

1. According to many scholars, its opening quotation, "What Tarquinius Superbus spoke by means of the poppies was understood by the son, but not by the messenger", implies that this book can only be understood in terms of the abandonment of the author's love affair with Regine Olsen. Published under the pseudonym Johannes de silentio and subtitled "A Dialectical Lyric", this 1843 work contrasts "the tragic hero", who must make an agonizing decision within the bounds of the ethical domain, and the so-called "knight of faith", who, due to a "teleological suspension of the ethical", must commit to an action which cannot be defended as ethical, as seen in the story of Abraham and Isaac. FTP, name this philosophical work by Soren Kierkegaard.

**Fear and Trembling** (or Frygt og baeven)

2. One potential problem with this theory -- that it deals with ten-dimensional space-time -- may be resolved by allowing six of the dimensions to be compactified so they are unnoticable. But other problems remain -- inability to explain the masses of the known particles and the implied existence of "shadow matter" with which normal matter can interact only through gravity. When supersymmetry was added to an early 1970s theory which sought to explain the strong force, it led to this theory which considered massless, one-dimensional entities with a length equal to 10 to the -33 cm. FTP, name this theory, which became popular in the 1980s when Michael Green and John Schwartz showed it to be a candidate for a unified quantum theory. **superstring theory**

3. Later works, including "The Man Born To Be King" and "Creed or Choas", are imbued with a strong religious bent. After obtaining a degree in medieval literature from Oxford in 1915, this author published popular translations of "Tristan in Brittany", "The Song of Roland", and "The Divine Comedy", although "Paradiso" was left unfinished at her death in 1954. Her short stories often featured the sleuth Montague Egg, but she is best known for works like "Strong Poison", "The Unpleasantness of the Bellona Club", and "The Nine Tailors". FTP, name this author who created the erudite detective Lord Peter Wimsey. **Dorothy Sayers**

4. He advocated an independent black economy within the framework of white capitalism, backing his words by establishing Negro Factories Corporation and the Black Star Line. Controversial due to support of the KKK, he was indicted for mail fraud in 1922, after which Coolidge had him deported. He'd come to the U. S. from Jamaica in 1916, and 3 years later was known as the "Black Moses" due to a following of 2,000,000. FTP name the founder of the Universal Negro Improvement Association. **Marcus (Mozaih) Garvey**

5. Samuel Taylor Coleridge called this musical instrument an "actor, perfect in all tragic sounds!" Called a "musical autophone" when it was rediscovered in the mid-17th century, it is composed of a soundbox up to a meter long containing 4 to 12 strings of equal length but different thickness tuned to the same note. Because of the strings' varying thickness, harmonic chords are produced whenever wind passes through the soundbox. FTP, identify this musical instrument named for the Greek keeper of the winds. **Aeolian harp**; prompt on harp

6. Of the family Varanidae, it was almost driven to extinction because of collectors, and is now a protected species. Living in burrows up to 9 meters deep, these lizards reproduce by laying eggs which hatch in April or May, after which the newly hatched young live in trees for several months. Living mostly on carrion, they are typically 10 feet in length, 300 pounds, and can live up to 100 years of age. FTP, name these lizards of the Lesser Sunda Islands of Indonesia, the largest extant lizard species. **Komodo dragon**

7. This leader, whose most famous pseudonym means "Enlightener", was born on May 19, 1890, in Kimlien, Annam, and at the age of 21 became a cook on a French steamship. Using the name Nguyen the Patriot, he helped found the French Communist Party, and in 1930 founded the Indochinese Communist Party. He died in 1969, but not before he declared himself president of a French colony, won the battle of Dien Bien Phu, and led his country into war with the United States. FTP, name this communist leader for whom Saigon is now named.

**\_Ho\_ Chi Minh** (or \_Nguyen Tat Thanh\_)

8. The papers of this psychologist were published posthumously as "The Farther Reaches of Human Nature". Author of "Religion, Values, and Peak Experiences", this native New Yorker argued that each person has a hierarchy of needs that must be satisfied, and that a higher need cannot be addressed until lower needs have been fulfilled. FTP, name this social scientist, author of "Motivation and Personality" and "Toward a Psychology of Being".  
**Abraham Harold Maslow**

9. This compound is an excellent solvent for rubber, gums, fats, and many resins. Since 1950 it has been prepared from petroleum, but historically it has been obtained chiefly from coke-oven gas. Known to cause leukemia after long exposure, it was named in 1845 by A.W. von Hofmann, 20 years after it was discovered in illuminating gas made from whale oil by Michael Faraday. Although amended to take into account Pauling's resonance hybrid theory, its basic structure is still held to be the hexagonal formula proposed by Kekule. FTP, name this simplest aromatic hydrocarbon, with formula C<sub>6</sub>H<sub>6</sub>.  
**benzene**

10. The author of this 1979 work called it "a novel in the form of variations". Comprised of seven interrelated stories, its main theme can be found in two sections, entitled "Lost Letters" and "The Angels", which tell of Tamina, a waitress who struggles to hold onto the memory of her dead husband, and who drowns trying to escape from an island inhabited by children. Containing the author's characteristic eroticism, it is set against the backdrop of post-Prague Spring Czechoslovakia. FTP, name this novel by Milan Kundera.

The **Book of Laughter and Forgetting** (or *Le Livre du rire et de l'oubli* or *Kniha smichu a zapomneni*)

11. This comedian's act has been called "the lamest possible act in the world" by his writer, Robert Smigel. In the vein of his hero, Don Rickles, he has unleashed verbal beratings upon such stars as Tom Arnold, Fabio, Pauly Shore, and David Hasselhoff; pretty good for a Yugoslavian mountain hound who got his start performing at the Westminster Dog Show, and who periodically brings his act to *Late Night with Conan O'Brien*. FTP, name this comic/hand puppet who would say that this is a good question "for me to poop on!"

**Triumph** (or the *Insult-Comic Dog*)

12. This battle began when Prince P.I. Bognation crossed the Alle River and led repeated attacks against the seemingly isolated forces of Marshal Jean Lannes. Lannes, although outnumbered two to one, held off General Leonty Bennigsen's Russian Army for nine hours, until about 65,000 members of the Grand Army joined the fray, pushing the Russians into a tiny village. The Russians' tightly packed troops were decimated by volleys of canister and grapeshot, leading to 19,000 casualties and providing Napoleon with a major victory. FTP, name this June 14, 1807, battle which led to the Treaty of Tilsit.  
**Battle of Friedland**

13. The image of dusk is a recurring theme in this experimental novel, whose chapters are interspersed with poems such as "Portrait in Georgia", "Harvest Song", and "November Cotton Flower". The first section records the frustrated lives of the black inhabitants of a small Georgia town. The second, set mainly in Washington, D.C., tells of the spiritual quest of those who abandoned their rural roots in hopes of finding a new life, while the artistic struggles of a Southern schoolteacher are detailed in the final section, "Kabnis". FTP, name this 1923 novel which ushered in the Harlem Renaissance, written by Jean Toomer.  
**Cane**

14. After a seventy-year absence from the Western Hemisphere, a major outbreak of this disease occurred in Peru in 1991. Although only limited protection is available through immunization with a vaccine of killed vibrio bacteria, rapid recovery is possible with prompt fluid and salt repletion; however, inadequate therapy leads to a high mortality rate. The toxin enters the body via the mouth, and, after an incubation period of 12 to 28 hours, causes an infection in mucous membranes lining the lumen of the small intestine, causing massive diarrhea, vomiting and dehydration, lowered blood pressure, and a faint pulse, with the skin becoming cold and withered. FTP, name this acute bacterial virus.  
**cholera**

15. He required less sleep than a bird, could see 100 leagues, and could hear grass growing in the meadows and wool growing on sheep. Called the whitest skinned of the gods, he is noted for his rivalry with Loki, with whom he struggles for the possession of the Brisingamen necklace. This rivalry with result in their killing each other at Ragnarok, the coming of which this god will announce with Gjallarhorn. FTP, name this watchman of the gods who guards Bifrost.

**Heimdall** (or **Heimdallr** or **Rigr**)

16. He published works like "Castilian Days" and "Pike County Ballads", and collaborated with John Nicolay on "Abraham Lincoln: A History", based on his time as assistant to Lincoln's private secretary. His political career, began in earnest in 1879, when he became assistant secretary of state. After serving as ambassador to Great Britain from 1897-98, he directed peace negotiations after the Spanish-American War, organized the annexation of the Philippines, and negotiated a 1901 treaty which allowed the United States to construct the Panama Canal. FTP, name this secretary of state under McKinley and Roosevelt, champion of the Open Door policy.

**John Milton Hay**

17. This native of Gary, Indiana, was the first recipient of the American Economic Association's John Bates Clark Medal. In a series of papers starting in 1954 he revived, clarified, and extended analysis of the production and allocation of public goods. His 1948 work *Economics* is still the elementary college textbook in many countries, while in *Foundations of Economic Analysis* he unified the treatment of the basic decision units in the economy and showed that supply and demand theories could be derived from the postulate that consumers maximize satisfaction and firms maximize profits. FTP, name this winner of the Nobel Prize for Economic Science in 1970.

**Paul Samuelson**

18. When Isaac Newton said that he could see so much because he stood upon the shoulders of giants, it is believed that he was insulting this scientist's small stature. A pioneer in microscopic research, this native of the Isle of Wight discovered plant cells. After the Great Fire he was appointed surveyor of London, and designed Montague House and Bethlehem Hospital. As assistant to Robert Boyle he helped design the air pump, and later formulated a theory of planetary motion which allowed for elliptical orbits, but lacked the mathematical knowledge to prove the theory, opening the door for Newton to take the credit. FTP, name this scientist, whose law states that an elastic body stretches in proportion to the force that acts upon it.

**Robert Hooke**

19. This painter of "Joy of Life" practiced the violin two hours a day, because he wanted to be able to support his family by performing on a street corner should he fail as an artist. Among his eclectic output was the set design for Diaghilev's production of "Le Chant du Rossignol", a book of paper cutouts entitled "Jazz", and the decorations for the Chapelle du Rosaire in Vence. His first successes in painting came with "Woman Reading" and "The Dinner Table", while "The Dessert, a Harmony in Red", "Red Studio", and "Green Stripe" displayed his typical use of violent color. FTP, name this artist, the leader of Fauvism.

**Henri Matisse**

20. One legend holds that he may have been the student of the female poets Myrtis and Corinna, while another says that he died at Argos in the arms of his male lover Theoxenus. This Boeotian's work was a favorite of Hellenistic scholars, who admired his difficult, allusive style. After publication of his works by Aldus Manutius the Elder, his characteristic verse form was adapted for use by poets like de Ronsard and Cowley. Four of his 17 volumes of poetry survive today, revealing his mastery of the epinicia and his association with the Pythian games. FTP, name this Greek, often called the greatest Greek lyric poet.

**Pindar** (or Pindaros or Pindarus)

21. This king just couldn't get along with anybody; he ordered the death of his nephew Prince Arthur, a rival to the throne supported by Philip II of France, who consequently conquered all of England's continental territories except Aquitaine. After this failure, he refused to receive Stephen Langton as Archbishop of Canterbury, resulting in England being placed under papal interdict and this king being excommunicated. The oppressive government of this son of Henry II nicknamed Lackland provoked baronial opposition, which led to a historical meeting at Runnymede in 1215. FTP, name this king who signed the Magna Carta.

**King John Lackland**



22. The name of this religious movement is derived from the Arabic term meaning "wool", probably in reference to the woolen garments worn by early Islamic ascetics. An organized movement arising among pious Muslims as a reaction against the worldliness of the early Umayyad period, this movement initially strove to maintain observance of the Shari'ah, or traditional law, but it eventually produced dervish orders, which created a schism with the Shari'ah and which emphasized the attainment of hypnotic and ecstatic states. One of this movement's practices is the dhikr, the recitation of the name of God. FTP, name this mystical Islamic sect in which Muslims seek to find divine love and knowledge through direct personal experience with God. **Sufism** (or Sufism)

23. This author's tales "Ingenué of the Sierras" and "A Protegee of Jack Hamlin's" won him acclaim in England after his popularity had waned in the United States. A part-founder and editor of "The Overland Monthly", this author's rise to fame had begun with the release of his "Condensed Novels", which parodied the works of Cooper, Dickens, and Hugo, and continued with the publication of the poem "Plain Language From Truthful James". FTP, name this master of local-color fiction who described life during the California gold rush in "The Outcasts of Poker Flat" and "The Luck of Roaring Camp". (Francis) Bret Harte

24. Problem 14 of the Moscow Papyrus provides a demonstration of the calculation of the volume of this object. The volume can be calculated by the formula  $V = \frac{H}{3} (A^2 + AB + B^2)$ , where H is the vertical height, A is the length of a side of the base, and B is the length of a side of the top; if B equals zero, then the volume of a regular square pyramid results. FTP, name this object created when the top is removed from a square pyramid. frustum (prompt on truncated pyramid)

1. Sure, you've heard bonuses concerning "The Castle of Otronto" and those other seminal gothic novels over and over again. Let's see how much you know about these other novels in the gothic vein, FTSNOP.

A. This 1798 novel by Charles Brockden Brown, which tells of a religious enthusiast who kills his family on the urging of a ventriloquist, established Brown's reputation as "father of the American Novel". Name it, FTP.

**Wieland, or The Transformation**

B. F5P, gothic novels are parodied in this posthumously published Jane Austen work, which tells of Catherine Morland, who learns not to interpret the world through her reading of gothic thrillers. **Northanger Abbey**

C. F15P, Thomas Love Peacock in turn parodied Austen's novel in the 1818 work, which describes the conversations between Scythrop, Mr. Flosby, and Mr. Cypress, who represent Percy Shelley, Samuel Taylor Coleridge, and Lord Byron. **Nightmare Abbey**

2. FTSNOP, name these centaurs from Greek myth.

A. F5P, this centaur, famous for his skill in hunting, gymnastics, medicine, music, and prophecy, served as tutor to Achilles, Peleus, Theseus, and other Greek heroes. **Chiron**

B. While taking Hercules' wife Deianira across a river on his back, this centaur tried to carry her away, but was killed by one of Hercules' arrows. While dying, he told Deianira to take some of his blood, saying it would act upon Hercules as a love charm. However, it was poisonous, and, after intolerable agonies, Hercules placed himself on a pyre and had himself burned to death. **Nessus**

C. Little is known of this centaur, except that he too was killed by Hercules. In the "Divine Comedy", this centaur joins Chiron and Nessus in welcoming Dante and Virgil to the Seventh Circle of Hell. Name him, F15P. **Pholus**

3. FTPE, name these related figures from British politics.

A. This British politician became prime minister on the resignation of Anthony Eden. Name this prime minister noted for his visit to the Soviet Union and his failure to have Britain admitted to the European Economic Community. (Maurice) Harold **Macmillan**

B. In 1963, Macmillan's government was weakened by a scandal concerning the personal life of this man, Macmillan's Secretary of State for War. **John Profumo**

C. The Profumo affair resulted after Profumo deceived the House of Commons about the nature of his relationship with this woman, who, at the time, was also involved with a Soviet diplomat.

**Christine Keeler**

4. FTPE, identify these often confused French mathematicians.

A. He removed the last apparent anomaly from the theoretical description of the solar system by showing that lunar acceleration is dependent upon eccentricities of the Earth's orbit. He is also noted for his transform, defined as  $f$  of  $p$  equals the integral from 0 to infinity of  $e$  to the minus  $pt$  times capital  $F$  of  $t$   $dt$ . **Pierre Simon Laplace**

B. His "Mecanique analytique" summarized all the work done in the field of mechanics since the time of Newton. He is known for his multiplier, which provides a means for finding the maximum and minimum values of a function of several variables. **Joseph-Louis Lagrange**

C. Laplace's jealousy kept this mathematician from obtaining major government positions. His "New Methods for the Determination of Comet Orbits" contains the first published account of the method of least squares, while his "Elements of Geometry" rearranged and simplified Euclid's Elements and contained the first proof that  $\pi$  squared is irrational. His symbol expresses whether a number is a quadratic residue modulo of an odd prime number.

**Adrian-Marie Legendre**

5. Do you believe in magic? Well, some social scientists do. FTPE, name these thinkers who have studied the social function of magic.
- A. In "The Elementary Forms of the Religious Life", this French sociologist proposed that magical rites comprise the manipulation of sacred objects by a magician on behalf of individual clients, an idea that was also examined by his nephew, Marcel Mauss. **Emile Durkheim**
- B. This English social anthropologist added to Durkheim's work on society and magic in his major work, "The Andaman Islanders". **Alfred Reginald Radcliffe-Brown**
- B. This man, widely recognized as the founder of social anthropology, is principally associated with field studies of the peoples of Oceania. One of the major works dealing with the social function of magic is his "Argonauts of the Western Pacific". **Bronislaw Malinowski**
6. This question writer can't seem to keep the titles and authors of all those novels with women's names in the titles straight. Let's see how you do. Name the authors of these works, F5PE.
- A. Jenny Gerhart **Theodore Dreiser**  
 B. Alice Adams **Booth Tarkington**  
 C. Myra Breckenridge **Gore Vidal**  
 D. Annie Kilburn **William Dean Howells**  
 E. Marjorie Morningstar **Herman Wouk**  
 F. Manon Lescaut **Abbe Prevost.**
7. 5-10-15, name these moons of Saturn.
- A. This is the largest moon of Saturn, and the only satellite in the solar system known to have clouds and a dense atmosphere. **Titan**
- B. This satellite essentially composed of pure water ice has a diameter of 657 miles and orbits at a distance of 182,689 miles. It is known for two unique features, the long crack extending along three-quarters of its circumference, and a large crater measuring 250 miles in diameter and having a large central peak. **Tethys**
- C. W. H. Pickering reported the existence of this satellite in the early 20th century, but it has never been recovered and probably does not exist. **Themis**
8. Name these related laws and Supreme Court decisions, FTPE.
- A. This 1940 act made it a criminal offense to advocate violent overthrow of the government, or to organize or be a member of any group or society devoted to such advocacy. **Smith Act (or Alien Registration Act)**
- B. After World War II, the Smith Act was made the basis of a series of prosecutions against leaders of the Communist Party and the Social Workers Party. The Supreme Court upheld the conviction of the principal leaders in this 1951 case. **Dennis et al. vs. the United States**
- C. In this 1957 case, the Court used a strict reading of the language of the Smith Act to limit its use only to the urging of unlawful action, thus modifying the Dennis decision. **Yates vs. the United States**
9. Name these important battles of the Mexican War, FTPE.
- A. Two battles in early May 1846 saw Zachary Taylor's outnumbered forces hold their own against Santa Anna's Mexican troops. FTP name either. **Palo Alto or Resaca de la Palma**
- B. When Taylor appeared to be making little progress, Winfield Scott used a supplementary force to affect the seaborne invasion of this city in March 1847. From here, Scott would push northwest into the heart of Mexico. **Veracruz**
- C. This April 1847 battle, located about 60 miles northwest of Veracruz, marked the first serious resistance to Scott's march to Mexico City. Santa Anna entrenched his 12,000 men in a mountain pass near Plan del Rio, but Robert E Lee's flanking maneuver helped break the Mexican lines, resulting in a US rout. **Cerro Gordo**

10. FTPE, give the terms describing these features of glaciers.

A. This term describes the transitional material between snow and ice, and is formed from snow which lasts through a summer melt season. **firn**

B. From the French for "ring", this is a deep, steep-walled recess or hollow, semi-circular in shape, situated high on the side of a mountain and at the head of a glacial valley. **cirque**

C. From the German for "mountain crack" this is a deep and often wide crevasse in the ice and firn found at or near the top of an alpine glacier that separates moving ice and snow from the immobile ice and snow adhering to the headwall of a cirque. **bergschrand**

11. FTPE, name these pitchers who experienced every hurler's nightmare by breaking their arms while in the act of throwing.

A. A 1983 All-Star for the San Diego Padres, this lefty broke his arm due to the effects of cancer, which eventually resulted in the amputation of his arm. **Dave Dravecky**

B. This hurler, who pitched a perfect game for the Cincinnati Reds, had his career effectively ended by his fracture, despite a comeback attempt with the Royals in 1995, when he posted an 8.10 era in two starts. **Tom Browning**

C. After he was traded to Cleveland from Cincinnati for the Indian's stretch run in 1997, this lefty broke his arm while warming up in the Indians' bullpen, and has yet to return to action. He is best-known for his 20 win season with Pittsburgh in 1991. **John Smiley**

12. You know, John Smith sure does get around, doesn't he? Identify the following authors who have used various incarnations of John Smith in their works. You will receive 5 points for one correct, 15 for two, or 30 for all three.

A. John Smith appears as a master mason whose social status advances with the professional success of his architect son Stephen in this author's "A Pair of Blue Eyes". **Thomas Hardy**

B. John Smith turns up as a glove maker at whose lodgings Clarissa Harlowe dies in this author's "Clarissa, or The History of a Young Lady". **Samuel Richardson**

C. Finally, John Smith is a San Francisco Chandler who supplies the Norah Creina in this author's "The Wrecker". **Robert Louis Stevenson**

13. This leader first appears in history in 394 as a leader of the Visigoths who were used as mercenary troops by the Roman emperor Theodosius I. F5P, name this king of the Visigoths who would eventually sack Rome. **Alaric I**

After the death of Theodosius, the Visigoths renounced their allegiance to Rome and sacked Corinth, Argos, and Sparta before being defeated at Pollentia and Verona by the armies of this half-Vandal Roman general. F15P, name this leader, who would defeat Alaric again in Italy in 402. **Flavius Stilicho**

This Roman emperor pulled one of the biggest snafus in the history of the empire by first angering Alaric by reneging on his promise to pay the Visigoths 4,000 pounds of gold, and then compounding the problem by executing Flavius Stilicho, the only general who had been able to defeat Alaric. Not surprisingly, Alaric sacked Rome in 410. FTP, name this emperor who cowered in Ravenna while Rome was sacked. **Honorius I**

14. 5-10-15, name the artists of the following Impressionists works.

A. F5P, the series of paintings of the Rouen Cathedral and of the river Seine **Claude Monet**

B. FTP, "Vegetable Garden at the Hermitage, Pontoise" and "Bather in the Woods" **Camille Pissarro**

C. F15P, "La Seine a Bougival", "Flood at Port-Marly", "Street at Moret" **Alfred Sisley**



15. Many scientific achievements have been used for the benefit of a country at war. Name these chemistry Nobel Prize winners from the work which aided Germany during the World Wars FTPE, or F5PE if you need more information.

1A. This scientist headed Germany's chemical warfare department during World War I, in addition to coordinating the chlorine gas attack at the second battle of Ypres.

1B. He won the Prize in 1918 for his method of ammonia synthesis.

**Fritz Haber**

2A. This scientist developed a method for preparing nitric acid by oxidizing ammonia, which was used by Germany in World War I for the manufacture of explosives after their supply of nitrates was cutoff.

2B. For this achievement he was awarded the 1909 Nobel Prize.

**Wilhelm Ostwald**

3A. This chemist studied the conversion of wood into sugar, which helped feed Germany during World War II.

3B. With Karl Bosch, he shared the 1931 Nobel Prize for the above, and for his method of converting coal dust and hydrogen directly into gasoline.

**Friedrich Bergius**

16. Although T.S. Eliot is remembered mainly for his poetry, he was also an important literary critic and theorist. FTPE, answer these questions about this side of Eliot's literary life.

A. Eliot used this phrase to explain the change that occurred in English poetry after the heyday of the Metaphysical poets, a result of the natural development of poetry which led to more elevated language and cruder emotions.

**Dissociation of Sensibility**

B. This theory held that the only way of expressing emotion in the form of art is by finding a set of objects, a situation, or a chain of events which serves as the formula by which the emotion is evoked in the reader.

**Objective Correlative**

C. Eliot's theories of the "objective correlative" and "dissociation of sensibility" were put forth in this 1920 book of critical essays, which includes the articles "Hamlet and His Problems" and "Tradition and the Individual Talent".

**The Sacred Wood**

17. 30-20-10, name the philosopher from works.

A. "Between Man and Man", "The Prophetic Faith", "The Knowledge of Man"

B. "The Tales of Rabbi Nachman", "The Legend of the Baal-Shem"

C. "I and Thou", "On Judaism"

**Martin Buber**

18. This question writer misses the good ole days in United States history when we had a Secretary of War. FTPE, name these former occupants of the now-defunct post.

A. Serving from 1829-31 under Andrew Jackson, this Tennessee native is now remembered for the rumors concerning his relations with his wife when she was still Mrs. John Timberlake.

**John Henry Eaton**

B. Serving in 1841 under Harrison and Tyler, he was a candidate for the United States presidency in 1861.

**John Bell**

C. Secretary of War from 1899-1904, he is remembered for his work in establishing a civil government in Puerto Rico and for his 1912 Nobel Peace Prize, awarded for his promotion of international arbitration.

**Elihu Root**

19. FTPE, identify these effects from physics.

A. In certain radioactive substances in which atoms are held together in a tight crystalline structure, gamma rays are emitted without any recoil taking place. If such a gamma ray strikes an atom of the same element held in a similarly tight crystalline structure, another gamma ray of exactly the same frequency may be emitted.

**Mossbauer effect**

B. If two wires of different materials are joined at their ends and one end is maintained at a higher temperature than the other, a voltage difference will arise, and an electric current will exist between the hot and cold junctions.

**Seebeck effect**

C. If the spectral lines of a light source are subjected to a strong magnetic field, the lines will be split into several polarized components.

**Zeeman effect**



20. FTPE, name these major waterways of Russia.

A. This river rises in southwestern Siberia on the slopes of the Altai mountains and flows about 2,300 miles into the Arctic Ocean. Along with its chief tributary, the Irtysh, it makes up the longest river system in Asia.

**Ob**

B. This Siberian river originates west of Lake Baikal and flows north for 2,680 miles before emptying into the Laptev Sea. Yakutsk is the principal city on this river.

**Lena**

C. This river, about 2,550 miles in length, forms in the eastern part of Tuva, flows swiftly through a deep gorge in the Sayan Mountains, then less turbulently south of Krasnoyarsk, through the taiga and tundra, and into an arm of the Kara Sea. Usually frozen from November to May, its chief tributaries include the Kan, Angara, and Kureyka.

**Yenisey**

21. FTSNOP, identify these types of leukocytes.

A. F5P, these bodies are associated with antibody formation, although it is not positively known whether they actually produce or merely transport antibodies.

**lymphocytes**

B. F15P, these granulocytes are especially prominent during allergic reactions, when they engulf antigen-antibody complexes and apparently limit the effects of certain chemicals, like histamine, that appear during a foreign-body reaction.

**eosinophils**

C. FTP, these bodies, along with eosinophils and basophils, comprise the granulocytes. They are phagocytic bodies, engulfing and sometimes digesting bacteria at the site of an infection.

**neutrophils**

22. FTPE, name these European Wars from the treaties which ended them.

A. Treaty of Vienna, 1738

War of the **Polish Succession**

B. Treaty of Utrecht, 1713

War of the **Spanish Succession**

C. Treaty of Aix-la-Chapelle, 1748

War of the **Austrian Succession**

23.