Pichai, denies that it subverted the activities of other search engines like Bing.
ANSWER: **Google** [or **Alphabet**]
[10] Concerns over the relevancy of partisan censorship threaten to derail the Google lawsuit, similar to how these two telecommunications companies used "political bias" to successfully fend off a 2018 antitrust suit over their merger, which was overseen by John T. Stankey.
ANSWER: **AT&T** Communications AND Time **Warner** [prompt on partial answers; accept **American Telephone and Telegraph** Company Inc. in place of "AT&T"; accept **Warner**Media, LLC in place of "Time Warner"]
[10] This senator and Big Tech critic called the Google lawsuit "the most important antitrust case in a generation." This Republican senator from Missouri became the youngest US senator after defeating Claire McCaskill in 2018.
ANSWER: Josh **Hawley** [or Joshua David **Hawley**]
<CE/Geo/Other/Pop Culture>

11. Early visitors to this kingdom's court had to traverse the Cauldron of Hell, and later lay on the ground and crawl in towards its king. For 10 points each:
[10] Name this African kingdom whose *mani* Nzinga a Nkuwu ("n'JING-ah ah n'KOO-woo") took the name João I ("zh'WOW the first") upon being converted by Portuguese missionaries, and rebuilt his capital *mbanza* out of stone and renamed it São Salvador.
ANSWER: **Kongo**
[10] Despite its name, the Kingdom of Kongo was located in the north of this modern-day country. Portuguese *pombeiros* captured 2.8 million slaves and sent them to Brazil via a trading post that became this country's capital of Luanda.
ANSWER: **Angola**
[10] In 1539, this Kongolese king pleaded with his "brother king" of Portugal to return ten of his nephews who were kidnapped and enslaved. This king fully adopted Catholicism as a state religion and renamed noble titles in the Kongo after the Portuguese.
ANSWER: **Alfonso** I [or **Afonso** I or **Nzinga Mvemba** or **Mvemba a Nzinga**]
<World History>

12. This book's protagonist pretends to be Che Guevara while demonstrating on her front lawn. For 10 points each:
[10] Name this book in which Mehri's romance with a neighbor boy ends once he learns that Mehri is a maid. In the second part of this book, the protagonist attends school in Vienna before becoming homeless.
ANSWER: *Persepolis*
[10] *Persepolis* is a memoir by Marjane Satrapi ("mar-ZHAHN sah-trah-pee"), recounting her childhood in this country before its 1979 revolution.
ANSWER: **Iran**
[10] As a young girl, Marjane decides that she will be the first female person of this type when she grows up in order to cure her grandmother's pain. Al Mustafa of Orphalese ("OR-fuh-leez") is the title person of this type, according to a book of prose poems by a Lebanese author.
ANSWER: **prophet** [accept The **Prophet** (by Kahlil Gibran)]
<World/Other Literature>

13. Stepwise "extraction dilution analysis" of these things separates their components in a form of gas chromatography that takes descriptive inputs from human panelists. For 10 points each:
[10] Identify these things detected by an electronic version of a human structure. GPCRs in the diverse family that detects these things often bind multiple agonists, such as civetone, trimethylamine ("try-METH-ill-uh-meen"), and the neurosteroid androstenol ("an-DROSS-ten-all").
ANSWER: **odor**s [or **odor**ants; or **aroma**s or **smell**s or **fragrance**s or equivalents; accept gas chromatography **olfactometry**; accept **aroma** extract dilution analysis; accept **olfactory** receptors or **olfaction**; prompt on electronic n
<u>nose</u>s; prompt on <u>flavor</u>s, but do not accept or prompt on "tastes"] (BreathBase is an artificial nose.)
[10] The Mikherdov group found that intermolecular bonds with these elements can reduce the foul odors of isocyanides ("iso-cyanides"). This group includes tennessine and astatine, and the more familiar bromine and iodine.
ANSWER: **halogen**s [accept **halogen** bonding; accept group **17**]
[10] The halogen fluorine is incorporated into 5-fluorouracil ("5-floro-uracil") to create an analog of one of these compounds that inhibits thymidylate synthase in cancer cells. Nucleobases of this type include cytosine and thymine.
ANSWER: **pyrimidine**s [prompt on <u>nucleotide</u>s or <u>nucleoside</u> analogs or nucleo<u>base</u>s or <u>nucleic</u> acids]
<Chemistry>

14. A composer from this family, Lili, wrote orchestral settings of three psalms and the cantata *Faust et Hélène* ("fohst eh ay-LEN"). For 10 points each:
[10] Name this family. Another member of this family, Nadia, taught composition to Virgil Thomson and Aaron Copland at Fontainebleau ("fon-ten-BLOW").
ANSWER: **Boulanger** ("boo-lawn-ZHAY") family [accept Lili **Boulanger** or Nadia **Boulanger**]
[10] Nadia Boulanger famously turned down teaching this American composer, declaring "I can teach you nothing." This composer was inspired by that trip to France to write *An American in Paris*.
ANSWER: George **Gershwin** [or Jacob Bruskin **Gershowitz**]
[10] Among Nadia Boulanger's piano students was this Argentinian-Jewish pianist and conductor. This pianist and Edward Said ("sa-EED") co-founded the West-Eastern Divan Orchestra, which is aimed at bringing about a peaceful solution to the Arab-Israeli conflict.
ANSWER: Daniel **Barenboim**
<Classical Music>

15. The philosopher Vann McGee used an example involving one of Shakespeare or Hobbes writing *Hamlet* to argue that this argument form is sometimes invalid. For 10 points each:
[10] Name this argument form with a Latin name which states that if *p* implies *q*, and *p* is true, then *q* is true as well.
ANSWER: *modus ponens* [accept *modus ponendo ponens* or **implicature elimination**]
[10] The *modus ponens* argument form is valid, meaning that if the premises have this property, then the conclusion also has this property. This is one of the two values that a Boolean variable can take.
ANSWER: **true** [accept **truth**]
[10] A major distinction in philosophical logic is between propositional logic and this other type of logic, which allows the use of both quantifiers and relations. This type of logic is also used in mathematical axiomatizations of Peano arithmetic.
ANSWER: **first-order** logic [accept **predicate** logic or **first-order predicate** calculus]
<Philosophy>

16. A king of this region hired mercenaries to defeat his brother Zipoetes II and take control of the kingdom. For 10 points each:
[10] Name this region ruled by many kings named Nicomedes. Nicomedes IV of this region was rumored to be a lover of Julius Caesar.
ANSWER: **Bithynia** [prompt on Northwestern <u>Anatolia</u>]
[10] Bithynia was one of many states to hire these Celtic people as mercenaries. Julius Caesar wrote about a campaign against these people where they fought from their fortified *oppida* in modern-day France.
ANSWER: **Gaul**s [accept **Gallic** people or **Galatian**s; accept **Gaulish**]
[10] Antiochus III ("an-TYE-oh-kus the third") hired Gauls to fight for him against Romans at Magnesia and this other site. This place was the site of an earlier battle where Ephialtes ("eff-ee-ALL-teez") showed the winning side a mountain path that would allow them to outflank a much smaller force.
ANSWER: **Thermopylae** [accept the **Hot Gates**]
<Other History>

17. Mateo Alemán details his early life in this city in his picaresque novel *Guzmán de Alfarache*. For 10 points each:
[10] Name this city where a young nobleman is killed by the ghost of Gonzalo. That title character of a play by Tirso de Molina is banished from this city when the King learns that Don Pedro lied about that character's identity.
ANSWER: **Seville** [or **Sevilla**; accept *El burlador de **Sevilla** y convidado de piedra* or *The Trickster of **Seville*** or *The Trickster of **Seville** and the Stone Guest*; accept "playboy" or "seducer" in place of "trickster"]
[10] *The Trickster of Seville* is the first written account of this character, a legendary Spanish womanizer.
ANSWER: Don **Juan** [accept Don **Giovanni**]
[10] This other Spanish Golden Age playwright created the Comendador, who is murdered after tormenting the residents of the title town. This playwright of *The Sheep Well* also wrote *The Dog in the Manger*.
ANSWER: Felix **Lope de Vega** y Carpio
<European Literature>

18. These values are found in the middle of the edges of the thermodynamic square. For 10 points each:
[10] Name these quantities that include Gibbs free energy, enthalpy, and internal energy. These quantities all have units of energy.
ANSWER: **thermodynamic potential**s
[10] Thermodynamic potentials may be converted among each other using this transformation to switch their natural variables. This transformation also converts the Lagrangian into the Hamiltonian.
ANSWER: **Legendre** ("luh-ZHOND") transformation
[10] The second derivatives of the thermodynamic potentials are connected by relations named for this Scottish physicist who also names the four central equations of electromagnetism.
ANSWER: James Clerk **Maxwell** [accept **Maxwell**'s relations or **Maxwell**'s equations]
<Physics>

19. The Pacific Northwest has long been a hotbed of new religious movements. For 10 points each:
[10] Circa 1815, the Wanapum prophet Smohalla led dances inspired by these things that are guessed in a Midwinter Onondaga rite. The Ojibwe ("oh-JIB-way") inspired protective "catchers" for these things, which Joseph interprets for Pharaoh in Genesis.
ANSWER: **dream**s [accept **vision**s; accept **dream**catchers; accept **dreamer**-prophets]
[10] In 1881, Mary Slocum healed her husband John with this action, inspiring a new Salish ("SAIL-ish") and Wiyot religion. This action also named an unrelated group that practiced celibacy in New England in the 1780s.
ANSWER: **shaking** [or **trembling**; or **convulsing**; or **rolling**; or word forms or equivalents; accept Indian **Shaker** religion; accept **Shaker**s or **Shaking** Quakers]
[10] This Indian-born mystic founded a commune in Oregon, where his followers tried to spread *Salmonella* to win a 1984 election. The documentary *Wild Wild Country* highlights Ma Anand Sheela promoting this leader's teachings.
ANSWER: **Rajnees**h [or **Osho**; or Chandra Mohan **Jain**; or Acharya **Rajneesh**; or **Bhagwan** Shri Rajnees; or the **Rajneeshpuram**; or **Rajnees**h movement]
<Religion>

20. This behavior is learned from individual "teachers" who contribute to an overall imbalance in "definitions" according to Edwin Sutherland's differential association theory. For 10 points each:
[10] Name this behavior that Gary Becker described in terms of rational economic incentives. Cesare Lombroso's ("CHAY-zah-ray loam-BRO-zo's") "positivist" school used physiognomy to predict this behavior, which is caused by social pressures in strain theory.
ANSWER: **crime** [or **criminology**; or word forms like **criminal**s or **criminal**ity; accept **delinquent**s or **delinquency**]
[10] Sutherland's later editions of *Principles of Criminology* outlined this type of crime, which he defined based on ASARCO in an "Uncut" book. A 2020 book by Jennifer Taub notes that this type of crime is rarely prosecuted despite its "unseen cost."
ANSWER: **white-collar** crime [or **corporate** crime; accept *Big Dirty Money: The Shocking Injustice and Unseen Cost of **White Collar** Crime*]
[10] Sutherland's work on white-collar crime drew on meatpacking in this city, where he also studied homeless men with Harvey Locke. A university in this city led a quantitative sociology school as well as an economics school influenced by Milton Friedman.
ANSWER: **Chicago** [accept the **Chicago** School or University of **Chicago** or U**Chicago**]
<Social Science>

21. These components are found in microphones and almost any device that measures voltage. For 10 points each:
[10] Name these devices that convert continuous signals into discrete signals.
ANSWER: **analog-to-digital** converter [or **ADC** or **A/D** converter; do not accept or prompt on "digital-to-analog converter"]
[10] Analog-to-digital conversion can be thought of as first setting the rate of this process, then quantization. This process is necessary as the digital output must be discrete in time.
ANSWER: **sampling** [accept **sampling rate**]
[10] The Nyquist–Shannon theorem states that a faithful reproduction of the signal is only possible if the sampling rate is greater than twice the highest value of this quantity for the signal. Like the sampling rate, this quantity is usually measured in hertz.
ANSWER: **frequency**
<Physics>