

TOSSUPS

1. The vibrational partition function can be used to characterize these entities as “loose.” Analogs of these entities are useful enzyme inhibitors because they bind to the target enzymes more tightly than the enzyme’s natural substrate. They correspond to (*) saddle points on potential energy surfaces. For an SN₂ reaction, this entity is trigonal bipyramidal. They more closely resemble the species they are closest to in energy according to Hammond’s postulate. For 10 points, name these temporary states in a reaction that correspond to the activation energy.

ANSWER: transition state

2. This opera’s composer claimed he wrote it in 13 days after being commissioned by the owner of the Teatro Argentina, where its premiere was sabotaged by partisans of Giovanni Paisiello. An aria in this opera that is often transposed to F for coloratura sopranos describes an echoing voice in a heart; that aria is titled (*) “Una voce poco fa.” This opera’s title character repeats his name before the patter portion of the aria “Largo al factotum.” The disguised Almaviva tries to woo Rosina in - for 10 points - what opera by Gioachino Rossini, whose title character is Figaro?

ANSWER: The Barber of Seville, or, the Futile Precaution [or Il barbiere di Siviglia, ossia L'inutile precauzione]

3. Two companions of this man penned *The Adventures of Ook and Gluk: Kung-Fu Cavemen from the Future*. This character battles a plant who consumes alien rapid-growth juice to become the Dandelion of Doom. He was created when a hypnotic ring was used on Principal Krupp by (*) George Beard and Harold Hutchinson frequently rearrange the letters on signs; like from “come see our pretty armchairs” to “come see our hairy armpits.” He fights the Wicked Wedgie Woman and Professor Pippy Poopypants. For 10 points, name this superhero created by Dav Pilkey who only wears tighty-whities.

ANSWER: Captain Underpants

4. In one work by this author, Madame Cornouiller puts the blame for the theft of three melons on the title imaginary gardener. A character created by this author of *Putois* discovers a beautiful edition of the *Golden Legend* in a basket filled with violets left by his door. The title (*) creatures of another novel by this author include the powerful Greatank and the conniving Kraken, who are visited by a priest in their North Pole residence. Mael baptizes the title avians in - for 10 points - what French author’s novel *Penguin Island*?

ANSWER: Anatole France

5. This ruler invited Makarios of Antioch to a synod that condemned the Stoglav and the teachings of Avvakum, who opposed making the cross with three fingers. By the Treaty of Pereyaslav, this ruler agreed to protect the Zaporozhian host of Bohdan Khmelnytsky. During this ruler’s reign, the *raskol* (*) split occurred when Patriarch Nikon’s reforms upset the Old Believers. This tsar’s forces devastated Poland during the Deluge and put down the uprising of Stenka Razin. For 10 points, name this 17th century tsar, a son of Michael Romanov.

ANSWER: Tsar Alexis of Russia [or Alexis I; or Alexei Mikhailovich]

6. This is the last name of a Swiss philosopher who was banned from entering the U.S. until 2010, a man who wrote *Western Muslims and the Future of Islam* and teaches Oriental Studies at Oxford University. A form of retreat known as *i’tikaf* is most commonly practiced during a period of time with this name during which the (*) Night of Power occurs. During that period of time with this name, a sunset meal called *iftar* is consumed after observing *sawm*. For 10 points, identify this month during which Muslims must fast.

ANSWER: Ramadan [accept Tariq Ramadan]

7. This technique replaces Plato’s method of hierarchical opposition according to a series of interviews titled *Positions*. Gayatri Spivak used the word “trace” to translate a method of this technique which was borrowed from Heidegger. It was defined using a series of negatives, which made it notoriously difficult to define for users like (*) Paul de Man. This method relies on interpreting the interplay of signs, aims to take apart binaries in texts, and is championed in *Of Grammatology*. For 10 points, name this method promoted by Jacques Derrida.

ANSWER: deconstruction [or deconstructionism; prompt on “French bullshit” since that’s what it basically is]

8. Molecules for which this process occurs on the NMR timescale are analysed with ROESY, *not* [emphasize] NOESY. Quantum operators for performing this operation are described by the Wigner-Eckart theorem. Black holes undergoing this process are described by the (*) Kerr metric. 2 dimensional matrices that perform this operation have [read slowly] “first row: cosine theta, minus sine theta; second row: sine theta, cosine theta.” The moment of inertia is the analogue of mass for objects undergoing - for 10 points - what movement around a central axis?

ANSWER: rotation [or rotating; or spinning; or tumbling]

9. A poem written in this language mournfully notes: “We can search for nothing more -- the heart is full, the world is void.” In *Middlemarch*, Edward Casaubon’s *Key to All Mythologies* is outdated because he cannot read this language. The title character of a fragment novel written in this language obsesses over a blue (*) flower. *Hymns to the Night* was written in this language, which was also used in a poem praising a “daughter of Elysium.” “Ode to Joy” was written in - for 10 points - what language used by Novalis and Friedrich Schiller?

ANSWER: German [accept Deutsch]

10. Dr. Paul Willis reversed the original conditions of this experiment in a 2007 follow-up. Though not conducted by Milgram, anxiety levels were measured by asking participants: “How do you feel about being shocked?” This 1974 study, conducted in North Vancouver by Aron and Dutton, relied on data from survey questions asked by an (*) attractive female confederate. For 10 points, name this psychological experiment that exposed the human tendency to misattribute arousal, conducted atop either a sturdy or a rickety version of a canyon-spanning object.

ANSWER: the Capilano suspension bridge arousal study [accept answers mentioning a bridge; accept Dutton study until “Dutton” is read; prompt on answers that mention arousal or “misattribution of arousal”]

11. Doctors Without Borders has criticized this document for extending data exclusivity and patent protections, thus driving up the cost of drugs in developing countries. Since the Obama administration kept this document’s content secretly until November 2015, Wikileaks remains the only publicly available source on its contents. (*) Vietnam, the United States, Australia, and Japan are all parties to this agreement, which has been criticized as a thinly veiled anti-China alliance and a giveaway to corporate interests. For 10 points, name this proposed Pacific trade deal.

ANSWER: Trans-Pacific Partnership [TPP]

12. This group provided the muscle in the “Armalite and ballot box” strategy and often forced people to drive cars to targets as “proxy bombs.” This group announced a “cessation of military operations” under the influence of Gerry Adams. While in (*) H-Block in 1981, a member of this group on hunger strike was elected to parliament. Bobby Sands was a member of this group, which carried out the Brighton Hotel Bombing. For 10 points, identify this most prominent militant group during The Troubles in Northern Ireland.

ANSWER: (Provisional) Irish Republican Armey

13. Altdorfer’s *Mary with Child* depicts baby Jesus with his hand atop one of these objects, and Raphael painted a *Young Man* clad in red holding one of these objects. In *The Garden of Earthly Delights*, nude blonde women standing in a pool in the center panel balance these objects atop their heads. A slightly tilted bottle of wine sits by a (*) basket filled with these items in a still life by Cezanne. One of these objects obscures the face of a bowler hat-wearing man in a Magritte painting. For 10 points, identify this object shown awarded to Aphrodite in *The Judgment of Paris*.

ANSWER: apples [accept specific types of apples: golden apples, red apples, etc.]

14. This composer’s 12 fantasias for viola da gamba are lost, but those for solo flute and violin, of which there are also 12 each, survive. Two of his collections of chamber music were nicknamed for their popularity in Paris. The second movement *allegro* is often excerpted from this composer’s viola concerto, the first known. 15 pieces meant to accompany (*) meals were created by this composer, who was the godfather of Carl Philipp Emanuel Bach. For 10 points, name this composer of *Tafelmusik*, a prolific Baroque composer who worked in Hamburg.

ANSWER: Georg Philipp Telemann

15. This state's town of Monson is the beginning of a difficult section of trail called the "Hundred Mile Wilderness." Many painters traveled to this state to paint views of a mountain in its Baxter State Park. It's not near Lake Erie, but a federally recognized Micmac band is based in this state's town of Presque Isle. The (*) Penobscot people from this state believe that Mount Katahdin is sacred. Millions of tourists visit this state's Mount Desert Island, which is in Acadia National Park. For 10 points, which state contains the northern end of I-95?

ANSWER: Maine

16. The staging instructions of this play contrast a peripheral "angry glow of orange" with a "blue light" that illuminates the central scene. The protagonist of this play tells one character to go to hell after that character jokes about Ebbets Field blowing up. A character in this play brags about his son's ability to recite the (*) state capitals in alphabetical order before firing the protagonist. In another scene, the protagonist gifts stockings to his mistress, to the horror of his son Biff. For 10 points, name this play about the frustrations of Willy Loman, by Arthur Miller.

ANSWER: Death of a Salesman

17. Altman et al. used tetramers of these molecules with fluorophore-labeled streptavidin in diagnostics. TAPs ["T-A-P's"] bring peptides to the ER, where they bind with these molecules. Because of their beta-2 microglobulin subunit, one class of them can only (*) present epitopes to cells with CD8 co-receptors. APCs like dendritic cells express class II of these molecules. They must be matched between host and donor in organ transplants. For 10 points, name these cell surface molecules that display antigens for recognition by T cells, used to distinguish self from non-self.

ANSWER: major histocompatibility complex [or MHC; accept MHC class I, MHC class II, or MHC class III; prompt on "Human Leukocyte Antigen," "HLA," or "H-2"]

18. This commander's uncle was a renowned swordsman who fought with an ostrich feather on his head and was called "Lion of God." This commander's allies swore the Pledge of the Tree, helping lead to a ten-year peace concluded at the Treaty of Hudaibiyyah. This man withstood a fourteen-day siege by the forces of (*) Abu Sufyan at the Battle of the Trench, after which he suspected treason among the Jewish Qurayza tribe and had them executed. For 10 points, name this victor at the Battle of Badr, a leader of Medina who conquered Mecca.

ANSWER: Muhammad [or Abū al-Qāsim Muḥammad ibn 'Abd Allāh ibn 'Abd al-Muṭṭalib ibn Hāshim; prompt on Prophet or Rasulullah or other names used to refer to Muhammad]

19. This god spent four days in a stone box before ordering that the box be sealed. This god burned down some houses after all of the flowers in his garden died when his brother descended from the sky by a spider's thread. Bees produced sounds as they flew through a (*) conch shell given to this god in the underworld. While there, this god retrieved bones that he later used to recreate mankind. This god's malevolent brother baited Cipactli with his foot. For 10 points, identify this brother of Tezcatlipoca, the "feathered serpent" of the Aztecs.

ANSWER: Quetzalcoatl

20. One of this author's title characters is informed of the death of her gambling father at the end of the chapter "Mirth and Mourning." That character mercy-kills a brood of birds to prevent a sadistic seven-year old boy from plucking off their wings. Another novel by this author opens with a letter written to Jack (*) Halford by Gilbert Markham, who becomes infatuated with Helen Graham, a new resident of the title mansion. For 10 points, name this author of *Agnes Grey* and *The Tenant of Wildfell Hall*, the sister of authors Emily and Charlotte.

ANSWER: Anne Bronte [prompt on "Bronte"]

21. Much of this project relied on a BAC-based method whose results were put together with Jim Kent's GigAssembler. Bill Clinton's announcement that the result of this initiative couldn't be patented caused Celera Corporation's value to crash. This \$3 billion project was led by (*) Francis Collins, and J. Craig Venter led a rival project that used shotgun sequencing. Institutions like the Broad Institute divvied up chromosomes to map in this project. For 10 points, name this international project to sequence the the entire *Homo sapiens* genome.

ANSWER: Human Genome Project [or HGP; accept equivalents like sequencing the human genome until mentioned; prompt on partial answers]

22. A paragraph from an early draft of this document condemning “a market where MEN should be bought and sold” was removed. The first 200 published copies of this document are called the “Dunlap broadsides.” A tie in votes on this document was broken thanks to a timely (*) ride through a storm by Caesar Rodney. This document contains a list of grievances written as sentences beginning with “he has” and opens “When in the Course of Human Events.” For 10 points, name this document that formalized US intentions to separate from Britain.

ANSWER: (United States) Declaration of Independence

23. At the start of a two-week fast before a feast celebrating this figure, it was once custom to parade the True Cross through Constantinople. The most widely used of the Akathist hymns is dedicated to this figure. At the Council of Ephesus, Cyril and Nestorius debated a (*) title given to this figure. On August 15th, Orthodox Christians celebrate a feast celebrating a time during which this person slept called the Dormition. For 10 points, the title “theotokos” is given to what person by Orthodox Christians, since she bore Jesus?

ANSWER: Virgin Mary

24. Broyden’s method belongs to a family of methods that are like this one, but use an approximate Hessian or Jacobian. This method precedes Halley’s method as the first of Householder’s methods, and shows (*) quadratic convergence for close starting points. In this method, each iterate is produced by subtracting from the previous iterate the quotient of the function and its derivative, both evaluated at that iterate. For 10 points, name this method that uses the x-intercepts of tangent lines to approximate the roots of a function.

ANSWER: Newton-Raphson method [or Newton’s method]

BONUSES

1. The oxidative phase of this pathway generates two NADPH molecules, which inhibit glucose-6-phosphate dehydrogenase, the rate-limiting enzyme. For 10 points each:

[10] Name this pathway that oxidizes glucose to make sugars used in nucleic acid and amino acid synthesis.

ANSWER: pentose phosphate pathway [or hexose monophosphate pathway/shunt, or phosphogluconate pathway/shunt]

[10] The pentose phosphate pathway is parallel to this other ancient glucose-oxidizing pathway, which yields pyruvate and two net ATP.

ANSWER: glycolysis

[10] The intermediate DHAP in the pentose phosphate pathway is also part of the biosynthesis of this three-carbon triol. Besides forming the backbone of many phospholipids, it also catalyzes the synthesis of formic acid from oxalic acid.

ANSWER: glycerol [or glycerine]

2. Much of our knowledge of the myths of these people come from Pedro Cieza de Leon's *Cronica del Peru*. For 10 points each:

[10] Name this Andean civilization that revered the creator god Viracocha. Their cosmos were divided into three *pachas*, or worlds.

ANSWER: Incan Empire

[10] This Incan sun god resided in the *hanan pacha*. His wife, Mama Quilla [*"KEE-ya"*], cried tears of silver and served as goddess of the moon.

ANSWER: Inti

[10] This deity ruled opposite Inti and Mama Quilla as the god of death and ruler of *ukhu pacha*, or the underworld.

ANSWER: Supay

3. This man wrote the 2002 book *What Time Is It? You Mean Now?* For 10 points each:

[10] Name this recently deceased long-time New York Yankees catcher best known for his numerous malapropisms and contradictory phrases.

ANSWER: Lawrence Peter "Yogi" Berra

[10] This man, Berra's longtime manager, said "I never play a game without my man," referring to Yogi. The first manager in Mets history, he won seven World Series titles with the Yankees from 1949 to 1958.

ANSWER: Charles Dillon "Casey" Stengel

[10] While Berra himself was managing the Yankees in 1964, he infamously lost his temper with infielder Phil Linz on the team bus and demanded Linz stop playing with *this object*.

ANSWER: harmonica

4. These people speak the closest related living language to English and Scots. For 10 points each:

[10] Identify these inhabitants of a namesake island group off the coast of the Netherlands and Germany.

ANSWER: Frisians

[10] Frisia was administered from this city in the northern Netherlands, which was a member of the Hanseatic League. This city is home to the second-oldest university in the Netherlands, after Leiden.

ANSWER: Groningen

[10] During medieval times, the main privilege of Frisia was its freedom from this typical medieval social order, in which lords exchanged land for the loyalty of vassals.

ANSWER: feudalism

5. This author included Mount Rainier and Pyramid Lake among a list of "great centers of power" in his "Smokey the Bear Sutra." For 10 points each:

[10] Name this American environmentalist poet who inspired Japhy Rider's character in *The Dharma Bums*. He translated Han Shan's "Cold Mountain" poems into English.

ANSWER: Gary Snyder

[10] Along with Allen Ginsberg, Snyder participated in the Six Gallery reading in this West Coast city, a center of Beat Culture home to the City Lights Bookstore.

ANSWER: San Francisco

[10] San Francisco's '60's drug culture was detailed by this other writer in her essay "Slouching Towards Bethlehem."

ANSWER: Joan Didion

6. Marcus Aurelius wrote *Meditations* while on the Granus river, now this country's Hron river. For 10 points each:

[10] Name this country, whose flag contains a coat of arms with three hills on it that represent the Tatra, Fatra, and Matra mountain ranges.

ANSWER: **Slovakia** [or **Slovak Republic**; or **Slovenská republika**]

[10] This bigger European mountain range isn't represented on Slovakia's flag, since it's not in Slovakia, but melt from these mountains provides most water for the Danube, which flows through the capital Bratislava.

ANSWER: **Alps**

[10] The Lesser Fatra mountains lie near the border between Slovakia and this eastern region of the Czech Republic, whose historical center is Brno.

ANSWER: **Moravia** [or **Morava**; or **Mähren**]

7. Many members of a working group on this period proposed that it started with the Trinity test on July 16, 1945. For 10 points each:

[10] Name this epoch proposed by Paul Crutzen and Eugene Stoermer, characterized by increasing dominance of human activity in biological and geological processes.

ANSWER: **Anthropocene**

[10] Those seeking to legitimize the Anthropocene seek a definition in terms of this field concerned with rock layering. Its foundations were laid by three principles of Nicholas Steno.

ANSWER **stratigraphy**

[10] Other evidence marshalled in favor of the Anthropocene is the increase in carbon dioxide shown in cores of this material often taken from accumulated precipitation in Antarctica, Greenland, or mountain glaciers.

ANSWER: **ice** [accept **ice cores**]

8. This event was a reaction to martial law imposed by the Hanahoe Group. For 10 points each:

[10] Identify this 1980 event in which alleged Communists and supporters of Kim Dae-Jung were massacred.

ANSWER: **Gwangju Uprising** [or **Gwangju massacre**]

[10] This President of South Korea, the only Korean leader besides Kim Dae-Jung to be given a state funeral, ordered an assassination attempt on Kim in 1972. His daughter of the same surname is now South Korea's President.

ANSWER: **Park Chung-hee** [or **Chung-Hee Park**; prompt on **Park** since about 8% of Korea has that surname!]

[10] Like his American allies, Park Chung-hee sent a huge contingent of troops to fight in this conflict, during which the Ho Chi Minh trail was used to resupply Communist forces.

ANSWER: **Vietnam War**

9. This gathering derives its name from a term for a "pitcher fair." For 10 points each:

[10] Identify this largest religious gathering in the world, a gigantic Hindu pilgrimage in which hundreds of millions of people gather to bathe in one of several sacred rivers. It was held in Allahabad in 2013.

ANSWER: **Kumbh Mela**

[10] The most popular river to bathe in during Kumbh Mela is this one, along which the holy city Varanasi lies.

ANSWER: **Ganges** [or **Ganga**]

[10] The sacred Ganga and Yamuna rivers supposedly join a mythical, sacred river with this name in Allahabad. A goddess of learning and wisdom with this name is the consort of Brahma.

ANSWER: **Saraswati** [or **Sarasvati**]

10. Answer the following about William Easterly's book *The Elusive Quest for Growth*, for 10 points each.

[10] Easterly's book attacks forgiveness of these obligations as encouraging irresponsible behavior on the part of third-world countries and criticizes the IMF for helping those countries to take on too much of them.

ANSWER: (foreign) **debts** [or **loans**]

[10] Easterly's book repeatedly attacks this Columbia University economist, a prominent advocate of foreign aid. This author of *The End of Poverty* directed work for the UN Millennium Project from 2002 to 2006.

ANSWER: Jeffrey **Sachs**

[10] Chapter 11 of Easterly's book discusses black markets created by these policies. The Mundell-Fleming model says you can't have this policy, free movement of capital, and an independent monetary policy all at once.

ANSWER: **fixed exchange rate** [or **exchange rate peg**; or **currency peg**; or **dollar peg**; prompt on less specific answers involving **money** or **currency** controls]

11. At this story's climax, its central character cries out, "Ah, pretty eyes - pretty eyes!" before jumping off of a belltower to his death. For 10 points each:

[10] Name this short story in which Nathaniel obsesses over an automaton created by Coppélius, and later endangers Clara's life before she is saved by her brother, Lothair.

ANSWER: "The Sandman" [accept "Der Sandmann"]

[10] This German Romantic author of *The Nutcracker and the Mouse King* wrote "The Sandman."

ANSWER: E. T. A. Hoffmann

[10] In this E. T. A. Hoffmann novel, the monk Medardus is driven mad by the title concoction, and so he murders the family of the princess Aurelie before stabbing her to death on their wedding day.

ANSWER: *The* Devil's Elixirs [accept "*Die* Elixiere des Teufels"]

12. This idea was developed by Eugene Fama while at the Booth School at Chicago. For 10 points each:

[10] Identify this key idea in finance, which states that it is impossible to beat the market in the long run because over time, the market will incorporate all publicly available information into prices.

ANSWER: efficient market hypothesis [or EMH]

[10] Many argue that the fact that this cryptocurrency developed by Satoshi Nakamoto ever managed to get off the ground proves the efficient market hypothesis is bogus.

ANSWER: Bitcoin

[10] This Iranian Jewish professor at NYU's Stern School has accused Bitcoin of being a Ponzi scheme. He earned the nickname "Dr. Doom" for public predictions of the 2008 financial collapse.

ANSWER: Nouriel Roubini

13. Answer the following about West African art, for 10 points each.

[10] Varieties of these objects from various African cultures are extremely common display items in museums. Usually made of wood or copper, they are typically made for use in religion, as opposed to theater as in the West.

ANSWER: masks

[10] Some Ghanaian carpenters design "fantasy" examples of these objects made to resemble things from animals to airplanes. Ancient Europeans often crafted these things out of single massive logs.

ANSWER: coffins

[10] This West African city contains three great mosques which each feature spikes sticking out of their mud walls. Two of those mosques are named Sidi Yahya and Djinguereber.

ANSWER: Timbuktu

14. While in a relationship with Monica Jones, this man described sexual intercourse as "asking someone else to blow your own nose for you." For 10 points each:

[10] Name this man who, in a different context, wrote that "sexual intercourse began / In nineteen sixty-three / (which was rather late for me)."

ANSWER: Philip Arthur Larkin

[10] The speaker of this Larkin poem describes the effigies of an "earl and countess" that "lie in stone" in an old cathedral. It concludes by noting, "What will survive of us is love."

ANSWER: "An Arundel Tomb"

[10] In "This Be The Verse," Larkin wrote that these *two* people "fuck you up" and "fill you up with the faults they had." He advises the reader to "Get out as early as you can, / And don't have any kids yourself."

ANSWER: your mum and dad [accept "your parents" or equivalents]

15. Economic growth in this country tends to fluctuate based on the price of its main export, copper. For 10 points each:

[10] Identify this Sub-Saharan African country which briefly had a white man, Guy Scott, as its President until the early 2015 election of Edgar Lungu.

ANSWER: (Republic of) Zambia

[10] Most white people in Zambia are refugees from this neighboring country, where Robert Mugabe's government expropriated almost all of their land.

ANSWER: (Republic of) Zimbabwe

[10] A lot of white people, including former *retornados* and numerous Brazilians, have flocked to this country thanks to its economic boom, which took off after the MPLA won its civil war in 2002.

ANSWER: (Republic of) Angola [or República de Angola]

16. Sheep graze in the background as the title girl looks over her shoulder at the viewer in this artist's *The Young Shepherdess*. For 10 points each:

[10] Name this artist who also painted innocent-looking girls in *Alone in the World* and *The Knitting Girl*. In a mythical scene by this artist, several putti recline atop a porpoise as its central nude figure stands atop a clam shell.

ANSWER: William-Adolphe **Bouguereau**

[10] Bouguereau produced most of his works in this style, which focused on values and standards instilled by formal institutes of art.

ANSWER: **academic** art [accept **academism** or **academicism**]

[10] Academic art bridged neoclassicism with this other broad artistic movement, which emphasized strong emotion and nature. Caspar David Friedrich's *Wanderer Above the Sea of Fog* exemplifies this movement.

ANSWER: **Romanticism** [accept **Romantic** art]

17. Black Kettle was a chief from this people's Northern Branch who married into its Southern one. For 10 points each:

[10] Identify this plains-dwelling Native American people, dozens of whom were killed by U.S. Army troops despite flying flags of allegiance during the Sand Creek massacre.

ANSWER: **Cheyenne** [accept the specific branches: **Suhtai** or **Sutaio** and/or **Tsétséhéstâhese**]

[10] This other Native American people conducted a ceremonial peace trade with the Cheyenne in 1806 under their chief Le Borgne. They also carried out the raid on the Shoshone that abducted Sacagawea.

ANSWER: **Hidatsa** [or **Hiraacá**]

[10] This long river was the avenue for most trade between the Cheyenne and Hidatsa, as well as for the first part of the Lewis and Clark expedition.

ANSWER: **Missouri** River

18. This process gives rise to Stokes and Anti-Stokes lines, and it occurs much less frequently than Rayleigh scattering. For 10 points each:

[10] Identify this type of scattering where a molecule absorbs a photon, enters a virtual excited state, and re-emits it.

ANSWER: **Raman** scattering

[10] For a molecule to be vibrationally Raman-active, this quantity, which is symbolized alpha, must change during a vibration.

ANSWER: **polarisability** (yes, that's a BRITISH spelling from Ewan)

[10] Unlike Rayleigh scattering, Raman scattering is an example of this type of process, where the kinetic energy of the incident particle is not conserved. Collisions of this type have coefficients of restitution less than one.

ANSWER: **inelastic**

19. This treatise's fifth section implies that its findings, which it claims are based only on the perfection of God were excised from the author's earlier work *On the World*. For 10 points each:

[10] Identify this treatise, which argues that its author's ability to doubt his existence necessarily proves he exists, as exemplified by the phrase "Cogito ergo sum."

ANSWER: **Discourse on Method** [or **Discourse on the Method** of Rightly Conducting One's Reason and of Seeking Truth in the Sciences; or **Discours de la méthode** pour bien conduire sa raison, et chercher la vérité dans les sciences]

[10] This philosopher included the quote "Cogito ergo sum" in *Discourse on Method*.

ANSWER: René **Descartes** [or Renatus **Cartesius**]

[10] Descartes wrote *The Passions of the Soul* in response to a question from this correspondent about mind-body communication, as well as a challenge to "define the passions, in order to know them better."

ANSWER: **Elisabeth** of **Bohemia** [or **Elisabeth** of the **Palatinate**]

20. This man's cello, made by Matteo Goffriller, is now played by the Israeli Amit Peled, who himself studied under this man's pupil Bernard Greenhouse. For 10 points each:

[10] Name this Catalan cellist, whose orchestra charged cheap tickets for workers and was conducted by Albert Cortot in a recording of Brahms' double concerto that featured him and Jacques Thibault.

ANSWER: Pablo **Casals**

[10] Pablo Casals was discovered playing a trio in a cafe by this Catalan composer, who is best known for his piano suites inspired by his native country, such as *Chants d'Espagne* and *Iberia*.

ANSWER: Isaac (Manuel Francisco) **Albéniz** y Pascual

[10] Albéniz' pieces imitating this traditional Spanish instrument include *Asturias (Leyenda)* and *Tango in D*, the latter of which was transcribed by a virtuoso on it, Miguel Llobet. It was also played by Andres Segovia.

ANSWER: **guitar** [or **guitarra**]

21. Answer the following about the Chernyakhov culture of late Iron Age Ukraine, for 10 points each.

[10] The story of the migration of these people to Oium may be archaeologically reflected by the Chernyakhov. Branches of these people won the Battle of Adrianople and ruled Italy under Theodoric.

ANSWER: Goths [accept Visigoths or Ostrogoths]

[10] This ubiquitous Celtic Iron Age archaeological culture named for a site in Switzerland heavily influenced the artifacts of the Chernyakhov culture.

ANSWER: La Tène culture

[10] The sunken-floored huts of these people, who were ruled by Decebalus, also appear to have influenced the Chernyakhov dwellings.

ANSWER: Dacians [or Daoi; or Getai]

22. Answer some questions about protecting groups, for 10 points each.

[10] Alcohols are commonly protected by groups such as TBDMS, which contains an atom of this element. This element stabilizes carbanions α ["alpha"] to it.

ANSWER: silicon [or Si]

[10] Benzaldehyde and acetone are often used as protecting groups for this general class of molecules, which includes glucose and galactose.

ANSWER: sugars [accept monosaccharides; accept carbohydrates]

[10] In this reaction, a carbon can be removed from a monosaccharide by first converting the terminal aldehyde to a carboxylic acid before adding iron acetate and hydrogen peroxide. Glucose can be converted to arabinose through it.

ANSWER: Ruff degradation

23. This artist's collaborations with Patti Smith included the cover to Smith's album *Horses*. For 10 points each:

[10] Identify this photographer, best known for his black-and-white depiction of nudes which frequently explored homoerotic themes. He died in 1989 of complications related to AIDS.

ANSWER: Robert Mapplethorpe

[10] This other gay artist, who made his studio at The Factory, was a frequent subject of Mapplethorpe's photos.

ANSWER: Andy Warhol

[10] After his death, Mapplethorpe's work was donated to an art research institute named for this industrialist, which is part of a museum directed by Timothy Potts located in Los Angeles.

ANSWER: Jean Paul Getty

24. At age 82, this author was non-fatally stabbed twice in the neck while sitting in his car. For 10 points each:

[10] Name this author, who wrote about the assassination of his country's leader in the novel *The Day the Leader was Killed*. He also wrote *Miramar*.

ANSWER: Naguib Mahfouz

[10] Mahfouz was a Nobel Prize-winning novelist from this African country.

ANSWER: Egypt

[10] This prominent Egyptian playwright of the 20th century wrote *The People of the Cave* and *A Bullet in the Heart*.

ANSWER: Tawfiq al-Hakim