2020 Reinstein Set – Packet 6

Tossups

1. An attempt to discredit this rule, but which instead led to the idea of quantum entanglement, was the Einstein-Podolsky-Rosen paradox. This rule applies when the canonical commutation relation is not zero. A thought experiment designed to support this rule involved a microscope that used a photon to observe an electron. This rule applies to conjugate quantities such as energy and time, or different components of angular momentum. Name this rule which states that the product of the errors in the measurements of position and momentum must be at least a certain constant.

Answer: Heisenberg **uncertainty** principle [accept **indeterminacy** principle; prompt on **Heisenberg**]

2. This character eventually agrees to go to a hovel [HUV-ul] during a storm after saying "I am a man more sinned against than sinning." When a woman says "Nothing, my lord" to this character, he replies "Nothing can come of nothing. Speak again." That woman later marries the king of France. This character is praised by the wives of the Duke of Albany and the Duke of Cornwall, who are each given a half of his inheritance after initially being given a third of it. Name this king of Britain in a William Shakespeare tragedy whose daughters are Goneril [GAH-nuh-ril], Regan, and Cordelia.

Answer: King **Lear**

3. Some organisms that feed on this compound use the ribulose ["RYE"-byoo-lohss] mono·phosphate cycle for formaldehyde assimilation. Those organisms often grow in rice paddies, where large amounts of this compound are produced naturally by the waterlogged soil. Bacteria in the guts of certain animals, including termites, produce this compound. Much of this compound exists inside a lattice of water molecules in clathrates [KLATH-"rates"] beneath sea beds and in permafrost. This compound, which is over 20 times more potent than carbon dioxide as a greenhouse gas, is the primary component of natural gas. Name this compound whose chemical formula is CH_4.

Answer: **methane** [accept **CH_4** before the end]

4. In a short novel written in this country, a woman focuses on cooking after her grandmother dies and she moves in with a friend and his mother. That mother, named Eriko [eh-ree-koh], is a transgender woman in this country. In another novel from this country, one of the characters decides to sell his family's land to a person from Korea nicknamed "the Emperor". That character, who is dealing with the suicide of a friend and the institutionalization of his son, moves to a forest in this country. Those two works of fiction from this country are *Kitchen* and *The Silent Cry*. Name this country that is the home of Banana Yoshimoto and Kenzaburo Oe [oh-eh].

Answer: **Japan** [or **Nippon** or **Nihon**]

5. This composer showed his support for Shriners with the song "Nobles of the Mystic Shrine". His general support of Freemasonry can be seen by his dedication of "The Thunderer" to a Knights Templar commander and his naming of another piece "The Crusader". In support of an essay contest, this composer wrote a piece called "The Washington Post". The last four U.S. presidential inaugurations have featured this composer's "The Liberty Bell". One of his compositions has a piccolo obbligato [ohb-lee-GAH-toh] that represents the southern part of the United States. Name this composer whose piece "The Stars and Stripes Forever" is the official national march of the United States.

Answer: John Philip **Sousa**

6. This person led a group that ambushed Thomas Van Horne at the Battle of Brownstown. This person then worked with Isaac Brock to get William Hull to surrender Detroit. While this person was traveling in order to build a bigger alliance in 1811, his brother got into a costly battle against the U.S. that ended with their village being burned down. This person and his war chief, Roundhead, were killed at the same battle as each other. This leader of the Shawnee was the brother of Tenskwatawa [ten-skwah-TAH-wuh]. Name this leader who died fighting William Henry Harrison at the Battle of the Thames [temz] two years after his brother's loss at Tippecanoe.

Answer: **Tecumseh**

7. Before engaging in a sword fight, this character says "Wait while I choose my rhymes." This person then defeats Vicomte de Valvert [vee-kamt de val-vair] in a duel that takes place shortly after this person forces the cancellation of a performance of *Clorise* [klaw-reess] because he does not allow Montfleury [mawn-floo-ree] to act. This person gets upset because many people, including Christian, are in love with the same woman as him. Because he is afraid to declare his love, this person helps Christian write love letters to Roxane. Name this character in an Edmond Rostand play who is self-conscious about his very large nose.
Answer: **Cyrano** de Bergerac [prompt on **Bergerac**]

8. Lesions in this organ can cause Klüver-Bucy [KLOO-vur BOO-see] syndrome, which leads to inappropriate eating. The build-up of tau proteins in this organ leads to Pick's disease. One part of this organ contains the dentate gyrus [DENT-"ate" JY-russ] and is part of the limbic [LIM-bik] system. That part of this organ, whose name reflects the fact that it is shaped like a seahorse, is the hippocampus. The thalamus [THAL-uh-muss] and hypothalamus are in this organ. Portions of this organ are called the grey matter and white matter. Name this organ that contains the cerebellum [sair-uh-BELL-um] and cerebrum [suh-REE-brum] and is in the head.
Answer: **brain**

9. During this book of the Bible, a person claims God told him "I will give this land to your descendants as their possession forever." Also in this book of the Bible, a person states he had a dream in which "the sun, the moon, and eleven stars were bowing down to me." Those people, who die at the end of this book, are Jacob and Joseph. Earlier in this book, God saves Lot after some pleading by Lot's uncle, Abraham. Even earlier in this book of the Bible, Cain kills Abel. Name this book in which the fruit of the tree of knowledge of good and evil is eaten by Adam and Eve in the Garden of Eden.
Answer: **Genesis** [or **Bereishit**]

10. A poem by this writer begins "Low-anchored cloud, Newfoundland [NOO-fund-lund] air." Another poem by this writer ends "But he goes unappeased who is on kindness bent." Those poems, "Mist" and "Friendship", are in this writer's *Poems of Nature.* In a book, this writer imagines a conversation with a poet who is believed to be William Ellery Channing. That conversation occurs in "Brute Neighbors", a section of this writer's book that also describes a war between red ants and black ants. In that book, this person states "I went to the woods because I wished to live deliberately." This author named that book after the pond he lived near. Name this transcendentalist who wrote *Walden.*

Answer: Henry David **Thoreau**

11. It is believed that this leader died just before the Šuppiluliumas [soop-uh-loo-lee-OO-muhz] attacked the Mitanni [mih-TAN-ee], so his army did not protect Tushratta [tush-RAH-tah], whom this leader and his father often corresponded with. This leader had six daughters by his primary wife, and he had many consorts, at least one of whom had a son who succeeded him. This leader's son moved the capital to Memphis a few decades after this leader moved it to what is now Amarna. This leader was the father of Tutankhamun [too-tahnk-HAH-mun] and husband of Nefertiti [neff-ur-TEE-tee]. Name this pharaoh who temporarily moved Egypt towards monotheism through his worship of Aten [AH-tun].

Answer: **Akhenaten** or **Amenhotep IV** [prompt on **Amenhotep**]

12. An expansion of this place took land from Joint Base Myer-Henderson Hall and extended this place to a monument consisting of three curved spires. In this place there is a monument consisting of a white pyramid on a rock base. The Netherlands Carillon [KAR-ul-lon] is between this place and a monument depicting the U.S. flag being planted at Iwo Jima [EE-woh JEE-muh]. This place is on land that was taken from Robert E. Lee's wife. South Washington Boulevard is between this place and the Pentagon. Presidents Taft and Kennedy are buried here. Name this location near Washington, D.C. that includes the Tomb of the Unknown Soldier.

Answer: **Arlington** National **Cemetery**

13.   Dyes that are this type of substance work well for wool, silk, and nylon, but they do not work well for cotton. Organic compounds with a carboxyl [kahr-BOK-sil] group are all this type of compound, which is explicit in their names. Rechargeable batteries commonly use lead [led] at the terminals and this type of substance as the electrolyte. These substances make bromo·thymol [BROH-moh-THY-mawl] blue and phenol red both look yellow. According to Brønsted and Lowry, these substances donate hydrogen ions to a solution. These substances have a pH ["P-H"] less than 7. Name these molecules that can be neutralized by bases.

Answer: **acid**s [or **acid**ic substances]

14.   After Eliel Saarinen [EL-ee-el SAR-uh-nun] designed the Des Moines Art Center, this architect designed an addition to it, though he denied that the windows spell his name. This architect also designed a glass and metal figure in the Cour Napoléon [koor nah-poh-lee-aw] that is surrounded by three smaller figures. This architect used glass triangular shapes to design what used to be the tallest building in Asia, the Bank of China Tower in Hong Kong. He followed that project with the design for Cleveland's Rock and Roll Hall of Fame. Name this Chinese-American architect who designed the glass pyramid used as the entrance to the Louvre [loov].

Answer: I(eoh) M(ing) **Pei**

15.   One method to calculate this property is called expansion by minors and uses cofactors. A common shortcut for evaluating a triple product is to make the calculation equivalent to calculating this property. The value of this quantity is 0 when it comes from a structure that is not invertible. This quantity is negative when transformations of points or axes involve a reflection. Ratios of these quantities are used in Cramer's rule to find the solution to a system of equations. Name this quantity found from a square matrix that, when the matrix measures 2-by-2, can be calculated using the formula "a d minus b c".

Answer: **determinant** (of a matrix)

16.   This politician said "In the name of the greatest people that have ever trod this earth, I draw the line in the dust and toss the gauntlet before the feet of tyranny." Because his state's constitution prevented governors from holding office for consecutive terms, this person was succeeded by his wife Lurleen after his first term. When Arthur Bremer was unable to assassinate Richard Nixon, he shot this person instead, leaving him paralyzed. This person carried five states running for the American Independent Party in the 1968 Election. Name this governor of Alabama who supported "segregation now, segregation tomorrow, segregation forever".
Answer: George C(orley) **Wallace** (Jr.)

17.   Canonical [kuh-NAH-nuh-kul] coordinates most often use components of this quantity and Cartesian [kar-TEE-zhun] coordinates. For a photon, this quantity can be calculated as Planck's constant over wavelength, or as energy divided by the speed of light. The net force on an object equals the rate of change of this quantity. This quantity is conserved, which is useful when determining the outcome of both elastic and inelastic collisions. The change of this quantity equals the integral of force with respect to time, which is impulse. Name this quantity equal to mass times velocity.
Answer: linear **momentum** [do not accept or prompt on "angular momentum"]

18.   The majority decision in this Supreme Court case states "The government of the United States has been emphatically termed a government of laws, and not of men." Seven years after this case, the principle it established was expanded in *Fletcher v. Peck*. If this case had resulted in a writ of mandamus [man-DAY-mus], there is a good chance that the U.S. Secretary of State—who was the defendant in this case—would have ignored it. This case settled the issue of the "Midnight Judges" appointed by President John Adams. This decision invalidated Section 13 of the Judiciary Act of 1789. Name this 1803 case that established the principle of judicial review.
Answer: ***Marbury** v. **Madison*** [accept either underlined name]

19. Early seasons of this TV show feature Leslie Winkle, who got upset when the main character signed up for the Buckman 204 mainframe. One character in this show lives with his mom, whose face is never shown and who is often heard yelling at him. That character goes to the International Space Station and in later seasons marries Bernadette Rostenkowski, a microbiologist. The main character in this show is very protective of his spot on the couch, and in the last episode he and his wife Amy share the Nobel Prize in Physics. Name this TV series set at Caltech, on which Jim Parsons played Sheldon Cooper.

Answer: *The **Big Bang Theory***

20. After this person contracted syphilis, he chose not to go on expeditions led by Diego de Nicuesa [nee-KWAY-suh] and Alonso de Ojeda [oh-HAY-dah]. A few years later, this person helped Diego Velázquez de Cuellar [kway-yar] conquer Cuba. Shortly after this person left Cuba, he destroyed his ships so that his followers could not desert him. This person was supported by the Totonac people when he founded Veracruz in 1519. This person left Pedro de Alvarado in charge of his primary conquest, leading to the Massacre in the Great Temple. Name this leader who killed Montezuma in Tenochtitlán [tay-nohch-teet-LAHN] when he conquered the Aztec Empire.

Answer: Hernan(do) **Cortés**

21. Applying this function and then adding 1 only gives a perfect square if the input is 4, 5, or 7, according to the best-known solution of Brocard's problem. This function is used in the denominators of coefficients in a Taylor series. If this function is applied to n and n minus 1, the ratio of the results is n. This function is used to give simple definitions of the permutation and combination operations. This function is used to determine the number of ways to line up a given number of different items. Name this function calculated by taking the product of all positive integers less than or equal to the input, and which is represented by an exclamation point.

Answer: (n) **factorial** function

1. Wash Williams, the subject of the story "Respectability", is a telegraph operator in this town, where Kate Swift is a teacher.

A. Name this town that George Willard leaves in the story "Departure".

Answer: **Winesburg**, Ohio

B. This author wrote the short story cycle *Winesburg, Ohio.*

Answer: Sherwood **Anderson**

C. *Winesburg, Ohio* starts with "The Book of the Grotesque", in which a writer is helped by—and shares cigars with—a member of this profession.

Answer: **carpenter** or **carpentry**

2. It's relatively convenient to write the equation of a cardioid ["CARD"-ee-oyd] in this coordinate system.

A. Name this coordinate system in which each point is specified using the distance from the origin and the angle with the positive half of the x-axis.

Answer: **polar** coordinate system or **polar** coordinates

B. In polar coordinates, graphing the equation "r squared equals the cosine of 2 theta" produces this shape.

Answer: **lemniscate** [LEM-nuh-"skate"] of Bernoulli [prompt on **figure '8'**]

C. Find the area enclosed in the graph of the polar equation "r equals 5".

Answer: **25 pi** [do not prompt on partial answers]

3. This character's first name is "Alonso" at first, but it changes.

A. Name this character who calls himself a knight and attacks windmills.

Answer: Don **Quixote** (de La Mancha)

B. Don Quixote gives this name to Aldonza Lorenzo, saying that she is the perfect woman and is from El Toboso [toh-BOH-soh].

Answer: **Dulcinea** [dool-see-NAY-ah]

C. This is the profession of Nicholas, who helps the curate destroy Don Quixote's library and bring Don Quixote back home.

Answer: **barber**

4. These organic compounds are characterized by a hydroxyl ["hide-ROCK-sill"] group attached to carbon from an alkyl [AL-kill] group.

A. Name this class of compounds whose two-carbon example is ethanol.

Answer: **alcohol**s

B. This is the common name for isopropyl ["ice"-oh-PROH-pill] alcohol based on its use as a cleaning fluid and disinfectant.

Answer: **rubbing** alcohol

C. Rubbing alcohol is oxidized to form this compound that has three carbon atoms, one of which is double-bonded to oxygen and single-bonded to the two other carbon atoms.

Answer: **acetone** [or **propanone**]

5. This adjective describes the smallest possible circle or sphere that encloses a given shape.

A. Name this term that describes a circle which often touches each vertex of a polygon.

Answer: **circumscribe**d circle or sphere [accept **circumscribing** circle or sphere]

B. If the area of a square is 16, find the area of the circle that circumscribes it.

Answer: **8 pi** [do not prompt on partial answers]

C. If the length of the main diagonal of a cube is 6, find the *surface area* of the sphere that circumscribes it.

Answer: **36 pi** [do not prompt on partial answers]

6. When this country was under French control, it was called Saint-Domingue [san doh-meeng]. Then it gained independence through a revolution led by former slaves.

A. Name this country on the island of Hispaniola in the Caribbean Sea.

Answer: (Republic of) **Haiti** [or (République d')**Haiti**]

B. This leader of the Haitian revolution was named Governor-General for Life in 1801, but was removed from office in 1802.

Answer: Toussaint **Louverture** [or Toussaint **Bréda**]

C. Shortly after the revolution, Haiti was split into two nations, with Alexandre Pétion [pet-yaw] ruling the south and this person ruling the north until he died by suicide in 1820. This person took on the name King Henry I.

Answer: Henri **Christophe** [awn-ree **kree-stawff**]

7. One character in this novel sees a picture of herself and Lydia in *Life* magazine.

A. Name this novel about the Smales [SMAY-ulz] family and their relationship with the title servant.

Answer: ***July's People***

B. *July's People* was written by this South African novelist who died in 2014. She also wrote about the businessman Mehring in *The Conservationist*.

Answer: Nadine **Gordimer**

C. In this other novel by Gordimer, Rosa has the title relationship with a deceased anti-Apartheid ["apart-aid"] activist. Rosa is arrested for aiding her childhood friend Baasie in a violent revolt.

Answer: ***The Burgher's Daughter***

8. Identify these mortals from Greek mythology:

A. This person killed Hector but was killed when Paris shot him in the heel.

Answer: **Achilles**

B. This person used a ball of thread to escape the Labyrinth after he killed the Minotaur [MIN-oh-tor].

Answer: **Theseus** [THEE-see-uss]

C. This person finished off the Calydonian [kal-uh-DOH-nee-un] Boar after Atalanta injured it.

Answer: **Meleager** [mel-ee-AY-gur]

9. Identify these thought experiments:

A. This animal, which is in a sealed box with a flask of poison, is seemingly both alive and dead until it is observed.

Answer: **Schrödinger**'s **cat** [prompt on partial answer]

B. This experiment is about two people who are the same age until one of them goes through space at a high speed, then returns.

Answer: **twin paradox**

C. In this experiment, a delicate string connects two moving objects that are affected by length contraction.

Answer: **Bell**'s **spaceship** paradox

10. One of the first uses of motion pictures was by Eadweard Muybridge [Edward MOY-bridge] to determine whether all four feet of this animal were off the ground at the same time when it ran.

A. Name this type of animal that is the defining characteristic of an equestrian statue.

Answer: **horse**(s)

B. Étienne [et-yen] Maurice Falconet [fal-koh-nay] used this material to make his equestrian statue of Peter the Great in the Senate Square in St. Petersburg.

Answer: **bronze** [prompt on **copper** or **metal**]

C. This American artist, who often portrayed cowboys and horses, made the sculpture *The Bronco Buster*.

Answer: Frederic (Sackrider) **Remington**

11. There have been several attempts to add a balanced budget amendment to the Constitution.

A. This author of the Declaration of Independence and third U.S. president said that if he could have one amendment, it would be for a balanced budget.

Answer: Thomas **Jefferson**

B. This senator wrote a Balanced Budget Amendment that passed the Senate in 1982 but failed in the House. This person ran for president in 1948 as the States' Rights Democratic Party candidate.

Answer: (James) Strom **Thurmond** (Sr.)

C. A balanced budget amendment was promised in this document written by Newt Gingrich and Dick Armey to promote Republicans during the 1994 Congressional elections.

Answer: **Contract with America**

12. This poem refers to "pebbles which the waves draw back, and fling" and which "begin, and cease, and then again begin."

A. Name this poem that ends by stating we are "where ignorant armies clash by night".

Answer: "**Dover Beach**"

B. This 19th-century English poet wrote "Dover Beach".

Answer: Matthew **Arnold**

C. What adjective is used before the word "plain" in the third-to-last line of "Dover Beach"? Thomas Hardy used this adjective to describe a thrush in the title of one of his poems.

Answer: **darkling**

13. For a pyramid, this distance is measured along the center of a face that is not the base.

A. Give the two-word name for this line segment. For a cone, it is the distance from a point on the base circle to the apex.

Answer: **slant height** [do not prompt on partial answers]

B. Find the slant height of a cone whose radius measures 3 units and whose height is 4 units.

Answer: **5** units

C. Find the total surface area for the same cone, with a radius of 3 units and a height of 4 units.

Answer: **24 pi** square units

14. This poem states "No more to say, and nothing to weep for but the Beings in the Dream."

A. Name this poem that begins "Strange now to think of you, gone without corsets and eyes, while I walk on the sunny pavement of Greenwich Village."

Answer: "**Kaddish** for Naomi Ginsberg (1894–1956)"

B. This poet wrote "Kaddish" shortly after writing "Howl".

Answer: (Irwin) Allen **Ginsberg**

C. In the second section of "Howl", Ginsberg often repeats this name for a character he refers to as the loveless and the heavy judger of men.

Answer: **Moloch**

15. For water, this value is 273.16 kelvins and 611.2 pascals.

A. Give this term for the combination of temperature and pressure at which a compound can exist as a solid, liquid, and gas in equilibrium.

Answer: **triple point**

B. On a phase diagram, the curve below and to the left of the triple point is named for this process, in which a substance changes from a solid to a gas.

Answer: **sublimation** (curve) [accept **sublimate** or **sublimating**]

C. This point on a phase diagram borders two liquid phases and a gas phase.

Answer: **lambda** point

16. Sigmund Freud wrote a book on *The Interpretation of* these phenomena.

A. Name these involuntary sensations that occur while people are sleeping.

Answer: **dream**s

B. Freud used dreams to study this class of psychological disorders that are distressing and painful. Freud viewed these disorders as manifestations of anxiety.

Answer: psycho**neuroses** or psycho**neurosis**

C. Freud analyzed this dream he had in which his friend Otto treated one of his patients.

Answer: **Irma's injection**

17. This person said our government was "made for the people, made by the people, and answerable to the people" in a reply to Robert Hayne in 1830.

A. Name this orator and lawyer who served as a Congressman from New Hampshire and Massachusetts and as secretary of state.

Answer: Daniel **Webster**

B. The second time that Webster became secretary of state, he helped pass this package of five bills that—among other things—admitted California as a free state.

Answer: **Compromise of 1850**

C. Webster formulated a test of whether preemptive self-defense is necessary. The test was named after this ship that was set on fire by the British and sent over Niagara Falls in late 1837.

Answer: *__Caroline__*

18. This equation takes into account the average rate of star formation in our galaxy and the fraction of those stars that have planets, among other factors.

A. Name this equation that is supposed to approximate the number of civilizations that Earth could communicate with.

Answer: **Drake** equation

B. One factor in the Drake equation is based on whether planets are in a habitable zone. Such zones are given this name, based on a fairy tale.

Answer: **Goldilocks** zone

C. Sara Seager has modified the Drake equation to include signature atmosphere gases. Shawn Domagal-Goldman considers this gas to be the signature gas of life, but Seager encourages a more varied approach.

Answer: **oxygen** [accept $\underline{\mathbf{O_2}}$]

19. Stan Getz primarily played the tenor type of this instrument.

A. Name this single-reed woodwind that is usually made from brass and is popular in jazz music.

Answer: (tenor) **sax**ophone(s)

B. This saxophonist formed a quartet with McCoy Tyner, Jimmy Garrison, and Elvin Jones. His albums include *A Love Supreme* and *Giant Steps.*

Answer: John (William) **Coltrane**

C. Stan Getz is best known for his recording of this song that is set in Brazil and was written by Brazilians.

Answer: "The **Girl from Ipanema** [ip-uh-NEE-muh]" [or "**Garota de Ipanema**"]

20. Cells were discovered by looking at this substance.

A. Name this substance that is taken from the outer bark of a type of oak tree and is often used to make stoppers for bottles. Give a one-word answer.

Answer: **cork**

B. Cork is a type of this layer of bark near the phloem ["FLOW-um"].

Answer: (cork) **cambium**

C. This adjective describes cambium that produces xylem [ZY-lum] towards the interior but not phloem ["FLOW-um"] to the exterior.

Answer: **unifacial** cambium