

## Minnesota Undergraduate Tournament 2013

Questions by Rob Carson, Mike Cheyne, Andrew Hart, Gaurav Kandlikar, Matt Menard, and Bernadette Spencer

### Round 2: Hilbert and His Problems

#### Tossups

1. A woman known as “Julia the Beautiful” was the mistress of one member of this family and is likely depicted in the painting *Lady with an Unicorn*. After that member achieved his highest position, a rival reportedly said “Now we are in the power of a wolf.” That member of this family is said to have used four mule-loads of silver to bribe a rival in one election. Another member held the prostitute-laden Banquet of Chestnuts and in 1499 conquered the city of Forli, capturing rival Caterina (\*) Sforza. That member of this family’s cunning use of mercenaries was praised by Machiavelli in *The Prince*. One member became Pope Alexander VI, while another was accused of poisoning people with arsenic. For 10 points, name this notorious Renaissance era family whose members included Rodrigo, Cesare, and Lucrezia.

ANSWER: Borgia

2. In an essay, this novel’s author described how its first inspiration was a story about an ape in the Jardin des Plantes sketching the bars of its own cage. One character in this work forces another to read a parody of Eliot’s “Ash Wednesday” and imagines himself being followed by an Aztec Red convertible containing an “Inspector Trapp”. After the narrator learns that his wife has been hit by a car, he takes a trip to an inn called “The (\*) Enchanted Hunters”, which shares its name with a play in which the title character later performs. John Ray Jr.’s prologue reveals that this novel’s title character died in Gray Star after marrying Richard Schiller, while the narrator dies before his trial for the murder of Clare Quilty. For 10 points, identify this novel in which Humbert Humbert narrates his obsession with the “nymphet” Dolores Haze, a work of Vladimir Nabokov.

ANSWER: Lolita

3. The movement of these things is the subject of the Marcus Theory, and HIPIP proteins are components of systems which result in the movement of these things. The affinity of compounds for these things is described by their reduction potentials. These things are pushed from the tail of a curved (\*) arrow to its tip, and when only one of these particles move, a single barbed arrow is used. After homolytic bond cleavage, each half has an unpaired one of these particles; in those compounds, these particles are called free radicals. The placement of these particles in orbitals is the subject of Hund’s Rules and the Aufbau principle. For 10 points, name these nearly-massless subatomic particles that have a negative charge.

ANSWER: electrons

4. This head of state position was won by conservatives in the revolutionary elections of 1977, in which the “Alignment” party lost its plurality. The man who won this post ordered Operation Opera on a target named Osirak. In 1995, a man in this post was killed by a dissident opposed to the signing of the Oslo Accords. In the 1970’s, the person holding this position authorized Operation Wrath of God to assassinate (\*) Black September members. Currently held by a member of the Likud party, it is filled when the president nominates a member of the Knesset. The first man to hold this post was David Ben-Gurion, while the only woman to hold it was Golda Meir. For 10 points, name this position currently held by Benjamin Netanyahu, the head of state of a Jewish nation.

ANSWER: Prime Minister of Israel [do not accept “president of Israel”]

5. In one poem, this man described a figure who “draws his breath in confidence of Heaven’s applause” and who “every man in arms should wish to be”. This author of “Character of the Happy Warrior” describes his home country as “a fen of stagnant waters: altar, sword and pen” and claims that the addressee’s “soul was like a star” in a poem which begins by lamenting “Milton! thou shouldst be living at this hour”. In another poem, he notes that he’d “rather be a (\*) Pagan suckled in a creed outworn” and complains that “getting and spending, we lay waste our powers”. In addition to “London, 1802” and “The World is Too Much With Us”, he wrote a long poem recounting a visit to the banks of the Wye with his sister Dorothy and described seeing “a host of dancing Daffodils” in another poem. For 10 points, identify this author of “Tintern Abbey” and “I Wandered Lonely as a Cloud”.

ANSWER: William Wordsworth

6. Pathways involving these types of enzymes often recruit subsequent proteins via SH2 domains. The cAMP Response Binding Protein is only able to bind DNA after it has been acted on by one of these enzymes. Insulin receptors have the activity of these enzymes on their cytoplasmic faces. These enzymes are classified based on whether they work on tyrosine residues or serine and threonine residues, and Ras activates a pathway involving a (\*) cascade of these enzymes called the Map cascade. The first enzyme of glycolysis is one of these enzymes that works on hexoses. The effect of this type of enzymes is reversed by phosphatases. For 10 points, name these enzymes that transfer phosphate groups onto substrates.

ANSWER: kinases [prompt on answers like “enzymes that transfer phosphate groups” until giveaway; accept protein kinases; accept specific types like “tyrosine kinases” or “serine/threonine kinases”]

7. Karl Radek wrote a controversial article calling this man the “Organizer of Victory.” In October 1917, he told a political group that they should “go where you belong from now on—into the dustbin of history!” He was criticized as a hypocrite by Emma Goldman for calling in the army as War Commissioner to put down the 1921 Kronstadt Rebellion. This husband of Natalia Sedova replaced Adolph Joffe in leading a delegation of a country that pulled out of a war in the Treaty of (\*) Brest-Litovsk. This author of *The Revolution Betrayed* reportedly had an affair with Frida Kahlo while living in Diego Rivera’s home. He was slain in 1940 by Ramon Mercader, who used an ice axe. For 10 points, name this Russian revolutionary who was assassinated in Mexico on orders of Joseph Stalin.

ANSWER: Leon Trotsky [accept Lev Davidovich Bronstein]

8. One character in this novel dramatically rips an arrow out of his eye, then eats his eyeball. Another of its characters is captured and released seven consecutive times to earn his loyalty. In one scene in this novel, a character being feted at a feast is possessed by an angry ghost, who swears his vengeance and causes the living character to bleed to death from seven orifices. Horses in this novel include the cursed Hex Mark and the legendary Red Hare, the latter of which is owned by a warrior who kills his foster father (\*) Dong Zhuo over the courtesan Diaochan. One character in this novel employs the “Young Phoenix” and the “Sleeping Dragon” and swears the “Oath of the Peach Garden” with Zhang Fei and Guan Yu. The virtuous Liu Bei and the villainous Cao Cao (“tsao tsao”) appear in, for 10 points, which novel, attributed to Luo Guanzhong, which depicts the conflict between Wei, Wu, and Shu?

ANSWER: *The Romance of the Three Kingdoms* [or San Guo Yan Yi]

9. This book’s fourteenth and final chapter concludes that there are so many choices in the world that parents must teach their children how to think instead of what to think. One section of this work discusses the use of chicken blood to skirt the *taupou* system. This work, which contains the chapter “Education for Choice,” includes a preface written by (\*) Franz Boas. The idea that this book was based on “anthropological myth” is the thesis of a book about the “fateful hoaxing” of this work’s author by Derek Freeman. This book reports that its adolescent subjects engage in casual premarital sex. For 10 points, name this book that profiles the youth of the island of Ta’u in the title island group, written by Margaret Mead.

ANSWER: *Coming of Age in Samoa*

10. In one game, this character has the opportunity to pet four yaks; doing so earns the player the “Beast Mode” medal. In that game’s climactic fight, this character can take advantage of explosive blue resin. He can sometimes use a golden Desert-5 once owned by his former associate Eddy Raja. This character owns a ring reading “Sic Parvis Magna” which he combines with a cipher disk to decode Enochian script. In this character’s most recent appearance, he finds a hallucinogenic water fountain in Ubar, after which he shoots (\*) Talbot. He has an on-again-off-again relationship with Elena Fisher and his best friend is Victor Sullivan, both of whom first appeared in a game in which he searched for El Dorado. For 10 points, name this Nolan North-voiced protagonist of the *Uncharted* video game series, a treasure hunter who is ostensibly descended from an English explorer.

ANSWER: Nathan “Nate” Drake [accept any underlined portion]

11. This object’s namesake Mare Explorer mission has been proposed to visit its Liegia Mare, which is mainly made up of ethane and methane. Hotei Regio and Tui Regio are sites on this body, which is also home to the unusually dark Shangri-La area. The Kraken Lake is on this object, which features a region with remarkably high albedo called its “Xanadu” area. Because the Miller-Urey experiment’s prebiotic conditions were similar to this body’s atmosphere and because it may have (\*) methane lakes with floating ice, this satellite has been the subject of the search for life. This object was the destination of the Huygens probe, and this is the only moon with a dense atmosphere. For 10 points, name this largest moon of Saturn.

ANSWER: Titan

12. In this work, J. Willicombe Billows unsuccessfully tries to show off his invention, and in a later scene, a smuggler empties a packet of cocaine into a salt shaker. When the protagonist of this work takes a cigarette break in a bathroom, his boss appears on a large screen and tells him to “quit stalling.” The protagonist of this work is commended for helping prevent a jailbreak, but after unsuccessfully seeking a (\*) job, decides to return to jail by taking blame for stealing bread that was actually stolen by an orphan girl he later lives with. The protagonist of this film makes up a song for the patrons of a restaurant in this film. For 10 points, name this film in which the protagonist enters into the gears of a factory machine, a Charlie Chaplin film in which the Tramp adjusts to a highly industrialized society.

ANSWER: Modern Times

13. On this holiday, a sacrifice involving three groups of laity occurs. In Israel, this holiday is seven days long, and the second day marks the beginning of the counting of the Omer. Samaritans observe this holiday by making a pilgrimage to Mount Gerizim. All *chametz* must be forsaken on this holiday, on which the youngest child says “Ma Nishtana” as a part of the (\*) “four questions” ritual. Observers eat bitter herbs known as maror and a young lamb on this holiday, on which unleavened *matzo* bread is also consumed. For 10 points, name this Jewish holiday that commemorates the Israelites’ escape from Egypt after the tenth plague spared Jewish newborns.

ANSWER: Passover [or Pesah; or Pesakh]

14. A partial differential equation partially named for this man sets a namesake quantity equal to the negative time derivative of the action. That equation is named for this man and Jacobi. This man’s namesake principle is a refinement of the principle of stationary action. Applying this man’s namesake operator to the wavefunction of a system gives  $i\hbar$  times the partial of the wavefunction with respect to time according to the (\*) time-dependent Schroedinger’s equation. In classical mechanics, a function named for him can be obtained by a Legendre transform on the Lagrangian. For 10 points, name this Irish mathematical physicist who revised Lagrangian mechanics, gave his name to the operator representing the total energy of a system, and invented quaternions.

ANSWER: William Rowan Hamilton

15. One character in this play worries that “the moon’s getting nearer and nearer and there’ll be a big ‘splosion”. In one scene in this play, three uniformed baseball players suddenly appear to mock one of the main characters before being kicked off the stage. In three different scenes in this play, a choir sings the hymn “Blessed Be the Tie that Binds”. It ends with a scene in which a character revisits her twelfth birthday and wonders if “any human beings ever (\*) realize life while they live it”, and it also features the suicide of the alcoholic choirmaster Simon Stimson. Divided into three acts titled “Daily Life”, “Love and Marriage”, and “Death and Eternity”, it follows the developing love between George Gibbs and Emily Webb. For 10 points, identify this play set in Grover’s Corners and narrated by the Stage Manager, a work of Thornton Wilder.

ANSWER: Our Town

16. A one-time mayor of Bridgeport, Connecticut, this man built the fanciful mansion “Iranistan” in the city. He was a prime benefactor of Tufts University, which honored him with its choice of mascot. In one of the buildings he operated, this man hung the sign “This Way to the Egress,” which simply led people to the exit. He paid a \$1,000 a night to the “Swedish Nightingale,” singer Jenny Lind, to tour across America. After purchasing Scudder’s American (\*) Museum, this man purchased a creature with the head of a monkey and the tail of a fish. Besides showing off “General Tom Thumb” and the “Feejee mermaid,” he is credited with introducing the phrase “There’s a sucker born every minute.” For 10 points, name this famous hoaxer and circus showman.

ANSWER: Phineas Taylor Barnum

17. This deity was known as the “frequenter of Vagasker and Singasteinn”, the latter of which was the site at which he fought a son of Farbauti in the form of a seal. A lost poem about this gold-toothed god apparently relates a story in which he was pierced by a man’s head, explaining why a kenning for sword is “[this god’s] head”. This deity fought Loki to recover Brisingamen for Freya and fathered the three races of man in the guise of (\*) Ríg. He owns the golden-maned horse Gulltoppr and lives in Himinbjörg. The daughters of Aegir are sometimes identified with the nine maidens who gave birth to him. He sleeps less than a bird and can hear both grass and wool growing from his position at Bifrost, and he will use his most famous possession to signal Ragnarok. For 10 points, identify this owner of Gjallarhorn, the sentinel of the Aesir.

ANSWER: Heimdallr [accept Ríg until it is read]

18. One version of this scene was included as the frontispiece to Benjamin Peret’s book *Behind the Bundles of Firewood* and depicts a window on the right casting solid rays across a screaming, green-smudged central figure. A bowl of fruit and a brazier with a large flame sit on a table next to a nude redhead patterned after Tulla Larsen in a 1907 depiction of this scene. Those versions, by Picasso and Munch, were inspired by a painting of this scene which was hidden by Antoine-Jean (\*) Gros during its artist’s Belgian exile. In that version, a large wooden box in the foreground displays the names of the artist and the turban-wearing title figure, who slumps to the side and clutches a quill pen and a letter from the absent Charlotte Corday. For 10 points, identify this scene involving a deceased French revolutionary, painted most famously by Jean-Louis David.

ANSWER: *The* Death of Marat

19. One work by this man argued that physical facts do not always have to arise from mental facts and opens with a list of “truisms”. This philosopher outlined three qualities of acceptable proofs in an essay that claims that valid knowledge is not always logically sound. Another work by this man claims that its subject is an irreducible simple property that must be experienced to be known just as the one must see to understand the color (\*) yellow. This author of “A Defence of Common Sense” formulated the “here is a hand” argument to prove the existence of an external world. This man also defined the naturalistic fallacy and argued that the definition of good remains an “open question”. For 10 points, name this American philosopher who wrote *Principia Ethica*.

ANSWER: G.E. Moore [or George Edward Moore; or “Bill” Moore from family and friends]

20. Austrian composer Johann Fux was a disciple of a composer from this country, whose ideas he used to write the treatise *Gradus ad Parnassum*. Another composer from this country, who immigrated to London, was an early master of the piano who wrote the 1826 collection of keyboard studies also called *Gradus ad Parnassum*. A composer from this country wrote the opera *The Return of Ulysses* and nine books of (\*) madrigals. Another composer from this country apocryphally saved polyphony with the publication of his *Pope Marcellus Mass*. For 10 points, name this country, the home of Muzio Clementi, Giovanni Perluigi da Palestrina, and Claudio Monteverdi.

ANSWER: Republic of Italy [or Italian Republic; or Repubblica Italiana]

21. A trimer of PCNA is assembled during this process, which is inhibited by recruitment of the 9-1-1 complex. Prior to this process, the Pre-RC is assembled. SSB proteins are used during this process, during which the sliding clamp is loaded onto the central structure. This process occurs in a “rolling circle” mechanism during F-/F+ (“f minus, f plus”) mating. In bacteria, this highly processive process begins at the (\*) *ori* regions. The holoenzyme that conducts this process has an exonuclease site which assures a high level of fidelity. The enzyme Primase initiates this process, which synthesizes a structure that grows from the 5’ (“five prime”) to the 3’ end. For 10 points, name this process that results in the generation of a new copy of the genome.

ANSWER: DNA replication [accept equivalents]

## Bonuses

1. The remarkable diversity of these proteins is generated by somatic hypermutation, which is also called VDJ recombination. For 10 points each:

[10] Name these Y-shaped proteins that are composed of two heavy and two light chains. Group of these proteins that all bind the same epitope are called “monoclonal.”

ANSWER: **antibodies** [or **immunoglobulin** or **Igs**]

[10] Protein-DNA interactions are studied using this technique, in which antibodies are targeted to crosslinked protein-DNA complexes. In an amusingly named assay, this technique is followed up with a microarray.

ANSWER: **ChIP** [or **chromatin immunoprecipitation**] (coupling with microarray makes it “ChIP-Chip” assay)

[10] Antibodies are secreted by these cells, which mature after interacting with effector T4 cells. These cells mature in bone marrow.

ANSWER: **B** cells

2. After leaving office, this man noted “the crash will come twenty years after my departure” and referenced the battle of Jena. For 10 points each:

[10] Name this first Chancellor of a united Germany, who had spearheaded German unification. In 1862, he claimed that the “great questions of the time” will be settled by “iron and blood.”

ANSWER: Otto von **Bismarck** [or Otto Eduard Leopold, Prince of **Bismarck**]

[10] In 1871, Bismarck kicked off this series of anti-Catholic policies in Prussia. This campaign included the Congregations Law, which abolished religious orders, and the May Laws, which closed seminaries.

ANSWER: **Kulturkampf** [accept **culture struggle**]

[10] This man succeeded Bismarck as German Chancellor. He endorsed the “New Course” of foreign policy that supported improved relations with Britain before being dismissed in 1894.

ANSWER: (Georg) Leo Graf von **Caprivi** de Caprera de Montecuccoli

3. Lucifer uses the beautiful girl Matilda as part of a plan to tempt the previously-virtuous Ambrosio to fall from grace in one novel in this genre, Matthew Lewis’s *The Monk*. For 10 points each:

[10] Identify this genre, a blend of romance and horror inaugurated by Horace Walpole’s 1764 novel *The Castle of Otranto*.

ANSWER: **Gothic** novels [accept equivalents like “**Gothic** fiction” or “**Gothic** horror”]

[10] This foremost female Gothic novelist outlined the difference between “terror” and “horror” in her essay “On the Supernatural in Poetry”. Her novels include *The Italian* and *The Mysteries of Udolpho*.

ANSWER: Anne **Radcliffe**

[10] The title Abbasid caliph of this Gothic novel by William Beckford builds five palaces dedicated to the senses and buys glowing swords from the merchant Giaour, who convinces him to renounce Islam.

ANSWER: **Vathek**, *an Arabian Tale* [or *The History of the Caliph Vathek*]

4. Identify the following models from quantum mechanics, for 10 points each.

[10] This model considers a particle in a potential proportional to the displacement squared. Its solutions feature the Hermite polynomials, with corresponding energy levels proportional to  $n$  plus one half for non-negative integers  $n$ .

ANSWER: quantum **harmonic oscillator**

[10] Students are often introduced to solving the Schroedinger equation with this model, in which the potential energy is zero within a square or cube and infinite everywhere else. Its solutions are sinusoidal.

ANSWER: **particle** in a **box** [accept **infinite square well** or **infinite potential well**; prompt on “infinite cubic well”]

[10] Schroedinger debuted his namesake equation in a 1926 paper in which he used it to solve this model, which considers an electron orbiting a proton.

ANSWER: **hydrogen** atom



5. Name some things related to everyone's favorite philosophy subject, Platonic dialogues, for 10 points each.  
[10] Plato argued that the ideal society should consist of productive, protective, and governing groups in this dialogue that introduced the Theory of Forms and the Allegory of the Cave.

ANSWER: **Republic**

[10] In this dialogue, Socrates and the title religious thinker argue over the importance of belief in divine retribution and filial duty to come to a universal definition of piety.

ANSWER: **Euthyphro**

[10] In this dialogue within a dialogue, Socrates attempts to discover whether knowledge consists of perception, judgement, or true judgment with evidence.

ANSWER: **Theatetus**

6. The last of these works asserts that "the one discharge of sin and error" is "to be redeemed from fire by fire", while the first opens by positing "Time present and time past / Are both perhaps present in time future." For 10 points each:

[10] Identify this group of poems, written between 1935 and 1942, that includes "East Coker" as well as the aforementioned "Little Gidding" and "Burnt Norton"

ANSWER: **Four Quartets**

[10] The *Four Quartets* were written by this American-born poet, who coined the phrase "April is the cruellest month" in his long poem *The Waste Land*.

ANSWER: Thomas Stearns **Eliot**

[10] Eliot's first great success was this stream-of-consciousness monologue about a man who ultimately lacks "the strength to force the moment to its crisis". It opens with the line "Let us go then, you and I" and repeats the refrain "In the room the women come and go, talking of Michelangelo".

ANSWER: "The **Love Song of J. Alfred Prufrock**" [prompt on "Prufrock"]

7. Identify the following about chess terminology, for 10 points each.

[10] This technique, notated 0-0 or 0-0-0 depending on whether it is done kingside or queenside, involves simultaneously moving the king two squares toward the rook and the rook to the square on the other side of the king.

ANSWER: **castling** [or **castle**]

[10] If this piece is moved to the second rank of the knight's file behind an advanced knight's pawn, it is said to have been fianchettoed. This piece is the only one restricted to squares of a single color.

ANSWER: the **bishop**

[10] This German term designates a situation in which one player is compelled to move even though all of his available moves are disadvantageous to him.

ANSWER: **zugzwang** [prompt on translations like "compulsion to move"]

8. This ruler was the target of the Main Plot, which sought to replace him with his cousin Arabella. For 10 points each:

[10] Name this ruler, who was also targeted in the Bye Plot. The Main Plot's fallout resulted in the imprisonment of Sir Walter Raleigh, a favorite of this man's predecessor as monarch, who had died without having children.

ANSWER: **James I** [accept **James VI** of Scotland]

[10] This November 5, 1605 plot led by Robert Catesby tried to assassinate James I by blowing up the House of Lords. Also known as the "Jesuit Treason," it featured Guy Fawkes in charge of the explosives.

ANSWER: **Gunpowder** Plot

[10] A less violent incident in James I's reign was this 1604 conference in which James met with Puritans at the namesake palace. Its most notable result was the commissioning of an English translation of the Bible, which is now known as the King James Version.

ANSWER: **Hampton Court** Conference

9. Name some things about famed Rutgers political scientist Drucilla Cornell, for 10 points each.

[10] Cornell is a pioneer in deconstructing the law, using the methods of this French author of *Of Grammatology*.

ANSWER: Jacques **Derrida**

[10] Cornell wrote a book about the relationship between feminism and this form of media, which Catharine MacKinnon and Andrea Dworkin dislike and which was central to *Jacobellis v. Ohio*.

ANSWER: **pornography** [accept clear equivalents; accept **obscenity** or word forms]

[10] Cornell responded to the question of what lives are worth grieving presented in *Precarious Life*, a book by this author of *Bodies that Matter*.

ANSWER: Judith **Butler**

10. Characters in this story include the Comte and Comtesse de Breville and the democrat Cornudet, who begins whistling the Marseillaise as the story ends. For 10 points each:

[10] Identify this story in which a carriage of people fleeing to Le Havre are detained by a Prussian officer, who refuses to release them until Elisabeth Rousset, the title prostitute, sleeps with him.

ANSWER: "**Boule de Suif**" [accept "**Ball of Fat**", "**Ball of Lard**", "**Butterball**", "**Suet Dumpling**", or equivalent translations]

[10] "Boule de Suif" was written by this French short story master, whose other works in that form include "The Horla", "Mademoiselle Fifi", and "The Necklace".

ANSWER: Guy de **Maupassant** [or Henri René Albert Guy de **Maupassant**]

[10] In this Maupassant story, also set during the Franco-Prussian War, Messieurs Morissot and Sauvage go fishing in no man's land, but are captured by Prussian soldiers and shot when they refuse to divulge the French password.

ANSWER: "**Deux Amis**" [or "**Two Friends**"]

11. Note to moderator: DO NOT REVEAL ALTERNATE ANSWER TO FIRST PART.

Part of this island's native population was taken by missionary George Augustus Robinson to a place called The Lagoons. For 10 points each:

[10] Name this island which had most of its native population wiped out in the Black War. Historian Keith Windschuttle has questioned accounts of massacres that took place on this island.

ANSWER: **Tasmania** [or **Van Diemen's Land**, prompt on **Australia**]

[10] Tasmania was originally named for this Governor-General of the Dutch East Indies, who had dispatched Abel Tasman on his explorations. The island was known as this man's "Land"

ANSWER: Anthony **van Diemen**

[10] This term has been applied to the indigenous population of both Tasmania and Australia. While this term technically refers to any native inhabitant, it is used to commonly refer to Australian natives.

ANSWER: **aborigine** [accept word forms, like **aboriginal** or **aborigines**]

12. This composer cofounded the influential *New Journal for Music*, which published Richard Wagner's notorious article on "Jewishness in Music." For 10 points each:

[10] Name this husband of Clara Wieck who was inspired by E.T.A. Hoffman to write his *Fantasiestücke*. His orchestral works include the *Spring* and *Rhenish* symphonies.

ANSWER: Robert Alexander **Schumann**

[10] Schumann's *Fantasiestücke*, as well as his suites *Papillons* and *Carnaval*, were originally composed for this instrument. Schumann's concerto for this instrument was written in A minor.

ANSWER: **piano** [forte]

[10] Schumann collaborated with Johannes Brahms and Albert Dietrich to produce this four-movement work for violin and piano. Written as a gift for Joseph Joachim, it was inspired by Joachim's Romantic personal motto.

ANSWER: the **F-A-E Sonata** [accept the **Frei Aber Einsam Sonata**, I guess]



13. Identify the following animals from Greek myth, for 10 points each.

[10] This figure, like its brother Chrysaor, was born when Perseus decapitated its mother Medusa. This flying horse was later tamed by Bellerophon, who rode it while fighting the Chimera.

ANSWER: **Pegasus**

[10] For Heracles's third labor, he was tasked with traveling to Ceryneia and capturing a gigantic, bronze-hoofed example of these animals, which was sacred to Artemis.

ANSWER: the Ceryneian **hind** [or a **deer**; or a **doe**; prompt on "Cerynitis"]

[10] Sometimes said to be a gift from Zeus to Europa, this indefatigable dog was sent by Amphytrion to catch the uncatchable Teumessian fox. Zeus eventually got tired of their paradoxical nonsense and turned them both to stone.

ANSWER: **Laelaps**

14. Answer the following about the post-presidential life of Thomas Jefferson for 10 points each.

[10] In early 1812, Jefferson reconciled with this man, whom he had served under as Vice-President and eventually succeeded as President. Like Jefferson, this man, the second President, died on July 4, 1826.

ANSWER: **John Adams** [prompt on partial answer; do not accept "John Quincy Adams"]

[10] Adams and Jefferson were reunited as friends by this man, who founded Dickinson College and served as Surgeon General of the Continental Army. A proponent of bloodletting, this man's son, Richard, served in the Cabinet of James Monroe and John Quincy Adams.

ANSWER: Benjamin **Rush**

[10] In April 1820, Jefferson claimed that this proposal passed by Congress was a "fire bell in the night" and told a friend that he doubted the Union would last much longer.

ANSWER: **Missouri Compromise**

15. This painting was created as a satirical response to a group who'd criticized its artist for using German-made glass in a stained-glass window for the Cedar Rapids Veterans' Memorial Coliseum. For 10 points each:

[10] Identify this 1932 painting in which three thin-lipped, conspicuously unmarried older women gather around Emmanuel Leutze's *Washington Crossing the Delaware*.

ANSWER: **Daughters of Revolution**

[10] *Daughters of Revolution* was painted by this Iowan artist, whose dentist and sister modeled for his most famous painting, *American Gothic*.

ANSWER: Grant DeVolson **Wood**

[10] The title figure of this painting pulls back a red curtain with one hand and, with the other, gestures at the scene behind him, in which a red-coated man holds back a damaged cherry tree and interrogates a hatchet-wielding youngster.

ANSWER: **Parson Weems' Fable**

16. This company's 8086 CPU introduced its x86 family of system architectures, which have since been adopted by their primary competitor AMD. For 10 points:

[10] Name this company whose lines of processors include Pentium, and most recently the i3, i5, and i7.

ANSWER: **Intel** Corporation

[10] The x86 architecture supports the "renaming" of these objects that can have values loaded into them by assembly language operations. They are single-word segments of on-chip memory, examples of which can include EAX and EBX ones.

ANSWER: **registers**

[10] The x86 architecture supported a very deep example of this technique in which multiple operations are executed concurrently by a processor. The typical 5-stage MIPS example has stages like instruction fetch and execute.

ANSWER: **pipelining** [accept word forms]

17. One character in this play is assigned to write an essay on a “man of magnitude”, proposed examples of which include Charles Darwin, Leo Tolstoy, and Abraham Lincoln. For 10 points each:

[10] Identify this 1982 play in which the news of Hally’s father’s imminent return from the hospital causes relations to sour between him and the black servants Willie and Sam.

ANSWER: **“Master Harold”... and the boys**

[10] This South African author of *Sizwe Bansi is Dead*, *Tsotsi*, and *Blood Knot* wrote “Master Harold”... and the boys.

ANSWER: Athol **Fugard** [or Harold Athol Lanigan **Fugard**]

[10] Many of Fugard’s plays were originally produced in collaboration with this South African actor, who played Zacharias in *Blood Knot* and Sam in “Master Harold”... and the boys.

ANSWER: Zakes Makgona **Mokae**

18. The degrees of freedom for a system are given as 2 plus the difference between the number of components and the number of properties described on these constructs by a rule named for Gibbs. For 10 points each:

[10] Name these constructs which have temperature and pressure on axes and show lines of coexistence between solid, liquid and gas.

ANSWER: **phase** diagrams

[10] This equation relates the derivative of the coexistence curves of phase diagrams to a component’s latent heat, temperature, and change in volume.

ANSWER: **Clausius-Clapeyron** equation [or **Clapeyron**’s equation]

[10] So-called “tie lines” are drawn at constant temperatures on phase diagrams in order to use this type of rule, which is used to determine the weight percentages of each phase in a binary-equilibrium phase diagram.

ANSWER: **lever** rules

19. The Chesapeake Bay Foundation’s Philip Merrill Environmental Center is the first building to achieve platinum certification in this system. For 10 points each:

[10] Identify this set of rating systems for environmentally-friendly architecture, developed by Robert K. Watson of the U.S. Green Building Council.

ANSWER: **LEED** [or **Leadership in Energy and Environmental Design**; accept additional tacked-on words like “certification” or “ratings”]

[10] The largest LEED Platinum-certified building in both Asia and the world is this C.Y. Lee-designed building, which features motifs based on coins and *ruyi* figures. Its main tower features eight inverted-trapezoid sections of eight floors each.

ANSWER: **Taipei 101** [or the **Taipei World Financial Center**]

[10] This Art Deco skyscraper, designed by Shreve, Lamb, and Harmon, received LEED Gold certification in 2011. It sits at Fifth Avenue and West 34th Street in Midtown Manhattan and spent 41 years as the tallest building in the U.S.

ANSWER: the **Empire State Building**

20. This country’s capital is home to Chrystal the Drug Dealing Monkey in *The Hangover Part II*, which is set in this country. For 10 points each:

[10] Name this country in Southeast Asia, whose capital is Bangkok.

ANSWER: **Thailand**

[10] Thailand owns the eastern portion of this isthmus that connects the Malay peninsula to mainland Asia.

ANSWER: Isthmus of **Kra**

[10] Thailand’s neighbor Laos contains this plain that is home to clusters of namesake megalithic stones arranged during the Iron Age.

ANSWER: Plain of **Jars**

21. You are Dante. Answer the following about your travels through Hell, for 10 points each:

[10] In Limbo, you meet this Roman poet of the *Ars Amatoria* and the *Metamorphoses*.

ANSWER: **Ovid**

[10] The sixth through ninth circles of hell are within the city known by this name. Virgil shields your eyes before you can stupidly blind yourself by looking at Medusa outside this city, whose doors are opened by an angel.

ANSWER: city of **Dis**

[10] In the Seventh circle, you observe these creatures tearing leaves off of the trees, which represent victims of suicide.

ANSWER: **harpies**