

## 2020 Reinstein Set – Packet 8

### Tossups

1. Hydroxides [“hide-ROCK-sides”] of this element are commonly used to make soft soap. The transport of ions of this element in the body is hindered when apamin [AP-uh-min] from bee stings binds to calcium-activated channels, which is why bee stings are toxic. The English name of this element comes from the fact that it is derived from a mineral created by soaking the ashes of a plant. The nitrate of this element is used in gunpowder. Comparisons of the abundance of an isotope of this element to an isotope of argon are often used to date rocks. Name this alkali metal that in German is called “kalium” and which has the chemical symbol “K”.

Answer: **potassium** [accept **K** before the end]

2. In this novel, the Postmaster goes into a long and mistaken description of Captain Kopeikin [koh-PAY-kin], who lost an arm and a leg during a battle. One character in this novel gets mad at the skewbald horse because it makes a show of pulling while the two other horses do all the work. That character in this novel, who gets drunk and gets lost before eventually finding Madame Korobotchka [kor-oh-BOHCH-kuh], is Selifan [SEH-lee-fan]. In the first part of this novel, the protagonist makes a deal with Manilov [MAN-ih-lawff]. This novel is about a character’s scheme to get a huge loan after buying up the rights to former serfs. Name this Russian novel about Chichikov [CHICH-ee-kof], written by Nikolai Gogol.

Answer: ***Dead Souls*** [or ***Myortvye dooshi***]

3. Tinkers used to carry around lightweight versions of these objects that could be wedged into the ground. These objects typically have hardie holes that are square and pritchel holes near the corner that are small and round. The flat face on top of these objects typically has rounded edges. Farriers use versions of these objects with most of the mass in the horn. These objects must be both heavy and fastened to a sturdy base to be used properly. Giuseppe Verdi’s opera *Il trovatore* [“eel trove”-ah-TOH-ray] has a chorus sung by gypsies that is named for these objects. Name this iron block on top of which metal is placed to be hammered.

Answer: **anvils**

4. This compound is the neutral compound with the strongest bond, and it has a triple bond in which one of the three parts is a coordinate covalent bond. The production of **tropospheric** [“trophe-oh-sphere”-ik] ozone often begins with the oxidation of this compound by a **hydroxyl** [“hide-ROCK-sill”] radical, which creates a **hydrocarboxyl** [“hide-row-car-BOX-ill”] radical. In the water-gas shift reaction, this compound combines with water vapor to form carbon dioxide and hydrogen. People exposed to this compound should breathe 100% oxygen to recover. Name this compound formed by incomplete combustion, which is very toxic because it has a greater affinity for hemoglobin than oxygen does.

Answer: **carbon monoxide** or **CO**

5. One theory of these entities is called the Gentzen-type based on Gentzen’s development of sequent calculus and his use of the consistency types of these entities. Some of these entities are classified as being “by exhaustion”, including many computer-assisted examples such as the one by Kenneth Appel and Wolfgang Haken on the four color theorem. When these entities use a basis step and an inductive step they are classified as being “by induction”. The abbreviation “Q.E.D.” is sometimes written at the end of these entities. Name these rigorous mathematical arguments that geometry students often write in two columns.

Answer: mathematical **proofs**

6. This country established an alliance with the United Kingdom through the Burney Treaty and liberalized trade through the Bowring Treaty. In the late 19th and early 20th centuries, Prince Damrong **Rajanubhab** [RAH-juh-noo-bahb] developed this country’s *monthon* [mahn-tahn] system of administration. That prince was the half-brother of King **Chulalongkorn** [choo-LAH-long-korn] and son of King **Mongkut** [MAHNG-koot] of this country’s House of Chakri. Though this country sometimes lost territory to European powers, it was never colonized. Name this country ruled by several kings who were called **Rama** [RAH-muh] and which was historically called Siam.

Answer: (Kingdom of) **Thailand** or (Ratcha-anachak) **Thai** [accept **Siam** before the end]

7. In this novel, a woman takes a letter from under a bust of Beethoven and hands it to the protagonist, who asks whether the man writing the letters knows both women read them. Shortly after that, the protagonist buys bonbons for her sons in Iberville. Those letters, which are shared by Mademoiselle Reisz [reess], tell this novel's protagonist that Robert Lebrun will soon be in town. The protagonist in this novel is married to Léonce [lay-awnss], and they live in New Orleans and vacation on Grand Isle. Name this short novel about Edna Pontellier [pawn-tell-yay] written by Kate Chopin.

Answer: *The **Awakening***

8. Under this monarch, a policy was enacted by which federal officeholders paid one-sixtieth of their salary to the crown in return for being able to name their successors. Shortly before this king was murdered, he sponsored expeditions by Samuel de Champlain that led to the creation of Quebec City. This person was the first Bourbon king of France. Just after this person married Margaret of Valois [val-wah], the St. Bartholomew's Day Massacre occurred. This king gave substantial rights to Huguenots [HYOO-guh-nahts] by issuing the Edict of Nantes [nahnt]. Name this king who might have said "Paris is well worth a mass" when he converted to Catholicism.

Answer: **Henry IV** (Bourbon of France) [or **Henry of Navarre** or **Henry III of Navarre** or **Henry of Bourbon** or **Henri de Navarre** or **Henry de Bourbon**; prompt on **Henry**]

9. A 10-minute symphonic poem by this composer begins with four sharps in the key signature and ends with five flats, but never really settles into a key. That work is based on a poem by Stéphane Mallarmé [steh-fahn mah-lar-may]. A four-part piano suite by this composer, inspired by the poetry of Paul Verlaine, has a famous third part that is often performed separately. This composer of *Suite bergamasque* also wrote a set of three symphonic sketches for orchestra, the second of which is "Play of the Waves". Name this French composer of *Prelude to the Afternoon of a Faun*, *La mer*, and "Clair de lune".

Answer: (Achille-)Claude **Debussy**

10. This character says of the word “peace” that “I hate the word, as I hate hell.” This character is called “good king of cats” after he asks, “What wouldst thou have with me?”. At a feast, this character states “It fits, when such a villain is a guest: I’ll not endure him.” He says those words shortly after saying “Fetch me my rapier [RAY-pee-ur], boy.” Shortly after this character kills another character and flees, he returns to the scene and states “Thou, wretched boy, that didst consort him here, shalt with him hence”, leading to this character’s death. Name this nephew of Lady Capulet who kills Mercutio [mair-KYOO-shee-oh] and is killed by Romeo in William Shakespeare’s *Romeo and Juliet*.

Answer: **Tybalt** [TIB-ult]

11. This type of incident is very similar to, but more severe than, a transient ischemic [is-KEE-mik] attack. About 90% of these medical incidents are silent, meaning that the patient is unaware it happened but has lesions that appear on an MRI. This type of incident is more likely for people who have migraines with auras and women who take estrogen hormone replacement therapy. This type of incident is generally rare in children, though 10% of children with sickle-cell anemia suffer one. This type of incident is often due to problems in the carotid [kuh-“ROT”-id] arteries. These incidents can cause facial droop, speech difficulties, and death. Name this type of medical incident caused by poor blood flow to the brain.

Answer: **stroke(s)** [or **apoplexy** or **cerebral hemorrhage(s)** or **cerebral vascular accident(s)** or **cerebral infarction(s)**]; prompt on partial answers]

12. Near the end of this person’s presidency, Assistant U.S. Attorney General Jess Smith died, sparking a debate as to whether it was a suicide or murder. Smith was a member of the Ohio Gang, many of whom belonged to this president’s cabinet. This person’s cabinet, many of whom stayed on for his successor, also included Andrew Mellon and Herbert Hoover. Thomas Walsh investigated other members of this president’s cabinet, including Harry Daugherty and Albert Fall, the latter of whom accepted bribes from oil companies. Name this president who died in office in 1923 and whose presidency was marred by the Teapot Dome scandal.

Answer: Warren G(amaliel) **Harding**

13. A crime novel set mostly in this city eventually moves to Staten Island, where Arkady Renko releases some animals belonging to John Osborne. That novel is by Martin Cruz Smith. Another novel involves this city's literary community, which has a trade union called MASSOLIT. That novel, which alternates between this city and ancient Jerusalem, features this city's fictional writers Berlioz and **Ponyrev** [POHN-yuh-reff]. In another novel, this city is abandoned and burned soon after Anatole Kuragin and Andrei Bolkonsky are injured. Name this city that is the setting of *Gorky Park*, *The Master and Margarita*, and *War and Peace*.

Answer: **Moscow**, Russia [or **Moskva** or **Moscow**, Soviet Union or **Moscow**, USSR]

14. A woman born into this wealthy family started the Whitney Museum of American Art in New York. The family member most responsible for this family's wealth worked for Thomas Gibbons and convinced Gibbons to sue Aaron Ogden. That person built this family's fortune through shipping and by owning the New York Central Railroad. This family owned The Breakers in Rhode Island and Biltmore House in North Carolina. One member of this family made designer blue jeans and was Anderson Cooper's mother. Name this family whose patriarch was nicknamed "The Commodore", which explains the team name of the university named after him in Tennessee.

Answer: **Vanderbilt** family or the **Vanderbilts**

15. This country's **Pueblo Viejo** [PWEB-loh vee-AY-hoh] is one of the most productive gold mines in the world. Next to this country's town of Neyba is the very salty Lake **Enriquillo** [en-ree-KEE-yoh]. This country's capital used to be **Santiago de los Caballeros** [sahn-tee-AH-goh day lohss kah-by-YAIR-ohss]. Its current capital has a Colonial Zone that includes the Ozama Fortress built in 1502 and the Basilica Cathedral of Santa María la Menor, started in 1512. Many baseball players have come from this country's city of San Pedro de Macorís. This country is about 100 miles west of Puerto Rico. Name this country whose capital is Santo Domingo and that shares Hispaniola with Haiti.

Answer: **Dominican Republic** [or **República Dominicana**]

16. The quantity of these molecules is measured using **luciferase** [“Lucifer-ace”] and **luminometers** [loo-muh-NAH-muh-turz], which is done to determine whether surfaces are hygienic. 22 of these molecules are created by breaking up a **ketone** [“key-tone”] body. This molecule is used during primary active transport. The use of **hexokinase** [“hex”-oh-KY-nayss] breaks this molecule up at the beginning of **glycolysis** [gly-KAH-luh-siss], and the use of **pyruvate kinase** [“pie”-ROO-vayt KY-nayss] yields pyruvate and this molecule at the end of **glycolysis** [gly-KAH-luh-siss]. The electron transport chain forms a proton gradient that drives production of this molecule. Name this energy-carrying molecule used in all living cells that is produced in **mitochondria** [“my-toe-CON”-dree-uh].

Answer: **ATP** [or **adenosine triphosphate**]

17. A painting by this artist shows a woman helping to support a large basket that is held to a man’s back with a large yellow sash. This artist painted that man wearing white and on his hands and knees with a basket full of pink flowers. Another work by this artist contained panels titled *The Frontier of Ethical Evolution* and *The Frontier of Material Development*, and it later became *Man, Controller of the Universe*. That original work was destroyed when this artist refused to remove a portrait of Lenin. Name this creator of *Man at the Crossroads* who often portrayed Mexican history and was married to Frida Kahlo.

Answer: Diego **Rivera**

18. This god was worshiped in the songs and stories of **Narada** [NAH-rah-dah]. The joys of worshiping this god are described by **Prahlada** [PRAH-lah-dah] in the **Bhagavata Purana** [bah-gah-VAH-tah pur-AH-nah]. This god decapitated Makara the Crocodile when it was attacking **Gajendra** [guh-JEN-druh] the elephant, who lifted a lotus to get this god’s attention. In Hindu mythology, this god rides the eagle **Garuda** [gah-ROO-dah]. When Hindu grooms walk around their brides, they invoke the name of this god because of his exemplary marriage to Lakshmi. Rama and Krishna were avatars of this god. Name this “preserver” god who is in the Trimurti with Brahma and Shiva.

Answer: **Vishnu**

**19.** Radiant intensity is measured in units of this quantity over a solid angle. Irradiance is measured in units of this quantity over area. Radiant flux is measured in the same units as this quantity. In uniform circular motion, this quantity is the dot product of torque and angular velocity. In an electric circuit, this quantity is the product of current and electric potential difference. For linear motion, this quantity equals the dot product of force and velocity. Name this quantity, equal to work per unit time, that can be measured in watts.

Answer: **power** [prompt on **wattage** or **watts** before the end]

**20.** This explorer was the first person to lead a team that crossed the Antarctic Circle. Tobias **Furneaux** [fur-noh], who worked for this explorer, took a person named **Omai** ["OH-my"] from Tahiti to England, and this person brought Omai back on board the HMS *Resolution*. This person's first trip to Tahiti was to observe a transit of Venus in 1769. This explorer was killed while trying to retrieve a small boat from natives by kidnapping the king of Hawaii. Name this explorer who made the first recorded circumnavigation of New Zealand and who mapped the eastern coastline of Australia.

Answer: James **Cook**

**21.** The margin of error for a sample mean is calculated by multiplying the  $z$ -factor times the standard deviation and dividing by this function of the sample size. In the Lindeberg-Lévy statement of the central limit theorem, this function is applied to the sample size before multiplying by the difference of the sample average and expected value. The geometric mean of two numbers is found by applying this operation to the product of the numbers. This function is applied to variance to calculate the standard deviation. A graph of this function is the upper half of a parabola that opens to the right. Name this function equivalent to raising to the one-half power.

Answer: square **root** [prompt on **radical**; accept raising **to the 1/2 power** or **raising to the 1/2 power** before the end]

## 2020 Reinstein Set – Packet 8

### Bonuses

1. In this novel, one side of a ping-pong table has a calculator and a device for pitting cherries.

A. Name this novel in which Alfred's children notice his increasing Parkinson's disease and dementia when they return to St. Jude one year for Christmas.

Answer: *The Corrections*

B. This author of *The Corrections* got into a feud with Oprah Winfrey.

Answer: Jonathan **Franzen**

C. Jonathan Franzen wrote the essay "Mr. Difficult" about this author, particularly his novel *The Recognitions*.

Answer: William **Gaddis**

2. Females have one of these in most of their cells, while most males have none.

A. Name these deactivated X chromosomes.

Answer: **Barr body**/ies

B. This RNA gene plays a major role in deactivating Barr bodies once this gene is spliced by coating the X chromosome.

Answer: **Xist** or **X-inactive specific transcript**

C. Xist is this type of RNA gene that is not translated into proteins. Both tRNA and rRNA fit into this category.

Answer: **non-coding** RNA or **ncRNA**

3. This musical was inspired by a biography written by Ron Chernow [CHUR-"now"].

A. Name this Lin-Manuel Miranda musical featuring songs such as "The Room Where It Happens" and "The Reynolds Pamphlet".

Answer: ***Hamilton***

B. After "The Reynolds Pamphlet", Hamilton's wife Eliza sings this song while destroying letters written between them.

Answer: "**Burn**"

C. At the beginning of "The Room Where It Happens", Aaron Burr talks about the renaming of Clermont Street in honor of this general, saying that his legacy is secure.

Answer: General Hugh **Mercer**



4. This novel begins at the Central London Hatchery and Conditioning Center.  
A. Name this novel in which Bokanovsky's [boe-kuh-NAWV-skee'z] Process is used to clone fertilized eggs to create more people.

Answer: ***Brave New World***

B. This author wrote *Brave New World*.

Answer: Aldous **Huxley**

C. This is the lowest caste in *Brave New World*. These people wear black and are sometimes called "semi-morons".

Answer: **epsilons**

5. This shape is the set of all points in a plane that are the same distance from a fixed point and a fixed line.

A. Name this shape generated by the equation " $y$  equals  $x$  squared".

Answer: **parabola(s)** [or **parabolic** curve]

B. Find the  $x$ -coordinate of the vertex of the parabola generated by the equation " $y$  equals  $x$  squared plus  $8x$  plus  $3$ ".

Answer: **-4** [accept (**-4**, -13); do not accept or prompt on "4"]

C. Find the  $y$ -coordinate of the focus of the parabola generated by the equation " $y$  equals  $x$  squared".

Answer: **1/4** [or **0.25**; accept (**0**, 1/4) or (**0**, 0.25)]

6. This phenomenon explains why lunar orbital periods can often be expressed as ratios of small whole numbers.

A. Name this regular influence of one body on another that causes orbits to be more stable.

Answer: orbital **resonance**

B. **Dione** ["die"-OH-nee], a moon of Saturn, is in a 1-to-2 resonance with this coldest moon of Saturn. It has a very high **albedo** [al-BEE-doh].

Answer: **Enceladus** [en-SELL-uh-duss]

C. An orbital resonance in the ratio 4 to 2 to 1 is named for this person.

Answer: Pierre-Simon **Laplace** [luh-plahss] [accept **Laplace** resonance; prompt on **Laplacian** resonance]

7. The protagonist of this play asks “Why you got the white mens driving and the colored lifting?”.

A. Name this play about the first African-American truck driver in Pittsburgh, whose name is Troy Maxson.

Answer: **Fences**

B. In *Fences*, what type of instrument does Troy Maxson’s brother play?

Answer: **trumpet** [prompt on **horn**]

C. Name the playwright of *Fences*. It is one of his ten plays in a cycle set in Pittsburgh during each decade of the 20th century.

Answer: August **Wilson** [or Frederick August **Kittel Jr.**]

8. At the federal level, this value was first established by the 1938 Fair Labor Standards Act, which set it at 25 cents.

A. Name this value that was increased at the federal level to \$7.25 in 2009, though it is higher in many places.

Answer: **minimum** (hourly) **wage** (rate)

B. All of the major Democratic 2020 presidential candidates supported raising the minimum wage to this value. The Raise the Wage Act would increase it to this value by 2025.

Answer: **\$15** per hour

C. A recent major minimum-wage study compared this state with the federal minimum wage to a neighboring state with a higher minimum wage. This state’s governor, Tom Wolf, wants to raise the minimum wage.

Answer: **Pennsylvania**

9. Answer the following about the beginning of Barack Obama’s presidency:

A. As part of the stimulus, each person on this program received an extra 250 dollars. This program is formally called Old-Age, Survivors, and Disability Insurance, and it gives people retirement benefits.

Answer: **Social Security**

B. This person served as President Obama’s first chief of staff. He later became the mayor of Chicago.

Answer: Rahm (Israel) **Emanuel**

C. President Obama signed an executive order stating that this detention facility on the island of Cuba should be shut down, but it was never shut down.

Answer: **Guantanamo** Bay Detention Camp [accept **GITMO**]

10. This person wrote four postulates about how microorganisms cause disease.

A. Name this German microbiologist who determined the cause of tuberculosis and anthrax.

Answer: Robert **Koch** [“coke”]

B. Koch also found the cause of this bacterial disease that only affects humans and is caused by unsafe drinking water or undercooked seafood.

Answer: **cholera** [KAH-luh-ruh]

C. When Koch beat out Louis Pasteur at finding the cause of cholera, Pasteur turned his attention to this disease, developing a series of vaccines that saved nine-year-old Joseph **Meister** [MY-stur].

Answer: **rabies**

11. Monte Carlo methods use this concept to simulate complicated processes.

A. Name this concept in which numbers are unpredictable rather than forming patterns.

Answer: **randomness** [or **random** numbers; accept **stochasticness** or pseudor**andomness**]

B. A popular pseudo-random number generator is called the “twister” named after these prime numbers.

Answer: **Mersenne** primes [accept **Mersenne** twister]

C. Find the third Mersenne prime. In other words, find the third-smallest prime number that is 1 less than a power of 2.

Answer: **31**

12. This element is the defining characteristic of several materials called “lime”.

A. Name this alkaline earth metal that is important in bone formation.

Answer: **calcium** [accept **Ca**]

B. Calcium sulfate di-hydrate is this mineral. It defines 2 on the Mohs hardness scale.

Answer: **gypsum**

C. This ion is also important in bones. It and calcium are in milk and the mineral **apatite** [“appetite”].

Answer: **phosphate**

13. The protagonist of this novella has written an “epic prose poem about the life of Frederick the Great”.

A. Name this novella in which Gustav von **Aschenbach** [AH-shen-bahk] becomes fascinated with Tadzio.

Answer: ***Death in Venice*** [or *Der Tod in Venedig*]

B. This German author wrote *Death in Venice* as well as *The Magic Mountain*.

Answer: (Paul) **Thomas Mann** [toh-mahss mahn]

C. In *The Magic Mountain*, Hans Castorp leaves Hamburg to visit his cousin in this city.

Answer: **Davos**(-Platz, Grisons, Switzerland)

14. Name these Nobel Peace Prize laureates:

A. This person, who was born in what is now North Macedonia, was a nun who did charity work in Kolkata, India.

Answer: **Mother Teresa** [or Mary Anjezë **Bojaxhiu**]

B. This person was awarded the prize for her non-violent work but more recently has not controlled violence as the head of Myanmar.

Answer: **Aung San Suu Kyi** [awng san soo chee] [prompt on **Suu** or **Kyi** but do not accept or prompt on other partial answers]

C. This person received the prize when she was the President of Liberia.

Answer: Ellen **Johnson Sirleaf** [accept either underlined name]

15. Answer the following about Chinese folk religions:

A. This phrase, which means “wind water”, refers to the belief that architecture and furniture arrangements can bring harmony by balancing *yin* and *yang*.

Answer: **feng shui**

B. Many Chinese folk religions believe that this vital energy is important for living things to be healthy.

Answer: **qi** or **chi**

C. In early April, many Chinese people celebrate the Ching Ming Festival, during which these places are cleaned.

Answer: **tombs** or **graveyards** or **cemeteries**

16. One poem addressed to this woman begins “I hate and love. Why I do so, perhaps you ask. I know not, but I feel it, and I am in torment.”

A. Name this woman who was probably based on Clodia Metelli, and who is the subject of several ancient poems.

Answer: **Lesbia**

B. This Latin poet wrote to Lesbia. His poems are numbered from 1 to 116 and include several invectives.

Answer: (Gaius Valerius) **Catullus** [kuh-TULL-uss]

C. Catullus occasionally used a meter named after this poet from Lesbos.

Answer: **Sappho** [SAF-oh] [prompt on **Sapphic** meter]

17. The most massive of these six particles is the top one.

A. Name these subatomic particles, most of which are up or down.

Answer: **quarks**

B. This property is  $1/3$  for all quarks. This “number” is named for a class of **hadrons** [HAY-drahnz] that includes protons and neutrons.

Answer: **baryon** number

C. The discovery of quarks that are not up or down was made by solving a so-called “puzzle” named for these two particles. They were thought to be different but are actually both **kaons** [KAY-ahnz].

Answer: **theta** and **tau** [either order]

18. This painting was originally titled *The Bath*, since it shows a woman in a stream in the background.

A. Name this 1863 painting whose foreground shows two dressed men having a picnic with a naked woman.

Answer: *The **Luncheon on the Grass*** [or *Le **Déjeuner sur l’herbe***]

B. *The Luncheon on the Grass* is by this French painter. He depicted a woman on a bed being brought flowers by a servant in *Olympia*.

Answer: **Édouard Manet** [ayd-war man-ay] [do not accept “Monet”]

C. This Manet painting, named for its location, shows a man and a woman sitting next to each other on a bench in front of boats. They are both fully dressed and wearing hats, and the man is looking at the woman.

Answer: **Argenteuil** [ar-zhen-twee]

19. The Organisation of African Unity, or OAU, lasted from 1963 to 2002.

A. This Ethiopian emperor hosted its first summit.

Answer: **Haile Selassie** [“highly” **suh-LASS-ee**] (I) [or Lij Tafari **Makonnen** or Ras **Tafari**]

B. This country was the last country to join. Throughout much of its history, the OAU organized sanctions against this country due to its apartheid government.

Answer: (Republic of) **South Africa**

C. There were several rivalries within the OAU, including a rivalry between **Kwame Nkrumah** [**KWAH-may en-KROO-muh**] of Ghana and this leader of Senegal.

Answer: Léopold Sédar **Senghor**

20. This distribution is a specific bell-shaped curve.

A. Name this specific distribution which has a mean of 0 and a standard deviation of 1. Your answer should have two adjectives.

Answer: **standard normal** distribution [accept **standard Gaussian** distribution; prompt on partial answers]

B. The probability density function for the standard normal distribution contains the expression “ $e$  to the minus one-half  $x$  raised to a power”. What power is  $x$  raised to?

Answer: **2** or **second** power or **squared**

C. Rounded to the nearest hundredth, give the integral of the probability density function of the standard normal distribution between  $x$  equals  $-1$  and  $x$  equals  $1$ .

Answer: **0.68**