

## **Packet of Michigan, Michigan State Students**

### **Packet 5**

Packet by: Harris Bunker, Dillon Edwards, Austin Foos, Lucas Weingartz, Trent Koch, Sarah Wrase, Dominic Aluia, Alan Hettinger, Jasmine Czajka, Briana Magin, Tony Incorvati, Erik Bubolz, Siddhant Dogra, Rahul Keyal, Jonathan Suh, Kevin Yu and Vishal Puppala with assistance from many others

### **Tossups**

1. In this painting, three bathing women balance apples on their heads near another woman with a peacock in her head. A habit-wearing pig bites the ear of an emaciated man in this painting, which also depicts a man with a blueberry for a head. When folded, this painting depicts the creation of the world, and a stream of birds fly out from a cave in the left corner of this (\*) triptych. The right panel of this painting depicts damnation, and the left panel shows Adam meeting Eve. The ornate central panel of this painting is often interpreted as depicting the temptation of mankind. For 10 points, name this large triptych by Hieronymus Bosch.

ANSWER: *The Garden of Earthly Delights*

2. This writer started one poem with the question “What beck'ning ghost, along the moon-light shade/Invites my steps, and points to yonder glade?” in his work “Elegy to the Memory of an Unfortunate Lady.” In another poem this man wrote that, “One truth is clear, 'Whatever is, is right.” and in another section of that poem addressing “Henry St. John, Lord Bolingbroke” he asked “Who breaks a butterfly on a wheel?” (\*) Another poem by this man includes the aphorism “to err is human, to forgive divine.” In an epic poem by this poet of “Epistle to Dr. Arbuthnot,” characters including Ariel and Umbriel fail to prevent Lord Petre from stealing a piece of Belinda’s hair. For 10 points, name this 18th century English poet of “An Essay on Criticism,” and “The Rape of the Lock.

ANSWER: Alexander Pope

3. The last major epidemic of this disease in America turned Gallop’s island into a destination for men infected with this disease. That event, the 1901-1903 Boston epidemic, killed over 300 people. Ramesses V may have had this disease that some historians think caused the 430 Athenian Plague. (\*) William Trent devised a plan to spread this disease after defeating Gwaysuta in one battle. During that battle, the British gave Pontiac’s forces blankets exposed to this disease. Edward Jenner pioneered the first vaccine against this disease. For 10 points, name this eradicated disease that caused skin lesions.

ANSWER: Smallpox (or *Variola major*, *Variola minor*)

4. This scientist’s theories influenced Soviet scientist Trofim Lysenko [pr. “le-senk-uh”]. A theory promoted by this scientist was debunked in an experiment in which mice got their tails chopped off; that experiment was led by August Weisman. Unused body parts such as little toes and the appendix would disappear according to this theorist. (\*) Changes developed during an organism’s lifetime would be inherited by offspring in this scientist’s central theory that used a giraffe’s neck as an example. For 10 points, name this biologist and author of *Philosophie Zoologique* who proposed the discredited theory of heritability of acquired characteristics.

ANSWER: Jean-Baptiste Lamarck

**5. One person who chose not to run for reelection in this position sponsored the HOPE Act. One person currently in this position leaked details of the serial killer Richard Ramirez's crimes, which angered detectives while that person was mayor of a city related to this position. In 2010, (\*) Carly Fiorina was defeated in an election for one of these positions, and the author of the 1994 Federal Assault Weapons ban holds this position. A 2016 election for this position was between two Democrats and the loser of that race was Loretta Sanchez. For 10 points, name this congressional position shared by newly elected Kamala Harris and former mayor of San Francisco, Dianne Feinstein.**

ANSWER: Senator of California

**6. In Poland, a day that is part of this larger religious observance is known as Sledziowka and herring is served, while in Oberammergau, Germany, Christmas trees are burned. On one observance during this period, observers quote Genesis 3:19 (\*) with its reference to dust. Roman Catholic churches omit the "Gloria in excelsis Deo" during Sundays that fall into this period where Catholics are not to eat meat on Fridays. Practitioners often fast and commit acts of penance during this time that traditionally lasts for 40 days to commemorate the time that Jesus spent fasting in the desert. For 10 points, name this religious observance that begins on Ash Wednesday.**

ANSWER: Lent (accept Easter before "period" is read, prompt on "Easter season" afterwards)

**7. During this monarch's reign, a misinterpretation of Jean Baptiste Réveillon's words on "prices" caused a full-scale riot, which caused the destruction of a Henriot Saltpetre factory. On the advice of Turgot and Malesherbes, this monarch decided to levy a unique tax on his citizens. That event served as a catalyst towards the October Days, where this monarch agreed to the August Decrees (\*) to pacify many market-women. At Revolution Square, this monarch would later be guillotined which made him the first victim of the Reign of Terror. For 10 points, name this French monarch infamous for being the last king before the Revolution.**

ANSWER: Louis XVI (prompt on Louis)

**8. The Penman formula describes how water can undergo this phenomenon. The August equation assumes a temperature-independent heat of this phenomenon. The Clausius-Clapeyron equation can be used to derive curves for this phenomenon. A quantity associated with this phenomenon increases with molarity and is known as this phenomenon's (\*) elevation. Species with a higher volatility have a higher tendency to undergo this process. The heat of this phenomenon is always positive unlike the heat of condensation. For 10 points, identify this phenomenon where a liquid becomes a gas.**

ANSWER: Boiling (or Vaporization)

**9. One character in this novel is convinced an object is hidden in a Sphinx statue. The Palace of Green Porcelain turns out to be a ruined museum in this novel. Later, the sun appears redder to the protagonist and the air feels thinner just as the protagonist is attacked by a (\*) giant crab. The protagonist of this book accidentally starts a fire that kills Weena, whom he had earlier saved from drowning. Small humanoid beings known as Eloi are captured and likely eaten by the cave-dwelling Morlocks in this novel. For 10 points, identify this novel by H.G. Wells whose protagonist goes to the distant future.**

ANSWER: The Time Machine

10. In the third of these pieces, a violin solo imitates the sound of a hunting horn. Instruments are told to play like a barking dog in the second movement of one of these pieces. The tempos of these pieces follow the fast-slow-fast pattern. The first of these pieces contains an allegro in E major and an allegro pastorale. (\*) This set of pieces was accompanied by poems written by their composer. These pieces were included in their composer's *The Contest Between Harmony and Invention*. For 10 points, identify this set of four violin concerti that include "Primavera" and were composed by Antonio Vivaldi.

ANSWER: The Four Seasons (or Le quattro stagioni)

11. Triangular facets are indicative of this physical feature. Rock flour is created by these entities that transport larger rocks and sediment through plucking. Basal slip and plastic flow are the two methods of motion for these entities. Arêtes and cirques are common (\*) erosional features of these entities. These entities, which are bordered by the firm limit, lose mass in the zone of ablation. In Norway, these bodies produced the fjords. Unlike a river, these things leave behind a U-Shaped valley. For 10 points, name these large bodies of frozen water that are common in an Ice Age.

ANSWER: Glacier (prompt on "ice" I guess)

12. Turkish and Egyptian armies are referenced in this work because the standing army is closely aligned with the sultan. This work says a man is supposed to be content if he is not deprived of property or women. To show that men must be able to fight like both animals and men, this work alludes to the story of Achilles and Chiron (\*). Moses, Romulus, Theseus, and Cyrus are lauded in this text because they did not rely on an army of mercenaries. This text, written by the author of *Discourse on Livy*, argues that a leader should rather be "feared than loved". For 10 points, identify this guide to ruling an Italian state written by Niccolò Machiavelli.

Answer: The Prince (accept Il Principe)

13. A family created by this author work at a wheat and grain company that was founded by Johann. Schopenhauer is read by Thomas in that novel in which the maid Babette is attacked. Doctor Krokowski is known as Minos in a novel by this author in which the protagonist fraternizes with the lackadaisical Clavdia Chauchat. (\*) In another novel, a cholera outbreak does not prevent Tadzio from being sought out by the writer Gustav von Aschenbach. In one novel by this author of *Buddenbrooks*, the supposedly "simple minded" protagonist Hans Castorp goes to a Sanitarium. For 10 points, name this German author of *Death in Venice* and *The Magic Mountain*.

ANSWER: Thomas Mann

14. To describe a beautiful scene, the singer of this band sings "sleepy time and I lie with my love by my side, and she's breathing low". In another song, this band imagines one of their shows as a fascist rally and in yet another they mock Margaret Thatcher as a "pig". Supposedly, this band's most famous album will match (\*) The Wizard of Oz when played simultaneously. A chorus of children sing, "We don't need no education" in a single off this band's 1979 album *The Wall*. For 10 points, name this British psychedelic progressive rock band that famously sang "and if the band you're in starts playing different tunes, I'll see you on the dark side of the moon."

ANSWER: Pink Floyd

15. A 20<sup>th</sup> century ruler of this modern country said, “I hate imperialism. I detest colonialism. And I fear the consequences of their last bitter struggle for life.” One general who conquered much of this country was said to have taken the Sumpah Palapa oath, in which he vowed not to eat any foods containing (\*) spices until he finished his conquests. That man was Gajah Mada, who was the prime minister to the Majapahit [mah-juh-pa-hit] king Hayam Wuruk. The first president of this country was the Non-Aligned leader Sukarno. For 10 points, name this Asian country that was administered by the Dutch East India Company during the 18<sup>th</sup> century.

ANSWER: Indonesia (accept Nusantara)

16. Along with drums played by Rashied Ali, a player of this instrument performed on the posthumously released song “Jupiter” on the album *Interstellar Space*. Songs created by a player of this instrument include “Central Park West” (\*) and he performed with pianist Duke Ellington on “In a Sentimental Mood”. One player of this instrument was famous for his three on one chord approach and his method of playing multiple notes at once called the “sheets of sound”. This instrument was played by Stan Getz and Charlie “Bird” Parker and by the composer of *The Love Supreme*. For 10 points, there are Baritone and Alto varieties of what instrument played by John Coltrane?

ANSWER: Saxophone (be lenient and accept any type of Saxophone such as Baritone Saxophone or Alto Saxophone, prompt on “Sax”)

17. The idea that particles act as point-like constituents when probed at high energies is known as Bjorken scaling and with partons, gives rise to this phenomenon through asymptotic freedom. The semi-classical Yukawa potential can help describe this phenomenon. Free emission of this (\*) interaction is prevented by color confinement. This interaction does not decrease with increased distance and instead acts like a spring. This gluon-carried force holds baryons together. This force is 10 to the 38 times stronger than gravity. The residual effect of this phenomenon is also known as the nuclear force. For 10 points, identify this force that holds together the nucleus.

ANSWER: Strong Nuclear Force (prompt on “Nuclear Force” before the giveaway, accept Color Force before “color confinement”)

18. This character is a passenger in a car that gets pulled over, but the driver gives the policeman a white card so he doesn’t get a ticket. At a funeral in the novel in which he appears, this character is shown a self-improvement journal by the father of the deceased. In one scene, this character runs into the bespectacled (\*) Owl-Eyes while at a party where he meets a character that calls him “old sport”. This bondsman narrates the novel he appears in and has a relationship with the golfer Jordan Baker. For 10 points, identify this protagonist who moves to West Egg and goes to the parties of Jay Gatsby.

ANSWER: Nick Carraway (accept either)

19. This party’s platform included calls for full employment, exemptions from military service, and “land, bread, housing, education, clothing, justice and peace” in its Ten Point Program. This party’s leader faced scrutiny over the high-profile deaths of several of its members, including Alex Rackley and Betty van Patter. (\*) One prominent member of this party was killed while sleeping during a police raid on his apartment in Chicago. That man was Fred Hampton. J. Edgar Hoover focused the efforts of the FBI’s COINTELPRO [pr. “Co intel pro”] on disrupting this party. For 10 points, name this American black power organization, formed in Oakland by Robert Seale and Huey P. Newton.

ANSWER: Black Panthers Party (do not accept or prompt on “New Black Panther Party”)

20. After being astonished with this figure's bravery, the Haupt Prince Galehaut surrenders. In one myth, this hero rescues a figure that was abducted by Meleagant and encounters a dwarf who rides carts. This hero accidentally kills Gareth and Gaheris, which results in a feud with their (\*) brother. As a child, this hero was raised by Vivien, the Lady of the Lake. A son of this man by Elaine found the Holy Grail. This is— for 10 points— what first Knight of the Round Table who fathered Galahad and had an affair with Queen Guinevere?

ANSWER: Sir Lancelot Du Lac (or Launcelot)

21. (TB) One poem in this collection describes a boy finding two mockingbirds on a beach; that poem is the third in this collection's "Sea-Drift" section, and is titled "Out of the Cradle Endlessly Rocking." A poem in this collection asks, "Do I contradict myself?" before asserting that "I am large; I contain multitudes." Later editions of this collection included a poem about the death of Abraham Lincoln, and this collection of transcendentalist poetry contains "Song of Myself." For 10 points, identify this 1865 collection of poetry by Walt Whitman.

ANSWER: Leaves of Grass

22. (TB) Vasari said that the depiction of architecture in this painting might have been inspired by Bramante. A model for the painter is depicted in this painting as the personification of Love. That woman is Margarita Luti. The painter of this painting may have self-inserted himself next to Averroes. A man in a blue robe sits on the steps in this painting and is usually seen as Diogenes. One of the central figures of this painting points towards the sky while the other points towards the Earth. For 10 points, name this painting where Aristotle and Plato stand among other thinkers that was painted by Rafael.

ANSWER: *The* School of Athens (or Scuola di Atene)



## BONUSES

1. For 10 points each name some things about the “Father of the American Cartoon”.

[10] This cartoonist was known for his depictions of Tammany Hall leader Boss Tweed. This man created the Republican Elephant in his cartoon “Third Term Chaos”.

ANSWER: Thomas **Nast**

[10] Thomas Nast drew witty political cartoons in this magazine founded in New York City that went defunct in 1916.

ANSWER: **Harper’s Weekly**

[10] Although largely supportive of the Republican Party, Nast supported Grover Cleveland against this Republican. Nast thought this man was corrupt for his dealings in the Mulligan Letters Scandal.

ANSWER: James G. **Blaine**

2. This philosopher published his thoughts in *The Analects*. For 10 points each:

[10] Name this Zhou philosopher who described *ren* as a comprehensive ethical virtue.

ANSWER: **Confucius** (accept **Kong Qui** and either name)

[10] This principle, also known as xiao, is central to Confucianism and advocated a certain kind of familial relationship. This tenant was sometimes enforced by law under the Han dynasty.

ANSWER: **filial piety** (Prompt on descriptions like “devotion to father”)

[10] This influential student of Confucius is sometimes known as “The Second Sage” of Confucianism. This man once said, “human nature is good”.

ANSWER: **Mencius** (or **Mengzi**)

3. This result says that in a plane, there can be at most one line of a certain property that can be drawn through the point. For 10 points:

[10] Identify this mathematical axiom that is a basis for its formulator’s geometry.

ANSWER: The **Parallel Postulate** (accept **Euclid’s Fifth** Postulate but do not reveal the word “Euclid”)

[10] This Ptolemaic [pr. “Toe-Leh-May-ik”] mathematician outlined his Parallel Postulate in his *Elements*. This thinker is known as “The Father of Geometry”.

ANSWER: **Euclid**

[10] This Russian mathematician was among the first to formulate a non-Euclidean geometry. This man’s geometry is also known as hyperbolic geometry.

ANSWER: Nikolai **Lobachevsky**

4. Answer the following about monsters that may or may not go bump in the night in Greco/Roman myth for 10 points each:

[10] Many monsters were the children of Echidna and this monster who had to be fought off by Zeus and Athena. According to one myth, Zeus threw Mount Etna on top of this monster.

ANSWER: **Typhon**

[10] One child of Typhon was the Hydra, which had regenerating heads of this animal. Echinda was part woman and part this animal.

ANSWER: **Snakes** (or equivalents such as **serpents**)

[10] This other snake guarded the golden apples of the Hesperides. This snake, like the Hydra, was slain by Heracles as part of his twelve labors and is seen in the Draco constellation

ANSWER: **Ladon** (prompt on “Hesperian Dragon”)

5. A character featured in this novel gets the nickname “Cheats death” while in prison. For 10 points each:

[10] Identify this novel in which the law student Rastignac lives with the title character and Vautrin in Paris. After the title character dies, only Rastignac, a servant, and two paid mourners attend.

ANSWER: Père Goriot

[10] *Père Goriot* along with *The Wild Ass's Skin* are part of this realist author's larger literary work *The Human Comedy*.

ANSWER: Honoré de Balzac

[10] Some allege that Balzac was inspired to write *The Human Comedy* from reading this Italian author of *The Divine Comedy*.

ANSWER: Dante Alighieri (accept either)

6. Answer the following about America's beautiful national parks and forests for 10 points each:

[10] America's first national forest was established at this location, now better known for its geothermal features such as the Old Faithful geyser.

ANSWER: Yellowstone National Park

[10] In 1968, this national forest was established to curb the destruction of America's largest, tallest trees. This California park also contains large condors.

ANSWER: Redwood National Forest

[10] This national forest touches three of the five Great Lakes, and covers over 800,000 acres in Michigan's Upper Peninsula. This national forest in Ottawa County is unsurprisingly a big camping destination.

ANSWER: Hiawatha National Forest

7. Answer the following about a painting that was sold for over 119 million dollars in 2012, for 10 points each:

[10] Identify this oft-stolen painting where a man in front of a red sky stands in front of bridge. This painting may have been inspired by the Krakatoa eruption.

ANSWER: The Scream (or *Skrik*)

[10] *The Scream* was painted by this Norwegian symbolist artist of the *Frieze of Life* series.

ANSWER: Edvard Munch

[10] In the Frieze of Life series, Munch memorializes his sister in a painting titled *Death in this place*. A green wall is in the background of this painting in which a man prays in the foreground.

ANSWER: The Sickroom (accept Death in the Sickroom)

8. This impressionist composer created a keyboard suite dedicated to World War I victims of his home country. For 10 points:

[10] Name that composer who also created the ballet *Daphnis et Chloé* and the Spanish-inspired solo piano piece *Pavane for a Dead Infanta*.

ANSWER: Maurice Ravel

[10] Ravel is most famous for this piece, which was created for Ida Rubinstein and features a repetitive, building crescendo as well as a snare drum throughout this piece.

ANSWER: Boléro

[10] A Ravel piece was named after this French Baroque composer who combined the Italian and French musical styles in “*Styles Reunited*” and wrote the *Art of Playing the Harpsichord*.

ANSWER: François Couperin (or Couperin the Great)



9. Some cite the example of The Gravina Island Bridge, otherwise known as the “Bridge to Nowhere”, as an example of one of these pieces of legislation gone wrong. For 10 points each:

[10] Name these items used by congressmen to give benefits to their constituency and create compromise on legislation that come in “hard” and “soft” varieties.

ANSWER: **Earmarks** (prompt on “Pork Barrel spending”)

[10] Republicans are racing to try and bring back earmarks in the House of Representatives, after the practice of using them had been effectively ended under this former Speaker of the House from Ohio.

ANSWER: John **Boehner**

[10] The term Earmarks is synonymous with this evocative term which is a pejorative used to refer to legislation that is politically geared to benefit one congressional district—often economically.

ANSWER: **Pork Barrel** spending

10. During the age of African Imperialism, Ethiopia was one of two nations to maintain its independence. For 10 points each:

[10] Name this last Emperor of Ethiopia who was ousted in a coup in 1974. This man is also revered as a religious figure in the Rastafari faith.

ANSWER: **Haile Selassie**

[10] The largest religion in Ethiopia is Ethiopian Orthodox Christianity, which developed from this branch of Christianity.

ANSWER: **Coptic** Christianity

[10] Haile Selassie was a member of the Solomonic Dynasty, which ruled Ethiopia for 700 years. The Solomonic Dynasty traced its roots to King Solomon and this biblical woman, who visited Solomon at the head of a large retinue.

ANSWER: **Queen of Sheba** (also accept **Makeda**)

11. Answer the following about the literary pieces of Ernest Hemingway that aren’t all novels for 10 points each.

[10] The “snows” of this mountain where a lion was buried were described in a story in which the gangrene infected Harry narrates his life experiences to Helen. Harry tells her he fished in the Black Forest and harbored a deserter.

ANSWER: Mount **Kilimanjaro** (accept “**The Snows of Kilimanjaro**”)

[10] In this other Hemingway short story, “The American” and Jiq argue about the flavor of “Anis del Toro”. Some scholars suggest that there is an implicit discussion of abortion in this short story.

ANSWER: “**Hills Like White Elephants**”

[10] The “Anis del Toro” also appears in *The Sun Also Rises*, which like Hemingway’s nonfiction *Death in the Afternoon* describes this Spanish sport often practiced in Pamplona.

ANSWER: **bullfighting** (accept obvious equivalents like “**corrida de toros**” or “**tauromachia**”)

12. For 10 points each, name some things about King Egica.

[10] Egica was a king of this Barbarian people that originated in Scandinavia, and earlier had invaded the Roman Empire under its King Alaric, who sacked Rome in 410.

ANSWER: **Visigoths**

[10] Egica put forth legislation that took all land belonging to this Religious group and made them all slaves to Christians in 694 to combat a conspiracy that this group would overthrow the Christians.

ANSWER: **Jews**

[10] An archbishop of this city named Sisebert conspired against Egica in 693 in an attempt to place the Duke of Sunifred on the throne. This Spanish city is the namesake of a type of steel.

ANSWER: **Toledo**

13. The release of pyrophosphate in one form of this technique is detected as a burst of light. For 10 points each:

[10] Name this technique, one form of which uses ddNTPs to terminate a chain, allowing for identification of the order of adenines, guanines, cytosines, and thymines.

ANSWER: **DNA sequencing** (prompt on sequencing)

[10] Whole genome sequencing has been a boon for investigating this “mini-ecosystem,” defined as the collection of genetic material found in microorganisms in an environment.

ANSWER: **microbiome**

[10] One common way of characterizing bacteria is through their response to this test, wherein they appear purple or pink depending on whether they take up crystal violet.

ANSWER: **Gram** stain

14. This syncretic religion draws its name from a word for spirit or god in the Fon or Ewe languages. For 10 points each:

[10] Identify this religion mixed with French Catholicism in Haiti in which practitioners may make dolls.

ANSWER: **Vodou** (or **Voodoo**, **Voudou**, **Vaudou**, **Vodoun**, **Vodun**)

[10] Followers of Vodou worship these spirits that are placed into nations depending on country of origin in Africa. Corn meal drawings known as *veve* are meant to summon these spirits.

ANSWER: **Loa** (or **Iwa**)

[10] This Caribbean loa of the dead is commonly depicted with a cigar and a top hat. His face is often depicted a skull and is married to Maman Brigitte.

ANSWER: **Baron Samedi** (or **Bawon Sanmdi**)

15. This prime minister was depicted winning a horse race against his rival William Gladstone in a cartoon entitled “[this man] wins with Reform bill”. For 10 points each:

[10] Name this prime minister of Great Britain, a Conservative who passed the 1867 Reform bill which enfranchised many working-class men.

ANSWER: Benjamin **Disraeli**

[10] Benjamin Disraeli helped popularize this political philosophy that emphasized an organic society based on paternalism and pragmatism.

ANSWER: **One-nation conservatism**

[10] Unfortunately for him, Disraeli wouldn’t be prime minister forever, especially after his retired rival William Gladstone led the Midlothian Campaign against him which helped this party retake parliament.

ANSWER: **Liberal** Party (do NOT accept or prompt on “Labour” as this that did not exist yet)

16. In this novel, Ambrose Bierce crosses the El Paso border to find Pancho Villa. For 10 points each:

[10] Name that novel where Harriet Winslow teaches English to the Miranda children.

ANSWER: **The Old Gringo**

[10] *The Old Gringo* was written by this author who wrote about the deathbed flashbacks of a corrupt politician and tycoon in *The Death of Artemio Cruz*.

ANSWER: Carlos **Fuentes**

[10] Fuentes was part of the “Latin American Bloom” and was born in this country, whose early 20<sup>th</sup> century revolution was featured in both *The Old Gringo* and *The Death of Artemio Cruz*.

ANSWER: **Mexico**

17. Do you like Huey Lewis and the News? He's been compared to Elvis Costello, but for 10 points each, answer some other questions tangentially related to him:

[10] In '87, Huey released this song on *Fore!* their most famous album. This song is so catchy that most people don't even listen to the lyrics, but "there is no denying that" that Huey used to be a "renegade" and "used to fool around".

ANSWER: "**Hip to be Square**"

[10] "Hip to be Square" was referenced by the Christian Bale-played Patrick Bateman in this 2000 thriller where Bateman nonchalantly murders people that may be an indictment on 80s yuppie culture.

ANSWER: **American Psycho**

[10] Bale also starred alongside Russell Crowe in this 2007 remake of a 1957 Western. In this film, Dan Evans lost a leg in the Civil War and moves to Arizona to become a rancher before meeting the outlaw Ben Wade.

ANSWER: **3:10 to Yuma**

18. Answer the following about periodic trends for 10 points each:

[10] Theoretically, francium has the highest number for this value and helium should have the lowest. This distance can be estimated by finding distance between two bonded atoms and dividing by two.

ANSWER: **Atomic Radius** (prompt on "Radius")

[10] This is the reason, aside from the number of shells surrounding an atom, that atoms to the left side of the periodic table have a higher atomic radius. This phenomenon suggest that valence electrons are easier to remove.

ANSWER: Effective **Nuclear Charge** (prompt on "Z eff" and just "charge")

[10] The closer electrons are to the nucleus of an atom, the higher the value for this property is. It is the amount of energy required to remove a single electron from an atom.

ANSWER: **Ionization Energy**

19. As a punishment, this character is locked in the "Red Room," where she envisions seeing her dead uncle. For 10 points each,

[10] Identify this character, who stays at the estate of Mr. Rochester after her time at Lowood Institution.

ANSWER: **Jane Eyre**

[10] *Jane Eyre* was written by this Victorian author, also known for *Villette*.

ANSWER: **Charlotte Brontë** (prompt on "Brontë")

[10] Jane begins working at Thornfield to tutor this young French girl, who may be the illegitimate child of Mr. Rochester.

ANSWER: **Adele**

20. These examples of simple harmonic oscillators can be represented in a Free Body Diagram as a point mass with a downward force equal to the object's weight. For 10 points each:

[10] Name this device where a weight is suspended from a fixed point.

ANSWER: **Pendulum**

[10] If this approximation holds, then the pendulum's behavior can easily be described as oscillatory for small perturbations.

ANSWER: The **Small Angle Approximation** (accept "**Sine theta equals theta**" or similar variables such as "x" instead of theta)

[10] For a pendulum system to be considered chaotic, as in a double rod pendulum system, this property must hold. This property is exemplified by paint mixing where open sets overlap with another region.

ANSWER: **Topological Mixing** (accept "**Topological Transitivity**")

21 (TB). Early opera was considered revolutionary instead of yawn inducing as it is today. Let's try to change that perception for 10 points each:

[10] This early opera premiered in the 17<sup>th</sup> century and is based on the Greek story of a musician who descends into Hades to get back his wife Eurydice.

ANSWER: Orfeo (or L' Orfeo or La favola d'Orfeo)

[10] This Italian composer composed *L'Orfeo* as well as *The Coronation of Poppea*.

ANSWER: Claudio Giovanni Antonio Monteverdi

[10] In *L'Orfeo*, a singer of this musical range portrays characters such as Eurydice and La Speranza. This female vocal range is higher than the contralto and comes in a "mezzo" form.

ANSWER: Soprano (or mezzo soprano)