1. In the last stanza, the narrator states that he is "grown peaceful as old age to-night," and that he regrets little, and "would change still less." Recalling "that long festal year at Fontainebleau," he imagines the walls of his house becoming "illumined, brick from brick." Addressing his wife Lucrezia, he imagines that in the New Jerusalem, there will be four walls for Leonardo, Michaelangelo, Raphael, and himself, "the first three without a wife." The source of the line, "A man's reach should exceed his grasp, or what's a heaven for?", FTP, name this Robert Browning poem about "the Faultless Painter" of *The Madonna of the Harpies*.
Answer: **Andrea del Sarto**

2. In Chapter 16, "The Monetary Illusion," the author attacks the monetarist school for not adequately addressing the problems of want creation in trying to curb inflation. In "The Military Illusion," it is denied that national power correlates with economic output, and the problems of satisfying psychological needs is addressed in "The Imperatives of Consumer Demand". Claiming that "our economic attitudes are rooted in the poverty, inequality, and economic peril of the past," the author sets out to address the issues facing the title group in, FTP, what John Galbraith work that begins, "Wealth is not without its advantages."?
Answer: The **Affluent Society**

3. For an ideal gas, its namesake coefficient is zero, but for a non-ideal gas, that coefficient can be derived from the virial expansion of the equation of state. In order for it to be useful in cooling, the initial temperature must be less than the maximum temperature on the inversion curve. Its coefficient is given by the derivative of the temperature with respect to pressure. Occurring at constant enthalpy, FTP, identify this effect in which the adiabatic expansion of a gas produces a change in its temperature.
Answer: **Joule-Thomson** effect

4. A part-time job as an organist helped inspire a set of variations on the British national anthem that included one flamenco variation and another which saw his first use of bitonality; that set of variations was the 1891 piece *Variations on "America."* His work in the early 1900's showed a strong influence from the Transcendentalists, particularly in his oddly-arranged *The Unanswered Question* for trumpet, flutes, and string quartet and his later *Piano Sonata #2: Concord, Mass, 1840-1860*, which he felt reflected both the Alcotts and the spirit of Nathaniel Hawthorne. FTP, name this American composer best known for his *Three Places in New England*.
Answer: **Charles Edward Ives**

5. The second of them prompted the Mansion House speech, which declared that national honor was more valuable than peace, while the first was preceded by the French violation of the Treaty of Madrid. During the second one, the warship *Panther* entered the port of Agadir with the intent of weakening the Triple Entente. The first one, which began with Kaiser Wilhelm II's visit to the namesake location in an attempt to weaken the *entente cordiale*, was resolved at Algeciras in 1905. FTP, identify these events, named after a country whose capital is Rabat.
Answer: **Morocco Crisis** or **Crises** or **Affairs** (note: prompt on, but do not accept **Morocco**)

6. The word "really" is added to this five word phrase in a line uttered by Jon Favreau in Swingers to an answering machine. In *High Fidelity*, it's the top cliché Rob wants to hear from all the women he attempts to track down. This routine is used in the Seinfeld episode "The Lip-Reader." Gwen attempts to use this five-word phrase on George Costanza but, FTP, he claims to have invented what self-deprecating excuse for breaking up with someone?
Answer: **"It's not you, it's me"**

7. In semiconductors, its value is halfway between the conduction and valence bands, and it is equivalent to the Fermi level. Exponentiating this quantity gives the fugacity, and bosonic systems place an upper bound on its value. It is defined per particle as minus the temperature times the derivative of entropy with respect to number, but it more often appears as the derivative with respect to number of either the Helmholtz or the

Gibbs free energy. Equal for two systems in diffusive equilibrium, FTP, identify this thermodynamic quantity, the amount of energy needed to add a particle to the system.
Answer: **chemical potential** (accept **Fermi level** or **Fermi energy** before Fermi level is mentioned)

8. At one point, one of the four characters asks his son if he is very white, and demands that the window be opened so he can hear the sea. Confined to a wheelchair and blind, that character is dependent on his son, who is unable to sit down, and the two of them profess to be obliged to each other. The other two characters, Nagg and Nell, live and die in trash cans while carrying on conversations with each other and with Hamm and Clov, in, FTP, what Samuel Becket play that begins with the word "finished," ends with "remain," and is named after a phase in a game of chess.
Answer: **Endgame**

9. His Edict of Maximum Prices fixed prices for over a thousand goods and threatened merchants with death for overcharging. The only Roman emperor to retire from office of his own free will, he ruled from Nicomedia, unlike his appointed caesars, Galerius and Constantius. After the death of Numerian, Carinus defeated him in battle for the title of emperor but soon died, leaving him the sole successor and free to appoint Maximian as his co-Augustus. FTP, name this emperor who resumed the persecution of Christians in 302 AD.
Answer: Gaius Aurelius Valerius **Diocletian** (prompt on **Diocles**)

10. There are actually two laws bearing this name, but as the second affects only High German, it is less widely applicable than the first, which affects all Germanic languages, including English. The most troubling problem with it was later solved by the use of accented syllables in Werner's Law. FTP, what is this law which describes the consonant changes from Proto-Indo-European into Proto-Germanic, named for its discoverer Jakob, who also collected fairy tales?
Answer: **Grimm**'s Law

11. The Kermadec Islands and the Three Kings Islands are part of its territories lying north of the Bay of Plenty. Its largest lake, Lake Taupo, is located in the middle of a volcanic plateau just north of the active volcano Mount Ruapehu. Also known as the "Land of the Long White Clouds," its Southern Alps run through the Fiordland National Park. FTP, what is this country divided by the Cook Strait with capital at Wellington?
Answer: **New Zealand**

12. Malmsten's formula represents its logarithm as a definite integral, and its reciprocal can be written as an infinite product in Weierstrass form. Products of this object with itself can be found through the Gauss multiplication formula, and it is never zero, although it is not analytic for negative integer values. For arguments z with real parts greater than zero, it may be written as the integral from zero to infinity of t to the minus z times e to the t dt, and the Euler-Mascheroni constant appears in many of its expansions. FTP, what is this function, the generalization to complex and real arguments of the factorial?
Answer: Euler **gamma** function

13. Although her songs have appeared on *Melrose Place* and numerous film soundtracks, her primary connection to the screen is her husband, Sean Penn's brother Michael, with whom she duetted on the track "Two of Us" from the *I Am Sam* soundtrack. After breaking with her longtime band 'Till Tuesday, she released her first solo album, *Whatever*, in 1993. Her song "Wise Up" appeared on the *Jerry Macguire* soundtrack, catching the attention of director P.T. Anderson, who selected her for his 1999 project *Magnolia*. FTP, name this somber singer-songwriter whose song "Save Me" was nominated for an Oscar in 2000.
Answer: Aimee **Mann**

14. Originally written as a verse letter to Sara Hutchinson, the poem opens with a stanza from *The Ballad of Sir Patrick Spence* from which the speaker draws his theme of new and old moons present in the first two stanzas. The author indicates a sorrow "which finds no natural outlet, no relief/ In word, or sigh or tear", and later laments that "abstruse research" has stolen his poetic gift, in reference to the author's prominent

later career as a metaphysician and critic. FTP, name this depressing 1802 lyric by Samuel Taylor Coleridge.
Answer: **Dejection: An Ode**

15. In their song named for him, the Los Angeles-based punk group Le Tigre alternately call this man a genius, misogynist, alcoholic, and messiah. Though lauded for his own intense acting style in films like *Rosemary's Baby* and *The Dirty Dozen*, he merely took these Hollywood roles to finance his own films. Ray Carney recently recovered the original cut of his first film, which only Jonas Mekas liked; though it claims to be "an improvisation", Hugh, Ben, Lelia, and Rupert were acting from a script as they bounced around Manhattan in 1959's *Shadows*. FTP, name this the founder of modern American independent film married to Gena Rowland.
Answer: John **Cassavetes**

16. Referring to the new technical advancements that surrounded them, the first participant stated, "we have all these new things in our flats," and the second replied, "we hope to show our right to choose." Among the demands stated on one side was the removal of foreign bases, and to the statement that "our [rockets] are better than yours," Richard Nixon replied, "We have some too." In the end, both Nikita Khruschev and Nixon thanked the hostess of the exhibit following, FTP, what argument which occurred during Nixon's USSR visit in a model of a room where one might expect to find a dishwasher?
Answer: **Kitchen** Debate

17. He set up his own studio after leaving the workshop of Francesco Squarzione at age 17, and his earliest painting is *Agony in the Garden*. His earliest commission was for the fresco decorations of the Ovetari Chapel of the Eremitani Church, which included his *St. James Being Led to Martyrdom*. In 1457 he married Nicolosia Bellini, and in 1460 became court painter to the Gonzaga Duke in Mantua, for whose bedroom he executed his most famous work. Known also for the series *Triumph of Caesar* and the famously foreshortened *Dead Christ*, FTP, who is this painter best known for *Camera degli Sposi*?
Answer: Andrea **Mantegna**

18. Although it begins on an airplane in Germany circa 1987, most of the action of this novel takes place 20 years earlier near Tokyo. Like most of the author's narrators, Toru has an appreciation for fine food, good whiskey and Bob Dylan. The story, though, marks a move away from the magical realism of earlier works like *Dance Dance Dance* and *Sputnik Sweetheart*, centering instead on the aftermath of Kizuki's suicide and the twisted, painful romance that blossoms between his best friend Toru and girlfriend Naoko. FTP, identify this best-selling of Haruki Murakami's novels which is named for a track from the Beatles's *Rubber Soul* subtitled "This bird has flown."
Answer: **Norwegian Wood**

19. He earned the nickname "the Razor" for being an aggressive staff officer, and was assigned his first post as a military attaché to Switzerland and Germany. As an associate of the Control Faction, which sought to promote the technological modernization of the army, he rose to power when he was named chief of staff of the Kwantung Army in Manchuria. In 1945, he attempted suicide by shooting himself in the chest but failed and was later hanged as a war criminal. FTP who is this prime minister who planned the Japanese attack on Pearl Harbor?
Answer: **Tojo** Hideki

20. The repulsive r^{-12} term in the Lennard-Jones potential is due to this result, which is encoded in the Slater determinant, since the determinant vanishes whenever two columns are the same. In the cases where it applies, multi-particle wavefunctions must be antisymmetric under exchange of particles of the same species. According to the spin-statistics theorem, it applies only to particles with half-integer spin; that is, fermions but not bosons. FTP, name this principle which implies that no two electrons can occupy the same quantum state.
Answer: **Pauli's** exclusion **principle** or **exclusion** principle

1. Answer some questions about stellar structure and evolution, FTPE.
[10 points] The Chandrasekhar limit of 1.4 solar masses gives the upper mass limit on these stars, in which electron degeneracy pressure balances self-gravitation.
Answer: **white dwarf**
[10 points] In lightweight red giants, prior to a second ascent of the red giant branch, this element ignites with a namesake flash when it is added to the core by shell hydrogen burning.
Answer: **Helium**
[10 points] In stars about the size of the Sun, this process is the primary method of fusing hydrogen to helium. In larger stars, it is dominated by the CNO cycle.
Answer: **proton-proton chain reaction** or **process**

2. Given works by a minimalist composer, name the composer FTPE
[10 points] *Piano Phase, Different Trains, Electric Counterpoint*
Answer: Steve **Reich**
[10 points] *Imaginary Landscape No. 1, Sonatas for Prepared Piano, 4'33*
Answer: John **Cage**
[10 points] *Einstein on the Beach, Satyagraha, Akhnaten*
Answer: Philip **Glass**

3. Answer these questions about the man who conquered Jerusalem for Islam.
[5 points] What sultan defeated the Crusaders in 1187 and conquered Jerusalem prompting the Third Crusade?
(Note to reader: DO NOT read his complete name if it is not given as an answer)
Answer: **Saladin** or **Salah Ad-din** Yusuf Ibn Ayyub
[5 points] Saladin negotiated for possession of the Jerusalem with this British king who defeated him at the Battle of Arsuf.
Answer: **Richard the "Lionheart"** or **Richard I** or **Coeur de Lion** or **Oc et No** or **Melek-Ric**
[10 points] Saladin was a Kurd born in this city that is also noted as the birthplace of Saddam Hussein.
Answer: **Tikrit**
[10 points] F10P, after the death of his former master and rival Nur ad-Din, Saladin consolidated his territory ranging from Egypt to Syria under this new ruling dynasty?
Answer: **Ayyubid** dynasty

4. Identify these short works by Garbriel García Márquez FTPE.
[10 points] In this novella, the nameless title character reminisces about his revolutionary son and goes down to the post office every day, expecting a check that never arrives.
Answer: **No One Writes to the Colonel** (or: **El coronel no tiene quien le escriba**)
[10 points] This short novel, centering around the suicide of an eccentric doctor who once refused to treat the victims of a riot, was Garcia Marquez's first work featuring Macondo.
Answer: **Leaf Storm** (or: **La hojarasca**)
[10 points] This short story concerns the discovery of an ancient man capable of flight; the town takes him for an angel and his discoverers exhibit him to the public before he escapes.
Answer: A **Very Old Man With Enormous Wings**

5. Given a description, name the end product of processes in the respiration cycles FTPe.
[10 points] In glycolysis, glucose is decomposed to this end product, a three-carbon molecule.
Answer: **pyruvate** or **pyruvic acid**
[10 points] Before entering the actual Krebs cycle, pyruvate is combined with coenzyme A to create this product as well as the by-products 1 CO_2 and 1 NADH
Answer: **acetyl CoA**
[10 points] The Krebs cycle is also referred to by this name because acetyl CoA is converted to this first 3-carbon product.
Answer: **citric acid** or **tricarboxylic acid**

6. Given the name of a famous work in 20th-century Aesthetics, name the man who wrote it FTP; you get five if you need another work.

[10 points] *The Origin of the Work of Art*
[5 points] *Being & Time*
Answer: **Martin Heidegger**
[10 points] *Art and its Objects*
[5 points] *On Art and the Mind*
Answer: **Richard Wollheim**
[10 points] *The Truth in Painting*
[5 points] *Of Grammatology*
Answer: **Jacques Derrida**

7. Answer some questions about labor issues in the United States FTPE.
[10 points] In this 1918 case, the Supreme Court found that production was not commerce and its regulation was reserved to the states, thereby overturning a law that prohibited the transportation across state lines of goods made with child labor.
Answer: **Hammer** v. Dagenhart
[10 points] This was the law overturned by *Hammer v. Dagenart*.
Answer: **Keating-Owen** Child Labor Act
[10 points] Along with Holmes, McKenna, and Clarke, this man was the fourth dissenter in the case. His namesake brief had swayed the Court in favor of labor in 1908's *Muller v. Oregon*.
Answer: **Louis Brandeis**

8. Identify these World War I poems given the poet and some lines FTPE.
[10 points] Wilfred Owen; "What passing bells for those who die as cattle?/ Only the monstrous anger of the guns."
Answer: **Anthem For Doomed Youth**
[10 points] Rupert Brooke; "If I should die, think only this of me:/ That there's some corner of a foreign field/ that is forever England."
Answer: The **Soldier**
[10 points] John McCrae; "The poppies grow/ between the crosses, row on row/ That mark our place; and in the sky/ the larks still bravely singing fly/ scarce heard amid the guns below."
Answer: **In Flanders Fields**

9. Identify the following things about graphs FTPE.
[10 points] This is the term for a path in a graph which begins and ends at the same vertex and includes every other vertex exactly once.
Answer: **Hamiltonian** cycle or **path** or **circuit**
[10 points] With only one vehicle, the vehicle routing problem reduces to this traversal problem which seeks to complete a Hamiltonian cycle while minimizing edge costs.
Answer: **traveling salesman** problem
[10 points] This is the term for a graph that does not contain a subgraph homeomorphic to the complete graph on five vertices or the complete bipartitie graph with 3 vertices in each partition. More simply, it is a graph that can be drawn on paper without crossing edges.
Answer: **planar** graph

10. Identify these ancient Greek sculptors, FTSNOPE.
[5 each] Identify any two of the three sculptors responsible for the Laocoon group.
Answer: **Athenodoros**, **Polydoros**, **Agesander**
[10 points] This sculptor's namesake curve is best represented in his *Hermes with the Infant Dionysus*. He also sculpted the *Aphrodite of Knidos*, the first monumental female nude.
Answer: **Praxiteles**
[10 points] The author of the *Canon*, this man sculpted *Doryphoros* as well as a gold and ivory Hera for a temple at Argos, his home city.
Answer: **Polykleitos** the Elder

11. Answer some questions about everyone's favorite barbarians, the Mongols, and their interactions with Russia FTPE.

[10 points] Established by Batu Khan, this was the Mongol state, known for its colorful tents, to which Russia paid tribute from 1242 until 1380.
Answer: **Golden Horde** or **Kipchak Khanate**
[10 points] On September 8, 1380, Russian forces under Dmitri Donskoi defeated the Mongols under Mamai at this meadow near the Don river.
Answer: **Kulikovo** Field
[10 points] Prior to the rise of Donskoi, this Russian prince, ruling from Moscow from 1325 to 1341, made himself fabulously wealthy by acting as a tribute collector for the Golden Horde.
Answer: **Ivan I** or **Ivan Moneybags** or **Kalita**

12. Identify these things from condensed matter physics FTSNOP.
[5 each] At high densities, Maxwell-Boltzmann statistics must be replaced by these two types of statistics, one for particles with integer spin and one for particles with half-integer spin.
Answer: **Fermi-Dirac** and **Bose-Einstein** statistics
[10 points] This is the theory of the superconducting state which shows that for type I superconductors, below a certain temperature the superconducting state is thermodynamically favorable. It is named after its three creators.
Answer: **B**ardeen-**C**ooper-**S**chrieffer theory
[10 points] In materials of this type, like manganese oxide, adjacent electron spins spontaneously align themselves in opposite directions, so there is almost no external magnetism. This behavior is disrupted above the Neel temperature.
Answer: **antiferromagnetic**

13. Answer some questions about a playwright and his work, FTPE.
[10 points] Lesser-known works of this 19th century German playwright include the short story *Lenz* and the play *Leonce and Lena*, but he is best known for another play that was made into an opera by Alban Berg.
Answer: Georg **Büchner**
[10 points] This is the play on which the opera was based. It tells the story of the title character, who impregnates Marie, who is then seduced by the Drum Major. It ends with the title character's murder of Marie.
Answer: **Woyzeck** (pronounced "Voy-check", I think, but be generous)
[10 points] Buchner also wrote wrote an 1835 play about the death of this French revolutionary, who is horrified by the bloodshed of the French Revolution.
Answer: Georges Jacques **Danton**

14. Name the movie, given quotes 30-20-10
[30 points] "In the fifth, my ass goes down."
[20 points] "Vincent, do you still want to hear my Fox Force Five joke?"
[10 points] "Ezekiel 25:17 - The path of the righteous man is beset on all sides by the inequities of the selfish and the tyranny of evil men"
Answer: **Pulp Fiction**

15. Answer these questions about the Rio de la Plata for the stated number of points.
[5 for one, 15 for both] What two national capitals lie along the coastline of the Rio de la Plata?
Answer: **Montevideo** and **Buenos Aires**
[5 for one, 15 for both] What two major rivers, one named for a country and one the second longest in South America, flow into the Rio de la Plata?
Answer: **Parana** and **Paraguay**

16. Answer the following on foreign trade in China.
[10 points] Established in 1757, this southern city was designated by the Qing emperor as the sole legal port for foreign trade with China.
Answer: **Guangzhou** (accept **Canton**)
[10 points] The beginning of the First Opium War was essentially the result of the breakup of a monopoly, held by this company, in opium cultivation in a neighboring country.

Answer: **English East India Company**
[10 points] Name either of the treaties that ended the first or second Opium Wars.
Answer: **Treaty of Nanjing or Nanking; or Treaty of Tianjin**

17. Answer some questions about the sociological work of Vilifredo Pareto, FTPSNOPE.
[10 points] In this work, Pareto formulated his theory of the circulation of the elites by postulating that the elites replenish themselves from the lower classes.
Answer: The **Mind and Society** or **Treatise on General Sociology** or **Trattato di Sociologia Generale**
[5 each] To differentiate theories he believed scientific from nonscientific ones, Pareto coined these two terms, one used to refer to elements which are constants of human psychology and the other referring to the changing elements issuing from the first group.
Answer: **residues** and **derivatives**; or **residuo** and **derivato**; or **residui** and **derivati**
[5 each] Pareto also used these animal descriptions for two types of people, a distinction originally made by Machiavelli.
Answer: **lions** and **foxes**

18. Name these songs that have been used on *Futurama* and also heard on the big screen FTPE.
[10 points] On *Futurama*, Kif sings this song to Amy on their first date. This song by one-hit wonder Bonnie Tyler also causes Cate Blanchett fall for Bruce Willis in the movie *Bandits*.
Answer: **Total Eclipse of the Heart**
[10 points] When Fry discovers that his nephew shares his name, this Simple Minds song plays as the episode ends. This is also the same song that ends the movie *The Breakfast Club*.
Answer: **Don't You Forget About Me**
[10 points] Fry is obsessed with this song by Katrina and the Waves, even singing it in the shower. This song has got to be on the most soundtracks including Look Who's Talking, Daddy Day Care, and Ella Enchanted.
Answer: **Walking on Sunshine**

19. Given a brief description, name the organic chemistry functional group FTPE. Assume any free valence electrons are bonded to alkyl groups.
[10 points] A carbon is double-bonded to one oxygen and singled bonded to another oxygen.
Answer: **ester**
[10 points] A carbon is triple-bonded to a nitrogen.
Answer: **nitrile**
[10 points] A carbon is double-bonded to an oxygen and a hydrogen.
Answer: **aldehyde**

20. Given thinkers from modern Literary Theory, identify the school with which they are most associated FTPE
[10 points] John Crowe Ransom, William K. Wimsatt, Robert Penn Warren
Answer: **New Criticism**
[10 points] Judith Butler, Eve Kosofsky Sedgwick
Answer: **Queer Theory**
[10 points] Claude Levi-Strauss, Roland Barthes, Mikhail Bakhtin
Answer: **Structuralism**