

## Teterboro's Academic Packets of Intellectual Rigor

## Packet 5

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**Tossups**

**On the graph  $x^x$ , this function of  $e$  is the  $x$  value of the absolute minimum, while this function of the golden ratio is one less than itself. This non arithmetic function must be satisfied by every element in a set in order for it to be defined as a field. Taking the Riemann Zeta function of 1 is equal to the infinite sum of this function of the natural numbers, which is equal to (\*) pi squared over 6. Taking this function of  $x$  yields the simplest involution and a hyperbola with asymptotes at  $x$  and  $y$  equals 0. This function of 0 is undefined. For 10 points, name this function equal to 1 divided by a number.**

ANSWER: **reciprocal** (accept  $1/x$  and equivalents before mentioned)

**Organisms that perform this process have a DSCF area dedicated to measuring the Doppler shift. This process is aided by the melon in the heads of some organisms, which focuses a transmitted signal. Organisms interfere with this process through the use of (\*) jamming. Organisms which use this technique contain a modified fold in their inner ear. To hunt insects, this technique is employed at frequencies of over 100 kHz and rates of up to 200 clicks per second by bats. For 10 points, name this process in which animals use sound waves to identify their environment.**

ANSWER: **echolocation**

**One of these structures was constructed while Themistocles delayed Spartan envoys, leading to a hostage crisis, while other examples of these structures between Piraeus and Athens would later be destroyed by Sparta. Another of these structures was adorned with blue glazed (\*) bricks, depictions of several beasts, and was dedicated to Ishtar. One of these structures in Britannica named Hadrian's marked the northern border of the Roman Empire. For 10 points, name these structures, a "great" example of which was built to keep out the Xiongnu by the Chinese.**

ANSWER: **walls** (accept gates)

**In this country, the failure to stop a crisis caused by an attempted assassination at Rua Tonelero ultimately caused one of its presidents to commit suicide. That leader was supported by this country's fascist Integralists, who imprisoned Luis Carlos Prestes and overthrew Joao Goulart. During Juscelino (\*) Kubitschek's governance of this country, Lucio Costa and Oscar Niemeyer designed and built its new capital city, which was first proposed by Jose Bonifacio. Getulio Vargas became dictator of this country during its Estado Novo period. For 10 points, name this South American country once governed from Rio de Janeiro.**

ANSWER: **Brazil**

**Evidence for this process includes the discovery of a lanceolate in the site of Meadowcroft Rockshelter, which predates the lanceolates made by another culture. The site of Monte Verde in Chile supports the "coastal" hypothesis of this process, and along with the site of Buttermilk Creek, refutes the theory that the (\*) Clovis people were the first to undergo this process. One theory for this process is explained by the Last Glacial Minimum lowering sea levels and creating the Bering Land Bridge. For 10 points, name this process in which humans reached the New World.**

ANSWER: **Migrating to the Americas** (accept equivalents like "settling america")

**One of these objects stands on a stack of red books along with an airplane in the background of a self portrait by Frida Kahlo. A gold and brown one of these objects appears in a portrait of Napoleon at Tuileries. One of these objects stands in front of a yellow mirror and above a fireplace with an (\*) emerging train in a work by Rene Magritte. Melting camembert inspired the warped appearance of these objects hanging on both a tree branch and a table on the left of a surrealist painting. For 10 points, name these objects which appear in Time Transfixed and are melted in Dali's The Persistence of Memory.**

ANSWER: clocks (accept watches)

**In the mining town of Yaksha Puri, miners are inspired to revolt led by Nandini, who wears a garland of the title flowers of this color in a play by Tagore. A coin, Satan, and a corpse narrate a novel titled for this color in which the miniaturist Elegant Effendi is murdered in the Ottoman Empire. Straw boats are used to borrow arrows in order to defeat (\*) Cao Cao in a battle named for "cliffs" of this color in Romance of the Three Kingdoms. Mo Yan wrote a novel about Sorghum of this color. For 10 points, name this color of a chamber where a "dream" occurs in a Chinese great classic.**

ANSWER: red (accept Red Oleanders, My Name is Red, Battle of Red Cliffs, and Romance of the Red Chamber)

**Cyanobacteria are able to synthesize this compound using molybdenum or iron containing enzymes. The oxidation of this compound produces nitric acid in the Ostwald process, and in many legumes, it can be produced through a type of "fixing" by (\*) symbiotic rhizobia bacteria. This compound reacts with bicarbonate in the first step of the urea cycle. Most processes for producing this compound begins with producing hydrogen from natural gas, which is then reacted with another gas under high pressures and temperatures in the Haber Process. For 10 points, name this often used in fertilizer with formula NH<sub>3</sub>.**

ANSWER: ammonia (accept NH<sub>3</sub> before mentioned, do not accept or prompt on ammonium)

**A brutal massacre of these people inspired Shostakovich's 13th symphony. The Viennese violinist Fritz Kreisler, none for his warm style, was also an important composer from this heritage. Two people belonging to this group, one rich and one poor, are depicted in the sixth piece of Mussorgsky's (\*) Pictures at an Exhibition. A D minor scale begins a folk song which inspired a nationalistic piece for this people, as well as a Slovenian folk song that inspired part of Smetana's Ma Vlast. For 10 points, name this ethnoreligious group who wrote "Hatikvah," the national anthem of Israel.**

ANSWER: the Ashkenazi Jews (accept Jewish people in general)

**One hypothesis for the prevalence of these creatures in many isolated cultures may stem from instinctive fears of our ancestral predators. Depictions of these creatures as greedy were popularized by the one in Beowulf and exemplified by one that guarded its treasure under the (\*) Lonely Mountain. In one legendary tale, St. George slays one of these creatures may have actually been inspired by a crocodile, while other depictions may have been inspired by the ancient discovery of dinosaur fossils. For 10 points, name these creatures, one example of which is the fire breathing Smaug.**

ANSWER: dragons

**One of these institutions contains a group of 8 creatures in a large sculpture designed by Carl Akeley. That institution's main entrance is adjacent to its Theodore Roosevelt Memorial Hall. Another of these institutions in London contains a 105 foot long replica named "Dippy" as well as "Hope," a large mounted (\*) skeleton. That place's Darwin Hall also includes Archie the giant squid. Another of these locations in Chicago contains Sue, one of the largest and the most complete T-Rex specimens ever discovered. For 10 points, name these institutions which preserve specimens of past creatures.**

ANSWER: natural history museums (accept the American Museum of Natural History, Natural History Museum in London and the Field Museum, prompt on museum)

**Bonuses**

After her death, this deity's eyes became the Tigris and Euphrates rivers. For 10 points each:

[10] Name this Babylonian goddess who originally gives the Tablet of Destinies to Kingu, with whom she creates an army of monsters. Sometimes depicted as a dragon, this deity represented primordial chaos and the sea.

ANSWER: **Tiamat**

[10] In the Enuma Elish, Tiamat was killed by Marduk, who was armed with a spear and Imhullu, an "evil" weapon which utilized this phenomenon. Seven of these things prevent Tiamat from swallowing Marduk, which allows him to strike the killing blow.

ANSWER: **wind**

[10] After his victory, Marduk creates this structure by setting Tiamat's tail in the sky. In Greek myth, this structure is created due to Hera breastfeeding Heracles.

ANSWER: The **Milky Way**

This man's defeat against the Lombard League at the Battle of Legnano led to the weakening of his rule over Italy.

For 10 points each:

[10] Name this European leader who led 4 Italian campaigns, and was nicknamed for his famously red beard.

ANSWER: **Frederick Barbarossa** (accept **Frederick I**, **Friedrich I** and **Friedrich Barbarossa**, prompt on **Frederick** or **Friedrich** alone)

[10] Frederick Barbarossa died during this military campaign, during which Richard the Lionheart was unable to reclaim Jerusalem despite defeating Saladin at several battles.

ANSWER: the **Third Crusade** (prompt on just the **Crusades**)

[10] Following his defeat at Legnano, Frederick Barbarossa signed a treaty named for this city, recognizing Alexander III as the true pope. This city later funded a campaign which sieged both Zara and Constantinople.

ANSWER: **Venice**

Following his victory over Barry Goldwater in the 1964 election, this man implemented several important reforms.

For 10 points each:

[10] Name this president who created Medicare and Medicaid through his Great Society program as part of his war on poverty.

ANSWER: Lyndon B **Johnson**

[10] Another part of Johnson's Great Society program was this act, meant to enforce the fifteenth amendment and prevent racial discrimination such as literacy tests.

ANSWER: the **Voting Rights** Act of 1965

[10] Description Acceptable. As part of his education policies, Johnson also implemented the Bilingual Education Act to give federal funds to programs for students with this impediment. The act was the first that aided the needs of people with this impediment, such as LESAs.

ANSWER: **Limited English Speaking Ability** (accept equivalents or **English as a second language** or **ESL**)

In one of these works, sixteenth notes in the right hand imitate the sound of Gretchen spinning a wheel while the left hand imitates a foot pedal. For 10 points each:

[10] Name this genre of “art songs” in which a solo vocalist is paired with accompaniment, usually a piano.

ANSWER: **Lied** (or **Lieder**)

[10] This Austrian musician composed over 600 lieder, including a cycle of them in his collection of Winterreise. This composer also wrote an unfinished 8th symphony in B minor.

ANSWER: Franz **Schubert**

[10] Schubert also composed a lied based off of this Johann von Goethe poem, which depicts a “fairy king.” The sound of a horse galloping in this lied is imitated by a quick triplet ostinato.

ANSWER: Die **Erlkonig** (or the **Erlking**)

One character from this play tells another that all paths lead to death, which causes him to seemingly die from stabbing until it is revealed that the dagger was a prop. For 10 points each:

[10] Name this Tom Stoppard play beginning with one of the title characters from Hamlet flipping a coin which lands on heads 92 times in a row.

ANSWER: ***Rosencrantz and Guildenstern are Dead***

[10] In the play, the title characters watch the Player lead the Tragedians during a dress rehearsal of this play. After the characters watch two characters in the play taking a voyage and being killed, they themselves receive the same fate.

ANSWER: ***The Murder of Gonzago***

[10] The Tragedians hide “impossibly” in barrels since their performance of *The Murder of Gonzago* had offended this character. This king of Denmark attempts to kill his nephew Hamlet, but his letter is replaced with one written by Hamlet which instead orders for Rosencrantz and Guildenstern to be executed.

ANSWER: **Claudius**

This author wrote one short story in which Dmitri Gurov attempts to meet the title woman during a performance of *The Geisha* in Yalta. For 10 points each:

[10] Name this Russian author of “The Lady with the Dog,” “The Crocodile” and several plays like *The Seagull*, *Uncle Vanya*, and *The Cherry Orchard*.

ANSWER: Anton **Chekhov**

[10] Chekhov also wrote this short story in which the doctor Andrey Ragin works at an asylum with inhumane conditions, and is later imprisoned there along with Gromov, with whom he discusses the nature of suffering at the title institution.

ANSWER: **“Ward No. 6”**

[10] In Chekhov’s short story “The Bet,” a banker and a lawyer make a bet about whether the death penalty is better than this condition, leading the lawyer to put himself in isolation for 1 day less than 15 years.

ANSWER: **Life in Prison** (accept equivalents)

Several large examples of these formations may be found in Berca reservation in Romania. For 10 points each:

[10] Name these formations which instead of erupting lava, spout out gases, water, and slurries of soil.

ANSWER: **mud volcanoes** (prompt on volcanoes, mud geysers, hot springs, mud pots or fumaroles)

[10] Mud volcanoes and prehistoric carvings are popular attractions in this nation’s Gobustan National Park, located just west of its Absheron peninsula, which juts into the western portion of the Caspian Sea.

ANSWER: **Azerbaijan**

[10] On this island, the drilling of an exploration well in 2006 led to the currently ongoing Sidoarjo mud flow after triggering a mud volcano eruption. This island's regency of Sidoarjo is located south of Madura island and the city of Surabaya.

ANSWER: **Java**

For 10 points each answer the following about Thomas Young:

[10] Young performed this experiment in which he proved that light behaved as a wave. The results of this experiment showed an interference pattern due to the effects of diffraction, which are impossible if light were a particle.

ANSWER: **Double Slit** Experiment

[10] Young's modulus is a property which can measure this property of a linear substance, as it is the ratio of the stress and strain.

ANSWER: **elasticity**

[10] Young names a differential equation along with Laplace in which forces are balanced and can calculate the pressure difference between two fluids due to this phenomenon. In the equation, this property denoted gamma is multiplied by the sum of the reciprocal of the radii of curvatures.

ANSWER: **surface tension**

During the Green Revolution, newer wheat varieties were shorter since they responded abnormally to these hormones. For 10 points each:

[10] Name these plant hormones responsible for plant growth and stem elongation between nodes.

ANSWER: **Gibberellins**

[10] Gibberellins are also responsible for the development of these structures in plants. The process in which a plant grows from one of these structures is known as germination, which is also regulated by gibberellins.

ANSWER: **seeds**

[10] Bakanae, or foolish seedling disease, occurs as a result of overexpression of gibberellins in this plant, which causes them to grow and topple over under their own weight. The small "miracle" variety of this staple crop helped begin the green revolution in India.

ANSWER: **rice**

The pilot episode of this TV series was filmed during the star actors' honeymoon in 1996. For 10 points each:

[10] Name this Animal Planet documentary following a zoo owner's adventures capturing large reptiles in Australia.

ANSWER: **The Crocodile Hunter**

[10] This man was the host of The Crocodile Hunter. Other Animal Planet documentaries hosted by this man include Ocean's Deadliest, during the filming of which he was killed by a stingray impaling his heart.

ANSWER: Steven **Irwin**

[10] Irwin hosted many crocodile feeding shows in this 5000 seat stadium in the Australia Zoo. In the premiere of the show Crikey! It's the Irwins, Irwin's son Robert feeds Graham the crocodile in this stadium.

ANSWER: **Crocoseum**