



1. **This religion's induction ceremony is the Navjote, in which children are given a shirt called the *sedreh* and a girdle called the *kushti*. This religion worships a god that emanates six Amesha Spentas. This religion, whose (*) Indian practitioners are called Parsis, was founded by the author of the *Gathas*, hymns collected in its holy text, the *Avesta*. Members of this faith worship in fire temples and believe that evil is embodied in Angra Mainyu, the counterpart of its supreme god, Ahura Mazda. For 10 points, name this dualistic religion that originated in ancient Persia.**

ANSWER: Zoroastrianism

080-12-69-15101

2. **One character in this novel had one of her buttocks eaten by Turks during the Siege of Azov despite being the daughter of Pope Urban X. In this work, the syphilitic Paquette falls in with Brother Giroflee. The title character of this work befriends the pessimist Martin and the honest native (*) Cacambo. After being thrown out by Baron Thunder-ten-Tronckh, witnessing the Lisbon earthquake, and seeing Cunegonde lose her beauty, the protagonist of this novel rejects Dr. Pangloss's claim that "this is the best of all possible worlds." For 10 points, name this philosophical novel by Voltaire.**

ANSWER: Candide [or Candide]

080-12-69-15102

3. **The memoir *Becoming Odyssa* describes how Jennifer Pharr Davis broke the world record for accomplishing this task. Crossing the Hundred-Mile Wilderness and reaching the summit of Katahdin soon thereafter are performed near its end. Mark Sanford used this activity as a cover for his disappearance and extramarital affair. Those who perform this action follow the mantra "no pain, no rain, no (*) Maine," although only the most hardcore begin their journey in Georgia. For 10 points, name this activity that involves traversing a path across a long mountain system in the eastern US.**

ANSWER: hiking the Appalachian National Scenic Trail [or hiking the AT; prompt on partial answers; accept reasonable synonyms for hiking]

020-12-69-15103

4. **In nineteenth-century England, the name of this building was a derogatory nickname for the workhouse. The Marquis de Launay was killed for refusing to give up its gunpowder. The mysterious "man in the iron mask" died here. This building, where the Marquis de Sade wrote the *120 Days of Sodom*, was attacked on (*) July 14th, now its namesake "day." It was going to be demolished and held only seven prisoners at the time it fell. For 10 points, name this Paris prison stormed during the French Revolution.**

ANSWER: Bastille

080-12-69-15104

5. **This film opens with an extreme close-up of an eye reflecting the flames bursting over an industrial landscape. The antagonist of this film strips and drives a nail through his hand during the climax and notes that his memories "will be lost in time, like (*) tears in rain." The protagonist of this film discovers an origami unicorn outside his apartment after surviving his fight with Roy Batty. For 10 points, name this Ridley Scott film in which Rick Deckard is forced out of retirement to eliminate a group of Nexus-6 replicants.**

ANSWER: Blade Runner

014-12-69-15105

6. Making up about 10% of cosmic rays, these particles can only travel through a few centimeters of air. One of these is produced alongside thorium in a transnucleation reaction. These particles were deflected by "corpuscles" in an experiment that disproved the plum pudding theory, in which they were fired at a thin sheet of (*) gold foil. Used by Rutherford in that experiment, they are produced from a namesake form of decay of uranium. For 10 points, name these particles with a mass number of 4, which are basically helium nuclei.

ANSWER: alpha particles [or helium nuclei before mention; or helium nucleus before mention; do not accept or prompt on "helium"]

020-12-69-15106

7. This character ignores the omen of an electrical fire caused by a storm and similarly misinterprets a vision of two hearses. Fedallah often stands in the shadow of this character. This character performs a mock baptism by dipping his weapon in human blood. Shortly before his death by (*) strangulation with his own rope, this character utters the line "from hell's heart I stab at thee." After losing one leg, this character employs a crew including Queequeg and Ishmael to get revenge. For 10 points, name this captain, the mortal enemy of Moby-Dick.

ANSWER: Captain Ahab

020-12-69-15107

8. Two of this ruler's generals overwhelmed Mstislav the Bold at the Battle of the Kalka River. This man outlawed abduction of women with his *Yassa* law code, recorded in a script he adopted from a Uighur (WEE-gur) scribe. This employer of Subutai destroyed the Khwarizmian Empire and launched the war that brought down the Jin Dynasty. With an army made up entirely of cavalry, mostly wielding composite bows, he created what became the (*) largest land empire in history. For 10 points, name this founder of the Mongol Empire.

ANSWER: Genghis Khan [or Chinggis Khan; or Temujin]

080-12-69-15108

9. This artist used a print depicting the Wandering Jew as the model for a painting in which he encounters his patron Alfred Bruyas. This artist of *The Meeting* painted a work destroyed in the bombing of Dresden; that picture shows an old man lifting up a hammer in front of a younger worker struggling to carry a big (*) rock. He controversially used a huge canvas for a painting of humble peasants standing around a grave at a funeral. For 10 points, name this French realist who painted *The Stonebreakers* and *A Burial at Ornans*.

ANSWER: Gustave Courbet

080-12-69-15109

10. Genetic forms of this disease are caused by mutations in PINK1 or dardarin. A pathological hallmark of this disease is alpha-synuclein-containing Lewy bodies. This disease is caused by the degeneration of the substantia nigra, and its symptoms include lead-pipe rigidity, cogwheel rigidity, and (*) shuffling gait. It is treated by L-DOPA, which replaces lost dopamine. For 10 points, name this neurological disease that causes rigidity, slowness, and jerky movements, named for an English physician.

ANSWER: Parkinson's disease

048-12-69-15110

11. Several members of this group piled up tree trunks to overcome the impenetrable hero Caeneus (KYE-nee-iss) after interrupting the wedding of Pirithous (pih-rih-THU-us). They were born from the cloud Nephele, which Ixion had attempted to rape, and feuded with the Lapiths. One of these creatures advised Deianira (die-uh-NEE-ruh) to put his blood in a shirt after being slain by Heracles. Another of them was a (*) tutor to heroes like Jason. Nessus and Chiron (KYE-ron) were examples of, for 10 points, what mythical race that was half-horse, half-human?

ANSWER: Centaurs

186-12-69-15111

12. In one poem, this man compared his depressing poetry to small doses of poison immunizing his readers against the horrors of reality. That poem by this man famously declares that “malt does more than Milton can to justify God’s ways to man.” Another of his poems tells the title character that “silence sounds no worse than (*) cheers after earth has stopped the ears” after recalling “the time you won your town the race.” For 10 points, name this British poet of “Terence, This Is Stupid Stuff” and “To an Athlete Dying Young.”

ANSWER: A. E. Housman [or Alfred Edward Housman]

014-12-69-15112

13. A fictional ‘80s band seen on this show is the group “Love Handel.” The main antagonist has a robot assistant named Norm, a daughter named Vanessa, and creates various “-inators,” like the “Shrink-inator.” Set in Danville, this show focuses on the Flynn-Fletcher family. Almost every episode features the boys’ pet, (*) Perry the Platypus, work as a spy and fight Dr. Doofenshmirtz. For 10 points, name this Disney Channel cartoon in which the two title boys make fantastical inventions during summer vacation.

ANSWER: Phineas and Ferb

052-12-69-15113

14. This emperor is not Diocletian, but the word "soldier" is derived from a currency he reintroduced called the *solidus*. This man defeated Maxentius after dreaming he saw the words "In this sign, you shall conquer" in the sky alongside the Chi Rho. This victor of the Battle of the Milvian Bridge extended (*) religious toleration in the Edict of Milan. He rebuilt Byzantium, which came to be named after him. For 10 points, name this first Roman Emperor to convert to Christianity.

ANSWER: Constantine the Great [or Constantine I; or Flavius Valerius Aurelius Constantinus Augustus]

080-12-69-15114

15. David Harrington founded an ensemble that specializes in contemporary examples of these pieces, named after Kronos. It's not a lied, but a Matthias Claudius poem served as the inspiration for one of these pieces composed by Franz Schubert, titled *Death and the Maiden*. The *Russian* and *Sun* works of this type were written by (*) Joseph Haydn, who is often regarded as the "father" of this form. For 10 points, name these pieces written for an ensemble of two violins, a viola and a cello.

ANSWER: string quartet [prompt on quartet]

121-12-69-15115

16. The MCS type of these entities results in the formation of a bow echo, and a downdraft created during their mature stage weakens the updraft during their dissipating stage. Severe examples of them include supercells, and a collection of them forms a (*) squall line. They occur more often in the afternoon because surface warming causes instability in the air, and they occur in the presence of cumulonimbus clouds. For 10 points, identify these loud storms which are accompanied by lightning. ANSWER: thunderstorms [or electrical storms; or lightning storms before mentioned; prompt on just rainstorms or storms]

189-12-69-15116

17. John Bowlby drew on work by Otto Rank and others in arguing separation from these people caused mental illness. Bruno Bettelheim linked autism to the emotionally frigid “refrigerator” type of this person. Carl Jung proposed girls compete with them for love in the (*) Electra complex. That is analogous to the male Oedipus complex, a condition where boys unconsciously compete for the love of these people. For 10 points, name these people who often raise children with fathers. ANSWER: mothers [or obvious equivalents; prompt on women; prompt on parents]

121-12-69-15117

18. A mixture of dry ice and this substance is used to snap-freeze cells and food items, and this substance burns with a pale blue flame. This substance is used to precipitate nucleic acids, and it is oxidized to acetaldehyde in humans. This substance forms an azeotrope with water at 96% concentration, and this substance can be created from cellulose or from yeast under (*) anaerobic conditions in fermentation. For 10 points, name this substance found in fermented beverages. ANSWER: ethanol

048-12-69-15118

19. In this novel, one character is killed by the propeller of a low-flying plane while he is swimming. Another character in this novel becomes the Vice Shah of Oran, Imam of Damascus, and mayor of several Italian cities. Nately’s whore accuses the protagonist for the death of her lover, and that protagonist describes a man who looks exactly like Henry Fonda named (*) Major Major. The protagonist escapes from the island of Pianosa, where he is a bombardier for the 265th squadron. For 10 points, name this novel about Yossarian's conflict with the insanity of war by Joseph Heller. ANSWER: Catch-22

141-12-69-15119

20. This first site of mule breeding in the United States was named after the admiral who captured Porto Bello during the War of Jenkins' Ear. Slaves who worked at this location, including Billy Lee, were emancipated after their owner's death according to his will. Its most famous owner died here after his doctors let 1.7 liters of blood from him to cure a sore throat, and that owner moved here after marrying (*) Martha Custis. For 10 points, name this plantation on the Potomac that was the estate of George Washington. ANSWER: Mount Vernon

080-12-69-15120

21. Edmond Halley suggested this quantity could be found by measuring the total amount of salt in the ocean and its rate of increase. George-Louis Leclerc estimated it by heating metal spheres, and Lord Kelvin used a similar thermodynamic argument when he declared this value was between 20 million and 400 million. Clair Patterson calculated the value by measuring the number of (*) lead isotopes in meteorites, and his value of 4.55 billion is still used today. For 10 points, name this value, the age of the third planet from the sun. ANSWER: age of the Earth [or obvious equivalents; or age of the ocean before “metal spheres”]

121-12-69-15121

22. This man's introduction of sauerkraut into his crew's diet was one reason why, over two voyages, scurvy killed none of his sailors. This man tested a copy of John Harrison's chronometer to keep longitude at sea. This man sailed with the scientists Daniel Solander and Joseph Banks, who classified over 1000 new species of plants. While captaining the *Resolution*, he was killed in (*) Hawaii, which he discovered. For 10 points, name this British captain who circumnavigated New Zealand and explored the Eastern coast of Australia.

ANSWER: James Cook

080-12-69-15122

23. In this novel, the protagonist questions the point of Leer's knowledge of mathematics after his death. The protagonist of this work suffers from guilt after killing a French printer named Gerard Duval. The main characters of this novel recall how their schoolteacher, (*) Kantorek, lectured them about the glories of war. In this work, the death of the cobbler Kat from a shell leaves the young soldier Paul Baumer companionless. For 10 points, name this anti-war novel by Erich Maria Remarque.

ANSWER: *All Quiet on the Western Front* [or *Im Westen Nichts Neues*]

080-12-69-15123



1. Stephen Greenblatt's essay *Invisible Bullets* is about this man's *Henry IV* and *Henry V* plays. For 10 points each:

[10] Name this Elizabethan playwright.

ANSWER: William Shakespeare

[10] This literary critic wrote about how Shakespeare "invented the human" in one work. A professor at Yale, this man claimed that poets commit creative misprision in his *The Anxiety of Influence*.

ANSWER: Harold Bloom

[10] In one work, Harold Bloom claims that this character from *Othello* was the first to perfect the art of disinformation. This husband of Emilia attempts to convince Othello that Desdemona is cheating on him.

ANSWER: Iago

149-12-69-15201

2. Both Phil and Joe Niekro threw this pitch. For 10 points each:

[10] Name this traditionally slow pitch that R.A. Dickey is primarily known for throwing. Catchers typically wear a modified mitt while catching this pitch, which "floats" due to having minimal spin.

ANSWER: knuckleball [or knuckler]

[10] This long time knuckleball pitcher played for the Red Sox. A member of the 2004 team, this pitcher frequently threw to Doug Mirabelli rather than Jason Varitek.

ANSWER: Tim Wakefield

[10] This former Oakland Athletic returned to professional baseball as a pitcher after learning how to throw a knuckleball. A member of the "Bash Brothers" alongside Mark McGuire, this man wrote *Juiced* about steroid use in baseball.

ANSWER: Jose Canseco

149-12-69-15202

3. This theorem is central to its namesake's interpretation of probability, which emphasizes the degree of belief in a hypothesis. For 10 points each:

[10] Name this theorem which relates the probability of event A, given B, to the probability of event B, given A.

ANSWER: Bayes' theorem [or Bayes' formula]

[10] Bayes' theorem reduces to a trivial statement in the case of these events. If A and B are events of this type, then "P of AB" equals "P of A" times "P of B."

ANSWER: independent events

[10] Bayes' theorem is also trivialized if the events are mutually exclusive, which means that the probability that both events occur has this numerical value.

ANSWER: zero

132-12-69-15203

4. A still-living player of this instrument recorded the albums *Juju* and *Speak No Evil* and co-founded Weather Report with Joe Zawinul. For 10 points each:

[10] Name this woodwind instrument played by Wayne Shorter and Bill Clinton. It consists of a conical brass tube with around 20 holes, each covered by a key.

ANSWER: the **saxophone**

[10] This jazz saxophonist created music described as "sheets of sound" in albums like *Giant Steps*, *A Love Supreme*, and *My Favorite Things*.

ANSWER: John **Coltrane**

[10] This saxophonist was inspired by Ray Noble's "Cherokee" to create one of the first bebop recordings, "Ko-Ko." He incorporated the chord progression from the earlier piece, "How High the Moon," into his standard "Ornithology."

ANSWER: Charlie "Bird" **Parker**

080-12-69-15204

5. This man became heir to the throne after Crown Prince Rudolf committed suicide in the Mayerling Incident. For 10 points each:

[10] Name this Archduke whose assassination in Sarajevo helped set off World War I.

ANSWER: **Franz Ferdinand**

[10] The assassination was perpetrated by Gavrilo Princip, a member of this secret society led by Apis.

ANSWER: **Black Hand** [or **Ujedinjenje Ili Smrt**]

[10] This period of diplomatic crisis arose after the assassination and degenerated into open war. It was worsened by Austria-Hungary's issuance of an ultimatum to Serbia.

ANSWER: **July** Crisis

080-12-69-15205

6. One couple in this play pretends to have a son who died after swerving his car to avoid a porcupine. For 10 points each:

[10] Name this play in which George and Martha invite Nick and Honey over to their house to play games like "Get the Guest" and "Humiliate the Host."

ANSWER: ***Who's Afraid of Virginia Woolf?***

[10] *Who's Afraid of Virginia Woolf* is a play by this author of *Seascape*.

ANSWER: Edward **Albee** [or Edward Franklin **Albee**]

[10] Another 20th-century American playwright is this man, who wrote about realtors in *Glengarry Glen Ross* and about an attempt to steal a valuable nickel in *American Buffalo*.

ANSWER: David **Mamet** [or David Alan **Mamet**]

192-12-69-15206

7. Answer the following about the work of Albert Einstein, for 10 points each:

[10] Einstein devised this famous equation, suggesting the equivalence of mass and energy

ANSWER: ***E equals m c squared***

[10] In one of his 1905 papers, Einstein built off the work of Hertz in theorizing the photoelectric effect, which occurs when an electron acquires more energy than this threshold.

ANSWER: **work function**

[10] Another of Einstein's papers dealt with this phenomenon, a random movement of particles in a fluid, such as pollen grains in water.

ANSWER: **Brownian motion** [or **pedesis**]

020-12-69-15207

8. This man's westernizing reforms included outlawing the fez, adopting the Gregorian calendar, and separating shari'a from civil law. For 10 points each:

[10] Name this first president of the Republic of Turkey, who was named the "father of the Turks."

ANSWER: Mustafa Kemal **Ataturk** [or Mustafa **Kemal**]

[10] Turkish law prohibits both insulting the memory of Ataturk and discussing the genocide of this ethnic group, perpetrated by the Young Turks.

ANSWER: **Armenians** [or **Armenian** Genocide]

[10] In 1929, Ataturk enacted this reform of public communications, by which he sought to improve the literacy rate and cut off younger Turks from the reactionary texts of the Ottoman Empire.

ANSWER: **switching to the Latin alphabet** [or **creating the Turkish alphabet**; or **eliminating use of the Arabic alphabet**; or **creating a new alphabet**; or equivalent answers about changing alphabets]

080-12-69-15208

9. This man depicted the rise and fall of a city in the five-painting series *The Course of Empire*. For 10 points each:

[10] Name this man who also painted an angel watching over four ages of a man in a boat in his series *The Voyage of Life*.

ANSWER: Thomas **Cole**

[10] Thomas Cole founded this artistic movement of American landscape painters. The artist of *The Heart of the Andes*, Frederic Church, was a member of this school.

ANSWER: **Hudson River** School

[10] This member of the Hudson River School also known as an engraver painted Thomas Cole standing with poet William Cullen Bryant above a waterfall in *Kindred Spirits*.

ANSWER: Asher **Durand**

105-12-69-15209

10. Errors in the synthesis of the subunits of this protein, possibly due to the deletion of locus control regions, cause thalassemia. For 10 points each:

[10] Name this protein that carries oxygen in the blood. It contains two alpha and two beta chains, each attached to an iron-containing prosthetic group.

ANSWER: **hemoglobin**

[10] In sickle-cell anemia, a glutamic acid in the beta chain of hemoglobin is mutated to this nonpolar amino acid, which has an isopropyl side chain.

ANSWER: **valine** [or **v** or **val**]

[10] The inability to synthesize the heme prosthetic group of hemoglobin leads to this condition. Subtypes of it include "acute intermittent" and "cutanea tarda", and vampire legends are believed to originate from sufferers of this condition.

ANSWER: **porphyria**

048-12-69-15210

11. This character helps his neighbor, Raymond Sintes, get revenge on Raymond's girlfriend. For 10 points each:

[10] Identify this character who, while suffering from intense heat, shoots an Arab. He also drinks coffee, smokes, and fails to weep at his mother's funeral.

ANSWER: **Meursault**

[10] Meursault is the protagonist of this 1942 work written by a French author and philosopher. Other characters in this novel include Marie Cardona, who becomes Mersault's girlfriend.

ANSWER: *The **Stranger*** [or ***L'Etranger***

[10] *The Stranger* was written by this existentialist French author. His other works include *The Plague* and *The Fall*.

ANSWER: Albert **Camus**

189-12-69-15211

12. One man of this profession hid high in a tree in order to listen to Jesus without being thought a hypocrite. For 10 points each,

[10] Name this Biblical profession of the aforementioned Zacchaeus and an apostle whose former name was Levi.

ANSWER: a **tax collector** [or obvious equivalents]

[10] That apostle is the namesake of this gospel that contains the story of the Three Wise Men and is the first book in the New Testament.

ANSWER: **Matthew**

[10] When some followers protested paying taxes to the Roman Empire, Jesus responded by asking whose face was on one of these objects. In a parable in Luke, a woman searches her dark house until she finds the missing one of these objects.

ANSWER: **coins**

005-12-69-15212

13. This desert is the home of the endangered Przewalski's Horse, and its name means "waterless place." For 10 points each:

[10] Name this desert that, despite its name, was once the site of the Onggi River flowing into Ulaan Lake in Mongolia.

ANSWER: **Gobi** Desert

[10] This mountain range extends from the Gobi Desert to the northwest, and pass through Mongolia, China, Russia, and Kazakhstan.

ANSWER: **Altai** Mountains [or **Altayn** Nuruu; or **Altai** Shan]

[10] To the west of the Gobi Desert is this Uygur Autonomous Region of China that is filled with Sunni Muslim Uighurs.

ANSWER: Uygur Autonomous Region of **Xinjiang** [or **Xinjiang** Uygur Zizhiqu; or **Xinjiang** Weiwu'er Zizhiqu; or **Hsin-chiang** Wei-wu-erh Tzu-chih-chu]

023-12-69-15213

14. This composer reworked the ending of a piece by Giovanni Ruggieri for the concluding "Cum Sancto Spiritu" movement of his *Gloria*. For 10 points each:

[10] Name this Baroque Italian composer of *The Contest of Harmony and Invention*, who was nicknamed the "Red Priest."

ANSWER: Antonio **Vivaldi**

[10] Vivaldi is best known for this set of violin concertos, including "Spring," "Summer," and "Winter."

ANSWER: *The **Four Seasons*** [or *Le **Quattro Stagioni***]

[10] Vivaldi's "Nulla in Mundo Pax Sincera" is an example of this type of piece. These vocal pieces were usually settings of sacred texts, and, unlike madrigals, were in Latin rather than the vernacular.

ANSWER: **motets**

080-12-69-15214

15. This object lay in the castle of the Fisher King, and it was brought to Britain by Joseph of Arimathea. For 10 points each:

[10] Name this vessel, which caught the dripping blood of Jesus when he was on the cross. It was sought by the Knights of the Round Table.

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

[10] This perfect son of Sir Lancelot managed to obtain the Holy Grail and was immediately assumed into heaven.

ANSWER: Sir **Galahad**

[10] Because he was the Grail knight, Sir Galahad was able to sit in this seat at the Round Table. Anyone else who sat here would have been killed.

ANSWER: the **Siege Perilous**

080-12-69-15215

16. This ruler came to power after Charles X was overthrown in the Three Glorious Days. For 10 points each.

[10] Name this ruler during the July Monarchy known as the "Citizen King." His pear-like face was often caricatured.

ANSWER: **Louis-Philippe I**

[10] The July Monarchy was overthrown in this tumultuous year of the nineteenth century, in which several nationalist revolutions took place across Europe.

ANSWER: **1848**

[10] In 1830, this general declined to assume power himself, instead embracing Louis-Philippe on the balcony of the Hotel de Ville. He helped create the tricolor during the French Revolution and also fought in the American Revolution.

ANSWER: Marquis de **Lafayette** [or Marie-Joseph-Paul-Yves-Roch-Gilbert du **Motier**]

080-12-69-15216

17. In this poem, Wiglaf remains loyal to the title Geatish king, who dies in the process of killing a dragon. For 10 points each:

[10] Name this Old English epic whose title character saves Heorot from both Grendel and Grendel's mother.

ANSWER: **Beowulf**

[10] *Beowulf*, like much Old English poetry, uses these compound terms to express ideas more poetically. Examples include the use of "whale road" to mean "sea" and "ring-giver" to mean "king."

ANSWER: **kennings**

[10] This Oxford professor of Old English literature argued that *Beowulf* should be read as a poem, not just a historical artifact, in his essay "Beowulf: The Monsters and the Critics."

ANSWER: J. R. R. **Tolkien** [or John Ronald Reuel **Tolkien**]

080-12-69-15217

18. William Labov identified Southern and Northern Cities chain shifts taking place in this language in his atlas of its North American version. For 10 points each:

[10] Name this language, whose long vowels were raised or made diphthongs in the Great Vowel Shift.

ANSWER: **English**

[10] English and West African languages are the ancestors of Gullah, an example of this type of language. These are acquired as first languages by children, unlike the pidgins which precede them.

ANSWER: **creole** languages

[10] Similar features across creole languages are cited as evidence for Noam Chomsky's theory that all humans have this hard-wired faculty for learning and using language.

ANSWER: **universal grammar**

121-12-69-15218

19. Answer these questions about modern Canada, for 10 points each.

[10] A movement for the separatism of this province kidnapped James Cross and Pierre Laporte in 1970. This Canadian province is primarily Francophone.

ANSWER: **Quebec**

[10] This prime minister refused to negotiate with the FLQ during the aforementioned crisis. A Liberal, he patriated the Canadian constitution while serving as PM for most of the period from 1968 to 1984.

ANSWER: Pierre Elliott **Trudeau**

[10] This Conservative succeeded Trudeau as PM. He sang "When Irish Eyes are Smiling" with Ronald Reagan during the Shamrock Summit.

ANSWER: Martin Brian **Mulroney**

080-12-69-15219

20. This quantity, measured in kilojoules per mole, can be estimated for an ionic solid using the values found in the Born-Haber cycle. For 10 points each:

[10] Name this energy needed for gaseous ions to form into an ionic solid.

ANSWER: **lattice** energy [or **lattice** enthalpy]

[10] The lattice energies for the formation of ionic solids are negative because this type of reaction in which energy is released is needed to form the solid.

ANSWER: **exothermic** reaction

[10] One value used in the Born-Haber cycle is this measure of the energy released when an atom or ion has an electron added.

ANSWER: electron **affinity**

023-12-69-15220

21. This planet includes such satellite groups as the Ananke, Carme, and Psiphae moons. For 10 points each:

[10] Name this planet, whose moons also include the enormous Io and Ganymede.

ANSWER: **Jupiter**

[10] Io, Ganymede, and Europa are three of the four members of this group of moons, named for the person who discovered them with his improved telescope in 1609.

ANSWER: **Galilean** moons

[10] The fourth Galilean moon is this heavily cratered home of the Valhalla and Asgard basins.

ANSWER: **Callisto**

019-12-69-15221