

ACF Regionals 2015: A Livable Community

Packet by Chattahoochee HS (Nirav Ilango, Amith Punyala, Sahrudh Dharanendra, Ashwin Ramaswami, Tej Guttikonda), Columbia B (Irit Huq-Kuruvilla, Kailee Marie Pedersen, Wilton Rao, Shreyas Vissapragada), and Toronto B (Jordan Mackay-Hofmann, Faheem Pahlwan, Sunanthan Sivakumar, Meghan Torchia)

Edited by Matthew Jackson, Sarah Angelo, Tommy Casalaspi, Trevor Davis, Stephen Liu, and Sriram Pendyala

Tossups

1. A G minor piece by this composer begins with an ascending arpeggiated A-flat major chord beginning on C and played by both hands an octave apart, then transitions into 6/4 time to introduce the first theme. Towards the end of another of his pieces, the right hand rapidly and repeatedly plays C-flat, B-flat, C-natural, A before resolving into E-flat major chords, first broken, then blocked. This composer's posthumous Op. 72 includes a set of three brief *écossaises*. He proceeded via the circle of fifths through all the major and minor keys with his Op. 28 set of 24 standalone preludes. The third movement of his Piano Sonata No. 2 in B-flat minor is a well-known funeral march. For 10 points, name this Romantic pianist whose many mazurkas and polonaises built on traditional forms from his homeland, Poland.

ANSWER: Frederic Chopin

2. In Shinto myth, a god's arm turns into an icicle during an instance of this activity when it is used to decide the ruler of Japan by Takemikazuchi and Takeminakata. In the *Mahabharata*, Krishna uses a blade of grass to demonstrate to Bhima how he can defeat Jarasandha in this activity. A Libyan giant uses the skulls of his victims in this activity to build a temple to his father Poseidon. In the *Prose Edda*, Elli is an old hag who is able to defeat Thor in this because she is a personification of old age. Atalanta defeats Peleus in this, and Heracles kills a practitioner of it in midair because he draws his strength from the earth. The giant Antaeus kills travelers after challenging them to this athletic competition. For 10 points, name this activity invented by the Shinto gods in its "sumo" form.

ANSWER: wrestling [accept sumo wrestling; prompt on "combat," "fighting," etc.]

3. In a play by this author, the young boy Joas is hidden in a temple to escape the murder of his siblings by the title queen so that he may survive to become king of the Jews. This author included the nobly-born servants Cleone and Cephisa in another play. This author of *Athalie* used a meter with a caesura in the middle of each line to write a monologue relating how a prince's horses were frightened by a bull-dragon which arose from the sea off-stage. He used that alexandrine verse to adapt a plot in which Helen's daughter Hermione loves Pyrrhus, and another plot also derived from Euripides in which Aricie is treated like a daughter after Hippolytus is accused of raping his stepmother. For 10 points, name this 17th-century French playwright of *Andromache* and *Phèdre*.

ANSWER: Jean Racine

4. Transport between these two structures requires the BET1 membrane protein. The GTPase SAR1A helps assemble Sec23p/24p and Sec13p/31p into the coat that covers molecules being transported between these structures. Transport between these structures is mediated by the vesicular-tubular cluster, also called their namesake "intermediate compartment." The presence of a KDEL sequence causes the continuous retrieval of molecules from one of these organelles to the other. In the first of these organelles, PDI creates disulfide bridges in substrates which the second of these organelles might label with mannose-6-phosphate. COPII coats proteins transported between these organelles. For 10 points, name these two organelles, the first of which folds proteins which are then packaged by the second.

ANSWER: rough endoplasmic reticulum and Golgi apparatus [or rough ER and Golgi body; accept underlined portions in either order]

5. This book rejects Spinozist pantheism in its chapter on "Epiphilosophy" at the very end of its last volume. This work posits that people have a unique "twofold knowledge" of their own bodies, which they see both as "object among objects" and as an "inside self." Nietzsche drew on this book's idea that people become self-aware via a "principle of individuation" which also explains space and time. This book says that we can only transcend blind striving through art or ascetic self-denial. Inspired by the recently-translated Hindu Upanishads, it revised Kant's view of the *noumenon* by claiming that that only one *Ding an sich*, or thing-in-itself, pervades the universe. For 10 points, name this book about two aspects of the cosmos, the pessimistic magnum opus of Arthur Schopenhauer.

ANSWER: The World as Will and Representation [or The World as Will and Idea; or Die Welt als Wille und Vorstellung]

6. During an attempt to end one of these events, a small village was mistakenly raided after a séance used a Ouija board to spell out the name "Gradoli." As part of Operation Panzerfaust, Otto Skorzeny orchestrated one of these events inspired by the carpet scene from Shaw's *Caesar and Cleopatra*, which targeted the son of Miklos Horthy. 86 letters were written to various politicians and Pope Paul VI during one of these events which caused the end of the Historic Compromise. A third one was orchestrated by the Chénier Cell, prompting Trudeau to invoke the War Measures Act. One of these events led to the execution of the leader of the Christian Democrats by Red Brigades. For 10 points, name these events in which people like Pierre Laporte and Aldo Moro are taken and held for ransom.

ANSWER: kidnappings [or abductions; or hostage takings; or hostage crises; prompt on "killings," "murders," "executions," etc.]

7. One modification of a reaction developed by this scientist reacts an allylic ether or thioether with a ketene to form an unsaturated ester or thioester. Another modification of the same reaction developed by this man forms gamma, delta-unsaturated carboxylic acids from the rearrangement of deprotonated allylic acetates, and is named for Ireland and this scientist. This man also names a reaction used in the first step in the mevalonate pathway, which forms the molecule acetoacetyl-CoA. Unsaturated ketones are formed from allyl vinyl ethers in this man's rearrangement, a variant of the Cope rearrangement. Dieckmann names an intramolecular version of this man's most famous reaction. For 10 points, name this German chemist whose namesake condensation of two esters forms beta-keto-esters.

ANSWER: Rainer Ludwig Claisen

8. He's not Maxentius, but a supporter of this man was captured at the Milvian Bridge by Caius Pomptinus, and was named Titus Volturcius. Some allies of this man were strangled by cords in the Tullian dungeon; another ally of his had Publius Umbrenus try to gain the support of the Allobroges, who revealed his plans instead. This man may have bribed Quintus Lutatius Catulus to testify for him during his trial for adultery with a Vestal Virgin. In one speech this man was asked, "How long...will you abuse our patience?" before he died fighting at the Battle of Pistoria. This subject of a history by Sallust inspired the exclamation "O tempora! O mores!" in the first of four speeches against him by Cicero. For 10 points, name this leader of a 63 BC conspiracy to overthrow the Roman Republic.

ANSWER: Catiline [or Lucius Sergius Catilina]

9. When a character in one of this author's novels insists that her mother is with God, her sister pushes her off a wall. That character created by this author is routinely raped by Richard, who keeps her silence by threatening to turn in the radical author Alex. Another of this author's protagonists is abandoned by his mother, who takes away Killer, his pet rakunk; that character created by this author later takes a lover later in life who had been forced into child pornography after the murder of Uncle En. This author also wrote a novel in which increasing female sterility forces men such as the Commander to hire concubines like Offred ["of Fred"] in the Republic of Gilead. For 10 points, name this Canadian feminist author of *The Blind Assassin*, *Oryx and Crake*, and *The Handmaid's Tale*.

ANSWER: Margaret Eleanor Atwood

10. The de Jager model for this phenomenon overpredicts it in OB-type stars. That "weak" problem with this phenomenon cannot be explained by its namesake clumping or by the broadening of P Cygni profiles, which is indicative of line-driving processes causing this phenomenon. Some luminous blue variables, like Eta Carinae, exhibit bubbles named after this phenomenon. Other stars that exhibit this phenomenon lose their nitrogen lines as it occurs, resulting in a transition from WN to WC classification; those are Wolf-Rayet stars. Near us, it manifests as Parker spirals and its interaction with the magnetosphere allows aurorae to be visible on the Earth's surface. For 10 points, name this phenomenon in which charged particles are ejected from a star's surface.

ANSWER: stellar wind [or solar wind]

11. Reactions to unresponsive examples of these figures were studied in Edward Tronick's still-face experiments. One of these figures is moved into and out of a room in Mary Ainsworth's "strange situation" procedure. An experiment found that a drumming toy bear elicited a higher emotionality score in animals in the absence of one of these figures. One scientist discovered that mallards will treat farmyard ducks, but not muscovy ducks, as one of these. Due to "contact comfort," cloth is more effective than wire mesh for creating replacements of them for rhesus macaques. Konrad Lorenz found that, in the critical period, greylag goslings can become attached to a substitute for one via imprinting. For 10 points, name these relatives, which Harry Harlow's experiments replaced with milk-dispensing surrogates.

ANSWER: mothers [or parents; accept surrogate mothers or surrogate parents before "surrogates" is read]

12. In a poetic passage named for this person, a cowardly tribe is asked "Why abodest thou among the sheepfolds, to hear the bleatings of the flocks?" and a mother cries through a window lattice, "Why is his chariot so long in coming?" This spouse of Lappidoth foresaw the need for ten thousand men to march to Mount Tabor for a battle whose loser was killed by a Kenite woman hammering a tent peg through the temple. That murder by Jael validated this person, who accompanied Barak upon suggesting a campaign against Sisera's iron chariots. This namesake of a poetic Hebrew "Song" sat under a palm tree between Ramah and Bethel to settle disputes before Gideon rose to prominence in a set of twelve pre-monarchical leaders. For 10 points, name this only female judge of the Israelites.

ANSWER: Deborah [or D'vorah]

13. A variant of this experiment used atoms of rubidium-57 and rubidium-87 with a standing wave tuned resonantly to the rubidium D1-line. Another variant of this experiment fired a Scout D rocket from Wallops Island, with an atomic hydrogen maser on board. Modified in the Vissot-Levine experiment, this study used the cone of a loudspeaker to vary the frequency of photons with initial energies of 14.4 kilo-electron volts, and was based on the principle that atoms cannot absorb photons emitted by the same species if they have been Doppler-shifted. Relying on the Mossbauer effect, this experiment used a helium-filled Mylar bag placed between two iron-57 samples and measured gravitational redshift. For 10 points, name this study conducted in the tower of Harvard's Jefferson Laboratory to verify general relativity.

ANSWER: Pound-Rebka experiment

14. The A-flat major tonality of this character's Act II duet recurs in her last aria, which resolves the earlier scene with a B major tonic chord bringing the opera to a close. Wilhelm Furtwängler conducted a famous 1952 recording of this role sung by Kirsten Flagstad, who sang the role seventy-three times at the Metropolitan Opera between 1935 and 1941. The composer paired an orchestral version of this character's final aria with the opera's prelude as a promotional concert piece, which is still popular today. She sings the aria "Mild und leise wie er lächelt" after the arrival of her fiancé, King Marke, in a scene commonly referred to as the "Liebestod," meaning her "Love-Death." For 10 points, name this heroine of an Arthurian Wagner opera who falls in love with Tristan.

ANSWER: Isolde

15. In a poem by this man, a group appears at first "like the leaves of the forest when Summer is green" but then "when Autumn hath blown." That poem by this man describes a rider lying "distorted and pale / With the dew on his brow, and the rust on his mail." This poet also described a woman with "a mind at peace with all below." This man wrote a poem in anapestic tetrameter to evoke the galloping of horses, in which attackers' spears are likened to "stars on the sea" but become useless after "the Angel of Death spread his wings...and breathed in the face of the foe." For 10 points, name this poet who wrote about an Assyrian king who "came down like the wolf on the fold" in "The Destruction of Sennacherib" and about a woman who moves "like the night" in "She Walks in Beauty."

ANSWER: Lord **Byron** [or George **Gordon**, Lord Byron]

16. In a ceiling painting by this artist, four saints occupy four sections that are divided by red lines decorated with fruit, around a centerpiece showing a head with three faces. A portrait by this artist shows Cerberus lurking behind the nude Orpheus, who holds a violin and turns to face the viewer. *The Miracle of the Brazen Serpent* is one of the Biblical scenes this artist painted in the Palazzo Vecchio's chapel dedicated to Eleanor of Toledo, the wife of his patron Cosimo de' Medici. This man used a deep blue cloth for the background of a work in which an hourglass appears on the back of an old man, the serpent-tailed and woman-headed Deceit holds a honeycomb, Jealousy clutches her head in agony, and two nude deities embrace. For 10 points, name this Mannerist painter of *Venus*, *Cupid, Folly, and Time*.

ANSWER: Il **Bronzino** [or Agnolo **Bronzino**; or Agnolo di **Cosimo**]

17. A letter written after this event by one-time Alaskan Independence Party leader Wally Hickel led to Hickel's firing as Secretary of the Interior. A 2010 forensic study into the Strubbe tape implied that Terry Norman provoked this event, which helped inspire the unrest of New York's Hard Hat Riot four days later. The Scranton Commission investigated this event. Governor Jim Rhodes threatened martial law in the run-up to this event, whose aftermath was shown in John Filo's photograph of a kneeling woman screaming. This event happened near Blanket Hill in the Prentice Hall parking lot, as its victims protested Nixon's decision to expand the Vietnam War into Cambodia. For ten points, name this 1970 massacre in which members of the Ohio National Guard killed four college students.

ANSWER: **Kent State** University shootings [or **Kent State** massacre]

18. This country's Titov Veles district is known for its high quality opium. A campaign to build nationalist monuments in this country is known as antiquisation. The Golem Grad, home to ruined churches and thousands of snakes, can be found in this country's majority portion of Lake Prespa. Using Motorola's Canopy technology, this country was the first to achieve nationwide wireless broadband. In 1995, this country was forced to remove a 16-rayed sun from its flag, as part of a dispute that still keeps it out of the EU. This country was forced to use a name abbreviated FYROM when it joined the UN. Lake Ohrid lies on this country's border with Albania. For 10 points, name this country that disputes a national identity with Greece, a former Yugoslav republic with capital at Skopje.

ANSWER: **Macedonia** [or Former Yugoslav Republic of **Macedonia**; accept **FYROM** ["fie"-rahm] before it is mentioned]

19. In this story, an old professor who has had too much to drink says that the title character "is already qualified to fill a professor's chair," though he declines to share "other absurd rumors." The title character of this story has a voice as "rich as a tropical sunset," which causes the protagonist to "think of deep hues of purple or crimson, and of perfumes heavily delectable." This story's narrator watches a drop of dew that falls and kills a lizard near a shrub bearing a "profusion of purple blossoms." Eventually, Professor Baglioni convinces Giovanni to give the title Padua resident a cup of medicine to counteract her father's experimentation, but it kills her. For 10 points, name this short story by Nathaniel Hawthorne about Beatrice, who becomes as poisonous as the plants she tends.

ANSWER: "**Rappaccini's Daughter**"

20. This leader welcomed war as a "nice electrical shock" to his nationality after a neighbor country impounded a merchant steamer with one of his territorial governors aboard. This man's governess Mariana de Verna dominated as part of the Courtier Faction. Peasants who feared higher taxes from this man's enforcement of the metric system broke scales and weights in public. This husband of Teresa Cristina of the Kingdom of Two Sicilies put down the Praieira Revolt in Pernambuco. This man abdicated due to Deodoro da Fonseca's republican coup. He sent armies under the Duke of Caxias to help fight Francisco Solano Lopez in the War of the Triple Alliance. For 10 points, name this man whose daughter Isabel signed the Golden Law to end slavery, the second and final emperor of Brazil.
ANSWER: Dom **Pedro II**

TB. In 1997, this city's Otherside Lounge lesbian bar was the target of a bombing. A park in this city houses a statue of a woman holding aloft a phoenix, titled for *[This city] from the Ashes*. In addition to Woodruff Park, this city is home to Piedmont Park, which hosts the annual Music Midtown festival. After Chicago and New York, this city has the 3rd tallest building in America, the Bank of America Plaza. Security guard Richard Jewell was wrongly accused of a series of bombings in this city, which Eric Robert Rudolph actually committed in its Centennial Olympic Park. The central Five Points stop connects four lines of its MARTA subway system. This city's Hartsfield-Jackson airport is the busiest in the world, and its outskirts house the CDC headquarters. For 10 points, name this capital of Georgia.
ANSWER: **Atlanta**, Georgia

Bonuses

1. This general technique is used to separate macromolecules by size and charge. For 10 points each:

[10] Name this laboratory technique in which samples are placed in a matrix of agarose or polyacrylamide, through which a current is run.

ANSWER: **gel electrophoresis** [or agarose **gel electrophoresis**; or SDS-**PAGE**; prompt on "electrophoresis"; prompt on "running a gel"]

[10] A dye containing ethidium and a negatively charged ion of this element is used to visualize nucleic acids in agarose gel electrophoresis, and fluoresces red-orange under UV light.

ANSWER: **bromine** [or **bromide** ion]

[10] Leonard Lerman invented this variant of gel electrophoresis that chemically melts a DNA sample into single strands. It can detect single base changes in DNA, and is the basis for a related method using applied heat to melt the sample.

ANSWER: **DGGE** [or **denaturing gradient** gel electrophoresis; prompt on "denaturing"]

2. Answer the following about the oft-overlooked colonial ambitions of ...Denmark, for 10 points each.

[10] The Danish quickly sold their forts in this colonial region to Britain, including Osu Castle. Elmina was a slave-trading fort in this British region of colonial West Africa, where the Ashanti wars occurred. Colonial name required.

ANSWER: **Gold Coast** [do not accept or prompt on "Ghana"]

[10] The Danish founded Charlotte-Amalie and grew sugar on this trio of Caribbean islands, which includes St. Thomas. They were sold to the United States in 1917.

ANSWER: Danish **Virgin Islands** [accept U.S. **Virgin Islands**]

[10] In this Gregorian decade, the Danish sold their Indian colony towns of Serampore and Tranquebar to the British and wrote a Constitution for Denmark itself.

ANSWER: **1840s** CE

3. How was the Greek alphabet invented? Let's see what Hyginus has to say, for 10 points each.

[10] Hermes invented the wedge-shape representation of Greek characters because these birds flew in a wedge shape. These birds, perennial enemies of the Pygmies, avenged the death of Ibycus at the hands of two robbers.

ANSWER: **cranes**

[10] Hyginus also reports an alternate tale where these goddesses invented the first letters. They consist of Clotho, Lachesis, and Atropos, who spinning, measure, and cut the thread of life.

ANSWER: the **fates** [or **Moirai**]

[10] This Phoenician prince introduced the alphabet to the Greeks. In old age, Ares turned this man into a serpent as punishment for killing a serpent he found at the Ismenian spring.

ANSWER: **Cadmus**

4. Answer the following about the story "A Scandal in Bohemia," for 10 points each:

[10] The king of Bohemia asks Sherlock Holmes for help in recovering old letters and one of these objects, for fear that it could endanger his impending marriage to a Scandinavian princess.

ANSWER: **photographs** [or **pictures**]

[10] "A Scandal in Bohemia" introduces this American opera singer. Sherlock simply calls her "The Woman," and states that she "eclipses and predominates the whole of her sex."

ANSWER: **Irene** Adler [or Irene **Adler**]

[10] Irene Adler is also mentioned in this other Sherlock Holmes story, in which the title object belonging to the Countess of Morcar is discovered inside a Christmas goose.

ANSWER: "The Adventure of the **Blue Carbuncle**"

5. This composer wrote the F minor *Aria Sebalдина* variations for harpsichord as part of his *Hexachordum Apollinis*. For 10 points each:

[10] Name this composer and organist whose other works include the suites for chamber ensembles called *Musical Delight* and the keyboard *Musical Thoughts of Dying*.

ANSWER: Johann **Pachelbel**

[10] Pachelbel's most popular composition is a D major three-voice piece in this genre, which he scored for three violins and basso continuo and paired with a gigue.

ANSWER: **canons**

[10] This earlier organist of the Renaissance era studied under Thomas Tallis at the Chapel Royal in London. He wrote the keyboard pieces in the collection *My Ladye Nevells Booke*.

ANSWER: William **Byrd**

6. Answer the following about polyatomic ions, for 10 points each:

[10] These positively charged compounds have a four-coordinate phosphorus center. Transfer of a proton to a phosphine can result in one of these, and organic ones can be deprotonated to form ylides.

ANSWER: **phosphonium**

[10] This weak organic base is relatively inert and is often used in buffer solutions. Almost all of its metal salts completely dissolve in water, and compounds of it are formed when vinegar reacts with strong bases.

ANSWER: **acetate** [do not accept "acetic acid"]

[10] Triflate, or trifluoromethyl sulfonate, is a polyatomic ion regarded as one of the best examples of these species. These molecular fragments are formed by heterolytic bond cleavage.

ANSWER: **leaving groups** [or **LGs**]

7. A US surrender ledger listing the troops who fought with this man includes vulgar names like "Pisses in Horn" and "Soft Prick," which may have been pranks to trick whites. For 10 points each:

[10] Name this warrior from the Black Hills who was honored in the Last Sun Dance of 1877. He led decoys into the Fetterman massacre during Red Cloud's War.

ANSWER: **Crazy Horse** [or **His-Horse-Is-Crazy**; or **Tashunka Witkó**]

[10] At this battle, Crazy Horse allied with Sitting Bull to defeat the U. S. 7th Cavalry and the "last stand" of their commander George Custer.

ANSWER: Battle of the **Little Bighorn** [or Battle of the **Greasy Grass**]

[10] A year later, this American general accepted Crazy Horse's surrender. This loser at Rosebud Creek later pursued the retreating Apache until Nelson Miles replaced him in command.

ANSWER: George **Crook**

8. In this novel, the apprentices Butterfly, Stork, and Olive are the prime suspects in a murder. For 10 points each:

[10] Name this novel whose first narrator is the corpse of Elegant Effendi. Master Osman blinds himself after seeing the sultan's treasury in this novel about a group of Ottoman miniaturists.

ANSWER: **My Name is Red** [or **Benim Adım Kırmızı**]

[10] This Turkish author of *My Name is Red* won the 2006 Nobel Prize in Literature. Galip searches for his missing wife Rüya in this man's novel *The Black Book*.

ANSWER: Orhan **Pamuk** [or Ferit Orhan **Pamuk**]

[10] In this Pamuk novel, the narrator is captured by pirates and becomes a slave of the scientist Hoja, who looks exactly like him. Hoja is obsessed with creating a "war engine" to help the sultan capture this book's title location.

ANSWER: *The* **White Castle** [or **Beyaz Kale**]

9. In this painter's *The Proposition*, a woman sits on a chair sewing by candlelight, ignoring a man wearing a fur hat who leans over her shoulder and offers her some coins. For 10 points each:

[10] Name this Dutch painter who, in a self-portrait, takes a break from painting a smiling violinist in blue clothing to glance at the viewer, while holding up a brush to emulate the violinist's bow.

ANSWER: Judith Jans Leyster

[10] Leyster once sued this other painter for taking in a student that had just left her workshop. This man made many group portraits of militia companies and painted the incorrectly-named *Laughing Cavalier*.

ANSWER: Frans Hals the Elder

[10] The subject of this Hals portrait was probably mentally ill. She is shown holding an open pewter beer mug with an owl perched on her left shoulder.

ANSWER: Malle Babbe [or Hille Bobbe; or *The Witch of Haarlem*]

10. This politician served as Chief of Staff under Lula da Silva after Jose Dirceu resigned. For 10 points each:

[10] Name this woman, the leader of the Workers' Party and current president of Brazil.

ANSWER: Dilma Rousseff

[10] In the 2014 Brazilian general election, Rousseff won a runoff election against this member of the Social Democracy party. This proponent of "Management Shock" defeated Marina Silva in the first round of elections.

ANSWER: Aécio Neves

[10] Neves gained fame for turning around this state's economy as governor. Rousseff and Neves were both born in this state's city of Belo Horizonte.

ANSWER: Minas Gerais

11. This operation can be performed in big-O of n to the log-base-2 of 3, by Karatsuba's algorithm for two integers of length n . For 10 points each:

[10] Name this binary operation which is commutative for real and complex numbers, but not commutative for matrices. It can be understood as adding a number to itself repeatedly.

ANSWER: multiplication [or multiplying; or taking the product]

[10] Although multiplying two matrices of dimension n naively takes n cubed time, this algorithm computes the product in big-O of n to the log-base-2 of 7. The time savings come from having to compute 7 products instead of 8 in each recursive step.

ANSWER: Strassen's algorithm

[10] With Arnold Schonhage, Volker Strassen also names a method for the fast multiplication of two n -digit integers which recursively uses this algorithm. This algorithm, which is often used for fast convolutions, computes a discrete transform between time and frequency domains.

ANSWER: fast Fourier transform [or FFT; prompt on "Fourier transform"]

12. Answer some questions about the dysfunctional Neopets economy, for 10 points each.

[10] The article "The Sinking Neopoint" estimates that almost a billion Neopoints enter the economy every day, leading to this phenomenon in which prices rise over time, making currency less valuable.

ANSWER: inflation

[10] Due to tricks like auction sniping and the restocking of Draik eggs, this metric would be very high for the Neopets economy. This measure of income disparity equals the proportional area between the Lorenz curve and the 45 degree line.

ANSWER: Gini coefficient

[10] The Neopets codestone market exhibits perfect competition, which means that sellers should shut down when the market price goes below this value. Unlike a similar curve, firms can operate above the U-shaped curve for this value in the long run, but will incur a loss.

ANSWER: average variable cost [or AVC; prompt on partial answer]

13. For 10 points each, answer the following about the emergence of New Hollywood and independent American cinema in the 1960s and 70s.

[10] This 1967 Arthur Penn film ushered in the New Hollywood era. Stylistically influenced by the French New Wave, it broke new ground in depicting graphic violence committed by and against the title romantically-linked bank robbers.

ANSWER: Bonnie and Clyde

[10] This director further explored edgy, violent material in his controversial films *Straw Dogs* and *The Wild Bunch*.

ANSWER: Sam Peckinpah

[10] This other director, often considered the father of American independent film, had his wife Gena Rowlands star in films of his such as *A Woman Under the Influence* and *Faces*. His first film, *Shadows*, was largely improvised.

ANSWER: John Cassavetes

14. Heinrich Bünting created one of these objects that places Jerusalem at the center of three clover leaves representing Asia, Africa, and Europe. For 10 points each:

[10] Name these objects that included Portolan charts, which were assembled by mariners using estimated distances and their compasses. The word "America" was first used by Martin Waldseemüller on one of these objects.

ANSWER: maps [accept world maps or mappae mundi; accept atlases]

[10] A very popular type of medieval map, also called a Beatus map, is generally known by these two letters, which refer to the shape created by the Nile and Don Rivers, the Mediterranean Sea, and the ocean.

ANSWER: T and O map

[10] Muhammad al-Idrisi created a map known as the *Tabula Rogeriana* for Roger II, a king of this island. A Norman kingdom on this non-Britain island controlled Apulia and Calabria before it passed to the Angevins.

ANSWER: Kingdom of Sicily [or Sicilia]

15. Ferdowsi reimagined this beast as a human tyrant with two brain-eating black snakes growing out of his shoulders. For 10 points each:

[10] Name this three-headed serpent which stole cattle, and sometimes people, from people. Thankfully, it's imprisoned under a mountain and destined to die in a river of fire.

ANSWER: Azi Dahaka [or Zahhak; or Zohak]

[10] This evil deity created Azi Dahaka. This rival of the good god Ahura Mazda presides over *druj*, or lies, in Zoroastrian cosmology.

ANSWER: Ahriman [or Angra Mainyu]

[10] Some Zoroastrians shun these creatures as heralds of Ahriman. In one legend, Ahriman created one that tried to drink all the world's water. After blood, these creatures were the second plague set on Egypt before the Exodus.

ANSWER: frogs [generously accept toads; prompt on "amphibians"]

16. Dirac's ladder operator method gives an elegant solution to the Schrödinger equation for this system, which Einstein used to model each atom in the lattice for his model of solids. For 10 points each:

[10] Name this system, the quantum analogue to a mass on a spring. The potential energy portion of this system's Hamiltonian is given by Hooke's law.

ANSWER: quantum harmonic oscillator [prompt on "harmonic oscillator"]

[10] These values for a quantum harmonic oscillator are equal to \hbar times the angular frequency multiplied by quantity n plus one-half. For a particle in a box, these values are proportional to n squared over the length squared.

ANSWER: energy levels [or energy eigenvalues; or eigenenergies]

[10] Eigenstates for the quantum harmonic oscillator contain these functions, which can be stated as special cases of the Laguerre polynomials and satisfy Cramér's inequality.

ANSWER: Hermite polynomials

17. This speech was given in defense of the right for a "British subject, in whatever land he may be, [to] feel confident that the watchful eye and the strong arm of England will protect him." For 10 points each:

[10] Name this speech delivered in 1850 at the House of Commons in response to an anti-Semitic assault on Don Pacifico. Its title is a statement lifted from Cicero's sixth oration against Verres.

ANSWER: "Civis Romanus Sum" speech

[10] This British Foreign Secretary, who later served as Prime Minister during the American Civil War, delivered the "Civis Romanus Sum" speech.

ANSWER: Lord Henry John Temple, 3rd Viscount Palmerston [accept either underlined answer]

[10] This man's second of two terms as Prime Minister came after Palmerston's. He did his most important work as a regular Member of Parliament in 1832, when he was the driving force behind the First Reform Act.

ANSWER: Lord John Russell, 1st Earl Russell

18. This collection's first story, "Hands," concerns the isolation of the former schoolmaster Wing Biddlebaum. For 10 points each:

[10] Name this short-story collection by Sherwood Anderson. Its namesake Midwestern town is inhabited by the thoughtful Doctor Reefy and the intensely religious farmer Jesse.

ANSWER: Winesburg, Ohio

[10] This young reporter for the *Winesburg Eagle* appears in several stories in *Winesburg, Ohio*. He moves to the big city in the collection's last story, "Departure."

ANSWER: George Willard [or George Willard]

[10] This schoolteacher in *Winesburg, Ohio* is watched by Reverend Hartman in the story "The Strength of God." In another story, she briefly makes advances on George Willard in his office before running off to cry.

ANSWER: Kate Swift [or Kate Swift]

19. A 20th-century philosopher from this country critiqued the pampered "mass man," who disdains the expertise of others, in *The Revolt of the Masses*. For 10 points each:

[10] Name this modern-day country whose prominent thinkers also included Saint Isidore, who attempted a compendium of worthwhile knowledge in his *Etymologiae*.

ANSWER: Kingdom of Spain [or Reino de España]

[10] This Spanish contemporary of José Ortega y Gasset wrote that "philosophy begins *in medias res*" and "Those who cannot remember the past are condemned to repeat it" while teaching at Harvard.

ANSWER: George Santayana [or Jorge Ruiz y Santayana]

[10] This Aristotelian doctrine, which helped justify the *oikos*, was cited by Spaniards such as Bartolome de las Casas and Francisco de Vitoria in 16th-century debates over the fate of the New World's Indians.

ANSWER: natural slavery doctrine [accept any answer indicating the idea that some people are by their nature or inborn disposition most fit to be slaves; or any answer indicating that some people are innately suited to be slaves; prompt on "pro-slavery" or "justification of slavery"]

20. In *The Killer*, this man's lover is drowned in a swimming pool by a serial murderer. For 10 points each:

[10] Name this recurring character who loves Daisy in one play. He is over four hundred years old in *Exit the King*.

ANSWER: Berenger

[10] Eugene Ionesco created Berenger within this literary movement, which explored the meaninglessness of human existence by showing nonsensical events on stage. Samuel Beckett is usually lumped in with it.

ANSWER: absurdism [or Theater of the Absurd]

[10] This absurdist play by Jean Genet, set mostly in a brothel during a revolution in an unnamed city, includes a character called the Envoy who says "A true image born of a false spectacle" after witnessing a photograph.

ANSWER: *The* Balcony [or *Le* Balcon]

21. In this painting, a woman in yellow and blue robes rests her hand on the shoulder of a shepherd, as another shepherd casts a scythe-like shadow with his hand while kneeling to examine an inscription. For 10 points each:
[10] Name this painting in which those shepherds are gathered around a tomb engraved with the title phrase.

ANSWER: *Et in Arcadia Ego* [or *The Arcadian shepherds*; or *Les Bergers d'Arcadie*]

[10] *Et in Arcadia Ego* was painted by this French Baroque artist, who showed Aurora flying in front of Apollo's chariot in the sky above the four dancing Seasons in *A Dance to the Music of Time*.

ANSWER: Nicolas Poussin

[10] This artist's version of *Et in Arcadia Ego* uses darker colors and features a skull with a mouse and blowfly. This man decorated the Sala dell'Aurora at the Villa Ludovisi, and was nicknamed for his tendency to squint.

ANSWER: Il Guercino [or Giovanni Francesco Barbieri]