

Teterboro's Academic Packets of Intellectual Rigor  
Packet 10

Written and Edited by Nicholas Zhang

Special Thanks to: Kevin Wang, Karan Gurazada, Annie Lin, Brad Fischer, Pedro Juan Orduz, Jamie Faeder, Mazin Omer, Anson Berns, Felix Wang, Aidan Leahy, Jason Lewis, Will Yaeger, Rohit Agarwal, Josh Rollin, Hari Parameswaran, and Danny Kim

### Tossups

1. **This quantity is equal to negative  $kT$  times the log of the partition function, and is minimized when the system is in contact with a thermal reservoir. The form of this quantity minimized in isochoric equilibrium and equal to the most work obtainable from a reversible process is the (\*) Helmholtz type.** Another form of this quantity is equal to the enthalpy minus the product of temperature times entropy and determines spontaneity. For 10 points, name this quantity, the amount of energy that can be converted to do work, which may come in its Gibbs form.

ANSWER: free energy [accept Gibbs free energy or Helmholtz free energy]

2. **The speaker of a poem by this man asks “if I dance naked, grotesquely before my mirror waving my shirt round my head and singing softly to myself..who shall say I am not the happy genius of my household?” This author wrote how he “saw the figure 5 in gold” in his poem “the Great Figure,” and also asks the addressee to forgive him for (\*) eating their plums in another work. This man wrote another work describing a vehicle glazed with rainwater beside the white chickens that “so much depends upon.”** For 10 points, name this author of “The Red Wheelbarrow.”

ANSWER: William Carlos Williams

3. **One character in this profession was presumed dead after an encounter with the bounty hunter Miss Fortune. While in disguise as one of these characters in the show LazyTown, Robbie Rotten sings “do you want you want because” these people (\*) “are free.”** In the post credits scene of Dead Men Tell no Tales, the fifth film in a series titled for these people, Davy Jones, the captain of the Flying Dutchman, is revealed to be alive. For 10 points, name this title profession of Jack Sparrow in a film series set in the Caribbean.

ANSWER: Pirate (accept captain before “Robbie Rotten”)

4. **In Cherokee myth, this entity was retrieved by a spider who walked across water and carried it in a bowl on her back. Utgard Loki pits Logi, a personification of this entity, against Loki in an eating contest, who consumes a trencher of meat and the bones. Several near east myths describe heroes who are punished by being (\*) chained in the Caucasus for their theft of this phenomenon, which possibly inspired the myth of a Titan who was punished by having his liver eaten every day for introducing it to humanity.** For 10 points, name this substance stolen and gifted to humanity by Prometheus.

ANSWER: fire

5. **Settlers from this nation founded the colonies of Demerara and Essequibo, which were later captured by other European forces. Those colonies' capital, Stabroek, would later be renamed Georgetown under the British. (\*) Abel Tasman's voyage was funded by this country's VOC, or East India Company, which also founded the city of Batavia. During the Treaty of Breda, this country obtained Suriname from the British in exchange for what would later become the colony of New York.** For 10 points, name this country which established New Amsterdam.

ANSWER: the Netherlands (accept the Dutch Empire)

6. **A planetarium in this city features a bronze cast sundial consisting of two intersecting semicircles supporting a thin rod. This home city of *Man Entering the Cosmos* also includes Joan Miro's *The Sun, The Moon, and One Star*. The "Calder red" sculpture *Flamingo* also resides in Mies Van der Rohe's (\*) Federal Plaza in this city. Another sculpture in this city's Millennium Park features a highly reflective, smooth metallic design nicknamed "the bean." For 10 points, name this Midwestern city, home to its namesake art institute and Anish Kapoor's *Cloud Gate*.**

ANSWER: Chicago (thanks to AL!)

7. **According to Plateau's laws, the edges of these objects meet in threes along an edge at angles of 120 degrees. The size of these objects can be evaluated by a second order differential equation named for Rayleigh and Plesset, which is derived from the Navier Stokes equation under (\*) spherical symmetry. The formation of these objects requires the presence of a surfactant to increase the surface tension of a solution for their spherical shape, like soap in water. For 10 points, name these round objects in which a liquid encloses some gas.**

ANSWER: bubbles (prompt on films and foams)

8. **The artist of one painting titled for this good intentionally chose uglier models for a more natural scene involving this good. Since this staple good was poorly adapted for long term storage in granaries, it was rarely collected by landlords and thus favored among the working class for personal consumption. This crop originated in the (\*) Andes mountains, and after it was brought to Europe, its accessibility to grow in small plots and gardens made it a popular staple food for peasants. For 10 points, name this food, a shortage of which led to a 1840s famine in Ireland.**

ANSWER: Potatoes

9. **When asked to collect a blue one of these things by his best friend, a boy who is given a surgery for his harelip answers "for you, a thousand times over." That character is then raped by Assef shortly after catching one of these items after it is cut. In the play *Master Harold...and the Boys*, Hally insults Sam and Willie by saying that (\*) "you can't fly" these items "on rainy days." Hassan is the title "runner" of these things in a novel set in Afghanistan by Khaled Hosseini. For 10 points, name these tethered, four sided aircrafts.**

ANSWER: kites (accept The Kite Runner)

10. **Charles Drew served as director of a "bank" for this organization during World War II, but resigned after the army ruled to segregate donations made by African Americans. The founder of the American branch of this organization was founded by a woman, who, after her work in the Battle of Antietam (\*) carrying supplies to wounded soldiers, was nicknamed "Angel of the Battlefield." That branch of this organization internationally headquartered in Geneva was founded by Clara Barton. For 10 points, name this humanitarian organization dedicated to disaster relief and providing blood to hospitals.**

ANSWER: the American Red Cross

11. **In one play set in this country, an old man knows the shared guilt of the inhabitants of an apartment, such as the consul's affair with the superintendent's wife. In another play, the title character wishes to start a hotel with Jean in this country. This country that is the setting of (\*) *The Ghost Sonata* is also the setting of a play in which the decapitation of a pet canary pushes Miss Julie to commit suicide with a razor. For 10 points, name this Scandinavian home country of August Strindberg, whose many plays are performed in the theaters of Stockholm.**

ANSWER: Sweden

12. **Certain organisms have evolved “traps” such as odors or adhesives to encourage this process. The tube lipped bat’s tongue has evolved to be 1.5 times the length of its body to facilitate this process. The recent decrease in the amount of organisms performing this task can be largely attributed to diseases such as those transferred by (\*) Varroa mites in colony collapse disorder. The majority of species which perform these tasks are insects such as honey bees. For 10 points, name this transfer of a type of cell that enables plant fertilization.**

ANSWER: pollination (prompt on plant fertilization)

13. **This empire often used the northern high road for trade, and also built a highway over that route known as the Grand Trunk Road. One ruler of this empire built a torture chamber in his capital. After defeating Seleucus I, this empire traded (\*) 500 elephants for land. Following a destructive war, a ruler of this empire constructed capitals topped with 4 lions bearing his edicts in a namesake pillar. This empire once ruled by Pataliputra greatly spread Buddhism throughout Asia following the Kalinga war. For 10 points, name this ancient Indian empire ruled by Ashoka.**

ANSWER: Mauryan Empire

14. **Fritz Zwicky hypothesized this thing after noticing discrepancies in the mass to light ratio while applying the Virial Theorem. One example of this substance with a high free streaming length is sterile neutrinos. The unexpected curve of rotation for disk galaxies is explained by the (\*) cold type of this substance, one example of which is WIMPs. This substance is able to interact with gravity, but cannot interact with the electromagnetic force, making it difficult to observe. For 10 points, name this substance which composes about 85% of the matter in the universe.**

ANSWER: dark matter

15. **A retroflex reaction must be performed in order to create one example of these things, which are denoted by a hook placed on its right in the IPA, and are “r-colored.” During the Middle Ages, a change and increased raising of these things possibly arose from either migration of English people after the Black Death or increased imitation of the nobler (\*) French. Combinations of these sounds, which possess tone, intonation and stress, are called diphthongs, and one common example of them is the schwa. For 10 points, name these sounds contrasted with consonants.**

ANSWER: vowels

16. **The Santa Cruz massacre in what was once this nation drew international support and attention leading the eventual independence of a small nation in its east. The first president of this nation implemented the Guided Democracy system, causing a rift between him and Muhammed Hatta. That leader of this country also organised the (\*) Bandung Conference. Shortly after Suharto ousted Sukarno, this nation ended up ceding parts of Borneo to Malaysia in a war against the British Commonwealth. For 10 points, name this large island nation in Southeast Asia.**

ANSWER: Indonesia

17. **Extremely fast repeated notes are featured in a “morning piece” by this composer that was inspired by Spanish music, the *Alborada*. Franz Schubert inspired this man’s suite of “noble and sentimental” waltzes. This composer of the *Miroirs* suite was inspired by a poem about the water nymph (\*) Ondine inspired the first movement of another suite, who’s ridiculously challenging third movement depicts a mischievous small goblin at night. Scarbo is the last movement of this man’s *Gaspard de la Nuit*. For 10 points, name this French composer of *Bolero*.**

ANSWER: Maurice Ravel

18. A city in this country names a salad that is traditionally made from tomatoes, boiled eggs, olives, anchovies and olive oil. That city is also home to a seaside promenade “of the English.” One city bordering this country is governed by the Grimaldi family while a film festival is held annually in this country’s town of (\*) Cannes. This country’s region of Provence, whose largest city is Nice, completely surrounds the microstate of Monaco. For 10 points, name this European country with a resort coast on the Mediterranean in its southern Riviera.

ANSWER: France

19. One property of these types of cells is marked by the presence of the Rex1 protein. NANOG prevents the maturation of these types of cells, while a combination of Oct4, Sox2, c-myc and Klf4 genes allows them to self-renew. The mesenchymal and hematopoietic types of these (\*) pluripotent cells are found in the bone marrow. Since these types of cells make up blastocysts, which later develops into the germ layers of an embryo, they are controversial for their use in medicine. For 10 points, name these types of cells which may differentiate many kinds of tissue cells.

ANSWER: stem cells

20. In one poem, the title character is “watchful” while these creatures “are in peace, for they know when” he is “nigh.” This title creature with “such a tender voice, making all the vales rejoice” is contrasted with another creature with “twisted sinews” in its heart and “fearful symmetry” who is (\*) “burning bright in the forest of the night.” This creature is asked “dost thou know who made thee” in a poem that appears in the collection “Songs of Innocence.” For 10 points, name this animal contrasted with the Tyger in a William Blake poem.

ANSWER: lamb (accept sheep, be nice and prompt on shepherds)

**Bonuses**

1. This author's last published work features a man and a wife who are both German refugees during World War II in *The Night in Lisbon*. For 10 points each:  
[10] Name this German author who also used his experiences fighting in World War I in his book *All Quiet on the Western Front*.  
ANSWER: Erich Maria **Remarque**  
[10] This character is the protagonist of *All Quiet on the Western Front*. This soldier is given Kemmerich's boots by Friedrich Muller after the latter's death.  
ANSWER: **Paul Baumer** (either underlined part is fine)  
[10] Paul is mentored by and becomes best friends with this older soldier and excellent scavenger. After this character's death, Paul becomes apathetic about his own life and dies shortly after.  
ANSWER: **Kat** (or **Stanislaus Kaczinsky**)
  
2. In this state, KKK terrorists bombed the 16th Street Baptist Church, leading to 4 deaths and 22 injuries. For 10 points each:  
[10] Name this state where during the first of 3 marches from Selma to the state capital, unarmed civil rights activists were attacked on Bloody Sunday.  
ANSWER: **Alabama**  
[10] The earlier Montgomery Bus Boycott in Alabama started after this woman refused to give up her seat in the colored section after the whites only section was filled on the segregated bus.  
ANSWER: Rosa **Parks**  
[10] These civil rights activists were attacked by KKK members aided by Police Commissioner Bull Connor while traveling through Birmingham. These activists traveled on buses to protest the unenforced Supreme Court cases that ruled segregated buses as unconstitutional.  
ANSWER: **Freedom Riders**
  
3. Sandstone rocks! For 10 points each:  
[10] Sandstone is one example of this type of rock, formed from the accumulation and deposition of eroded materials. They are contrasted with igneous and metamorphic rocks.  
ANSWER: **sedimentary** rock  
[10] Since sandstone is composed of particles from preexisting rocks, it is classified as this type of sedimentary rock. Conglomerates are another example of this most common type of sedimentary rock.  
ANSWER: **clastic** sedimentary rock  
[10] In addition to quartz, most sandstone is made of this mineral, with varying numbers of aluminum and silicon atoms and exactly 8 oxygen atoms.  
ANSWER: **feldspar**

4. Many experts speculate that these creatures may have actually been inspired by the misidentification of bears. For 10 points each:
- [10] Name this cryptid also known as the abominable snowman.  
ANSWER: the **Yeti**
- [10] One now debunked explanation for Yetis proposed that they are actually a relict population of Gigantopithecus, which has now been debunked since they lack this quality. An extra curve in the spines of humans facilitates this ability.  
ANSWER: **bipedalism** (accept word forms and any description that it walks upright)
- [10] Despite the fact that the existence of the yeti has been well debunked, they were still the target of 4th season episodes of this Animal Planet show that attempts to find proof of it and other cryptids.  
ANSWER: **Finding Bigfoot**
5. This work contradicted Erikson's suggestion that childhood was a time of "storm and stress," and stressed the role of culture in development. For 10 points each:
- [10] Name this work heavily criticized by Derek Freeman which describes the relationship between sexuality and culture on the title Pacific island.  
ANSWER: ***Coming of Age in Samoa***
- [10] This anthropologist described how adolescent girls in Samoa often engaged in premarital sex in her work *Coming of Age in Samoa*.  
ANSWER: Margaret **Mead**
- [10] This other work by Margaret Mead documented the pacifist Arapesh people of New Guinea, and compared the role of gender between the pacifist Arapesh and aggressive Mundugumor peoples.  
ANSWER: ***Sex and Temperament in Three Primitive Societies***
6. After coming to power, this regime announced that the start of their rule would become "Year Zero" and called for the execution of "New People" in Killing Fields. For 10 points each:
- [10] Name this regime led by Pol Pot during the 1970s.  
ANSWER: **Khmer Rouge** (accept the **Communist Party of Cambodia/Kampuchea**)
- [10] The Khmer Rouge massacred thousands of civilians while in power in this southeast asian country, whose medieval Khmer Empire built Angkor Wat.  
ANSWER: **Cambodia**
- [10] A museum memorializing the atrocities of the Khmer Rouge was created at this former high school turned execution center. This facility now displays thousands of black and white photographs of prisoners sent here taken by the regime.  
ANSWER: **Tuol Sleng** (or **Security Prison 21**)
7. Yom Kippur is celebrated on the 10th day of this month. For 10 points each:
- [10] Name this month whose first two days begin the new year in Judaism.  
ANSWER: **Tishrei** (prompt on **Rosh Hashanah**)
- [10] These first two days of Tishrei are when Jews believe that their fates are decided by god for the next year. During this occasion, a shofar is blown, bread crumbs are thrown into running water, and apples with honey are eaten.  
ANSWER: **Rosh Hashanah**
- [10] This day is celebrated on the 15th of Tishrei. This holiday celebrates the harvest and reminds celebrators of the "booths" that the Israelites lived in during their exodus.  
ANSWER: **Sukkot** (or the **Festival of Tabernacles**)

8. According to the Copenhagen interpretation, particles follow this equation except during the wave function collapse. For 10 points each:  
[10] Name this equation which states that the Hamiltonian of the wave function equals  $i$  times the reduced Planck constant times the partial time derivative of the wavefunction.  
ANSWER: **Schrodinger's Equation**  
[10] This generalization of Schrodinger's equation describes only particles with a spin of  $\frac{1}{2}$ , and takes into account both special relativity and quantum mechanics.  
ANSWER: **Dirac Equation**  
[10] The Dirac Equation helps describe the way electrons travel at close to this constant equal in all reference frames. This quantity is equal to the product of the frequency and wavelength of a photon.  
ANSWER: **Speed of Light** (or  $c$ )
9. This work's extremely long third movement in F# minor is marked *adagio sostenuto*. For 10 points each:  
[10] Name this extremely long and challenging solo piano work in Bb major in four movements. Its last movement is a difficult 3 voice fugue, and has a subject consisting of a tenth jump and trill followed by a 7 note scale.  
ANSWER: **Hammerklavier** Sonata (accept but don't reveal *Beethoven's Piano Sonata No. 29 in B-flat*)  
[10] *Hammerklavier* is the 29th work by a certain composer in this genre. Other works in this genre by the same composer which usually consist of an exposition, development and recapitulation sections include *Pathetique*, *Appassionata*, and *Moonlight*.  
ANSWER: **piano sonata** (accept but don't reveal any answers mentioning Beethoven, prompt on just sonata)  
[10] This deaf German composer wrote the *Hammerklavier*, *Appassionata*, *Pathetique* and *Moonlight Sonatas*.  
ANSWER: Ludvig van **Beethoven**
10. In the final "Remembered" work in this series, Nelson meets his illegitimate sister Annabelle. For 10 points each:  
[10] Name this series about the life of a former basketball player "redux" and "at rest." This series's title character sells MagiPeelers and is married to Janice.  
ANSWER: **Rabbit**  
[10] This man wrote about Harry Angstrom's life in the Rabbit series, as well as another novel about three women who obtain powers after being left by their husbands in *The Witches of Eastwick*.  
ANSWER: John **Updike**  
[10] In his short story "A&P," Updike writes about Sammy quitting his job at one of these stores in protest of the manager kicking out some scantily clad girls.  
ANSWER: **Grocery Store** (accept equivalents like supermarkets, prompt on just store)
11. In this compound's namesake cycle, it is produced from 2 ammonia molecules and one carbon dioxide molecule. For 10 points each:  
[10] Name this nitrogen containing substance found in urine.  
ANSWER: **urea**  
[10] In one step of the urea cycle, malate is oxidized into this compound by cytosolic malate dehydrogenase. In another cycle, this 4 carbon compound reacts with acetyl-coA to form citrate.  
ANSWER: **oxaloacetate**  
[10] The majority of the urea cycle takes place in this largest internal organ, which also produces bile.  
ANSWER: **liver**

12. About 44 million viewers tuned in to the 2019 World Championship finals in this game, where Funplus Phoenix unceremoniously demolished G2 Esports 3-0. For 10 points each:
- [10] Name this most viewed esport in the world. Popular characters picked by pro players in this game include Yasuo and Ryze.  
ANSWER: **League of Legends**
- [10] The champion team of the 2019 World Championship was Funplus Phoenix, who are based in this country. This asian country is home to the most League of Legends players.  
ANSWER: **China**
- [10] On the way to winning the World Championship, Funplus Phoenix defeated this European team 3-1 in the quarterfinals. In CSGO this esports organization has the second most Majors wins after Astralis.  
ANSWER: **Fnatic**
13. This hero keeps a necklace given to him by his mother Tahmina, revealing that he is the son of the opponent who fatally wounds him. For 10 points each:
- [10] Name this hero who is ultimately defeated by his father Rostam in a “Book of Kings” by Ferdowsi.  
ANSWER: **Sohrab**
- [10] The story of Rostam and Sohrab is part of the *Shahnameh*, a national epic of this country written in Farsi.  
ANSWER: **Iran** (accept **Persia**)
- [10] One author who translated the legend into English is this poet who wrote of a place where “ignorant armies clash by night” in his poem “Dover Beach.”  
ANSWER: Matthew **Arnold**
14. This civilization’s alphabet is considered a precursor to the Greek one. For 10 points each:
- [10] Name this eastern Mediterranean civilization important cities founded by this civilization include Tyre and Byblos.  
ANSWER: **Phoenicia**
- [10] The phoenician city of Sidon was a center of production for this good. The Romans often used natron to make this substance, which was also a major export of Murano and Venice.  
ANSWER: **glass**
- [10] The Phoenicians founded this African city that fought the Punic Wars against Rome. Its best known general was Hannibal.  
ANSWER: **Carthage**
15. This object has a tenuous atmosphere composed mainly of nitrogen, and sometimes experiences weather. For 10 points each:
- [10] Name this largest moon of Neptune, which may also possess a mantle made of water.  
ANSWER: **Triton**
- [10] Triton is unique among moons since it possesses this type of orbit in the opposite direction of Neptune’s orbit.  
ANSWER: **retrograde** orbit
- [10] Some bodies share an orbit with Neptune at these points about 60 degrees ahead or behind Neptune. These points are near the L4 and L5 Lagrangian points.  
ANSWER: **trojans**



16. From afar, a turtle's shell in a lake may look like a small island in a pond. For 10 points each, answer the following about some real life turtle islands.
- [10] The Dry Tortugas archipelago is a national park found west of this island, which contains the end of US Highway 1 and Truman's Little White House.  
ANSWER: **Key West**
- [10] Many species of large tortoises may be found on islands such as Isabela and Santa Cruz, which are controlled by this South American country that governs the Galapagos Islands.  
ANSWER: **Ecuador**
- [10] Another species of giant island tortoise may be found on Aldabra, the world's second largest example of these formations. Many other islands of the Seychelles are also examples of these coral islands that surround lagoons.  
ANSWER: **atolls**
17. In one play from this country, a womanizer pretends to be impotent to have multiple affairs with married women. For 10 points each:
- [10] Name this country where king Charles II encouraged more sexually explicit comedy during the Restoration period.  
ANSWER: **England**
- [10] This Restoration period playwright wrote the lewd play *The Country Wife*. Along with William Congreve, this writer was among the most prominent playwrights of the Restoration period.  
ANSWER: William **Wycherley**
- [10] Wycherley's play *The Plain Dealer* inspired this French writer and thinker to write the play *La Prude*. This philosopher also wrote the novella *Zadig* and another novel in which Pangloss claims that we live in the best of all possible worlds.  
ANSWER: **Voltaire** (or Francois-Marie **Arouet**)
18. 100% of people who go through this process do not live to tell the tale. For 10 points each:
- [10] Name this process in which biological functions like breathing and brain activity end.  
ANSWER: **death**
- [10] One easy way to realize you have died is if you experience this condition in which your limbs become stiff since muscle tissues are unable to relax.  
ANSWER: **rigor mortis**
- [10] Decomposition of the body following death leads to this sign as anaerobic metabolism from bacteria inside the body results in gases accumulating inside the body.  
ANSWER: **bloating** (accept word forms)
19. The production of works in this medium required secretive kiln workshops. For 10 points each:
- [10] Name this art form exemplified by blue and white porcelain objects produced in the Ming Dynasty.  
ANSWER: **pottery** (or **ceramics**, prompt on **china**)
- [10] Another important traditional chinese art form was this style of painting, which typically used wider strokes and simple shades of black to produce a more impressionist artwork.  
ANSWER: **Ink Wash** Painting (prompt on **ink** paintings)
- [10] The Chinese painter Xu Beihong often made ink wash paintings depicting these creatures mid gallop.  
ANSWER: **horses**

20. This pair committed suicide after their defeat at the Battle of Lang Bac to Ma Yuan. For 10 points each:

[10] Name this pair of sisters who rode war elephants during a rebellion against the Han Dynasty.

ANSWER: the **Trung** sisters (**Trung** Trac and **Trung** Nhi)

[10] The Trung sisters are national heroes of this southeast asian nation, which was called Nanyue under chinese rule. The later Champa kingdom founded its city of Saigon.

ANSWER: **Vietnam**

[10] The Tran Dynasty's constant warfare with the Champa left them weakened against annexation by this later chinese dynasty. However, this dynasty's rule over Vietnam was overthrown shortly after by Le Loi in 1427.

ANSWER: the **Ming** Dynasty