

TOSSUPS

1. In geochemistry, for a silicate melt, the right side of *this law* becomes the exponential of negative beta times the difference in excess chemical potentials. This law's metallurgical equivalent is Sievert's law. The nonideal behavior of a solution follows (*) Raoult's law at high concentrations and this law at low concentrations. This law can be stated as C equals its namesake constant times P and explains why divers experience decompression sickness. For 10 points, name this law which states that the amount of dissolved gas is proportional to its partial pressure.

ANSWER: Henry's Law

2. The recent Economic Policy Institute paper "Raising America's Pay" estimates 64.9 percent growth in *this quantity* in the US since 1979. Either population or this quantity must increase to allow for long-run growth in neoclassical models, which may represent this quantity empirically with a (*) Solow residual. This quantity is represented by a constant in a Cobb-Douglas function. Technological improvements increase the "total factor" form of - for 10 points - what quantity, which measures how many inputs are required to make a given output?

ANSWER: factor productivity [accept labor productivity or capital productivity; accept total factor productivity; prompt on technology]

3. Pakistani general Zia ul-Haq became famous for training a country's 2nd Division to fight *this man*. After being confined to Ramallah in a siege, this man officially incorporated the Al-Aqsa Martyrs' Brigades into an organization he founded that earlier fought against (*) King Hussein's forces during Black September. Bill Clinton mediated a meeting between this founder of Fatah and Ehud Barak at the Camp David Summit. Two Israelis won the Nobel for the Oslo Accords with - for 10 points - what long-time President of the PLO who died in 2004?

ANSWER: Yasser Arafat

4. In May 2015, rival factions in this country held a week-long national reconciliation forum that included its suspended National Assembly. The Sango word for "coalition" names a group led by Michel Djotodia in this country, temporarily led by Catherine Samba-Panza. Genocide of (*) Muslim civilians by anti-Balaka militias began in this country after François Bozizé was forced out of power by Séléka rebels in 2013. Violence plagues the capital of Bangui in - for 10 points - what violence-ridden African country formerly ruled by Bokassa I?

ANSWER: Central AAfrican Republic [CAR]

5. This composer parodied government policy with a cantata called a *rayok* containing quotes from the love song *Suliko*. This composer quoted Mussorgsky's *Songs and Dances of Death* in his Cello Concerto No. 1 in E-flat major and wrote a painful, brassless *largo* third movement for his fifth symphony, written (*) conservatively after the article "Muddle Instead of Music" denounced one of his operas. Yevgeny Yevtushenko's poetry features in this composer's *Babi Yar* symphony. For 10 points, name this composer of the "Leningrad" symphony.

ANSWER: Dmitry Shostakovich

6. This author translated a fellow countryman's early novel *The Forest of a Thousand Daemons* into English. A character created by this author enjoys the flavor of testicles and shoots his own cannibalistic father, who is known as The Old Man. Eman serves as the scapegoat "carrier" and is killed in this author's play (*) *The Strong Breed*. In another play by this author, the chieftain of the town of Ilujinle fights over Sidi with the Westernized teacher Lakunle. For 10 points, name this Nigerian dramatist who wrote *The Lion and the Jewel*.

ANSWER: Wole Soyinka

7. Many of this city's early landmarks, including the Tremont House, were designed by John M. Van Osdel. To create natural drainage, whole blocks of this city were hydraulically during the 1850s and 60s. A building in this city called the Wigwam hosted the 1860 (*) Republican National Convention. Governor John Altgeld ordered troops into this city to break up a strike against the Pullman Company, which built its company town on this city's South Side. Upton Sinclair described the meatpacking industry in - for 10 points - what largest Illinois city?

ANSWER: Chicago, Illinois

8. The Frank-Tamm formula is only valid when beta is greater than one over this quantity. The Abraham-Minkowski controversy regarded whether the momentum of a photon was directly or inversely proportional to this quantity, whose values at the Fraunhofer D, F and C lines can be used to calculate the Abbe number. The arctangent of the (*) ratio of two values of this quantity can be used to compute Brewster's angle. This quantity can be calculated from the angle of incidence with Snell's law. For 10 points, name this ratio of the speed of light in a medium to its value in a vacuum.

ANSWER: index of refraction

9. This figure rescued a son of Aura named Iakhos from being eaten by his mother. During the Trojan War, Hera struck this figure on the ear with an arrow-filled quiver. The father of Arcas disguised himself as this figure to seduce Callisto. After King (*) Oeneus neglected to honor this deity during a harvest festival, this deity sent forth a fierce boar to terrorize Calydon. A pack of dogs attacked their master Actaeon when he was transformed into a deer as punishment for spotting this goddess bathing. For 10 points, name this Greek goddess of the hunt.

ANSWER: Artemis

10. In an episode of this show, characters argue over the existence of a feral chicken on their estate. A character on this show is fined for punching a woman and rupturing her fake breast. The main character is given a tattoo reading (*) "Trust No Bitch" by Stella Carlin, who is played by Ruby Rose. The transgender hairdresser Sophia on this show is played by Laverne Cox. Its intro sequence depicts the eyes of multiple women set to Regina Spektor's "You've Got Time." For 10 points, name this Netflix series set in Litchfield Women's Penitentiary.

ANSWER: Orange is the New Black [or OITNB]

11. This novel concludes on the ominous note that a central character's tears were "not the last she was destined to shed." In a letter, Mark Twain wrote that he'd rather be "damned to John Bunyan's heaven than read" this novel, which includes a charlatan mesmerist-healer named Selah. This novel's heroine is dissuaded from speaking at a (*) music hall by Olive Chancellor's cousin, a Civil War veteran named Basil Ransom. For 10 points, Verena Tarrant is one of the title residents of a Massachusetts city in - for 10 points - what Henry James novel?

ANSWER: *The* Bostonians

12. When this painting's title figure first saw it, he exclaimed: "This is not a painting; one walks in this picture." A statue of the *Pieta* is cut off on the right side of this painting next to an ornate candelabrum holding enormous candles. This painting inaccurately included its central subject's (*) mother in the center background. Pope Pius VII blesses the central subject of this painting, which is set in Notre Dame cathedral. A French ruler crowns his wife Josephine in - for 10 points - what Jacques-Louis David painting?

ANSWER: *The* Coronation of Napoleon [accept *The Consecration of the Emperor Napoleon and the Coronation of Empress Josephine*; accept *Le Sacre de Napoleon*]

13. This system is commemorated by a porphyry sculpture now on the steps of Saint Mark's Basilica. Maximinus Daia was killed in the wars prompted by this system, which brought greater importance to Sirmium and Trier because they became the permanent residences of (*) Constantine Chlorus and Galerius. The civil wars during this system ended at the Battle of Chrysopolis, where Licinius was defeated. Two Augusti and two Caesars were created by - for 10 points - what system created by Diocletian in which four men ruled the Roman Empire?

ANSWER: Tetrarchy [prompt on Diocletian's reforms; prompt on descriptions involving four emperors]

14. Sculptures of colored inflated domes were created for one of these events that featured the dream of a little girl who recited the alphabet. The sculpture ArcelorMittal Orbit was created for one of these events, another of which saw ghostly ships projected on the floor to represent (*) Peter the Great's journeys. The "Brilliant Civilization" and "Glorious Era" were represented at one of these events by hundreds of dancers and Beijing opera. For 10 points, identify these events whose artistic opening ceremonies conclude with torch lightings, as at Sochi in 2014.

ANSWER: Olympics [accept Olympic opening ceremonies; accept Summer Olympics or Winter Olympics specifically]

15. Howell Harris and Daniel Rowland led a revival of this sect in Wales in the late 18th century. An offshoot of this sect founded by Richard Allen in Philadelphia is the oldest black Protestant denomination. This is the largest Protestant sect which holds that God's grace can be (*) earned or refused by anyone, a belief adopted from Jacobus Arminius. This sect originated as a revival of Anglicanism and was spread by Thomas Coke. George Whitefield created a Calvinistic offshoot of - for 10 points - what denomination founded by John Wesley?

ANSWER: Methodism

16. Jeanne Schulkind edited this author's essay "Am I a Snob?" into this author's posthumous autobiography, titled *Moments of Being*. A character created by this author feels a "perpetual sense" of being "far out to sea and alone" while watching taxi cabs, and reminisces about a garden in Bourton where (*) she kissed Sally Seton. A visit to the Isle of Skye frames this author's novel about Charles Tansley and the Ramsay family. For 10 points, name this author of *Mrs. Dalloway* and *To The Lighthouse*.

ANSWER: (Adeline) Virginia Woolf

17. It's not in North America, but this natural region has the second highest frequency of tornadoes in the world in its so-called "tornado hall" or *pasillo de los tornados*. This region is home to most of the large estates called *estancias*. The province of Entre Ríos in this region, which also includes the state of (*) Rio Grande do Sul, is named for the Paraná and Uruguay rivers. The Gran Chaco and Patagonia bound - for 10 points - what region of fertile grasslands in Brazil and northern Argentina, frequented by gauchos and home to Buenos Aires?

ANSWER: Pampas [the tossup says "natural region" so don't accept anything else]

18. The S_N1 Phillips mechanism was proposed for the enzymatic breakdown of this molecule. By recognizing DAP or MDP in this molecule, Nod1 and Nod2 act as sensors for it. Lysozymes degrade this molecule, and by inhibiting DD-transpeptidase, (*) beta-lactams prevent this molecule's synthesis. This molecule contains several D-amino acids and is made of beta-(1,4)-linked N-acetylglucosamine and N-acetylmuramic acid. It comprises 90% of the dry mass of Gram-positive bacteria. For 10 points, name this molecule that forms most of the bacterial cell wall.

ANSWER: peptidoglycan [or murein]

19. A sample of a song about this city recurs in the soundtrack to *Touki Bouki*. In a movie set in this city, a mime acts out the theft of a gold chain, and is one of four men to fall in love with Garance. A group of tourists in this city include Barbara, who often runs into (*) Hulot in *Playtime*. Marlon Brando's character Paul uses butter in an anal rape scene in a Bertolucci movie named for a "Last Tango in" this setting of *Children of Paradise*. Patricia sells the New York Herald Tribune here in *Breathless*. For 10 points, name this setting of many French New Wave movies.

ANSWER: Paris, France

20. In an agreement named for this city, knights and certain cities were exempted from uniformity by the *Declaratio Ferdinandei*. In this city, Philip of Hesse and other princes were read a document named for it by Christian Beyer that was created out of the Torgau Articles. The principle of (*) *cuius regio, eius religio* was established by an agreement in this city, which names a declaration of faith written by Philip Melancthon. The 1555 peace ending the German Wars of religion was signed in - for 10 points - what city, which names the Lutheran confession?

ANSWER: Augsburg

21. This book was described by its author as a project of analysis, or *Zergliederung*, of the faculty of understanding, and its second edition had an attack on Cartesian skepticism appended to it titled *The Refutation of Idealism*. It argues that categories such as causality are necessary for any possible (*) experience through its "transcendental analytic" and introduces the concept of inherently unknowable *noumena*, as opposed to phenomena. For 10 points, name this book showing the existence of *a priori* synthetic truths by Immanuel Kant.

ANSWER: Critique of Pure Reason [or Kritik der Reinen Vernunft]

22. The author of the clause from which this right is extrapolated, Senator Jacob Howard, said it did not exist due to the words “subject to the jurisdiction thereof.” This right, which is rare outside of the Americas since most countries adhere to *jus sanguinis*, was established judicially by *U.S. v. Wong Kim Ark*. (*) Jeb Bush was criticized for nothing that, each year, 60,000 Chinese nationals come to America to take advantage of this doctrine. “Anchor babies” are supposedly created by - for 10 points - what guarantee of citizenship granted by the 14th amendment?

ANSWER: birthright citizenship (for immigrants and foreigners) [accept jus soli; anything indicating that a person becomes a citizen automatically if they are born in the United States of America]

23. In the theory of these systems, Pontryagin’s principle and the Hamilton-Jacobi-Bellman equation give conditions for their optimality. An equation governing some systems of this type sums past, present, and predicted future error to determine output. Systems of this type that switch discontinuously between two states show “bang-bang” behavior. The (*) proportional-integral-derivative loop feedback mechanism is used in industrial systems of this type. For 10 points, name these systems that direct behavior of other devices, exemplified by thermostats.

ANSWER: control systems [accept specific types like PID controller]

24. One of this author’s characters asks, “Is it not enough for the misery of many that monarchs are men?” upon discovering that his lover is dead. This author wrote a play in which a man standing beneath palm trees admits that he is a bastard child. The title character of a play by this author is stabbed by her father to prevent Hettore (*) Gonzaga from stealing her innocence. Another of this author’s characters relates the “Ring Parable” to Saladin. For 10 points, name this German dramatist of *Emilia Galotti* and *Nathan the Wise*.

ANSWER: Gotthold Ephraim Lessing

BONUSES

1. These explosions can briefly outshine an entire galaxy. For 10 points each:

[10] Name these massive explosions of giant stars.

ANSWER: supernovas [or supernovae]

[10] Supernovas are classified into Type I and Type II varieties based on spectra and readouts of these graphs. Type I supernovae exhibit sharp, early maxima on them, while Type II ones plateau before declining.

ANSWER: light curves [specific answer required; prompt on less specific answers, like “graphs of luminosity”]

[10] Type II supernovae aren’t observed in these types of galaxies since they’re primarily composed of Population II stars. The Faber-Jackson relation applies to these galaxies found on the left of a traditional tuning fork diagram.

ANSWER: elliptical galaxies

2. A video from this country showed a news camera woman kicking refugees. For 10 points each:

[10] Name this central European country which has attracted lots of international criticism for denying refugees entrance and constructing border fences to keep them out.

ANSWER: Hungary [or Magyarország]

[10] This Prime Minister of Hungary has attacked Muslim immigrants, including refugees, as threats to European civilization.

ANSWER: Viktor Orbán

[10] Like Austria, this country has had to deal with thousands of passing refugees due to Hungary’s actions. On October 20th, this country deployed its army to the borders and a massive fire broke out in one of its refugee camps.

ANSWER: (Republic of) Slovenia [or Republika Slovenija]

3. This work's title character is first spotted sleeping under a tree by a pair of students. For 10 points each:

[10] Name this story about Tomas Rodaja, whose consumption of a wonky love potion causes him to believe that he’s made of the title substance.

ANSWER: “The Lawyer of Glass” [accept “El licenciado Vidriera” or “Doctor Glass-Case” or “Master Glass” or “The Glass Graduate” or other reasonable translations]

[10] “The Lawyer of Glass” is one of the twelve stories in this Spanish series, which also includes “The Conversation of the Dogs” and “The Deceitful Wedding.” It was first printed in Madrid in the year 1613.

ANSWER: Exemplary Novels [accept “Novelas ejemplares”]

[10] The *Exemplary Novels* were published by this author shortly before he completed his magnum opus, *Don Quixote*.

ANSWER: Miguel de Cervantes Saavedra

4. This regime took its name from the word for “king” or “rule.” For 10 points each:

[10] Give this common name for the non-Company British government of India, which ended in 1947.

ANSWER: British Raj

[10] The Raj was prompted by the Sepoy Mutiny, during which this capital of modern Uttar Pradesh endured a major siege. This city also names a 1916 pact between the INC and the Muslim League.

ANSWER: Lucknow

[10] A politician with this surname was the first Viceroy of India under the Raj. A pro-free trade, pro-emancipation Tory faction was named for a politician of this surname who was Britain’s shortest-serving Prime Minister.

ANSWER: Canning (Charles and George)

5. This artist painted a gleeful couple holding hands amidst crashing waves in his painting *What Freedom!* For 10 points each:

[10] Name this leader of The Wanderers, who also painted *The Reply of the Zaporozhian Cossacks* and *Barge Haulers on the Volga*.

ANSWER: Ilya Repin

[10] Ilya Repin and other members of The Wanderers, such as Ivan Kramskoi and Viktor Vasnetsov, were from this country.

ANSWER: Russian Empire [accept Russia or Rossiya or Rossiyskaya Imperia]

[10] Two other members of The Wanderers named Ivan Shishkin and Konstantin Savitsky collaborated on the painting *Morning in a Pine Forest*, which depicts a few of these animals amidst the underbrush.

ANSWER: brown bears

6. This figure's name means "furrow," because she was discovered in a ploughed field. For 10 points each:

[10] Name this incarnation of Lakshmi who is betrothed to the winner of a competition to lift and string a bow of Shiva. After her husband abandons her, she gives birth to a set of twins and is swallowed by the earth.

ANSWER: Sita [or Janike]

[10] Sita is the wife of this king of Ayodhya who killed the evil king of Lanka, Ravana.

ANSWER: Rama

[10] Sita is considered a daughter of this goddess of the earth. She was stolen by the demon Hiranyaksha and saved by Vishnu in the form of the boar Varaha.

ANSWER: Bhumi-devi [or Bhu-devi]

7. In the late stages of this game, the protagonist fights Organization XIII members in "The World That Never Was." For 10 points each:

[10] Identify this game which begins with Roxas in a simulation of Twilight Town. This game featured additions such as the use of Sora's Master Form and Final Form, and includes worlds like Port Royal and Space Paranoids.

ANSWER: Kingdom Hearts II [do not accept or prompt on "Kingdom Hearts"]

[10] In Kingdom Hearts, Sora gets beat up by several characters from this video game series, including Cloud Strife and Squall Leonheart. Sephiroth, another character from this series, is featured in an optional fight and subplot.

ANSWER: Final Fantasy

[10] In the original Kingdom Hearts, Sora wishes to give one of these star-shaped fruits to Kairi as a symbol of his affection. It's the keychain on Kairi's Destiny's Embrace.

ANSWER: paupou fruit

8. Some historians have used this term to refer to the setup of the Gupta Empire. For 10 points each:

[10] Identify this term, which refers to a government that justifies its existence through its role in perpetuation of culture through elaborate exercise of ritual, rather than any real exercise of power.

ANSWER: theater state

[10] This anthropologist coined the term "theater state" and wrote *The Interpretation of Cultures*.

ANSWER: Clifford Geertz

[10] This method of ethnography pioneered by Geertz aims to explain not only the behavior of a society, but its context as well, in order to communicate the behavior's meaning to outsiders.

ANSWER: thick description

9. Karl Marlantes recounted his experiences during this war in his novel *Matterhorn*. For 10 points each:

[10] Name this war, which served as the setting to a short story about Rat Kiley, Kiowa, and other members of Lieutenant Jimmy Cross's squad.

ANSWER: The Vietnam War

[10] Jimmy Cross and his squad are weighed down by dope, ammunition, fear, and many other of the title objects in this author's story "The Things They Carried."

ANSWER: William Timothy "Tim" O'Brien

[10] After Ted Lavender is killed in "The Things They Carried," Jimmy Cross discards all of the letters he had received from this woman so that he can focus more on his platoon.

ANSWER: Martha

10. Three-dimensional structures of axonal bundles can be reconstructed using this technique, which is used in tractographic analyses in the Human Connectome Project. For 10 points each:

[10] Name this imaging method which tracks the random movement and collisions of water molecules to sense the structure of tissue.

ANSWER: diffusion MRI [or diffusion magnetic resonance imaging (dMRI); accept subtypes like diffusion tensor imaging (or DTI), diffusion weighted imaging (or DWI), or diffusion functional magnetic resonance imaging (or DfMRI, or diffusion fMRI), diffusion spectrum imaging (or DSI)]

[10] Diffusion MRI is most commonly used in this kind of brain tissue, which consists mostly of myelinated axons and glial cells, unlike gray matter.

ANSWER: white matter

[10] In this disorder, the myelin sheaths in white matter are destroyed by inflammation. Charcot described nystagmus, intention tremor, and scanning speech as a namesake "triad" of this disease.

ANSWER: multiple sclerosis [or MS]

11. This scientist came up with the names of hydrogen and oxygen. For 10 points each:

[10] Identify this French “father of modern chemistry” who stated the law of conservation of mass.

ANSWER: Antoine **Lavoisier**

[10] Lavoisier’s isolation of oxygen put the final nail in the coffin for the Johann Joachim Becher’s idea that this substance, a form of fiery air, caused combustion reactions.

ANSWER: **phlogiston**

[10] Lavoisier built on the work of this other scientist, who termed the oxygen he isolated in a jar “dephlogisticated air” since he was determined to defend phlogiston theory.

ANSWER: Joseph **Priestley**

12. This city was the base of power of the Trinh faction. For 10 points each:

[10] Identify this city from which the Lê dynasty ruled. It was visited by the Frenchman Alexandre de Rhodes.

ANSWER: **Hanoi**

[10] This other faction formed the main southern opposition to the Trinh faction. After the chaos of the Tay Son period, they established themselves as their country’s ruling family.

ANSWER: **Nguyen** faction/family [or **Nguyen** lords]

[10] The Trinh and Nguyen factions vied for power in this modern-day country, where Hanoi can be found.

ANSWER: (Socialist Republic of) **Vietnam** [or Cộng hòa Xã hội chủ nghĩa **Việt Nam**]

13. César Franck created a piece in this genre in A major as a wedding gift for Eugène Ysaÿe. For 10 points each:

[10] Identify this type of piece for soloist and piano, exemplified by the technically demanding “Devil’s Trill” one by Giuseppe Tartini.

ANSWER: **violin sonatas**

[10] This other Italian composed lots of violin sonatas, but he’s better known for his 24 demanding violin caprices, as well as his own virtuosic skill with the instrument.

ANSWER: Niccolò **Paganini**

[10] Paganini’s twenty-four caprices show off violin techniques such as this one demonstrated in the 8th, in which two separate strings are played simultaneously with the bow.

ANSWER: **double stop**

14. This book argues that most problems of modern philosophy are unproductive language games. For 10 points each:

[10] Name this book, which illustrates the misapplication of language to experience with its discussion of the fictional race of Antipodeans.

ANSWER: ***Philosophy and the Mirror of Nature***

[10] *Philosophy and the Mirror of Nature* was written by this author of *Contingency, Irony, and Solidarity*.

ANSWER: Richard (McKay) **Rorty**

[10] Rorty’s *Achieving Our Country* praises the national pride advocated by progressives such as this American pragmatist, who wrote *Democracy and Education*.

ANSWER: John **Dewey**

15. Motiejus Valančius, who himself created many of these things, financed their smuggling. For 10 points each:

[10] Identify these products, exemplified by one created by Daniel Klein, which were smuggled into Lithuania from Prussia *en masse* by *knygnešiai* in defiance of Russification policies.

ANSWER: **books** (in the Lithuanian language) [accept any specific kind of book like **grammars** or **dictionaries**]

[10] Lithuanian book smugglers defied the laws of this tsar who employed Nikolai Milutin and put down the January Uprising.

ANSWER: **Alexander II** [prompt on partial answer]

[10] Before the 19th-century language revival, it was common for Lithuanians to speak this country’s national language. This wasn’t odd, since Lithuania had formed a union with this country for centuries.

ANSWER: **Poland** [or **Polska**]

16. Nucleophiles described by this term preferentially add 1,2 to alpha, beta unsaturated carbonyls. For 10 points each:
[10] Give this term that also names a property equal to one half the difference of the ionization energy and electron affinity. It is used to describe, small, densely charged ions.

ANSWER: hard

[10] Pearson hard-soft acid base theory is not as useful as this other acid-base theory which defines acids as proton donors and bases as proton acceptors

ANSWER: Bronsted-Lowry

[10] According to HSAB, the hardest base is the anion of this element. It's 19 isotope is used for NMR and adding 3 atoms of it to acetic acid causes a sharp increase in acidity due to an inductive effect.

ANSWER: fluorine [or fluoride or F⁻]

17. Answer the following about the Great Basin, for 10 points each.

[10] Since the Great Basin is endorheic, none of its water drains into any sea. The waters of the Bear River, however, drain into this body of water in Utah, the namesake of the state's largest city.

ANSWER: Great Salt Lake

[10] Besides containing its own namesake desert, the Great Basin encompasses part of this desert, which straddles the borders of California, Nevada, and Arizona and contains Death Valley.

ANSWER: Mojave desert

[10] This Numic Native American group, divided into Owens Valley, Southern, and Northern branches - the latter of which Wovoka was from - is indigenous to the Great Basin.

ANSWER: Paiute [or Piute]

18. A devil named Pug appears in this author's play *The Devil is an Ass*. For 10 points each:

[10] Name this English playwright who also wrote *Volpone* and *The Alchemist*.

ANSWER: Ben Jonson

[10] Many of Ben Jonson's later works were written during this era of English culture, whose other prominent playwrights include John Fletcher and Thomas Middleton. It was followed by the Caroline era.

ANSWER: Jacobean era

[10] Thomas Middleton wrote this "city comedy" which centers on the house servant Moll Yellowhammer, who is betrothed to the heavily indebted knight Walter Whorehound.

ANSWER: *A Chaste Maid in Cheapside*

19. These structures are extremely important in modeling networks of actors and relationships. For 10 points each:

[10] Identify these mathematical structures, which consist of vertices and the edges that connect them.

ANSWER: graphs

[10] This term refers to a subgraph of a graph in which each vertex within the subgraph are adjacent to each other vertex. Finding the maximum size of one of these complete subgraphs is a common problem.

ANSWER: clique [if they answer complete subgraph before the bonus is read, prompt and read the whole thing]

[10] Claude Berge introduced this term to refer to graphs in which, for each induced subgraph, the chromatic number of that subgraph equals the size of the largest clique within that subgraph.

ANSWER: perfect graphs

20. James Madison is thought by some to have repressed the importance of this youngest delegate at the Constitutional Convention, who proposed a plan similar to the Virginia Plan. For 10 points each:

[10] Identify this governor of South Carolina who switched allegiance from the Federalists in the mid-1790s. His cousin of the same first and last name was twice nominated by the Federalists for President.

ANSWER: Charles Pinckney [prompt on Pinckney; accept Charles Cotesworth Pinckney]

[10] Pinckney provided information to this Sixth President when he was assembling a record of the Constitutional Convention.

ANSWER: John Quincy Adams [prompt on Adams]

[10] Another member of the Pinckney family, Thomas, negotiated a 1795 treaty resolving a dispute over the border between these two present-day states. Name both.

ANSWER: Florida AND Georgia [or Florida-Georgia Line from country fans]

21. The Colebrook equation is the most common method of calculating this quantity. For 10 points each:

[10] Name this constant of proportionality that is used to determine the head loss along a length of pipe. It is four times a similar quantity named for Fanning.

ANSWER: **Darcy** friction factor [accept **friction factor**]

[10] On a Moody diagram, the Darcy friction factor is plotted against this other dimensionless quantity.

ANSWER: **Reynolds** number [accept **Re**]

[10] The Reynolds number can be calculated as the ratio of velocity times length to this quantity. This quantity, which is the material's resistance to flow, is time-dependent in thixotropic materials.

ANSWER: **viscosity**

22. During services, members of the clergy sit in this area. For 10 points each:

[10] Identify this part of a church. It shares its name with the ensemble of singers that sing liturgies and hymns during services.

ANSWER: church **choir**

[10] The choir separates the sanctuary from this other area, which is the main body of the church where the congregation sits.

ANSWER: **nave**

[10] In Eastern Orthodox churches, this wall covered in religious imagery separates the nave from the sanctuary. It contains two sets of Deacon's Doors and a Royal Door.

ANSWER: **iconostasis**

23. This man was a cup-bearer, but to the King of Persia, not Kish. For 10 points each:

[10] Identify this biblical man who took measures to divorce Jewish men from non-Jewish wives while working to restore the Jewish community in Jerusalem.

ANSWER: **Nehemiah**

[10] The book named for Nehemiah is often paired with the book named for this scribe, who led the Jews out of exile in Babylon. Many scholars credit him with the compilation of the Torah.

ANSWER: **Ezra** [or **Esdras**]

[10] Sanballat the Horonite, a major opponent of Nehemiah, was a leader of this religious sect. In another biblical story, a man of this sect does what a priest and a Levite chose not to.

ANSWER: **Samaritans**

24. This writer analyzed the poetry of Wallace Stevens in *On Extended Wings*. For 10 points each:

[10] Name this literary critic, who also wrote a vitriolic review of a fellow poet's anthology of twentieth-century American poetry.

ANSWER: Helen **Vendler**

[10] In her book *The Given and the Made*, Vendler analyzed several of this poet's *Dream Songs*. This Confessional poet also wrote an "Homage to Mistress Bradstreet."

ANSWER: John **Berryman**

[10] Vendler wrote an article in the New York Times about this other Confessional poet "playing Pygmalion to her own Galatea." This poet's collection *Ariel* was published two years after her suicide in 1963.

ANSWER: Sylvia **Plath**