

Dec 15th QANTA Event Report

Shi Feng

University of Maryland

December 16, 2018

Colors and styles indicate outcomes

- good buzz
- neg
- could have buzzed here but did not
- neither did it buzz nor is the answer ever correct

Shapes indicate teams

- ◆ FYY
- Technical Wizards
- FowardRethinking
- ▲ Working Title

Packet P1 Question 1

A team based in this city won a game where a ruled incomplection by Quentin Morgan lead to fans throwing bottles on the field. A quarterback for a team in this city miraculously won a game when Mike Thomas caught his Hail Mary off a deflection; that 2009 pro bowler is David Garrard. A cornerback of a team from this city hilariously called Buffalo Bills quarterback Josh Allen “trash” in a GQ interview and plays alongside A.J. Bouye. For 10 points, name this city home to a team starring Jalen Ramsey and quarterbacked by Blake Bortles, that plays home games in Florida. ♦ ○ □ ▲

Answer: Jacksonville, Florida

♦ Atlanta ○ Los Angeles □ New York Jets ▲ New York City

Packet P1 Question 2

Scott Tremaine proposed ● that an eccentric disk created this entity's nuclei in 1995 - that model was discussed in a paper by CY Peng that also described the 2 nuclei of this entity. Walter Baade used observation of this body to classify stars into 2 populations.

○ The Hooker telescope found the first Cepheid variables here, ◆
■ following up on hypotheses about this object discussed in the Curtis Shapley debate. The Triangulum Galaxy is thought to be bound to this other galaxy. Also known □ as M31, it is the ▲ largest galaxy in the Milky Way. For ◆ ten points, name this galaxy, predicted to collide with the Milky Way in a few billion years.

Answer: Andromeda Galaxy

● Kuiper belt ■ Allan Sandage ◆ Andromeda (constellation)







Packet P1 Question 3

Examples of these species with C_2 symmetry can increase enantioselectivity, ● as in their Josiphos variety. Two of these species combine in migratory insertion, an important step in carbonylation reactions. These species are classified as either L, X, or Z based on how many electrons they donate. Carbon monoxide functions as this type of group in a metal carbonyl. “Agents” that can cure heavy metal poisoning in chelation therapy are polydentate examples of these ■ ▲ species, such as EDTA. For 10 points, name these species that bind to a central metal atom in coordination complexes. ◆





Answer: Ligand

● Homo erectus ■ Chelation ▲ Ion ◆ Ligand





Packet P1 Question 4

It's not the pituitary gland, but this organ   is tested with the insulin tolerance test. The binding of CRF to the pituitary gland releases a hormone that stimulates this organ. Heightened activity of this organ leads to a high ARR, as overproduction of one hormone from this organ dangerously  depresses renin levels. This last organ in the HPA axis produces too much aldosterone in Conn's Syndrome. This organ's zona fasciculata  is overactive in Cushing's disease,  overproducing the anti-stress hormone cortisol. For 10 points, name these glands that also produce the catecholamine hormone epinephrine. 

Answer: Adrenal gland





 Pituitary gland  Follicle-stimulating hormone  Pituitary gland  Liver

Packet P1 Question 5

A paper titled this algorithm “through Time” by Paul Werbos lays the theoretical groundwork for recurrent models that repeat parameters. In pytorch, setting `requires_grad` to `False` means that this is not applied to a parameter. This can fail because of either “vanishing” or “exploding” gradients in particularly large neural networks, as it uses the chain rule to calculate the gradient of the loss at each layer, which   in turn is used to compute how much and in what direction layer weights should be  tuned. For 10 points, name this algorithm  that is the basis for most forms of neural network training named for the direction that error moves through a model.

Answer: Backpropagation





Packet P1 Question 6

A paper by Lutchyn, Sau and Das Sarma details how observing one of these events in a nanowire would prove the existence of Majorana fermions. Widom scaling leads to the dependence of critical exponents  that characterize these events. The dissociation of vortex-antivortex pairs occurs during one of these events named for Kosterlitz and Thouless.   YBCO undergoes one of these events at an abnormally high temperature. In contrast, elemental mercury undergoes one at about 234 Kelvin, far lower than most metals. When materials are brought past these events' points without undergoing these events, the material can enter metastates such as supercooled or superheated. For 10 points, name these events such as freezing, which are transitions between different states of matter. 


Answer: Phase transition

 Witch-hunt

Packet P1 Question 7

A paper by Lutchyn, Sau and Das Sarma details how observing one of these events in a nanowire would prove the existence of Majorana fermions. Properties of these events are described in Halperin-Lubensky-Ma theory. Widom scaling leads to the dependence of critical exponents that characterize these events. The dissociation of vortex-antivortex pairs occurs during one of these events named for Kosterlitz and Thouless. YBCO   undergoes one of these events at an abnormally high temperature. For 10 points, name these transitions between different states of matter, such as freezing.  

Answer: Phase transition

 Phase transition  Witch-hunt

Packet P1 Question 8

The Epsilon system released in JDK 11 performs this task. In Java, objects not affected by this process are stored in metaspace, ● while other objects are stored in the Eden space until this action occurs, after which they are divided generationally. The tricolor abstraction visualizes algorithms for this ■ task. This task can be performed with the mark and sweep □ algorithm, which sometimes requires a stop-the-world pause. This task occurs when unreachable objects on the heap are found, and failure to perform it can cause memory leaks. For 10 points, name this task that frees unneeded ◆ ▲ memory.

Answer: Garbage collection (computer science)

■ Sperm ▲ String searching algorithm

Packet P1 Question 9

Tensor-vector-scalar' gravity is an extension to an alternative answer to the puzzles posed by this substance, known as MOND theory. String theory predicts a class of particles that do not interact via gauge boson forces, known as 'hidden sector' particles, another candidate for this substance. This substance derives its name from its apparent lack of interaction with light, and its existence is inferred from its gravitational effects, leading scientists to hypothesize the existence of a new class of particles known as WIMPs. For 10 points, ■ identify this substance ▲ believed to greatly outnumber its baryonic counterpart ● in the universe, an as-yet-unobserved form of matter. ◆

Answer: Dark matter

◆ Neutron

Packet P1 Question 10

This virus is a member of the Flaviviridae family and is most ■ closely related to the ● Spondweni virus. It was first isolated in a rhesus macaque in Uganda in 1947. ◆ ■ In both humans and monkeys it is transmitted primarily by *Aedes aegypti*, though it can also be spread through sex, blood transfusions, and mother-to-child transmission. The latter can lead to chorioretinal scarring and microcephaly. An outbreak of this disease in 2015-2016 raised concerns about athletes competing in the Olympics. For 10 points, identify this mosquito-borne virus ▲ that caused a sharp drop in tourism to Brazil and the Caribbean.

Answer: Zika virus

■ Poxviridae ● Hepatitis C virus

Packet P1 Question 11

Richard Feynman hypothesized that an element with atomic number 138 could not exist because it would require this particle to violate the laws of physics. Huckel's Rule relies on counting ● the number of these particles. Linus Pauling proposed a property measuring the tendency of an atom to attract these ■ particles; that property ○ is termed (*) "electronegativity." The charge of these ▲ particles was first measured by suspending oil drops in an ◆ electric field. For ten points, name these particles that Niels Bohr modeled as traveling in circular orbits around the □ nucleus of an atom.

Answer: Electron

● Magnetic monopole ■ Electronegativity

Packet P1 Question 12

Edward Gibbon relies on ● ■ Hydatius's chronicle to identify the location of this battle, which is troubling as the chronicle technically begins the year after it occurred. The cavalry of this battle's winning side returned from foraging to rebuff an assault on their wagon circle led by Bacurius. Gratian ○ ■ infuriated his legionnaires by dressing up in a Scythian outfit after this battle. Ammianus Marcellinus's history of Rome concludes with the empire's loss of this battle to an army commanded by Fritigern. For 10 points, name this battle at which Valens was killed by the Goths in ◆ 378 AD. ▲

Answer: Battle of Adrianople

● The History of the Decline and Fall of the Roman Empire ■
The History of the Decline and Fall of the Roman Empire ▲ Battle of Marathon

Packet P1 Question 13

One of this author's characters claims "America . . . stretches so far everywhere you look. And there's lots of insects there." One of this author's characters recalls punching a woman who asks for help with a mangle during a sexually tense encounter over a glass of water. Later, characters in that play by this man ask if Joey went the "whole hog" with Ruth, who becomes a prostitute despite being Teddy's ● wife. In another play by this author, ■ a character repeatedly pulls a toilet chain, though no toilet flushes. For 10 points, name this author of The Homecoming who created the hit-men ◆ Ben and Gus in □ ▲ The Dumbwaiter.

Answer: Harold Pinter

■ The Homecoming






Packet P1 Question 14

This character is likely named after a type of fur used in nobles' robes and a French term for a horse. This man "eyed a khaki suit with loathing" in a stanza that expresses his preference for "iron clothing." ♦ This man, who dreamed of "Thebes and Camelot," loved ● the Medici despite ▲ never having seen one of them. This man "coughed, and called ▲ it fate, / And kept ○ on drinking" at the end of a poem that calls him a "child of scorn" who was "born too late." For 10 points, name this character who "loved the days of old" in an Edwin Arlington Robinson poem. ■



Answer: Miniver Cheevy

● Edwin Arlington Robinson ▲ Edwin Arlington Robinson ■
Weird Al Yankovic

Packet P1 Question 15

One of this author's character becomes white-haired after sitting in a Ferris Wheel and watching a copy of herself have sex. In that novel, the protagonist's friend has a lesbian crush on her employer and disappears suddenly off an island near Greece. In another novel by this author, a character who receives a letter about "duck people" sits at the bottom of a well after being trapped there by his neighbor May Kasahara; that character hires Creta Kano to help   find his cat. For 10 points, name this author of Sputnik Sweetheart who created  Toru Okada in The   Wind-Up Bird Chronicle.

Answer: Haruki Murakami

 The Wind-Up Bird Chronicle  Ryū Murakami

Packet P1 Question 16

In a story set during this war, a draper and ■ a watchmaker are executed by enemy soldiers for refusing to reveal the password of their country's ● defense lines. A woman uses a hay-loft to burn down a house with enemy soldiers in it after her son dies during this war. This war, the backdrop of "Two Friends" and "Mother Savage," sets a work in which a woman who shares a basket of food with her wagonmates is made to sleep with an enemy officer for passage to Le Havre. For 10 points, name this setting of Guy de Maupassant's "Ball of Fat," a war ◆ France lost against its eastern neighbor in 1870. ▲

Answer: Franco-Prussian War

■ Mad Men ▲ World War II

Packet P1 Question 17

This artist depicted a woman with red and grey arms stretching paw-like limbs across a table in Stenographic Figure, which was shown in Peggy Guggenheim's gallery Art of This Century. This artist supposedly ● painted his twenty foot long by eight foot high Mural in one day, and he used a turkey baster to apply black paint to a canvas in a painting characteristically called Number 7, 1951. This husband of Lee Krasner often ■ painted by laying ○ out canvases on his studio floor. Lavender Mist is by, for 10 ◆ ▲ points, what abstract expressionist painter nicknamed "Jack the Dripper"?

Answer: Jackson Pollock

● Max Ernst

Packet P1 Question 18

One member of this school of thought developed a three stage criterion for it, which he illustrated by ● using the example of a rope in a dark room. Legendarily, the founder of one branch of this non-Confucian school left his friend to die while he was trapped in a hole. Circularity and regress are among this school's "five modes" named for Agrippa, and it included Carneades.

Pyrrhonism, a movement within this school of thought, included an author who wrote Against the Mathematicians, Sextus Empiricus. ○ For 10 points name ■ this school that ◆ questions the certainty of much of knowledge. ▲

Answer: Skepticism

● Behaviorism ▲ Behaviorism

Packet P1 Question 19

A book by this man discusses the absurdity of animal sacrifice while describing the Intichiuma ceremony. This man argued that the difference between Protestants and Catholics was the amount of “free inquiry” demanded of their members. A book by this sociologist differentiates between totemistic objects ● that have special significance and mundane objects which do not, or the sacred and the profane. He ■ discussed egoistic, altruistic, fatalistic, ◆ ▲ and anomic forms ▲ of the title phenomenon in one text. For 10 points, name this sociologist who wrote The Elementary Forms of Religious Life and Suicide.

Answer: Émile Durkheim

▲ Suicide (book)

Packet P1 Question 20

After being trapped in ■ a cave with a demon, one of these animals assumes his brother betrayed him to take □ control of Kishkindha. One of these ● animals carries an entire mountain and stops the sun from rising to find a medicinal herb. After escaping ◆ from a trigram meant to turn him into an elixir, one of these animals becomes trapped by pillars revealed to be the Buddha's fingers. Indra breaks the chin of a devotee of Rama who takes this form, which is also taken by a "king" who appears in Journey to the West. For 10 points, name these animals including Sun Wukong and Hanuman. ▲

Answer: Monkey

■ Shangri-La ▲ Horse

Packet P1 Question 21

This culture produced an image of a walking man with sandals in its Monument 13, or the “Ambassador Relief.” A sculpture from this culture shows a man with a twisting torso and a possibly fake mustache called “The Wrestler”. Much of this culture’s artwork was preserved in the bogs of El Manati. This culture used jade in the Kunz Axe, which ■ features its common ● were-jaguar motif. This civilization produced many of its works in cities such as San Lorenzo and La Venta. For 10 points, name this Mesoamerican culture that produced ◆ many sculptures of gigantic heads. ▲

Answer: Olmec

▲ Mississippian culture

Packet P1 Question 22

A fiat order given to ● ■ a person with this profession was deemed illegal in the DC circuit case of Sherrill v. Knight. A recording of one man with this profession at a community barbeque featured his glasses being broken. Donald Trump yelled “I don’t know what I said” while shaking his arms to mock Serge Kovalski, who has this job. After the November 2018 elections, Trump said “that’s enough” to a member of this profession at the White House as an intern tried to seize his microphone. For 10 points, name this job held by Jim Acosta, who works for what Donald Trump terms the “Fake News Media.” ♦ ▲

Answer: Journalist

● Money ■ Money ♦ Lists of actors ▲ ELIZA

Packet P1 Question 23

Thomas Carlyle influenced ■ this thinker to develop a theory on the impact of “Great Men, Great Thoughts, and the Environment” ● on history. This American posited that emotions arise from ○ the mind’s appraisal of physical changes in response to environmental stimuli in a theory that he ◆ co-names with Carl Lange. He posited the theory of “radical empiricism” in The Meaning □ of Truth and titled a book for a philosophical school that he developed with C.S. Pierce and John Dewey. For 10 points, name this “father of American psychology” and co-founder ▲ of pragmatism.

Answer: William James

■ Sartor Resartus ● John Stuart Mill

Packet P1 Question 24

This thinker argued that ■ capital punishment ◆ was only acceptable in very pious societies- as they believed in atonement in the afterlife- in his essay “Reflections ◆ on the Guillotine.” An essay by this thinker argues that Ivan ● Karamazov’s statement that “Everything is permitted” is not a happy observation but rather a bitter ○ truth. That essay by this man begins by saying that “There is but one truly serious philosophical problem, and that is suicide,” and it concludes that “One must imagine” the title ▲ figure “happy.” For ten points, name this existentialist author of “The Myth of Sisyphus.”

Answer: Albert Camus

■ Rosa Luxemburg ◆ Michel Foucault ● Sigmund Freud ▲ The Myth of Sisyphus

Packet P1 Question 25

Richard Lourie echoed a Flaubert insult by saying of a version of this work, “It is flat, your translation.” Two years after discussing it in *Le Ton beau de Marot*, Douglas Hofstadter ■ published a translation of this work. Walter Arndt’s translation of this work won the 1962 Bollingen Prize. Vladimir Nabokov published a notoriously literal translation of this work, despite calling it “mathematically impossible” to maintain its masculine and feminine rhymes across ◆ ● ■ fourteen-line stanzas. Vikram Seth’s *The Golden Gate* pays homage to, for 10 points, what verse novel ▲ by Alexander Pushkin?

Answer: Eugene Onegin

■ Douglas Hofstadter

Packet P1 Question 26

In a story set in this country, an academic crawls to a tavern to order wine after his legs are broken as punishment for stealing food. After losing a fight at a gambling table, the title character of a story set in this country slaps himself in the face twice, claiming a “spiritual victory” because it was he who gave the slap. A collection from this country, *A Call to Arms*, contains “The True Story of Ah Q.” An autobiographical ◆ ▲ novel from this country tells ● of “I,” who is misdiagnosed with terminal lung cancer, in *Soul Mountain*. For 10 ■ points, name this birthplace of Lu Xun and Gao Xingjian.

Answer: China

Packet P1 Question 27

This writer developed the “status” and “contract” models of writing in an essay that labels William Gaddis as “Mr. Difficult.” In a novel by this man, a character flees a kitchen when he sees a plate of liver and onions, and later his father hallucinates about talking feces. He discussed the research ■ of Shirley Bryce Heath on reading demographics in a work alternately titled “Why Bother?” or “The Harpers □ Essay,” and he wrote a novel in which Alfred Lambert suffers ◆ ● from Parkinson’s. For 10 points, name this contemporary ▲ author of *The Corrections*.

Answer: Jonathan Franzen

■ The Recognitions





Packet P1 Question 28

An essay by this author praises Coriolanus ■ and Antony and Cleopatra as Shakespeare's greatest successes. He compared a different Shakespeare play to the "Mona Lisa" and argued that it is "an artistic failure" in that essay, "Hamlet and His Problems." A poem by this author begins with a quote from Dante about Guido da Montefeltro; that poem's title character declares that he is "not Prince Hamlet, nor was meant to be," after comparing the evening sky to a "patient ● etherized upon a table." For 10 points, □ ▲ name this author of "The Love Song ◆ of J. Alfred Prufrock."

Answer: T. S. Eliot

■ On the Sublime ● The Love Song of J. Alfred Prufrock

Packet P1 Question 29

This meeting established the short-lived Duchy of Lucca. An agreement   that established Krakow as a free city resolved the   Polish-Saxon crisis during this meeting, after France brokered a secret alliance against Russia. As a result of this meeting, the remains of the Holy Roman Empire were combined into a 39-state German Confederation. Its main negotiations were completed during the Hundred Days period. For 10 points, name this meeting that determined the balance of power in Europe after the Napoleonic Wars.

Answer: Congress of Vienna





Packet P1 Question 30

Torkild Rieber, the CEO ● of Texaco, illegally supplied 3.5 million tons of oil to one side of this war. The Thalmann Battalion were a group of European volunteers who fought on one side of this conflict, often in practical and ideological opposition to the Condor Legion. Emilio Mola ◆ coined the term “fifth ■ column” to refer ○ to resistance fighters in this war. A German bombing campaign destroyed the town of Guernica during, ▲ for 10 points, what Iberian conflict that led to the establishment of Francisco Franco's dictatorship?


Answer: Spanish Civil War

● Adam Hochschild

Packet P1 Question 31

Coleman v. Miller established    Congress's power to set time restrictions on these entities. The president's power to create these entities was limited in the case of *Hollingsworth v. Virginia*. States' equal representation in the Senate is explicitly protected from these entities. In Federalist No. 84, Alexander Hamilton argued against a set of these, though twelve were introduced by James Madison during the first Congress. The twenty-first of these entities ended the federal policy of prohibition. For 10 points, name these entities, the first ten of which are called the Bill of Rights. 

Answer: Constitutional amendment

 Supreme Court of the United States

Packet P1 Question 32

A Willy Decker production ■ of this opera features a giant clock on stage. The tenor lead sings the phrase “Di quell’amor” from offstage during the soprano lead’s Act I cabaletta, in which ● ■ she affirms her commitment to pleasure and freedom. The lead soprano of this opera sings “Sempre libera.” At the end of this opera’s second act, its tenor lead humiliates a woman by throwing his gambling winnings at her. It contains the drinking song “Libiamo ◆ ne’ lieti calici.” ▲ The title character dies of tuberculosis in, for 10 points, what opera about Alfredo and Violetta by Giuseppe Verdi?

Answer: La traviata

■ Bus Stop (William Inge play)

Packet P1 Question 33

Frédéric Chopin based his first work for piano and orchestra on music by this composer. In the slow introduction to one of this composer's works, the instruments enter on C, E-flat, A-flat, and A natural. A Franz Liszt transcription of a choral work by this composer ● is the basis of the "Preghiera" movement in a Pyotr Tchaikovsky orchestral suite titled after this composer. This composer wrote the "Dissonance" string quartet, a five-part fugato to conclude his final symphony, and ◆ a piano sonata containing ◆ the "Rondo alla ■ turca." For 10 points, ■ name this composer of the "Jupiter" Symphony. ▲

Answer: Wolfgang Amadeus Mozart






● Ludwig van Beethoven ◆ Ludwig van Beethoven ■ Ludwig van Beethoven ▲ Ludwig van Beethoven

Packet P1 Question 34

A 2007 book about this painting by Susan Vreeland imaginatively tells of how its artist created it to represent “la vie moderne” in response to a challenge from Emile Zola. A railing divides this work along ● a diagonal into a crowded scene of people and a swirl of reeds and grass. Gustave Caillebotte wears ■ a sleeveless white shirt on the right side of this painting that depicts its artists’s future wife Aline Charigot playing ▲ with a small dog. The Restaurant Fournaise is the setting of, for 10 points, what painting by Pierre-Auguste Renoir titled for a midday ◆ waterfront meal?

Answer: Luncheon of the Boating Party





Packet P1 Question 35

During a cold open on this show, one character tells another that  he came down with a “Dianne Wiest infection.” In an episode of this show, a recurring character leaves the main character some diamonds in a Le Creuset pot at a Korean karaoke establishment. Craig Robinson and Jason Mantzoukas have recurring roles as Doug Judy and Adrian Pimento on this show, whose Halloween episodes involve a thieving contest involving people such as Amy Santiago and Captain Holt. For 10 points,  name this sitcom set in an NYPD precinct that stars Andy Samberg   as Jake Peralta. 

Answer: Brooklyn Nine-Nine





 The Big Bang Theory  Brooklyn Nine-Nine

Packet P1 Question 36



The province of Bushehr, which borders this body of water, was once part of the Fars province. Bubiyan Island and Warbah Island harbor military installations at the northern end of this body of water. The Safaniya Field is a major center of economic activity in this body of water. The U.S. Fifth Fleet is headquartered in this body of water, in part to protect the safe passage of oil through the Strait of Hormuz. The Shatt  al-Arab delta of  the Tigris and the  Euphrates empties into, for 10 points, what body of water that gave its name to a 1991 war between Iraq  and the U.S.?

Answer: Persian Gulf





Packet P1 Question 37

On the tv show Parks and  Recreation, Leslie Knope performs this action while wearing roller skates after discovering that citizens of Eagleton could be deprived of  their right to vote. On Scandal, Mellie Grant takes a break from performing this action when the Vice President interrupts with a question about gonorrhea; that action leads to the successful funding of Planned Parenthood. On The West Wing, Howard Stackhouse performs this action for eight hours because he has a grandson who is autistic. For 10 points, identify this action performed by Jefferson Smith for twenty-four hours in Mr. Smith Goes to Washington.  

Answer: Filibuster

 Bob's Burgers  Kristen Bell  Drowning  Suicide

Packet P1 Question 38

By transforming to an abstract 'shape-sphere', researchers in 2013 discovered the first new families of solutions to this problem since the Broucke-Henon family. Expanding the coordinates as a function of the cube root of t was the technique used by Sundman to create  a series expansion for this problem. Another family of  solutions is named after Euler and a mathematician who lends his name to their solutions, known as 'Lagrange points'. A  third family is named for their characteristic motion pattern, the figure-eight. For 10 points, name this celestial mechanics problem, which requires calculating the motions of three masses influenced by each other's gravity from a given position and velocity. 

Answer: Three-body problem






 Multi-armed bandit

Packet P1 Question 39



A leader of this country denounced the invasion of a nearby nation in his “August 21st” speech. Jews in this country were massacred at a kosher slaughterhouse by members of the Legionnaires’ Rebellion. In this country, political prisoners at Pitesti were reeducated by the Iron Guard. Many children became ♦ orphans with this country’s Decree 770, issued by a leader who wanted to restrict abortion and create ● “hero mothers.” A leader of this country and his wife Elena were killed by ■ ▲ a firing squad in Timisoara. For 10 points, name this country once led by Nicolae Ceaușescu.

Answer: Romania

Packet P1 Question 40

This country, which banned the book *The Past Is Not Like Smoke*,  is the subject of  several books by the historian Frank Dikotter. This country  replaced sparrows with cockroaches in a list of pests to eliminate after killing  sparrows led to a famine known as the Three Bitter Years. Critics of its government were punished after its leader asked for criticism in the Hundred Flowers campaign. This country disastrously required farmers to make steel mills in their backyards. For 10 points, name this country that experienced the “Great Leap Forward” and “Cultural Revolution” under Mao Zedong. 

Answer: China

 Netherlands  China

Packet P1 Question 41

Sword Lake, which is in ■ this country's capital, contains the Turtle Tower in its center. In this country, two huge, stone hands hold up a golden bridge in the Ba Na Hills region. Alexandre De Rhodes founded a script primarily used by languages ♦ in this country. This □ country's "Central Highlands" lie in the Annamite Range. The delta of the Red ● River lies in this country, as does that of a river that shoots namesake "fireballs," the Mekong. Like China, this country borders the Gulf of Tonkin. For 10 points, name this country that contains Saigon and its capital, Hanoi. ▲

Answer: Vietnam

■ Excalibur ▲ Canada






Packet P2 Question 1

This law created tribunals called “half-chambers” ■ or “parted houses,” which had exactly equal representation from two religious groups. Proponents of this law argued that it was violated by the royal establishment of a parliament in Bearn. This law included fifty six secret articles ■ that gave funding to safe havens such as the fortress at La Rochelle. This law ◆ expanded upon a proclamation made by Catherine ○ de Medici named after the month of January. For 10 points, name this 1562 law by which Henry IV granted tolerance to French Protestants. ▲

Answer: Edict of Nantes

■ Ex parte ▲ Second law of thermodynamics

Packet P2 Question 2

The minima of a flow named  for one form of this quantity solve the isoperimetric problem. The local form of one theorem relates the sum of exterior angles of a simple  surface to the sum of integrals of two forms of this quantity, and the global form relates those integrals to the Euler characteristic. As the Hessian's eigenvalues give a form of this quantity, the Hessian's determinant at extrema determines a function's concavity. Under an arc length parametrization, this quantity  is the magnitude of the derivative of the tangent vector.  For 10 points, name this measure of a surface's bending. 

Answer: Curvature

 Theodor W. Adorno  Curvature

Packet P2 Question 3

At thirty, this thinker had an epiphany about the natural world while visiting the classified cabinets of Paris's Jardin des Plantes. The importance ■ of this thinker's aunt Mary Moody to his ideas is traced in a Robert Richardson's biography subtitled "the mind on fire." He described Emanuel Swedenborg as "the Mystic" in his book Representative Men. An oft-quoted passage from an essay by this man states "I am part or particle of God" and "I become a transparent eyeball." For 10 ♦ points, name this American philosopher who ■ wrote the essays "Nature" and "Self-Reliance."



Answer: Ralph Waldo Emerson

■ Julio Cortázar ○ Ralph Waldo Emerson ▲ Ralph Waldo Emerson

Packet P2 Question 4

People in this place built temporary homes known as tilts and annually fled inland in a practice called winterhousing. John Guy's Cuper's Cove company was established in this home of the Beothuk people. It's not in Maryland, but George Calvert established the colony of Avalon in this place. The colony of L'Anse aux Meadows was discovered in this place, and represents the earliest evidence of a European presence in the Americas. Joseph Smallwood led the Confederation ● campaign on, for 10 points, what Canadian island near ■ Labrador that takes ◆ its name from Leif Eriksson's 11th century ▲ visit?

Answer: Newfoundland (island)

● Newfoundland and Labrador ■ Newfoundland and Labrador ◆ Newfoundland and Labrador ▲ Newfoundland and Labrador

Packet P2 Question 5

This quantity names a kind of crystal experimentally verified in 2016 in a chain of ytterbium atoms driven by laser pulses. In quantum mechanics, ● this quantity is negated by an antiunitary operator that produces degenerate states according to Kramers theorem. Invariance under changes in this quantity ■ implies energy conservation as per Noether's Theorem. The RC constant for a circuit has units of this quantity, as does the inverse of the radioactive decay constant. This quantity is the non-spatial dimension in Minkowski space. For 10 points, name this quantity measured in SI units of seconds. ◆ ▲

Answer: Time

● Bose–Einstein condensate ■ Symmetry ◆ Time ▲ Temperature





Packet P2 Question 6

With James Watson, this physicist founded ■ a discussion group for scientists concerning the genetic code called the RNA Tie Club. In a novel by this man, he describes people on bicycles undergoing Lorentz contractions to illustrate special relativity. This man proposed an early nuclear model where it is treated as an incompressible fluid, the liquid drop model. This man used quantum tunneling to show □ how nuclear fusion occurs despite Coulomb repulsion. Known ○ for his work on Big Bang nucleosynthesis, for 10 points, name ▲ this physicist who humorously authored a paper along with ◆ Alpher and Bethe.

Answer: George Gamow

■ Francis Crick

Packet P2 Question 7

One type of this structure proposed by Bentley quickly finds the nearest neighbor of an input, and its elements represent splitting planes. A proof of the $n \log(n)$   lower bound for comparison based sorting builds one of these structures, and notes it must have at least n factorial of a certain type of element. The inverse Ackermann function appears when analyzing an algorithm that uses a union-find data structure to find one of these structures. A greedy algorithm by Kruskal finds the minimum spanning type of this structure. For 10 points, name these acyclic  graphs with root and leaf nodes. 

Answer: Tree (data structure)

 Quicksort  Tree  Tree (data structure)

Packet P2 Question 8

Increased response to this chemical is initiated when galantamine ● binds to its 5-HT₃ receptor, and its overproduction can result in a condition described with the mnemonic “SLUDGE syndrome.” Receptors for this chemical are ○ classified in whether they employ a second messenger system or gated ion channels and are respectively muscarinic and nicotinic. ■ Receptors ◆ of this neurotransmitter ▲ are attacked in myasthenia gravis. Latrotoxin causes its supply to be rapidly released whereas curare poison inhibits the uptake of this small molecule. For 10 points, name this neurotransmitter that activates muscle contractions, an ester of acetic acid and choline.

Answer: Acetylcholine

● Zoltán Kodály






Packet P2 Question 9

Development of these structures results from asymmetric cell division after SPCH production is inhibited by YODA. In response to elevated carbon ● dioxide levels, an increase in the number of these structures ◆ has been observed □ to be regulated by the HIC gene. The pericytic type found in ferns are surrounded by a single donut-like cell, while monocots possess two ■ peripheral lens-like cells in the gramineous type. Uptake of potassium ions increases turgor pressure ▲ within these structures causing them to swell and open. Flanked by two guard cells, for 10 points, name these pores found on the surfaces of plant leaves.

Answer: Stoma

■ Meristem





Packet P2 Question 10

This technique can identify weak points in polypropylene or aramid fibers as applied stress affects the  fibers' response to this technique. In a variant of this technique, a depolarization ratio greater than three-fourths shows that the sample has asymmetric vibrations. This technique penetrates deep beneath surfaces in its spatially offset variant. The results of this technique are characterized by the change in scattered photon energy and  are known as Stokes and anti-Stokes shifts.   For 10 points,  name this technique used to probe low frequency molecular modes, named for an Indian physicist.




Answer: Raman spectroscopy

 Plastic





Packet P2 Question 11

In 2017 this body was shown to be surrounded by cold blobs of  protons by the JADE instrument. The convergence of currents around this body forms a radially outward current known as the CEC. A prominent feature of this body is produced by the  dissociation of sulfur dioxide ejected by an interior moon and is known as the plasma torus. This planet's magnetosphere is generated by a rotating layer of metallic hydrogen and interacts locally with magnetic moments of Io and Ganymede. For 10 points, identify this planet that has the largest magnetic structure in the solar system, the   fifth from the Sun.

Answer: Jupiter

 Pillow lava  Titan (moon)  Mercury (planet)

Packet P2 Question 12

A common mistake when calculating the index error of these devices occurs when converting between the Kew and Fortin types. Printed sheets explaining how to interpret readings from these devices were included on the reverse of the ones named for HMS Beagle captain Admiral FitzRoy. Airplanes usually make use of the smaller aneroid type of these devices. One often factors in the temperature and gravity when using a mercury-based device of this type. Some of these devices offer readings in millibars. For 10 points, name this type of device which measures the pressure of the atmosphere.    

Answer: Barometer

 Flip-flops  Fuel cell  Compass  Laser

Packet P2 Question 13

Claude le Jay and Jean Codure met the founder of this organization in Paris. Joanna of Austria may have been secretly admitted to this organization. While living in a Manresa cave, its founder wrote a text that instructs the reader to imagine “wailing” and “screaming.” A book by Ludolph of Saxony influenced ■ its founder, who was wounded near Pamplona. This group ● ran the San Ignacio Guazu reduction but was expelled from Spain in 1767. The Spiritual Exercises are a central text of, for 10 points, what Catholic religious order founded by Ignatius ▲ of Loyola known ◆ ■ for its support of education?

Answer: Society of Jesus

■ Ignatius of Loyola

Packet P2 Question 14

This artist chewed out her eventual biographer David Yaffe for calling her music “middle class” in the Times. While in Crete, this artist of “Don Juan’s Reckless Daughter” met Cary Raditz, who was immortalized in her lyrics as a “redneck on a Grecian isle.” The opening of one of her biggest hits riffs on “Jingle Bells” and contains the line, “I made my baby cry.” She appeared on the Dick Cavett Show instead of performing at Woodstock, but then wrote the track “Woodstock” made famous by CSNY. A 2017 NPR list was topped by her album, Blue. For 10 points, name this folk singer behind “River”. ♦ ○ □ ▲

Answer: Joni Mitchell

♦ Ritchie (album) ○ Amy Winehouse □ Tom Petty ▲ Georgia O’Keeffe







Packet P2 Question 15

In a novel by this author, a doctor who is treating bee stings has a boating accident ■ with an estranged friend as they watch a nearby religious festival. A character created by this writer visits the hypnotist Dr. Lasker Jones, ○ falls in love with the gamekeeper Alec Scudder, and appears ● in a novel published posthumously in 1971. Cyril Fielding misses a train in a plot point devised by this author, who wrote about the nature of homosexual relationships in early 20th-Century Britain in his novel Maurice. ◆
For 10 points, name this author of A Passage to India. ▲

Answer: E. M. Forster

■ Formate ● Maurice (novel) ▲ E. M. Forster





Packet P2 Question 16

This man's spring at Barenton was a popular pilgrimage site. French sources usually  referred to this man's mother as Optima. If his namesake tree, also known as the Priory Oak, was cut down, then the town of Carmarthen would be destroyed. He pointed out that a pool was why Vortigern's tower kept falling   down. He convinced Aurelius Ambrosius  to venture to Ireland to retrieve the stones to build Stonehenge.  Igraine slept with Uther Pendragon through the machinations  of this man, who then organized the sword-in-the-stone contest. For 10 points, name this magician in Arthurian legends.




Answer: Merlin

 Chartres  Uther Pendragon

Packet P2 Question 17

Robert Garland described these events as a “three-act drama with precise regulations” in his 1985 book on them. Egkhystristria made blood sacrifices during these events, where an epikedeion was sung. These events concluded with the prothesis. In the Pre-Classical period, a part of these events involved women beating their breasts and tearing out their hair. During the Hellenistic  period, a Charon piece was inserted in their first stage. Pericles gave an oration during a massive one of these events during the Peloponnesian War. For 10 points, name these events centering on deceased Greeks.   

Answer: Funeral

 Olympic Games  Thucydides  Witch-hunt

Packet P2 Question 18

A character in this film receives a frugal Christmas gift of a ■ pillow with the phrase “Golfers Never Diet They Just Exist On Greens” knit on it. In this film, a football coach uses X’s and O’s to diagram The Tempest. The protagonist throws herself out of a car after listening to an audiobook of The Grapes of Wrath and writes an essay on Sacramento. Lucas Hedges plays the closeted Danny O’Neill in this film. Laurie Metcalf’s character cries after dropping her daughter off to leave for college in, for 10 points, what 2017 coming-of-age film directed by Greta Gerwig and starring Saoirse Ronan? ◆ ○ ▲

Answer: Lady Bird (film)

■ The Polar Express ◆ John Wick ○ Zelda Fitzgerald ▲ Citizen Kane

Packet P2 Question 19

In a version of this film directed by Melanie Mayron, the characters work to sell plaid kid's clothes to Sandra Bernhard. The Hives are discussed in a version of this film featuring "Asian voodoo." The first version of this film, based on a Mary Rodgers novel, cast Jodie Foster as a water skier. Heidi Blickenstaff is a caterer alongside Cozi Zuehlsdorff in a 2018 musical version of this film for the Disney Channel. An earlier version had Jamie Lee Curtis and Lindsay Lohan each playing two characters. For 10 points, name these films about a mother and daughter who swap bodies on the title day. ♦ ○ □ ▲

Answer: Freaky Friday

♦ The Golden Boy ○ Love and Mercy (film) □ Mean Girls ▲ Selma (film)

Packet P2 Question 20

On this show's episode "Penguin One, Us Zero," a character has an existential crisis when a bagel doesn't come out of a toaster. A character on this show repeatedly hires prostitutes to shoot her while wearing a bulletproof vest. Its penultimate episode features a confrontation between a bearded and clean-shaven version of the same character, police chief Kevin Garvey. The Guilty Remnant is a cult on this series co-created by Lost's Damon Lindelof and based on books by Tom Perrotta. For 10 points, name this HBO series where 2 percent of the Earth's population vanishes in The Departure. ♦ ○ □ ▲

Answer: The Leftovers (TV series)

♦ True Blood ○ Parks and Recreation □ The Wire ▲ Invader Zim

Packet P2 Question 21

After this man gave a funeral sermon proclaiming “Where thy treasure is, there is also thy heart”, a moneylender’s still-beating heart was found. This saint is often depicted next to the infant Jesus with a psalter and a book that he retrieved from a thief. He studied at an Augustinian monastery in Coimbra before joining the Franciscans. While at the Marecchia River, he preached to the fishes. A prayer is said to this patron saint of Portugal to retrieve lost ■ items. For 10 points, ▲ name this saint who resettled in Padua and who shares his name with a saint who underwent temptations in the desert. ◆ ○

Answer: Anthony of Padua

■ Andrew the Apostle ▲ Jude the Apostle ◆ Saint Christopher ○
Jude the Apostle

Packet P2 Question 22

Packing for a vacation to this location inspires a book's narrator to exclaim "throw the lumber over, man!" after comparing luxuries to "useless lumber." Daniel Deronda saves Mirah Lapidoth from committing suicide in this location. This location is called "sweet" in the final line of each stanza of Edmund Spenser's "Prothalamion." An 1889 book mostly set in this place centers on the narrator J., his friends George and Harris, and the dog Montmorency; that book is Jerome K. Jerome's *Three Men in a Boat*. For 10 points, name this river that flows through London. ♦



Answer: River Thames

♦ *Three Men in a Boat* ○ Pendleton Civil Service Reform Act □ England ▲ Mount Olympus

Packet P2 Question 23

In this novel, the only book that a woman takes on a trip is *The Betrothed*, but she never reads it. A character in this novel wakes up with what he thinks is pig's blood on his penis before realizing that ● it's his wife's menstrual blood. Two servants in this novel are called "Our Jim" and "My Jim." A chief in this novel reveals he knows English when he speaks to Maureen, who later ◆ chases after a helicopter at its end. The white Smales flee a war-torn Johannesburg to live with the ■ title character in, for 10 points, what Nadine Gordimer novel ▲ that shares part of its name with a summer month?

Answer: July's People

Packet P2 Question 24

The protagonist of this story suggests that by signing crosses in the air “it will be scattering curses abroad in the likeness of holy symbols!” This story, whose purported author is M. de l’Aubepine, includes the tale of a beautiful, dangerous Indian woman who was gifted to Alexander the Great. Dame Lisabetta points out ● a secret door to its protagonist, who later kills a spider ■ by breathing on it. Dr. Pietro Baglioni ◆ ▲ provides a chemical antidote that kills this story’s title character. For 10 points, name this Nathaniel Hawthorne story about the title poisonous girl.

Answer: Rappaccini’s Daughter

Packet P2 Question 25

A deity proclaims “I am something supernatural / not exactly god, ● ghost, spirit, angel, principle or element” in a 2017 translation of this play accompanied by the poem “I Wish I Were Two Dogs Then I Could Play With Me” by Anne Carson. A “juggling charmer from Lydia” escapes prison during an earthquake in this play, and later boasts that he’s caused “the whole bursting female seed-pod” of the city to worship him. Agave does not realize her son’s head is impaled upon her spear in, for 10 points, what Euripides play where ● ▲ Pentheus is torn ■ apart by crazed followers ◆ of Dionysus?

Answer: The Bacchae

● Common sense

Packet P2 Question 26

This poem evokes images of “Ohio’s shores and flashing Missouri,”
◆ ● with the speaker himself located among the “spires, and the sparkling and hurrying tides” of the city. An aside in this poem declares that if a creature wasn’t able to sing it would “surely die”. One object in this poem is located “fronting an old farm-house near the white-wash’d palings.” The “tolling tolling bells’ perpetual clang” mark a passing of a ■ coffin in this poem. It describes a “great star disappear’d” and a solitary thrush. For 10 points, name this Walt Whitman elegy for Abraham ▲ Lincoln titled for some purple flowers.

Answer: When Lilacs Last in the Dooryard Bloom’d

Packet P2 Question 27

This author wrote of her ■ father admiring the naked body of the Venus of Urbino in ▲ a eulogy for John Berger. This author wrote of how “I feels like too straight and singular a phoneme” in an essay written after Obama’s election and wrote another essay about Dana Schutz’s Open Casket painting. This author of “Speaking in Tongues” and “Getting In and Out” wrote a novel in which has Irie Jones gets her hair straightened, Marcus Chalfen works ■ on the FutureMouse program, and Archie Jones is best friends with Samad Iqbal. For ◆ ● ▲ 10 points, name this British author of White Teeth.

Answer: Zadie Smith





■ Maria Edgeworth ▲ Titian

Packet P2 Question 28


A Bayer employee in this novel uses dolls to reenact car accidents, and a Jehovah's Witness asks for a letter opener to cut off his penis and prove he didn't rape a young girl. In this novel, Pascual often writes about "some pyromaniac in Turkey" rather than the local news. This book's narrator works for the Genaros and tries to find a priest that will marry him ▲ to a divorcee. An ● Argentine-hating character in this novel is committed after confusing his plots and killing off his characters in an earthquake. Pedro Camacho cranks out radio ■ serials in, for 10 points, what Mario Vargas ◆ Llosa novel?

Answer: Aunt Julia and the Scriptwriter

Packet P2 Question 29

The reporter who broke this scandal tricked lawyer George Latimer into showing him a charge sheet against a man involved in it. The obscure Dispatch News Service first reported this scandal because of a disagreement with the New York Review of Books. Ron Ridenhour wrote to Congress about this event, during which Hugh Thompson  saved lives using a helicopter. Seymour  Hersch ran away from JAGs while trying to track down evidence of this scandal, which took place in a village in Quang Ngai Province and was ordered by Lieutenant William Calley.  For 10 points, name this 1968 massacre in Vietnam. 

Answer: My Lai Massacre

 My Lai Massacre






Packet P2 Question 30

Voltaire admired an imagined ● speech by an indigenous leader in this modern-day country named Colocob. Pedro de Ona was commissioned to write a rival account to the conquest of this country by Garcia Hurtado de Mendoza. The era of conquest in this country ended with the Disaster of Curalaba. The Basque conquistador Alonso de Ercilla turned the ■ conquest of this country into an epic poem, La Araucana. ○ Pedro de Valdivia fought against the Mapuche in this country. In 1578, Francis Drake attacked this country's port of Valparaíso. For 10 points, ◆ name this rival ABC power to Argentina and Brazil. ▲


Answer: Chile

● Candide ■ Mapuche ▲ Spain





Packet P2 Question 31

This document inspired Maya Angelou's "To  Form a More Perfect Union," which was carried by a torch relay to a 1977 conference in Houston. This document, one of whose sixteen main points attacks tyrants who have "monopolized nearly all the profitable employments,"   opens by quoting an earlier text's "inalienable rights." The phrase "We hold these truths to be self-evident:  that all men and women are created equal" appears in this document, which was largely written by Elizabeth Cady Stanton. For 10 points, name this 1848 document drafted  at the Seneca Falls Convention.

Answer: Declaration of Sentiments

 I Know Why the Caged Bird Sings

Packet P2 Question 32

This town lends its name to a 1910 exhibition in New York of the paintings of Lawton Parker, Richard Miller, and Guy Rose.  A traffic cone and some shopping carts appear in a Banksy parody of a painting made in this town. One artist working at this location created the Grandes Decorations and Nymphéas cycles. A series of paintings made in this town now comprise  almost 300 feet of continuous wall space in the Orangerie. A garden in this commune contains a noted Japanese footbridge. For 10 points, name  this commune in Northern France where Claude Monet painted  water lilies.

Answer: Giverny

 Virginia City, Nevada

Packet P2 Question 33

A photographer from this ■ country made photos ○ where “you could look at them forever” in his New Pictures from Paradise and captured patrons viewing Las Meninas in his Museum Photographs. Images of workers ● in this country were captured in the Face ▲ of Our Time series. A photographer from here showed the endless shelves of a grocery store in 99 Cent. An artist from here made blurred photo paintings. An artist born here made Homage to the Square but fled to the US after the 1933 closure of the Bauhaus. For 10 points, name this birthplace of Gerhard Richter, Josef ◆ Albers, and the Dusseldorf School.

Answer: Germany

■ Henri Cartier-Bresson ● Vietnam

Packet P2 Question 34

In 1963, Erwin Ratz's "critical edition" of a symphony by this composer switched the order of its inner movements. The scherzo of this composer's fourth symphony calls for a violin tuned a whole tone higher to represent "Freund Hein," a personification of death. His fourth symphony ends with a soprano singing about a child's vision of heaven. The death of his oldest daughter and his diagnosis with a heart condition inspired the giant wooden mallet in his sixth symphony which delivers ▲ three blows of fate. For 10 points, name this Austrian composer whose sixth ◆ ■ symphony is nicknamed "Tragic." ○

Answer: Gustav Mahler

▲ Anton Bruckner ■ Anton Bruckner ○ Anton Bruckner

Packet P2 Question 35

S. S. Stewart made these instruments with ■ a silver wrapped rim. Dock Boggs was plucked from obscurity to play this instrument in Asheville in □ 1963. Gus Cannon was sometimes nicknamed for this instrument and played in the “old-time” style. Pete Seeger wrote a book ◆ on this instrument, and invented a long-neck variant of it. Laurent Dubois’s history of this “African Instrument” traces its origins from the “rude guitar” used by slaves. A three finger plucking technique for playing it was developed by Earl Scruggs. For 10 points, name this stringed instrument common in bluegrass bands. ○ ▲

Answer: Banjo

■ Steelpan ○ Violin ▲ Violin

Packet P2 Question 36

In a recent performance of an opera by this man, Robert Burt as Iro gets hit over the head by the harp player as he starts plucking the strings. He's not Bach, but the conductor John Eliot Gardiner founded a choir named for this composer. He wrote a slow-paced aria with echoing ascending and descending scales that is addressed to Charon and titled "Possente spirito." This composer ● of The Return of Ulysses to his Homeland ◆ wrote an opera in which Ottavia is banished ■ by the Roman emperor for her role in a murder plot. For ▲ 10 points, name this early Italian composer of The Coronation of Poppea and Orfeo.

Answer: Claudio Monteverdi

Packet P2 Question 37

While working in this ▲ style, a painter showed a giant red “X” superimposed on a Race Track, and frequently painted ships such as in SS Independence with Cote d’Azur. Another artist who worked in this style placed lipstick above a skull that is reflected in a mirror next to symbols of gambling in her painting Wheel of Fortune. Malcolm Morley and Audrey Flack worked in his style, which was used to depict a series of phonebooths by Richard Estes. For 10 points, Big Nude was the first ■ painting by Chuck Close in what style ◆ that tried to simulate the precision of the camera? ○

Answer: Photorealism

▲ Speechwriter ○ Minimalism

Packet P2 Question 38

Historians Audrey Truschke and Wendy Doniger have been targeted by Section 295A of this country's penal code. The so-called "King of Good Times" fled from this country owing a billion dollars in debt after his airline business collapsed in 2012. A newspaper in this country spent just \$8 to access its supposedly secure national ID system called UIDAI. The Amazon rival Flipkart is based here. This country's prime minister has introduced a nationwide Goods and Services Tax and controversially demonetized larger bank notes. For 10 points, name this country ruled by BJP leader Narendra Modi. ♦ ○ □ ▲

Answer: India

♦ Libya ○ North Korea □ Hungary ▲ France

Packet P2 Question 39

Buildings in this city ■ erected before 1770 have upper stories that almost touch because of their “retreating facades.” The word “urbanization” was coined by the man who built this city’s octagonal blocks in a plan known as ● the “Eixample”. This ◆ city’s radical mayor wrote the book *Mortgaged Lives* and is named Ada Colau. Freddie Mercury died before he could perform ■ a song title for this city at an event whose mascot was the sheepdog Cobi. The first Dream Team won gold in this city. For 10 points, name this host of the 1992 Summer Olympics, a Catalan city home to La Sagrada Familia. ▲

Answer: Barcelona

■ Summer camp ▲ New York City

Packet P2 Question 40

Brutalist art fans are campaigning to save buildings in this country
● such as the H-shaped Golden Mile Tower. Becca D'Bus was a star of the drag scene along Bugis Street in this country. Linguist Jakob Leimgruber has studied a variant of English in this country where "lah" is often added to the end of phrases. Grant Associates created 18 steel "Supertrees" in this country. The Capella Hotel on a former pirate haven in this country was where the U.S. agreed to stop joint military exercises after meeting with North Korea in 2018. For 10 points, Lee Kuan Yew ruled ◆ ■ what Asian city state? ▲

Answer: Singapore

● I. M. Pei ▲ Peru

Packet P2 Question 41

A 1997 Economist cover story called this politician a “Serial Blunderer” after he was forced to provide an antidote in a botched assassination attempt. This former ▲ UN Ambassador did CNN interviews wearing a gas mask during the Gulf War. He’s received controversial gifts from Hollywood mogul Arnon Milchan and may have been bribed to buy German submarines. In 2018, a minority population in his country had their language downgraded to “special.” He got Donald Trump to move the US Embassy in his country and chairs the Likud party. For 10 points, name this Prime Minister of Israel. ♦ ○

Answer: Benjamin Netanyahu

▲ Abdullah II of Jordan ♦ Benjamin Netanyahu ○ Cristina Fernández de Kirchner

Packet P3 Question 1

Processes named for this ▲ man can be constructed on an arbitrary symmetric inner product space with a countable basis using ● the Ito isometry. Wiener processes such as Brownian motion are examples of a broader class of processes named for this man. The pdf of this man's namesake distribution is a rescaling of e to the negative x minus μ squared over 2 times the variance. For 10 points, name this German mathematician whose ▲ namesake distribution is commonly called ○ a bell curve. ◆ □

Answer: Carl Friedrich Gauss

▲ Matrix decomposition ● David Hilbert ◆ Bernhard Riemann □
Bernhard Riemann





Packet P3 Question 2

John ● Graham-Cumming's Plan 28 is a modern-day effort to build an early version of these machines described in paper by Luigi Manabrea. The court case Honeywell v. Sperry Rand determined that John Atanasoff, rather than Mauchly and Eckert, designed the first version of these machines. Early versions of these machines, such as ENIAC, used ring counters made of vacuum tubes to store numbers. For 10 points, name these machines that can be used to run programs. ♦ □ ▲




Answer: Computer

● Symmetric matrix ♦ Bicycle □ Vending machine ▲ Autoclave

Packet P3 Question 3

This is the shape of a  work containing the phrase “causarum cognitio”   that is located above Raphael’s School of Athens. God is placed within this shape as the largest figure in the mosaic on the ceiling of the Florence Cathedral. Tondos are works of art with this shape. Both Cimabue’s Santa Trinita Maesta and Giotto’s Ognissanti Madonna depict golden objects with this shape surrounding the head of the Virgin Mary. Along with a square, Leonardo da Vinci’s Vitruvian Man is placed within, for 10 points, what shape used by Renaissance artists to draw a halo? 

Answer: Circle

 Cone  The School of Athens  Parabola

Packet P3 Question 4

While Einstein provided the groundwork, this physicist was the first to write $E = mc^2$ in his 1907 paper on the elementary electrical charge. However, in 1922 he called Einstein and Sommerfeld a bad influence in his “The Present Crisis in German Physics” before joining with Lenard to lead ● ■ the “Deutsche Physik” movement. An effect known for this man allows fast switching in QSE optical modulators. Winning the 1919 Nobel prize for showing that an electric field splits ■ the spectral lines of a dipole, for ▲ 10 points, name this German physicist who names the electric analog of the Zeeman ◆ effect.

Answer: Johannes Stark

● Photoelectric effect ■ Photoelectric effect ▲ Stark effect






Packet P3 Question 5

Although it has nothing ■ to do with ergodic theory, any spherically symmetric solution to a set of equations name for this system must be static and asymptotically flat according to Birkhoff's theorem. The exchange of virtual photons between two otherwise uncharged plates placed in this system causes a net force in the Casimir effect. When the energy-momentum tensor equals zero in a region, the Einstein field equations ● are named for this system. For 10 points, what system consists of space devoid of all matter? ◆ ▲





Answer: Vacuum

■ Flavor ● General relativity ◆ Vacuum ▲ Email

Packet P3 Question 6

In one novel, spirits flock to obtain this product and pepper soup from Madame Koto. While on a quest to obtain this stuff, a character defeats  the red-fish and red-bird that are terrorizing the Red-town, and rescues his future wife from a “complete gentleman” who is really just a skull. That character obtains a magic egg from a servant who made this substance  for him after he finds him in Deads’ Town. Jugs of this substance are drunk throughout The Famished Road and Things Fall  Apart. Amos Tutuola titled a novel for a “drinkard” of, for 10 points, the “palm” type of what alcohol beverage?  

Answer: Wine

 Kola Ogunmola  Ben Okri  Kola Ogunmola  Kola Ogunmola

Packet P3 Question 7

A set of these objects depicting the hunt were designed for the brother of Maximilian II by the teacher of Albrecht Durer. An entry in a five-part series about these objects by Paul Cezanne depicts two ♦ men in brown seated at a table with their hands in front of a wine bottle. A boy's □ adversary holds a set of these objects behind his back in a painting by Caravaggio. Brown and Bigelow ● commissioned Cassius Coolidge to create a series in which animals interact with these objects. For 10 points, name these objects held by dogs as they play poker in His Station and Four Aces. ▲


Answer: Playing card

▲ Skull





Packet P3 Question 8

The firm that handled international public relations for this organization, Robert R. Mullen and Company, was also a CIA front. In 1868, it purchased the Eagle Emporium to form ZCMI which used the slogan "America's First Department Store". The 1887 Edmunds-Tucker act dissolved this organization and seized its assets, and Senator Reed Smoot's membership was the subject of a four year hearing. This religious organization owns Deseret Industries and the world's largest Family History Library. For 10 points, name this church founded by Joseph Smith and headquartered  in Salt   Lake City. 

Answer: The Church of Jesus Christ of Latter-day Saints

 The Church of Jesus Christ of Latter-day Saints

Packet P3 Question 9

In a liquid mixture, the i -th compound's value for this quantity can be computed by differentiating the excess Gibbs energy with respect to x_i . Another model computes this quantity by differentiating the virial expansion  of the excess Gibbs  energy with respect to molality. In addition to using the Margules and Pitzer models, you can compute this quantity with the Debye-Huckel equation. For 10 points,  name this dimensionless quantity that  models a liquid's deviation from being an ideal solution.

Answer: Activity coefficient





Packet P3 Question 10

This process is compromised by a nonsense mutation in dogs leading to Tarui's disease. An intermediate in this process is formed by an aldol cleavage before being processed by a catalytically perfect enzyme. ● That anion is a byproduct of the breakdown of fructose ◆ 1,6 biphosphate and is DHAP. This process ■ begins with the phosphorylation carried □ out by hexokinase, while its products are ultimately converted into acetyl-coA. For 10 points, name this anaerobic process, the first step in cellular respiration. ▲

Answer: Glycolysis

■ Catalase ▲ Citric acid cycle

Packet P3 Question 11

An exact answer to how this quantity changes between two states is given by the Zwanzig relation or exponential averaging. The change in this quantity between two systems in the same configuration can be approximated with the BAR method. This quantity is equal to negative k times temperature times the logarithm of the partition function. This   quantity represents the maximum obtainable work from a reversible  process and  is equal to the internal energy minus entropy times temperature. For 10 points, name this free energy not named for Gibbs.

Answer: Helmholtz free energy





Packet P3 Question 12

An indirect agglutination assay used to detect ■ this disease first sensitizes gelatin particles to antigens of this disease before checking for gelatin clumping. Lyophilized ● suspensions of this disease's causative agent are mixed with the patient's serum in another test for this disease. Screening methods for this disease such as VDRL are followed ○ by TPPA and FTP-ABS tests for it. Painless lesions called □ chancres often ◆ accompany the early stages of this disease, while many patients with its late-stage form go insane. For 10 points, name this sexually transmitted disease that is ▲ caused by *Treponema pallidum*.

Answer: Syphilis

■ ELISA ● Collagen

Packet P3 Question 13

This time signature is   used for most of the  “Aria” from Heitor Villa-Lobos’s *Bachianas brasileiras*. This time signature is used in the opening and closing sections of Sergei Rachmaninoff’s *Isle of the Dead* to represent the motion of water. It alternates with a triple meter time signature in the “Promenade” section of *Pictures at an Exhibition*. A two-note piano vamp plays throughout a piece in this time signature from the album *Time Out* by David Brubeck. For 10 points, give this time signature whose beats often have a “strong-weak-weak-medium-weak” pattern. 

Answer: Quintuple meter

 Mahavishnu Orchestra  Triple metre  Night

Packet P3 Question 14

This policy is the subject of much of Barry Eichengreen's work, which claims that its "fetters" were a prime cause of instability during the interwar period. The ■ 1926 general strike in Britain partly resulted from the re-implementation of this policy by Winston Churchill. The U.S. abandoned this policy in the "Nixon Shock," effectively ended the Bretton Woods system. Adhering to this policy would "press down upon the brow of labor this crown of thorns" according to a speech against it from the 1896 DNC. For 10 points, name this policy under which coinage is backed by a single precious metal. ♦ ○ ▲

Answer: Gold standard

■ Stanley Baldwin ♦ Cross of Gold speech ○ Conscription ▲ Conscription

Packet P3 Question 15

Examples of these structures include the megalithic Hagar Qim complex, which was built during the Ggantija period on Malta. Wooden objects called xoana were typically found within these structures. Another of these buildings contains 92 carved plaques called metopes and was financed with appropriations from the Delian treasury. One of these structures in Ephesus was among the Seven Wonders of the ancient world. Several of them contained exquisite chryselephantine statues sculpted by Phidias. For ● 10 points, name these buildings exemplified by the Parthenon. ◆ □ ▲

Answer: Temple

● Parthenon ◆ Ephesus □ Parthenon ▲ Mosque

Packet P3 Question 16

A song titled “Hey, [these ▲ people]” was first sung at a meeting named for this group that a young Mikhail Bakunin attended. Prince Windischgratz broke up that 1848 congress named for these people that was organized by František Palacký. A kingdom whose name means “the land of [this group]” was founded under Peter I, whose ■ son Alexander I was killed in Marseilles in 1934. The Nazi ● concept of “Drang nach Osten” targeted the lands of these people, who name a state that resisted the Nazis with Partisans led by Josip Tito. For 10 points, name this people that includes Russians and Serbs. ◆

Answer: Slavs

▲ Give My Regards to Broadway ■ International Workingmen's Association ● Huguenots ◆ Chetniks

Packet P3 Question 17

This sort of natural feature ■ names Vere Gordon Childe's theory that the invention of agriculture arose from climate change. Independent city-states based on features of this sort, such as Karakhoja and Khotan, were defeated during Emperor Taizong's campaigns in the Tarim Basin. An oracle of Amun Ra was located in one of these places called Siwa. The caravanserai inns of the Silk Road were typically built in these areas. For 10 points, name these areas surrounding water sources in deserts. ♦ ○ ▲

Answer: Oasis

■ Sound ♦ Xinjiang ○ Committee for the Promotion of Virtue and the Prevention of Vice (Saudi Arabia) ▲ Royal forest

Packet P3 Question 18

The priest Fernando Cardenal led a campaign for this goal launched by the Sandinistas in 1980. That campaign was inspired by a 1961 campaign for this goal, which ● featured groups such as the “Conrado Benitez” Brigade and was masterminded by Che Guevara in Fidel Castro’s ■ Cuba. The UNESCO award for initiatives promoting this goal is named for ▲ King Sejong, who is credited with an invention that increased the rate of this quality among the ordinary people of Korea; that invention was the Hangul script. For 10 points, give this term for the ability to read and write. ◆

Answer: Literacy

● Irish Home Rule movement ■ Bay of Pigs Invasion ▲ Irish Home Rule movement ◆ Cuba





Packet P3 Question 19

This person was made the monarch of Poland via an oath given in Lwów by John II Casimir. Miners skirmished with the German soldiers who were sent to break up crowds after this person supposedly visited the town of Marpingen. Lúcia dos Santos wrote down three secrets allegedly authored by this person. ■ Three children claimed to have seen this person in 1917 in Fatima, Portugal, while Bernadette Soubirous claimed to have seen her in Lourdes in 1858. For 10 points, name this religious figure whose alleged apparitions have earned her titles like “Our Lady of Guadulpe.” ♦ ○ ▲

Answer: Mary, mother of Jesus

■ Our Lady of Fátima ♦ Our Lady of Fátima ○ Anne Boleyn ▲
Clarence Earl Gideon





Packet P3 Question 20

At the climax of this novel, a shield-toting, fur-clad man on a black horse tries to get the main character hanged. Chapter 5 of this novel is occupied with a blind old man's speech about "the Founder." After bringing a wealthy man to a shack where a sharecropper describe how he impregnated his daughter, then taking him  to a brothel where he passes out, the protagonist of this novel is expelled from school. This novel's narrator describes how he came to live in a brightly-lit basement after working as a spokesperson for the Brotherhood.  For 10 points, name this magnum opus of Ralph Ellison.  

Answer: Invisible Man

 Invisible Man  Invisible Man





Packet P3 Question 21

In a scene from this novel, a blind man named  Pew is trampled   to death by a group of horsemen in the street. A boy in this novel hides behind a door with a man who is missing two fingers, and who is later revealed to be named Black Dog. An animal in this novel repeats the phrase “Pieces of Eight” and is named for his former owner, Captain Flint. In this novel, a man with one leg plans a mutiny aboard the Hispanola to find a buried treasure that is marked by an “X” on a map. For 10 points, name this novel by Robert Louis Stevenson. 

Answer: Treasure Island

 Treasure Island

Packet P3 Question 22

Beverly Watson discusses a line of poetry implied to be spoken by this title group, “Life is very long,” in August: Osage County. The voices of this group are compared to “rats’ feet over broken glass /  In our dry cellar.” This group is said to “grope together / And avoid speech / Gathered on the banks of the tumid river.” This group’s members are described as “Leaning together, headpiece filled with straw” and are implied  to recite the lines,  “Here we go round the prickly pear.”  For 10 points, what group titles a T. S. Eliot poem in which the world ends “not with a bang, but a whimper?”

Answer: The Hollow Men

Packet P3 Question 23





An author described life with his Swedish immigrant parents in a city in this state in the memoir *Always the Young Strangers*. Edmund Wilson's *Patriotic Gore* mocks a popular two-volume biography of a man from this state whose second volume, *The War Years*, won the the 1940 Pulitzer. A place in this state is told "I have seen your painted women under the gas lamps luring the farm boys" in a poem that calls it a "Tool Maker," "Stacker of Wheat, Player with Railroads," and "Hog Butcher for the World." ▲ For 10 points, Carl Sandburg wrote a biography ● ■ of what state's native son Abraham Lincoln? ◆

Answer: Illinois




▲ Chicago (poem) ● Chicago (poem) ■ Chicago (poem) ◆
Chicago

Packet P3 Question 24






In one of these works, the invisible Titivillus plots to plant weeds in the protagonist's corn. One of these works inspired the title of a Philip Roth novel about a man who dies during a stent surgery. In one of these works, the protagonist's cousin complains of a toe cramp to avoid going on a journey with him. At the end of a work in this genre, the protagonist climbs into his coffin with Good Deeds, having been abandoned by his Kindred and Goods.

Mankind and Everyman exemplify,  for 10 points, what medieval genre of  drama that evolved from similarly-themed Mystery Plays?  





Answer: Morality play

 Everyman  Gibbs free energy  Harry Potter fandom

Packet P3 Question 25

This author's love poetry is collected in a volume titled *A String of Flowers, Untied*. Richard Bowring translated a diary by this author that famously calls another writer "dreadfully  conceited." A term meaning "the pathos of things" originates from studies of this author's works. This author's pen-name derives from a character who is attacked by the living ghost of her husband's mistress. A novel by this author includes "Vanished Into the Clouds," a blank chapter that signifies the protagonist's death. For 10 points, name this lady-in-waiting who wrote *The  Tale of Genji*.   

Answer: Murasaki Shikibu

 Sarah Orne Jewett  Agatha Christie  Jun'ichirō Tanizaki 
Jane Austen





Packet P3 Question 26

One man concludes that a character with this profession killed himself by jumping out of a window and striking some rocks before being found in a bed of straw. Another man with this profession is found with his head sticking down in a vat of pig's blood on the second day. Characters of this profession serve as the librarians ● of the Aedificium and include Berengar of Arundel, who is found murdered two days after Adelmo. Jorge of Burgos is a blind character with, for 10 points, what job that William of Baskerville and Adso of Melk have in ■ The Name of the Rose? ◆ ▲


Answer: Monk

● Teacher ■ The Name of the Rose ◆ Firefighter ▲ Detective


Packet P3 Question 27

In this election, a candidate's habit of scheduling games of catch with his press secretary was criticized in the piece "Insider Baseball." An ad during this campaign excoriated one candidate's veto of mandatory minimums for drug dealers while criticizing his "revolving door" policy. That ad was created by the controversial Lee Atwater, a campaign manager in this election. The "Weekend Passes" advertisement about the furlough of William Horton ran during this election. For 10 points, name this election in which Michael Dukakis was defeated    by George H.W. Bush? 

Answer: United States presidential election, 1988

 United States presidential election, 1960

Packet P3 Question 28

The United Nations commonly uses the ratio of this quantity to GDP as a growth indicator, with Guinea  having the highest value of that ratio at about 75

Answer: Investment

 Gross domestic product  Gross domestic product  Density

Packet P3 Question 29

A passage about this object was copied wholesale for a poem about Cycnus's defeat by Heracles. A field high with grain, a field being ploughed, a star map featuring Orion and Ursus Major, a city at peace, and a city at war are among the many images on this object. This object, which ● is described in Book 18 of a poem in the first known example of ekphrasis, is ◆ ▲ forged along with armor by Hephaestus at the request of Thetis. For 10 points, identify this defensive object that a Greek hero wears on his arm during his fight with Hector in the Iliad. ■

Answer: The Shield of Achilles

● Sun ■ Achilles

Packet P3 Question 30

As an adjective, this ■ word denotes a movement whose “Sidhi program” is supposed to allow “yogic flying” and whose teaching in public schools is advocated by the David Lynch Foundation. This word denotes a type of meditation developed by Maharishi Mahesh Yogi. The movement of this name included Elizabeth Peabody, who published ◆ □ the first English translation of the Lotus Sutra, in its magazine The Dial. Some New Age religious movements have adopted the idea of the “Over-Soul” introduced by a member of this movement. For 10 points, name this movement that included ○ Ralph Waldo Emerson. ▲

Answer: Transcendentalism

■ Perfection ▲ Transcendentalism

Packet P3 Question 31

A thinker of this school monistically claimed that the idea of external relations leads to an infinite regress. A.J. Ayer mocked a thinker of this movement for writing that “the Absolute ● enters into, but is itself incapable of, evolution and progress.” J.E.M. McTaggart and F.H. Bradley exemplified the “British” branch of this school, which analytic philosophy developed in reaction to. To argue for this position, a philosopher formulated the “master argument” and claimed that “to be is to be perceived.” For 10 points, name this position of George Berkeley, ■ which holds that reality is dependent on mind. ◆ ▲

Answer: Idealism

● Pragmatism ◆ George Berkeley ▲ George Berkeley

Packet P3 Question 32

A 3rd century BC text titled for the “Oracle of” a user of this tool prophecies the ▲ destruction caused by the rule of the “beltwearers.” A god commonly associated with this tool features ● in royal birth myths with his wife, the frog goddess Heqet, and was worshipped at Esna and on Elephantine Island. This ■ tool is used to create human babies by the ram-headed god Khnum. This tool was used to create “red-figure” and “black-figure” artworks in ancient Greece. For 10 points, name this device used to shape wet clay into ceramics. ◆

Answer: Potter's wheel

▲ Smallpox vaccine ● Smallpox vaccine ■ Khnum ◆ Vase

Packet P3 Question 33

While he is surrounded by wild animals, the possessor of this object hears pipes in the distance and sings “Wie stark ist nicht dein Zauberton.” A quintet sings “Hm! Hm! Hm! Hm!” after ● this object and a set of silver bells are distributed by three women. The possessor of this object undergoes a trial ■ by silence, then is protected by it when undergoing trials of fire and water in the Temple of Ordeal with his lover Pamina. ◆ For 10 points, Tamino is given what title object in an opera by Wolfgang Amadeus Mozart? ▲

Answer: The Magic Flute

▲ The Magic Flute

Packet P3 Question 34

An event centered on works ■ of this musical genre began with the arrival of the leader of “The Insane Coho Lips” and the model Lorelei. At the urging of Willie Stargell, a team adopted a song in this genre as a symbol en route to overcoming a 3-1 deficit in the World Series against the Orioles. Bill Veeck organized an event opposing this genre. The White Sox were forced to forfeit a game due to a riotous “Demolition Night” for music of this genre. The “We are Family” Pirates team took their nickname from a song in, for 10 points, what genre popularized by the film Saturday Night Fever. ◆ ○ ▲

Answer: Disco

■ 1939 New York World's Fair ◆ Satire ○ Film noir ▲ Wuxia

Packet P3 Question 35

A song titled for this ▲ man begins with the singer correcting Ken Scott's pronunciation of this man's name. This person inspired the name of a Courtney Taylor-Taylor-fronted band that scored the sleeper hit "Bohemian Like You" in 2001. David Bowie included a song titled for this non-Bob Dylan man on Hunky Dory, and played him in the film Basquiat. This man's Exploding Plastic Inevitable events showcased ◆ a band who sang "Sunday morning, brings the dawning" on an album whose cover ■ he designed. For 10 points, what artist created the banana print that adorns the Velvet Underground's debut album? ○

Answer: Andy Warhol

▲ Give My Regards to Broadway ■ The Velvet Underground ○
Banana

Packet P3 Question 36

In a 2017 film, two characters make a pinky promise at a memorial to this person after impulsively driving 300 miles in the middle of the night. As depicted in *The Disaster Artist*, Tommy Wiseau took the line “You’re tearing me apart, Lisa!” from a movie starring this actor. In *La La Land*, Sebastian and Mia watch a film starring this actor, then dance at the Griffith Observatory where he was challenged to a knife fight. This actor starred in *East of Eden* and *Giant* prior to his 1955 death in a car crash. For 10 points, name this star of *Rebel Without a Cause*. ♦ □ ○ ▲

Answer: James Dean

♦ James Dean □ James Dean ○ George Clooney ▲ Tom Cruise

Packet P3 Question 37

It's not New York, but ● a viral video of Black ■ bloc protesters directing traffic and harassing drivers sparked a violent Proud Boys march in this state. Those protests were held in the wake of the police shooting of Patrick Kimmons. Ricky Best and Taliesin Namkai-Meche were stabbed to death on a train in this state after condemning the anti-Muslim tirade of the white nationalist Jeremy Christian. Backlash against Antifa activities in this state helped Knute Buehler's campaign in this state's 2018 gubernatorial election. For 10 points, what state recently re-elected Kate Brown as its governor? ◆ ▲

Answer: Oregon

● Japan ■ The Fox (What Does the Fox Say?) ◆ Idaho ▲
Pennsylvania

Packet P3 Question 38

In an opera titled for this object, a woman known as the “Muscovite Venus” reminisces about singing Laurette’s aria before Madame de Pompadour. ● The resident of Room 17 at the Obuhov hospital obsessively mutters a six-word phrase whose final word refers to this object. By possessing this object and thirteen objects of a different kind, one can “shoot the moon” in Hearts. This object is usually used as the namesake card of Old Maid. In a story, this object appears after a three and a seven, causing Herman to go insane. For 10 points, name ■ this card that titles an Alexander Pushkin story. ♦ ▲

Answer: Queen of spades

● Georges Bizet ♦ Light ▲ Moon






Packet P3 Question 39

After this treaty was signed in the Jerónimos Monastery, its signatories took a ride in an electric tram ■ together as a show of unity. A second referendum on this treaty was controversially held in Ireland, resulting in its acceptance after it was initially rejected by voters. This 2007 treaty set the maximum number of MEPs at 750 and created Article 50, which allows for the withdrawal process that Brexiteers seek to implement. For 10 points, name this treaty which amended the EU Constitution created in the Maastricht treaty, and which is named for the capital of Portugal. ♦ ○ ▲

Answer: Treaty of Lisbon

■ Treaty of Nystad ♦ Fontainebleau ○ Maastricht Treaty ▲
Treaty of Versailles

Packet P3 Question 40

This building's piazza  is defined by a colonnade of double Tuscan  columns that grow into an enormous elliptical circle. This building contains a reconstruction of   Giotto's depiction of Christ walking on the water, the Navicella. Its piazza contains an Egyptian obelisk known as "The Witness" as well as a fountain designed by the creator of this building's facade, Carlo Maderno. Bramante drew the original design for this building, before it was modified by Michelangelo. Pope Urban  VIII hired Gian Bernini to complete, for 10 points, what massive church at the heart of the Vatican City?

Answer: St. Peter's Basilica

 Baptistery






Packet P3 Question 41

This instrument partly titles a piece whose third movement begins with the xylophone playing a rhythm based on the Fibonacci sequence. Gustav Holst used wind instruments, a female chorus, and this instrument in the score of "Neptune, the Mystic." This instrument often plays the glockenspiel part in The Magic Flute since it has a similar sound. The third movement of the Nutcracker Suite begins with a solo for this instrument, and is titled "Dance of the Sugar Plum Fairy." For 10 points, Bela Bartok wrote a piece for "strings, ● percussion," ◆ and what keyboard instrument with a "heavenly" ■ sound? ▲





Answer: Celesta

● Harp ▲ Violin

Packet P4 Question 1

The Boomerang Nebula is  the closest natural place in the universe that approaches this concept. In a lab, sodium atoms at MIT were made to approach 0.1 nano of this concept. The Bose-Einstein condensate and superconductivity exist close to this  level. The Rankine zero is another scale for this concept. This concept marks the point where the entropy of an ideal gas reaches its minimum level and thermodynamic temperature scale reaches its lower limit. For 10 points, name the lowest temperature possible.   

Answer: Absolute zero

 Orion Nebula  Third law of thermodynamics  Knowledge 
Knowledge

Packet P4 Question 2

A character created by this author claims that he murdered a prostitute because she wanted his “lilac ● blossom.” A play by this author is set in a prison cell that is run by the convict Green-Eyes. The sounds ■ of an alarm clock, a telephone, and a doorbell cause breaks in the action in a play by this man, in which one of the title characters tries to seduce the milkman Mario. This ◆ ■ author of Deathwatch wrote a play in which ○ Claire and Solange plan to murder Madame using poisoned tea. ▲ For 10 points, name this French playwright of The Maids.

Answer: Jean Genet

● Sleeping Beauty ■ The Maids ▲ The Maids

Packet P4 Question 3

A scholar working in this dynasty established the principles governing the camera obscura to describe the function of the human eye. This dynasty funded the construction of the first paper mill. During the rule of this dynasty, three brothers collectively known as the Banu Musa wrote the Book of Ingenious Devices while working at the House of Wisdom. The Barmakid family advised several ● rulers of this dynasty, including Harun Al-Rashid. For ■ ▲ 10 points, name this third Islamic caliphate that established ◆ a capital at Baghdad and that succeeded the Umayyads.

Answer: Abbasid Caliphate






Packet P4 Question 4

The production and trade of this commodity is governed by a set of three “flexible mechanisms” including the use of the CDM. William Nordhaus ● was one of the first economists to recommend the taxation of this commodity, which Justin Trudeau announced in October 2018 would begin in Canada at a rate of twenty dollars per ton. Many economists recommend placing a heavy Pigouvian tax on ▲ this commodity, in line with recommendations made in the 2015 Paris Agreement. For 10 points, name this commodity, a gas believed to be responsible for global warming. ◆ □

Answer: Carbon dioxide

● Paul Samuelson ▲ Ivory ◆ Fish □ Kyoto Protocol







Packet P4 Question 5

An architect employed the motto “For everyone a garden” in designing an apartment complex in this city, all of whose units have access to rooftop plots. Saint Joseph’s Oratory is in this city, where Buckminster  Fuller designed a geodesic dome on St. Helen’s Island for a U.S. pavilion that today serves as the Biosphere environmental  museum. In this city, an apartment complex consisting of 354 prefabricated concrete forms was designed by Moshe Safdie. Habitat  67 was built for an Expo in, for 10 points, what most populous city of Quebec named  after Mount Royal? 

Answer: Montreal

 Buckminster Fuller  New York City






Packet P4 Question 6

Cheung and Klots use this  datastructure to store intermediate computations in computing the CDF of the Mann-Whitney-Wilcoxon  distribution. This was the subject of the 1975 Turing Award and was first implemented at the RAND  corporation for the IPL language by Newell and Simon, and one is constructed using the “cons” command   in LISP. For 10 points, what is this basic datastructure that chains data items  together with forward pointers?

Answer: Linked list

 Transaction cost  Central processing unit

Packet P4 Question 7

To a third party, Einstein described this scientist as “cold as a fish” but offered the advice to “stop reading that drivel”. That drivel was news reports that this scientist was unworthy to shake the hand of the King of Sweeden because of a romantic relationship with Paul Langevin. Baron de Rothschild built a laboratory for this scientist to process ore from Madagascar for use in sterilization vans. Her work led to the discovery of Radium and Polonium, named    for her native Poland. For 10 points,  name this two-time Nobel winner who developed a theory of radioactivity with Becquerel and her husband,  Pierre.

Answer: Marie Curie

 Curie






Packet P4 Question 8

This is the only color ● of multiple pieces of paper in the middle portion of the cut-out The Snail. The nose and forehead of the subject of the 1905 painting Woman with a Hat are this color. This is the color of the tree trunk that dominates the left border of The Joy of Life. The bottom-most section of both versions of The Dance are this color. This color dominates the right background of a Fauvist portrait of the artist's wife Amélie in which her face is divided by a vertical band of this color. For 10 points, name this color, a stripe of which titles an Henri Matisse painting. ◆ □ ▲


Answer: Green

● Gorilla ◆ Green □ Blue ▲ Blue



Packet P4 Question 9

Connie Gersick applied this theory to six independent fields, originating its application to organizational transformations. Richard Dawkins discussed  versions of this theory by analyzing the journey of the Israelites across the desert in the ninth chapter of The Blind Watchmaker. This theory builds upon  Ernst Mayr's theories of speciation,  argues that periods of cladogenesis alternate  with periods of stasis, and is contrasted with phyletic gradualism. Niles  Eldredge and Stephen Jay Gould proposed, for 10 points, what theory predicting that evolution usually proceeds slowly but is interspersed by short bursts of rapid change?

Answer: Punctuated equilibrium





 Sociobiology

Packet P4 Question 10

The “forked-line” method, using multiplication rather than combination, is an alternative to this mechanism. Using this method, one can visualize the Hardy-Weinberg principle. The results of this method,  created by a friend of Hardy, can be translated into ratios or percentages. However, this method will not give accurate results if the genes involved do not follow Mendel’s laws of inheritance. This table-based method that uses the genetic traits of parents to predict the genetic traits of their children. For 10 points, name this method of predicting the results of—for example—breeding pea plants  with purple versus white flowers and predicting how many offspring of each color will result.



Answer: Punnett square

 Genetic drift  Gregor Mendel  Gregor Mendel 
Chemotherapy

Packet P4 Question 11

This entity exists on ■ each of the terrestrial planets, as well as at least 3 different moons. Most of them—including Earth's—are primarily composed of silicate rock, but Triton has ● one made of ice. The Kola Super Deep Borehole took 20 years to drill here. Subduction occurs when a tectonic plate of the Earth is pushed into this layer, which ▲ had upper, lower, and transition zones. For 10 points, name this layer of a planetary ○ body that lies below the crust but ◆ □ above the core, and is typically molten.

Answer: Mantle (geology)

■ Anti-Life Equation ● Neptune





Packet P4 Question 12

In a story by this writer, a man recites Byron's "So We'll Go No More a Roving" in honor of a group of characters who died of chickenpox. This author wrote a story in which William Stendhal kills off a group of government inspectors by reenacting the plots of Edgar Allan Poe's stories. A Sara Teasdale poem provides the title of this man's story in which an automated house prepares ● ■ meals for a family who died in a nuclear blast. "—And the Moon Be Still as Bright," "Usher II," and ▲ "There Will Come Soft Rains" are by, ◆ for 10 points, what author of The Martian Chronicles?

Answer: Ray Bradbury

■ The Martian Chronicles ▲ The Martian Chronicles

Packet P4 Question 13

“A Minor Nation celebrates / It’s unobtrusive Mass” in this author’s poem that begins “Further in Summer than the Birds.” The speaker of a poem by this author calls the flight of a bird a softer motion than oars dividing the ocean and observes the bird eating an “Angle Worm.” This author described a feeling seen in “the chilliest land - / And on the strangest Sea” as “the little Bird / That kept so many warm.” This woman wrote the poems “A Bird, came down the Walk” and “Hope is the thing with feathers.” For 10 points,  name this reclusive poet who called Amherst,  Massachusetts   her home.

Answer: Emily Dickinson

Packet P4 Question 14

This character describes an owl as a “fatal bellman, / Which gives the stern’st good-night.” This character’s final spoken lines, including the statement “What’s done cannot be undone,” are unusually written in prose rather than in verse. This character urges spirits to fill her with “direst cruelty” ◆ and “unsex me now” as ● she wipes bloody knives onto the clothes of some sleeping servants. This character ▲ says that “all the / perfumes of Arabia will not sweeten this little / hand” in her sleepwalking scene. For 10 points, ■ name this spouse of a Scottish nobleman in a William Shakespeare play.

Answer: Lady Macbeth

Packet P4 Question 15

A stanza of this poem compares the successes of “Worldly Hope” to “Snow upon the Desert’s dusty Face.” The pen name of H.H. Munro comes from this poem, which inspired ● the title of Eugene O’Neill’s only comedy. A mystic in this poem asks “Who is the Potter, pray, ○ and who the Pot?” This ◇ poem states that “Wilderness were Paradise enow” if the speaker could have “A Book of Verses underneath the Bough, / A Jug of Wine, a Loaf ■ of Bread- and Thou.” ▲ Edward FitzGerald translated the quatrains of, for 10 points, what poem by Omar Khayyam?

Answer: Rubaiyat of Omar Khayyam

● Meghadūta

Packet P4 Question 16

His use of the letter “P” led to some confusion, but he later explained that he meant it to be a portmanteau, “prolaag”, in contrast to V, which stood for “increase” in his paper “Cooperating sequential processes”, which introduced the semaphore framework. He developed the shunting-yard algorithm for evaluating infix notation and originated the phrase “considered harmful” in his notorious hate for the “GOTO” statement. He created an algorithm that is the basis for the A-star algorithm and that can fail when the edge weights of its input graph are negative. For 10 points, what Dutch computer scientist formulated a namesake shortest path algorithm?

Answer: Edsger W. Dijkstra

Rob Roy (novel)

Packet P4 Question 17

This man, who disagreed with his student Lucy Mair by arguing against the reconstruction of past native cultures, once defined culture as a “well organized unity” consisting of “a body of artifacts and a system of customs.” This man described a ritual in which red shell necklaces were ● traded for white shell armbands. He ■ discussed the use of spells in agriculture in Coral Gardens ◆ ▲ and Their Magic and explained the role of the Kula Ring exchange among the Trobriand Islanders. For 10 points, what Polish anthropologist wrote *Argonauts of the Western Pacific*?
Answer: Bronisław Malinowski

Packet P4 Question 18

In a test in this city, Gabriel offered a prophet a choice between drinking water, wine, or milk, and the prophet's instincts correctly led him to drink the milk. The Al-Qibli Chapel is in this city, which is held to be the location of the "farthest mosque" in Sura 17 of the Qur'an. Muhammad traveled ● on the steed Buraq to this city, where he undertook the Isra and the Mi'raj. The Al-Aqsa Mosque and ■ the Dome of the Rock ▲ commemorate Muhammad's ◆ Night Journey to this city. For 10 points, name this city where those religious □ buildings were constructed on the Temple Mount.

Answer: Jerusalem

■ Buraq

Packet P4 Question 19

Members of this denomination celebrate a dinner ■ near Easter where they prepare but do not eat bread and ● wine called the Lord's Evening Meal, and they believe that Jesus was killed upon a stake instead of a cross. This denomination, whose members believe that exactly ■ 140,000 people are anointed, gather for worship in Kingdom Halls. This denomination ○ distributes evangelical magazines such as The Watchtower and Awake! Charles Taze Russell founded, ◆ ▲ for 10 points, what Christian denomination whose members preach door-to door?

Answer: Jehovah's Witnesses

■ United Methodist Church ● Shia Islam

Packet P4 Question 20

For over ten years, the cornetist Charles “Buddy” Bolden led a ● successful band based ■ in this city, which was where “Kid” Ory gave performances out of the Economy Hall. Fate Marable led a band out of this city that performed on boats such as the Sidney and the Capitol. Before moving to Chicago, King Oliver was based out of ■ this city, which was ◆ also the birthplace of the performer of the “Jelly Roll Blues,” the pianist Jelly Roll Morton. For 10 points, name this birthplace of Louis Armstrong where many Creole and Dixieland ○ bands were formed in the Jazz Age. ▲

Answer: New Orleans

● Michael Ondaatje ■ Louis Armstrong ▲ New York City

Packet P4 Question 21

Tourist sites in this region include a park that memorializes the Battle of Wilson's Creek and the Crystal Bridges Art Museum. This region was once known for its lead and zinc mining in the vicinity of ● Joplin. Buffalo Lookout is the highest point ○ in this region, which contains the Boston Mountains and ■ the St. Francois Mountains. □ This region ◆ contains the headquarters of Wal-Mart in the city of Bentonville and is found to the immediate southwest of St. Louis. For 10 points, name this hilly region of southern Missouri and northern Arkansas. ▲

Answer: Ozarks





● Yukon ■ Black Hills ▲ Brittany

Packet P4 Question 22

These objects are the main subject of Vasily Vereshchagin's painting ● The Apotheosis of War. A photograph by Philippe Halsman shows Salvador Dali standing in front of one of these objects formed from the bodies of seven nude women. The subtitle "Red, White, and Blue" is appended to a Georgia O'Keefe painting of one of these objects that originally belonged to a cow. An anamorphic one of these objects is stretched across the floor of Hans Holbein's The Ambassadors. For 10 points, ■ ▲ name these objects often used as a vanitas ◆ symbol of death.

Answer: Skull





Packet P4 Question 23

Roe created a characterization  of this function from a series of functions with constraints  on their derivatives and antiderivates. Shirali showed that a seventh-century approximation of it by Bhaskara-Aryabhata was better than approximations derived using modern methods. Its first through third derivatives at zero are one, zero, and negative one, making a series approximation easy to derive. With a range between negative one and one, for ten points name this trigonometric function  whose derivative  is cosine.

Answer: Sine

 Abortion

Packet P4 Question 24

The main character of this novel dreams of a cursed man who once cut out his cousin's heart after he falls asleep in a cave. This novel's protagonist wears his name on his back during a parade, and then talks to a massive brass head that is actually manned by a servant in an adjacent room in Barcelona. After losing a duel to the Knight of the White Moon, the title  character of this novel is forced to give up his adventures for the span of a year. The fictional heroine Dulcinea    and Sancho Panza appear in, for 10 points, what novel about a nobleman addicted to chivalry by Miguel de Cervantes?

Answer: Don Quixote






Packet P4 Question 25

In a novel by this author, two people wish that they had been born on a bus, believing that they would then have gotten free bus fares for life. This author first achieved fame when she accused the director of the film Bandit Queen of glorifying rape. A character created by this writer is ashamed when a group of communists force her to wave a red flag. She wrote a novel in which Sophie drowns when a ♦ boat capsizes, leading to the death of the untouchable Velutha and causing haunting memories for the ■ twins Rahul and Estha. For 10 points, name this Indian author of The God of Small Things. ▲ ○

Answer: Arundhati Roy

♦ Thomas Hardy ■ The God of Small Things ▲ Arundhati Roy ○
Water on Mars

Packet P4 Question 26

As aspect of this deity was an axe-wielding  man who killed a king and his many warriors to reclaim a wish-granting cow that had been stolen from his father. An aspect of this god killed a demon at the exact transition between day and night and had the head of a lion, but the body of a human. This deity took the form of a turtle to support a mountain during the churning of the cosmic ocean. Dashavatara,  Parashurama, and Kurma are aspects of,  for 10 points, what Hindu preserver god   who was married to Lakshmi and had ten avatars?

Answer: Vishnu

 Dashavatara

Packet P4 Question 27

In the U.K., participants in this situation are subject to the RPI-X rule. Values approaching one for ● the Lerner index characterize ◆ ○ this situation. The Coase conjecture predicts the price in this situation across an infinite time horizon. The “natural” form of this situation is characterized by high barriers ■ to entry and by economies of scale. In this situation, the quantity is determined by taking the marginal revenue equal to marginal cost, leading to a higher profit and price ▲ than in perfect competition. For 10 points, name this situation in which one company is the sole provider of a commodity.

Answer: Monopoly

● Information asymmetry

Packet P4 Question 28

This artist's first project of 2015 was a surprise album that spawned the platinum single "Energy" and preceded a collaborative mixtape with Atlanta artist Future. A track on a 2018 album by this artist acknowledged that he had secretly fathered a son, Adonis, a ● topic that was first revealed by fellow rapper and rival Pusha-T. ■ A 2016 song by this man includes the lyrics, "You used to call me on my cell phone / Late night when you need my ▲ love." For 10 points, name this Canadian rapper behind the albums ◆ Scorpion and If You're Reading This It's Too Late as well as the hit single "Hotline Bling."

Answer: Drake (musician)

● John Coltrane ■ Lil Wayne ▲ T.I.

Packet P4 Question 29

Barack Obama claimed that ■ this event would send its country to the “back of the queue.” Stephen Barclay and David Davis have both served as “secretary of state” for negotiations related to this event, which created the rejected “Chequers Plan” ● and will likely involve a “Divorce Bill” mandating payments of about fifty billion euros. Following this event, David Cameron resigned as prime minister, and ◆ he was replaced by Theresa May. For 10 points, name this event in which an island nation elected to leave a multinational organization. ▲

Answer: Brexit

■ Rick Warren ● German reunification ▲ Great Famine (Ireland)

Packet P4 Question 30

A friend nicknamed “Uncle Nate” once aided this athlete. This player was released after rumors surfaced that he partied in Las Vegas while under the concussion protocol. As a college freshman, this player led his team to a win over Oklahoma in ● the Cotton Bowl on route to winning the Heisman Triophy. In July 2018, this player was traded to the CFL’s Montreal Alouettes after being stuck behind Jeremiah Masoli on the Hamilton Tiger-Cats. He was drafted in the 2014 NFL and MLB drafts out of Texas A&M. For 10 points, name this troubled former Cleveland Browns ■ quarterback. ◆ ▲

Answer: Johnny Manziel

● LeBron James ◆ Darren McFadden ▲ Dwight Howard

Packet P4 Question 31

Thomas Ferry cited a lack of constitutional direction in his decision not to cast an executive vote in this election. In this ▲ election, Oregon governor La Fayette ● Grover tried to rule one of his state's electors ineligible. According to legend, the wife of this election's winner refused to serve alcohol in the White House, leading to her nickname "Lemonade Lucy." This election was marred by accusations of voter fraud in ■ Louisiana, Florida, and South Carolina. Reconstruction was ◆ ended by, for 10 points, what U.S. presidential election in which Rutherford Hayes defeated Samuel Tilden?

Answer: United States presidential election, 1876





Packet P4 Question 32

This man called a pact ■ partly named for Lord Irwin a “humiliating spectacle,” contributing to his permanent break from Stanley Baldwin. This man wrote about his posting as a journalist with a unit that fought against Mohmand rebels in his book *The Story of the Malakind Field Force*. This man’s war cabinet ▲ prioritized shipping and food distribution ○ for British soldiers, contributing to a 20th-Century Bengal Famine. For 10 points, name this two-time British prime minister whose sparring with Mahatma Gandhi may have contributed to his landslide loss in the 1945 general election. ◆

Answer: Winston Churchill

■ Kellyanne Conway ◆ Neville Chamberlain

Packet P4 Question 33

A movie about the lives of the perpetrators of this event was controversially banned in its country prior to its 2014 release and is called Gems of the Community, or Kaum De Heere. This event's target was en route to an interview with the actor Peter Ustinov. Secretary R.K. Dhawan was cleared of complicity in this event. It was an act of revenge for Operation Blue Star, which destroyed parts of a temple in Amritsar. Sikhism   adherents Satwant Singh and Beant  Singh fired 33 fatal  shots in, for 10 points, what event that resulted in the death of a female Indian prime minister?

Answer: Assassination of Indira Gandhi

Packet P4 Question 34

This artist showed serpents crawling around the exterior of a dead man's visage, with the image of the visage repeated in its mouth and eye sockets. This artist of *The Face of War* created a painting in which a stone hand grasps an egg from which emerges a flower, echoing a figure to the left who stares into a pool. A swarm of ants appear on ■ an orange surface in a painting by this ● artist of *The Metamorphosis of Narcissus*. The Catalan coast appears in the background of this artist's painting of melting clocks. For 10 points, ◆ name this surrealist painter of *The ▲ Persistence of Memory*.



Answer: Salvador Dalí

Packet P4 Question 35

In a concerto, this composer called for the strings to strum four-note chords in imitation of banjos in the “piu mosso” from the second-movement andante; that concerto by this man opens with four tympani strokes, a cymbal clash, a bass drum thud, and a snare drum roll, all followed by a “Charleston” motif. Walter Damrosch conducted the premiere of a piece by this composer that uses four taxi horns. ◆ ● This composer of the Concerto in F wrote a jazz-influenced piece that opens with a clarinet glissando. ■ For 10 points, name ▲ this composer of An American in Paris and Rhapsody in Blue.




Answer: George Gershwin

Packet P4 Question 36

In a song from this musical, interjections of “no” and “terrible” are interspersed between a gossip chain that ends with a character affirming cases of the measles and the mumps. “The Rumor” appears in  this musical, whose main character fakes having a nightmare in which the ghost of his grandmother gives  a dire warning. Two parents sing about how their daughter has grown up on her wedding day in this musical’s song “Sunrise, Sunset.”

“Tradition” and “If I Were  a Rich Man” appear near the start of, for 10 points, what musical set in Anatevka about the family of the Jewish milkman Tevye?  

Answer: Fiddler on the Roof

 Wicked (musical)  Into the Woods  West Side Story

Packet P4 Question 37

In a novel partly titled ■ for these beings, a woman demonstrates the strength of her hands by balancing herself on a single fingertip and then walking around on her fingers. A group of women form the “Pentagram of Death” to ward off these beings, who are often referred to as the “sorry stricken” or the “unmentionables.” These beings kill 18 people in Netherfield Park in a 2009 novel that tells of how Charlotte Lucas gradually turns into one of them. For 10 points, name these beings that Seth Grahame-Smith added to a horror mashup of *Pride and Prejudice*. ♦ ○ ▲

Answer: Zombie

■ Lightness ♦ Zombie ○ Fairy ▲ Amesha Spenta





Packet P4 Question 38

Olaf I used one of these ■ animals to execute Raud the Strong. One of these animals was baited using the ● head of a pack animal nicknamed “the heaven breaker.” Utgard-Loki disguised one of these animals as a cat, rendering Thor unable to lift the feline from the ground. A liquid secreted by one of these animals drips onto Loki’s face as part of his eternal punishment. Thor used the head of one of Hymir’s oxen to bait one of these animals from the ocean. For 10 points, name these animals, one of which named Jormungandr encircles the world in Norse myth. ♦ ▲

Answer: Snake

■ Heimskringla ● Tiger ♦ Goat ▲ Horse

Packet P4 Question 39

Tristan de Luna y Arellano founded a colony in this state whose site was thought to be lost until its 2015 rediscovery. Jean Ribault's men were massacred by Spanish forces in the state near the short-lived French colony at Fort Caroline. This state, whose fishing grounds are the homeland of the Calusa and Tequesta native  peoples, was first governed by Pedro Menendez de Aviles. The goal of the ill-fated Narvaez Expedition was to establish garrisons in this state. For 10 points, name this state where Ponce de Leon supposedly sought the Fountain of Youth.   

Answer: Florida

 Spanish Florida  Florida  Texas  Pennsylvania





Packet P4 Question 40

As a state governor, this ■ future president reformed primary voting practices through the Geran Bill and pushed through workers' protection measures in a foreshadow of his attacks on what he termed the "Triple Wall of Privilege." This man feuded with Andrew Fleming West over the placement of a graduate school as a university president. He beat out Champ Clark for the Democratic nomination after serving as the president of Princeton and the governor of New Jersey. For 10 points, name this president ◆ ○ ▲ who won the Election of 1912 and who led the U.S. during World War One.

Answer: Woodrow Wilson







■ Indiana

Packet P4 Question 41

The first three Acts of Uniformity laid out the mandatory use of this text, which set dress codes through the Ornaments Rubric. The Battle of Clyst Heath relieved a siege of Exeter in a rebellion named  for this text, which included a defeat of Cornish upstarts in the Battle of Sampford  Courtenay. The  Thirty Nine Articles were incorporated into this text, which  was developed by Thomas Cranmer during the rule of king Edward VI but then set aside during the Catholic rule of Mary I. For 10 points, name this text that provides words of worship in Anglican services.

Answer: Book of Common Prayer






Packet P5 Question 1

A generic, non-patented  relative of this substance developed by Paul Schlack requires a ring-opening polymerization of six carbon Caprolactam  molecules. This substance's patented "6-6" type refers to the six carbons in the adipic acid and hexamethylenediamine  used in its synthesis, originally by Wallace Carothers at DuPont. The US Government  diverted production of this material to make tents and parachutes in the second  World War. For 10 points name this synthetic material made from polyamides also used to make women's stockings. 



Answer: Nylon

 Mifepristone  Cyclohexane  Glass

Packet P5 Question 2

He chaired a parliament  select committee that declared in 1772 that Robert Clive's Plassey fortune was illegally obtained. To celebrate the marriage of his friend Lord Stanley in 1774, he wrote a play about a shepherdess who turns out to be the Lady Bab Lardoon in the Maid of the Oaks. He led the victorious    British forces at the battle of Alcantara in support of Portugal in the Seven Years' War. During the Revolutionary War, he led a force from Canada to split the colonies but was defeated by Horatio Gates. For ten points, name this British general who lost an early, crucial 1777 battle at Saratoga. 

Answer: John Burgoyne

 United States House Committee on Ways and Means  John Burgoyne

Packet P5 Question 3

His name is associated ■ with a Northern Irish group formed by former members of Torgas Valley Reds. This man's "optimism fell at the first hurdle" in "Waiting for the Great Leap Forward" by Billy Bragg. ▲ This man seduces his wife by performing a Baudelaire poem and asks "three person'd God" to "Batter My Heart" in his act-closing aria adapted from John Donne. Like Richard Nixon and Leon Klinghoffer, John Adams wrote him as a baritone. For 10 points, what title character of Doctor Atomic organizes the ◆ 1945 Trinity test? ○

Answer: J. Robert Oppenheimer

■ Harlan F. Stone ▲ Mao Zedong ○ J. Robert Oppenheimer






Packet P5 Question 4

Bradley Bailey speculated ■ that the odd number of birds in this artist's Manchurian Cranes may be a commentary on monogamy, and his 1812 "A Quick Guide to Painting" focused on finding geometric forms in the visible world. In 1817, he drew a temple on an 18 meter sheet of paper. When he had a falling out with a novelist collaborator, Takizawa Bakin, the publisher opted to keep him rather than the novelist. His Fine Wind, Clear Morning from ♦ his thirty-six views of Mount Fuji helped □ ▲ cement his reputation. For ten points, name this Japanese artist of The Great Wave off Kanagawa. ○

Answer: Hokusai

■ It's a Wonderful Life ▲ The Great Wave off Kanagawa ○ Color

Packet P5 Question 5

This organ primarily derives  from the endoderm, specifically the ventral side. However, certain cells from the neural crest eventually migrate into this organ and give rise to its characteristic colors. Elevated levels of corticosteroids have been implicated in striae development in this organ. When this  organ repairs itself with an overgrowth of granulation tissues, keloids may develop from excessive collagen. The linea nigra that often develops in pregnant women comes from placental hormones that stimulate melanocytes in this organ. For 10 points what organ in humans is covered in hair follicles and is composed of  the dermis and epidermis?  

Answer: Skin

 Somite  Skin  Liver

Packet P5 Question 6

A 1920 address entitled ■ “This and the Theory of Relativity” claimed that its only mechanical quality under Lorentz, its immobility, had been lost. The Jefferson Lab at Harvard was built ● without iron nails to undertake the measurements of it postulated by Maxwell. In Cleveland, an experiment to understand it tested whether two light beams interfered with each other after passing through a half-silvered mirror and bouncing ▲ back; this material was famously disproven with the null results of that 1887 experiment. For 10 points the Michelson-Morley ◆ experiment cast ◆ ▲ doubt on the existence of what hypothesized medium through □ which light traveled?

Answer: Luminiferous aether




■ Lincoln Memorial ● Willard Van Orman Quine ▲
Michelson–Morley experiment ◆ Interferometry

Packet P5 Question 7

It's not sulfur, but a solid, dark red allotrope of this element ▲ is made by pressurizing ◆ it into the epsilon phase, which yields an eight-atom molecular lattice. ● In another allotropic form, two of atoms of this element can temporarily exist in a singlet form where all electrons are spin paired. In yet ■ another allotropic form, three elements of this atom can combine to form a potent greenhouse gas with a pungent odor. The Space Shuttle main engine combined liquid hydrogen with a liquid form of this element. For 10 points what gaseous element, with atomic number 8, is a byproduct of photosynthesis?

Answer: Oxygen

Packet P5 Question 8





The clustering of viola  tricolor was an application of a process with this name by Svedberg. Conway and Maxwell adapted the distribution with this name to model overdispersion and underdispersion. The distribution with this name has a single mode if its parameter λ is not an integer but two modes  if it is and for large λ can be well approximated by a normal distribution with mean λ and variance λ .  For 10 points, what French statistician lends his name to a discrete probability distribution used to calculate the number of independent events occurring in a fixed interval at a constant rate?



Answer: Siméon Denis Poisson





 Small-world network  Poisson distribution  Poisson distribution  Poisson distribution

Packet P5 Question 9





In computational linguistics,  “projective” sentences refer to dependency parses that have this property. Scheinerman’s theorem states that every graph with this property is the intersection graph of line  segments. Fáry’s theorem says that graphs with this property can also be drawn with straight line  segments. Kuratowski’s theorem states that a graph has this property if and only if it does not contain a minor or subgraph isomorphic to $K_{3,3}$ or K_5 . For ten points, name this property of graph theory describing graphs that can be drawn  without overlapping lines.




Answer: Planar graph

 Stephen Wolfram  Differentiable function  Planarity 
Planarity





Packet P5 Question 10

In issue No. 364, this character “croaks” ... in that he is turned into a frog. He visits a doctor at 177A Bleecker Street in New York and is given a cup of tea that transforms into a beer stein that continually refills itself. This character falls through a wormhole and arrives in New Mexico where he meets Darcy Lewis and Dr. Erik Selvig after being exiled from his homeworld of Asgard. For 10 points what Avenger played by Chris Hemsworth wields the hammer Mjolnir?    

Answer: Thor (Marvel Comics)

 Thor (Marvel Comics)  Thor (Marvel Comics)  Thor 
Mass spectrometry





Packet P5 Question 11

A 1984 song by this band references the fictional revolutionary group La Luna and the Eventide synthesizer. This band commissioned artist Patrick Nagel for one album cover and repeats “please, please tell me now” in another of their songs. This band references dancing through fire in both their title song to Roger Moore’s final James Bond movie and “New Moon on   Monday.” This band’s classic lineup includes three unrelated members surnamed Taylor along with Nick Rhodes and Simon LeBon. For 10 points what band performs songs like “Rio” and “Hungry Like the Wolf”?  

Answer: Duran Duran





 Arcade Fire  Weezer

Packet P5 Question 12

A composer from this country included a chorus singing “Dear Lord  and Father of Mankind” in his “Elegy for Dunkirk.” Henry Mancini rearranged a song by a composer from this country into the song “A Time for Us.” A composer from this country wrote the score for Atonement. The “Love Theme” from 1969’s Romeo and Juliet is by  a composer from this country, as is “The Ecstasy of Gold,”  which plays as Eli Wallach runs through a cemetery in The Good, The Bad and the Ugly. For 10 points,  name this birthplace of Dario Marianelli, Nino Rota, and Ennio Morricone.

Answer: Italy





Packet P5 Question 13

Thomas Edison patronized  a prototype of these machines called the Mauch Chunk. Layers of laminated wood are retrofitted with steel in the “I”-box technique developed by Rocky Mountain Construction for these machines. Stress-minimizing innovations to these machines included the introduction of clothoid loops and moving the axis of rotation to chest level in the heartline roll configuration. Arrow Dynamics introduced tubular steel to these machines in a prototype installed at Disneyland known as the  Matterhorn. Lift hills and loops are often features of, for 10 points, what amusement park attractions?  

Answer: Roller coaster

 General Electric Company  Autoclave  Roller coaster 
Loom

Packet P5 Question 14

The Generalized Method of Moments was developed at this university by Lars Peter Hansen. A scholar at this university, Eugene Fama, co-developed the three-factor model in asset pricing  with Kenneth French. A scholar joined the faculty of this university in 1964, four years after publishing his controversial  paper “The Problem of Social Cost.” A longtime researcher at this university espoused monetarism and wrote the book Capitalism and Freedom. Ronald Coase  and Milton Friedman worked at, for 10 points, what midwestern university that names a “freshwater” school of economics? 

Answer: University of Chicago

 Robert J. Shiller  University of Texas at Austin

Packet P5 Question 15

“High-Quality Supportive Environments” and “Nurturing and Responsive Relationships” are two of the key components at the bottom of a childhood educational model named for this type of object. When paired with “population,” ▲ this type of object provides the usual name of an age-sex graph. This type of object names a pseudoscientific nutritional model created by the USDA. In a model first published as “A Theory of Human Motivation,” this is the shape of a diagram in which “self-actualization” appears at the apex. For 10 points, name this shape of Abraham Maslow’s
◆ hierarchy of needs. ○ □

Answer: Pyramid

▲ Veil ◆ Maslow’s hierarchy of needs ○ Maslow’s hierarchy of needs □ Abraham Maslow

Packet P5 Question 16

This man discussed how India was divided along ▲ linguistic lines by the British in an essay about “Primordial ● Sentiments and Civil Politics in the New States,” “Integrative Revolution.” This man discussed the term “lek,” which is often misrepresented as “shame,” in his chapter “Person Time and Conduct in Bali.” This man described viewing an illegal sporting event with his wife in ○ an essay titled after Jeremy Bentham’s term for an extremely high-stakes game. For 10 points, name this anthropologist who ◆
■ wrote “Deep Play” ▲ and The Interpretation of Cultures.

Answer: Clifford Geertz

▲ Ernst Kapp ● Octavio Paz

Packet P5 Question 17

This character asks another if he would lie about the answer to three times seven hundred to an ignorant man. This character promises that, if he should be fined thirty minae, then Apollodorus will guarantee he pays his debt. He relates that he is the smartest man in the world because he is aware of what ■ he does not know. This man presents the “cyclical argument” and the “theory of recollection” as part of four arguments for the immortality ■ of the soul before ▲ his death in Phaedo. For 10 points, what ◆ philosopher offers an “Apology” prior ● to drinking hemlock in a Platonic dialogue?

Answer: Socrates

■ Phaedo ▲ Phaedo

Packet P5 Question 18

A librarian from this ■ city explored “ring numbers” and “snake numbers” to decode astronomical tables. Yuri Knorozov deciphered a syllabary by examining works named for Madrid, Paris, and this city. Reading an object named for this city was instrumental in deciphering “bar and dot” numerals and the Long Count calendar. This European city was where the oldest surviving book from the Americas was rediscovered, a Codex written in Mayan hieroglyphs. For 10 points what German city firebombed during World ■ War II is home to ◆ the Saxon State Library? ○ ▲

Answer: Dresden

■ Melvil Dewey ○ Prague ▲ New York City

Packet P5 Question 19

After a British monarch is appointed by a ■ lottery during this year, he reinstitutes local flags reminiscent of medieval heraldry. A critically-exalted manuscript named Air Chrysalis is published in this ● year. Adam Wayne protests against a highway shortly after Auberon Quin assumes power in this year in *The Napoleon of Notting Hill*. A man rents a room above Mr. Charrington's shop ○ in this year, when he also begins an affair with Julia. For 10 points, events in what year title a 2010 Haruki Murakami novel and inspire Winston Smith to admit that "he loved Big ◆ Brother"? ▲

Answer: Nineteen Eighty-Four

■ George III of the United Kingdom ● Butterfly ▲ 1968





Packet P5 Question 20

A member of this family ■ cuts her hand after being ordered to punch out a window pane. Shortly before dying, a woman provides this family money by prostituting herself and by selling her hair and two of her teeth. The matriarch of this family dies in prison after they change their name to Jondrette. This family includes a street urchin named Gavroche, as well as daughters Anzelma and Eponine. This family mistreats Cosette while working as innkeepers. For 10 points, what family of troublemakers are the secondary antagonists in Victor Hugo's *Les Misérables*? ♦ ○ ▲

Answer: Thénardiens

■ ATP-binding cassette transporter ♦ As I Lay Dying ○ House of Habsburg ▲ House of Medici

Packet P5 Question 21

While carrying firewood, this character laments a group of “adders who with cloven tongues do hiss me into madness.” After being given alcohol, this man promises to “show thee the best springs” and “pluck thee berries.” This character is confined to a rock after attempting to rape his master’s daughter, and believes that that sorcerer is sending spirits after him. This character regrets mistaking Trinculo and Stephano for gods as he remains stranded on a remote island. For 10 points, what son of Sycorax is the slave   of Prospero in William   Shakespeare’s The Tempest?

Answer: Caliban

 The Tempest

Packet P5 Question 22

At the end of this play, a man uses his bus fare to play “Little Man” on a jukebox. A character in this ● play complains that his partner Hilda has reported him for not paying child support. After he is released from a hospital, an alcoholic father in this play forces its title character to massage his amputated leg stump. The main characters of this play reminisce about when they created a kite from garbage after they practice ballroom dancing ◆ inside a tea shop. Sam and Willie endure racially-motivated abuse in Apartheid-era ▲ South Africa ■ in, for 10 points, what play by Athol Fugard?

Answer: “Master Harold”...and the Boys

■ Athol Fugard

Packet P5 Question 23

This author created the character of Easy, who appears speaking English in a gibberish adaptation of Hamlet and reappears speaking gibberish in ● an English version of Macbeth performed in front of the secret police. This author parodied The Mousetrap in a play about the theater critics Moon and Birdboot, The Real Inspector ○ Hound. In an absurdist ■ play by this man, a troupe of tragedians prepare to stage ◆ The Murder of Gonzago in Denmark. For 10 points what playwright wrote about two of Hamlet's friends ▲ in Rosencrantz and Guildenstern are Dead?

Answer: Tom Stoppard





● Cyrano de Bergerac

Packet P5 Question 24

The climax of this poem asks “Is it death or is it life?” and answers in the next stanza with “Life out of death.” A character in this poem asks for a silver penny back after she declines to join in a feast. This poem presents the story of Jeanie, who died and “fell ● with the first snow.” This poem describes how a girl “suck’d and suck’d and suck’d the more... She suck’d until her lips were sore.” This poem inspired an engraving by its author’s brother, Dante Gabriel. Sisters Lizzie and Laura hear ■ ▲ cries of “come buy, come buy” in, for 10 points, what poem about fruit vendors by ◆ Christina Rossetti?

Answer: Goblin Market

Packet P5 Question 25

This object shows “sprawling flamboyant patterns committing every artistic sin.” Part of this object displays a pattern that looks “like a broken neck and two bulbous eyes.” Staring at this object makes a woman want to resume writing and to visit her Cousin Henry  and Julia. A physician named John moves  his wife and children to the house containing this object, which is “a dull yet lurid orange in some places, a sickly sulphur tint in others.” For 10 points, a woman goes crazy fixating on what title object of a short story by Charlotte Perkins  Gilman? 

Answer: The Yellow Wallpaper

 The Yellow Wallpaper






Packet P5 Question 26

Stephen, a writer with this surname, committed plagiarism in articles written for The New Republic in the late 1990s. A woman with this surname plays bass in the punk band La Llorona and is the lover of Maggie Chascarrillo in Jaimie Hernandez's comics. While using the alias Black, children with this surname win money on the radio quiz "It's A Wise Child." This surname is shared by a woman who dates Lane Coutell and her brother, whose behavior frustrates Sybil Carpenter in "A Perfect Day for Bananafish." For 10 points, ● what surname is shared by Franny and Seymour in J.D. Salinger's short fiction? ◆ □ ▲


Answer: Glass family

● J. D. Salinger ◆ Love □ The Spell (novel) ▲ Epstein

Packet P5 Question 27

Oliver Cromwell destroyed  a set of coronation regalia from this monarch used for several centuries. Osbert of Clare edited a two-part manuscript about the life of this ruler. Robert the Magnificent undertook an unsuccessful invasion to install this man as king; later, this man would later succeed his half-brother Harthacnut. This man was the   first king to be buried in a Romanesque church that he commissioned at Westminster. The short reign of Harold Godwinsson  followed the rule of, for 10 points, what Anglo-Saxon king nicknamed for his  piety?

Answer: Edward the Confessor

 English Civil War






Packet P5 Question 28

A banking act passed under ■ this prime minister gave the Bank of England the exclusive right to issue new banknotes. A man whose goal was to assassinate this prime minister, Daniel M'Naghten, names an insanity ● test. This man requested the queen to dismiss several ■ of her ladies in waiting, precipitating the Bedchamber crisis. This prime minister, who served 20 years as an MP from Tamworth, repealed unpopular grain tariffs called the Corn Laws in response to the Irish Potato Famine. For 10 points, what ◆ founder of modern British conservatism ▲ inspired the nickname of London's police officers?


Answer: Robert Peel

■ Glass–Steagall legislation

Packet P5 Question 29

Mark Lane's best-selling book *Rush to Judgment* is critical of the actions of this group. Hale Boggs and   Gerald Ford were the  two representatives who were members of this group. It researched the "curtain rod story," a trip to obtain passage to Cuba via Mexico City, and the murder of patrolman J.D. Tippit. Several members  of this group disagreed with the magic bullet theory, though it officially concluded that Jack Ruby and Lee Harvey Oswald both acted alone.  For 10 points, what group charged with exploring the assassination of JFK was chaired by the sitting Chief Justice?

Answer: Warren Commission

 Assassination of John F. Kennedy




Packet P5 Question 30

Tachi swords were notably ■ ineffective against the leather armor worn by these people. Interactions with these people inspired the construction of a “Borui” stone wall, whose placement led to the battle of Koan. These people departed from Masan and were able to seize Iki and Tsushima during an expedition where they were repelled at Hakata Bay. An inability to pay □ the Samurai who fought these people presaged the downfall of the Kamakura shogunate. ● Kamikaze typhoons thwarted two attempted invasions of Japan by, for 10 points, what people under Kublai Khan? ◆ ▲

Answer: Mongols




■ Oath of the Horatii ● Maya civilization ◆ Kamakura shogunate
▲ Vikings

Packet P5 Question 31

One participant in this event noted that “Mikoyan liked very peppery soup, I do not” and would later claim that he would surpass his opponent in only seven years. The guest at this event argued that, although his host had better rockets, he had color television. A discussion over the purchasing power of miners and soldiers framed this event in Sokolniki Park between an American vice president and a Soviet first secretary. For 10 points, name this July 1959 debate between Nikita Krushchev and Richard Nixon held in a model  home filled with refrigerators and dishwashers.  



Answer: Kitchen Debate





 Congress of Vienna  Gerald Ford  San Diego Comic-Con

Packet P5 Question 32




The Yatenga kingdom of the Mossi people launched a raid that sacked Macina and this city in the mid-14th Century. Many manuscripts from this city are preserved in its Ahmed Baba Institute. Scholars fled from Walata to this city after the fall of the Ghana Empire, presaging its status as a center of learning based around the Sidi Yahya Mosque, ● the Sankore University, ■ and the Djinguereber Mosque. Caravans ◆ ▲ brought salt to this city south from the Taghaza and Taoudenni mines to the Niger River. For 10 points, what cultural center of Mali flourished under the reign of Mansa Musa?

Answer: Timbuktu

Packet P5 Question 33

In a scene by this director, a man awakens in his plane to reveal hundreds of planes silently flying away from him. In a movie directed by this man, the two main characters hide in an abandoned mine after they are pursued by Captain Dola's pirates. This man directed a scene where a girl waits at a bus stop in the rain next to an enormous spirit creature, and formed  a production company following the success of Nausicaä of the Valley of the Wind. For 10 points what Japanese animator directed Porco Rosso, Castle in the Sky, and My Neighbor Totoro at Studio Ghibli?   

Answer: Hayao Miyazaki

 Hayao Miyazaki  The Frogs  Stanley Kubrick

Packet P5 Question 34

One of these features ● appears in the foreground of a painting subtitled “Page From An American Textbook” by Robert Colescott. Another of these features inspired works depicting the Schreiber and Biglin brothers. One of these features is the focus of “View from Mount Holyoke, Northampton, Massachusetts, after a Thunderstorm” by Thomas Cole; ▲ Cole and Frederic Church were members of a school of landscape painters named for ■ one of these features in New York state. For 10 points, what type of natural feature dominates the foreground of Emanuel Leutze’s Washington Crossing the Delaware? ◆

Answer: River

● Dune ▲ Dune ■ Hudson River School ◆ FLAGS





Packet P5 Question 35

The tenor soloist sings ■ falsetto to represent ● one of these roasting animals in the “Olim lacus colueram” aria from Carl Orff’s Carmina Burana. Sixteen of these creatures inspired a horn theme that precedes six isolated chords in the finale of the fifth symphony by a Finnish composer. Saint-Saens represents this animal with a cello played over two pianos while the English horn is used for these creatures as they float through the realm of the dead in a tone poem from the Leminkainen Suite. For 10 points, a story from the Kalevala about what birds floating through Tuonela inspired Jean Sibelius? ◆ ▲

Answer: Swan

■ Choral symphony ● Carmina Burana (Orff) ◆ Ralph Vaughan Williams ▲ Snake

Packet P5 Question 36

The death of Jean Charles de Menezes inspired   a song performed around this object. “The bleeding hearts and artists” are said to “make their stand” outside of this place. Animated sequences by Gerald Scarfe are projected onto this object which is traditionally constructed by stagehands with cardboard boxes. This object is ordered destroyed at the end of “The Trial.” David Gilmour would stand on top of this object to perform “Comfortably Numb.” For 10 points “all in all we’re just another brick” in what title object of a concept album from Pink Floyd?  

Answer: The Wall

 Bomb  Metropolitan Police Service  Pink Floyd – The Wall
 Moon

Packet P5 Question 37

This television series ▲ used selections from Hans Zimmer's score ● to Backdraft. One regular on this series would arrive accompanied by a string quartet and was challenged by a series of opponents known as the Serie A after a soccer league. The host of this series would sometimes bite into a raw yellow pepper. Regular personalities on this series included French-trained Hiroyuki Sakai and Chen Kenichi. Contestants had sixty minutes to utilize the secret ingredient in, for 10 points, what cult Japanese cooking series that ■ inspired an American adaptation starring Masaharu Morimoto and Bobby Flay? ◆

Answer: Iron Chef

▲ Cartoon Network ● Gladiator ◆ The Hunger Games

Packet P5 Question 38

Over 20,000 grebes died near this body of water in 2013 after it played host to an enormous outbreak of West Nile Virus, possibly transmitted by its shrimp population. This body of water, which is separated from the Tooele Valley by the Oquirrh Mountains, names the most populous city in the Wasatch Front. ■ An artist visiting Rozel Point created ● a 1500-foot-long counterclockwise coil that jets into this body of water, Robert Smithson's Spiral Jetty. This body of water is directly east of the Bonneville Flats. For 10 points, what Utah lake ◆ is named for its extreme salinity? ▲

Answer: Great Salt Lake

▲ Gulf of California

Packet P5 Question 39

A person indicted for ■ her role in these events was a former dental hygienist who treated a man who was attacked by a marble statue at a political rally. These events ● may take their name from a joke about two people who are captured and sentenced to death by an African chief. An underage girl nicknamed Ruby the Heartstealer ◆ attended several of these events, which were held at a villa in Milan and involved ○ exotic dancers dressed in costumes ■ as nuns or as Barack Obama. For 10 points, give the repetitive, nonsensical name of a series of sex parties hosted by Silvio Berlusconi. ▲

Answer: Bunga bunga

■ Raymond J. Donovan ● Haymarket affair ▲ Witch-hunt





Packet P5 Question 40

A man has a vision of ■ these characters after seeing a woman in a floating basket. In another depiction, these characters arrive from a whirlwind with “feet of brass” and reveal a different face on each side of their heads. Ezekiel and Zechariah observe analogs of these characters, one of whom instructs “do not damage the oil and the wine” while holding a pair of scales. John of Patmos describes these characters as arriving after the Lamb of God opens the first four of the seven seals. For 10 points, name these harbingers of the Last Judgment described in the Book of Revelation. ♦ ○ ▲





Answer: Four Horsemen of the Apocalypse

■ Jacob's Ladder ♦ 7 ○ Book of Revelation ▲ Rosencrantz and Guildenstern

Packet P5 Question 41

A holder of this title faced a non-French rebellion from relatives called the War of the Three Henries and attempted to secure the release of the jailed Pope Benedict VI, who was then murdered in prison. Another holder of this title arranged his son's marriage to princess Theophanu to strengthen ties with the Byzantines. The holder of this title defeated the Magyars at the Battle of Lechfeld and conquered   the Kingdom of  Italy after working to unify the German tribes. For 10 points, what title taken by Otto the Great was a callback to Charlemagne and refers to an earlier Italian civilization? 

Answer: Holy Roman Emperor

 Ottonian dynasty  Ottonian dynasty  List of monarchs of Hawaii  List of French monarchs

Packet P6 Question 1

This man described his vision for Europe as a “common European home.” This leader met with the U.S. president at the Reykjavik Summit. This man’s foreign policy approach was dubbed the Sinatra Doctrine- referencing the song “My Way” - because he did not interfere in domestic issues of eastern European countries. He permitted private ownership of foreign trade businesses as part of his “restructuring” reform, or perestroika. For 10 points, ■ ▲ name this leader whom Ronald Reagan told ◆ to tear down the Berlin Wall shortly before ● the fall of the Soviet Union.

Answer: Mikhail Gorbachev






Packet P6 Question 2

John ● Prine bemoaned the influence of this industry in his boyhood home in Muhlenberg county in his song “Paradise;” that protest song singled out a company in this industry that filled for Chapter 11 in 2016, only to emerge in the first year of the Trump administration. ■ The term sacrifice zone was adapted from nuclear fallout to describe the effects of this industry. Big Muskie was the largest dragline machine in this industry to use a single bucket design. For 10 points name this industry that often uses stripmining to extract fossil fuels from mountains. ♦ ▲

Answer: Coal mining

● Symmetric matrix ♦ Coal ▲ Airline

Packet P6 Question 3

One book titled for these concepts, written by a barnacle expert, discusses the problem of why this concept exists. Ernst Mayr developed the modern version of this concept, based on actual or potential reproductive isolation.  Gause's law says that if two of these are in competition for the same resource, one will eventually drive out the other. The formation of these groups can be caused by barrier introduction, and new ones can emerge from adaptive radiation. For 10 points, this  taxonomic classification below "genus," on whose origin Darwin    wrote.

Answer: Species

 Speciation







Packet P6 Question 4

Bjorken and E. A. Paschos ■ created a model ● of how these entities interact with high-energy electrons. That approach used Feynman's model that these objects are composed of point-like constituents called "partons". The name, meaning massive, was proposed by Lev Okun in 1962 to distinguish them from leptons. Consisting of two or more quarks bound by the strong force, for ten points, name this general class of particles that includes mesons and baryons like protons and neutrons. ◆ ▲





Answer: Hadron

■ Deep inelastic scattering ● Higgs boson ◆ Baryon ▲ Atomic nucleus





Packet P6 Question 5

A technical paper included  in this book borrows Aristotle's terms of "essence" and "accident" to distinguish between difficulties in designing conceptual constructs and difficulties in representing those conceptual constructs. That chapter of this book argues for the unlikelihood of  finding a "silver bullet" to achieve a order-of-magnitude improvement in productivity based on the author's experience  at IBM. This book put forth its author's namesake law that "Adding manpower to a late software project makes it later." For 10 points, name this seminal book on software engineering by Fred Brooks, titled  after a "mythical" unit of work done by a person in a month.  

Answer: The Mythical Man-Month

 International Organization for Standardization  Course in General Linguistics  Non-Euclidean geometry  Fred Brooks





Packet P6 Question 6

It is conjectured that, if one of these objects has an infinite  number of solutions, then an associated L-function constructed from the Euler product of the points lying on it modulo a prime p will equal zero when the complex variable equals one. The rational points of these objects have a finite basis by Mordell's theorem.  Over the complex numbers, these objects correspond to embedding tori in the complex projective plane. A theorem relating  these objects over the field of rationals to modular forms was instrumental  in Wiles' proof of Fermat's last theorem. For 10 points, name these curves given by an equation of the form $y^2 = x^3 + Ax + B$.

Answer: Elliptic curve

 Black hole







Packet P6 Question 7

Soft gamma repeaters and   AXP objects are thought  to be stars characterized by high values of this variable according to a theory of Robert Duncan. The death valley for pulsars occurs when this variable goes below a value defined by period. This value for the corona has been inferred from distance between flux ropes and bow shock in CMEs. The splitting of astrophysical hydroxyl masers can be used to measure this quantity due to the Zeeman effect. For 10 points name this quantity, generated by the dynamo effect, which is characteristically enormous for magnetars. 

Answer: Magnetic field

 Magnetar  Magnetar  Magnetar  Magnetar





Packet P6 Question 8

A 2018 Nature paper realized  this system moving cesium atoms in an optical lattice, and Jarzynski and Mandal devised a solvable model of this system. Zurek used algorithmic randomness to study this system. Szilard explained this thought experiment  by placing an energy cost on measurement. Charlie Bennett applied Landauer's principle to resolve  the paradox of this thought experiment, and it involves sorting molecules in its classic formulation. For 10 points name this thought experiment  where a fiendish agent allegedly violates the second law of thermodynamics,   named for a scottish physicist.





Answer: Maxwell's demon

 Space telescope  Original position

Packet P6 Question 9

The Sandmeyer reaction relies on a species of this type replacing the diazo group on an aromatic ring. An important family of concerted reactions named for these  species is carried out in a polar aprotic solvent and is slowed by steric effects.  These species rely on leaving groups such as tosylates and halides to create  carbocations in a unimolecular family of reactions named for them. For 10 points, name these chemical species that replace  a substituent in SN1 and SN2 reactions, 'attacking' electrophiles.

Answer: Nucleophile

 Aryl halide  SN2 reaction  SN2 reaction  Ion





Packet P6 Question 10

One protein named for its high value of this property is mutated in patients with cutis laxa. Scientists measured this value for actin filaments using piezoelectrically controlled microneedles. Proteins, such as reslin, that have high values of this property often have a disordered structure, and connect to extracellular matrix glycoproteins like fibrillin. The Windkessel effect, as seen in the aorta, is caused by certain ● blood vessels having high values in this property, which can be calculated from a stress strain curve. For 10 points, name this property of proteins that can ◆ store mechanical energy by stretching. □ ▲

Answer: Elasticity (physics)

● Marfan syndrome □ Yield (engineering) ▲ Commutative property

Packet P6 Question 11

One of these physical features includes the pulpit rock and another features the “Seven Sisters Waterfall”. Two of these features in Newfoundland are found near Bonne Bay and Facheux Bay. These are some of the best places in the world to observe killer whales, as Orcas shelter in their waters because of their abundant herring population and warm gulf stream waters. Scoresby Sund,  the longest one of these physical features in the world, is in Greenland. For 10 points, name these narrow steep inlets   that comprise most of the coastline of Norway. 

Answer: Fjord

 Dune

Packet P6 Question 12

In “On Referring,” Strawson argued that a statement mentioning this country is referring, but the referent is only presupposed. A statement mentioning this country was presented as the second puzzle in a text whose third puzzle concerns “the golden mountain” and a “round square.” An expression about an individual from this country is analyzed as an “incomplete symbol,” which is neither strictly true nor strictly false, in “On Denoting.” A sample statement by Bertrand Russell describes, for 10 points, what country’s nonexistent present king is bald? ♦ ○ □ ▲

Answer: France

♦ England ○ England □ Principia Mathematica ▲ Japan

Packet P6 Question 13

According to Strabo, priests ■ of this deity would hold their breaths and crawl into a hole dedicated to Pluto that was filled with toxic fumes to show their immunity. On April 4, this deity was celebrated with theatrical shows called ludi scaenici during the Megalesia □ festival. Atalanta ● and Hippomenes once had sex in a temple ▲ to this deity. ◆ The priests of this deity, who were known as the Galli, castrated themselves like this deity's consort Attis. For 10 points, name this Phrygian goddess who was adopted into the Roman pantheon as Magna Mater, the Great Mother.

Answer: Cybele

■ Statue of Zeus at Olympia

Packet P6 Question 14

Hermann Weyl added a local symmetry to this theory in his attempt ■ to unify it with electromagnetism. Cyclic permutations of the indices of one construct defined by this theory must sum to zero according to a result of an Italian mathematician. Hilbert derived the central equation of this theory by requiring the action be invariant under coordinate transformations. ● That equation from this theory quantifies curvature with a rank two tensor ▲ and includes source terms from momentum and energy density in four dimensional spacetime. For 10 points ○ name this theory ◆ of gravity developed by Einstein.

Answer: General relativity

■ Lie ● Special relativity

Packet P6 Question 15

Ahura Mazda sent these ■ creatures to guard the tree of life in a Zoroastrian story. In a Cherokee creation myth, the first man hits the first woman with one of these animals, causing her to give birth every seven days. The god Enki had these animals as a symbol, and an avatar of Vishnu, Matsya took this form. One of these animals ate nine hazelnuts from the Well □ of Wisdom, leading ◆ to a drop of its fat giving all of the world's knowledge to Finn Mac Cool. For ● 10 points, name these animals exemplified by the Zodiac Pisces and the early Christian symbol Ichthys. ▲

Answer: Fish

■ Angra Mainyu ▲ Horse

Packet P6 Question 16

This character wishes that the night of his ■ conception would “hope for light, but have none, nor see the eyelids of the morning” and asks why he was “not as a hidden stillborn child, as infants who never see the light?” This character is told to “Gird up your loins like a man” by another character speaking “out of the whirlwind.” This man declares, “I know that my Redeemer lives” as he defends himself from the accusations of his friends Eliphaz, Zophar, and ● ▲ Bildad. For 10 points, name this Old Testament character who is tested with great suffering. ◆

Answer: Job

■ Prince Hamlet ● Book of Job ▲ Book of Job ◆ Book of Job

Packet P6 Question 17

A Harvard Business School ■ case analyzes the ▲ role of this commodity in Credem's banking operations in northern Italy. A controversy arose in 2014 when the European Union demanded protection for "Geographical Indication" names for different types of this commodity. An Italian miller compared the mixing of earth, air, water, and fire to the creation of this commodity- which subsequently led to the emergence of angels analogized to worms- as related in a Carlo Ginzburg microhistory. Parmigiano-Reggiano is called the "king of," for 10 points, what food, a form of curdled milk? ♦ ○

Answer: Cheese

■ Jeff Immelt ▲ Jeff Immelt ♦ Cotton ○ Ivory





Packet P6 Question 18

According to Plutarch, ■ people with this occupation would mock the recipients of their services by dressing them up in Roman boots and a toga to ● not mistake their identity. Following an incident at Ostia, the activities of people with this occupation were limited by the Lex Gabinia. At the age of 25, Julius Caesar demanded that people with this occupation from Cilicia should have charged him 50 talents ▲ instead of 20 to release him from captivity. For 10 points, Pompey the Great suppressed what criminal maritime occupation? ◆


Answer: Piracy

■ Parallel Lives ● Gladiator ▲ List of historians ◆ Clown

Packet P6 Question 19

The “Schedule of Questions” was used by James Bertram to determine whether communities would be allowed  to benefit from one of these institutions. The words “Let there be light” were typically carved above the entrances of these institutions, honoring a request by their sponsor. These institutions pioneered  the use of open stacks, making use of a layout with “battleship” desks for  circulation. For 10 points, name these libraries that were sponsored in the late 19th and early 20th centuries by a namesake Scottish-American steel magnate. 

Answer: Carnegie library

 Monastery

Packet P6 Question 20

This lawyer helped Matthew Kilroy and Hugh Montgomery avoid a death sentence by having them claim the benefit of clergy. This lawyer questioned whether a man being hit with a club should be “patient as ● Epictetus while his master was breaking his legs with a cudgel” in a speech disparaging a crowd as “a motley rabble of saucy boys, negroes and mulattoes, Irish teagues and outlandish jack tarrs” in defending Captain Thomas Preston for the Boston ◆
▲ Massacre. For 10 points, name this American statesman, first Vice President, second President, and father of the □ sixth President.

Answer: John Adams

● Abe Fortas ▲ Boston Massacre






Packet P6 Question 21

A Renzo Piano building ■ in this country has ◆ ● a large wavy metal-and-glass roof that blends into its hilly surroundings and houses works of a 20th century artist from here. That artist from this country lived in Germany while producing a Pedagogical Sketchbook for a Bauhaus course. This country is where Hugo Ball recited the first dada manifesto, and it was home to Cabaret Voltaire. One artist from this country depicted stick-bodied birds in an ink and watercolor work called Twittering Machine. For 10 ◆ points, name this home country of Paul Klee, where the Dada art movement grew in Zurich. ▲

Answer: Switzerland

■ Airport ◆ Italy ● Japan ▲ Japan






Packet P6 Question 22

A book that inspired this movement describes how the author was told to chant sutras or donate money to  be saved, then realized that it would be hard to avoid “evil thoughts” on a daily basis. That book, which was written under the pen name “Student of Good,” is titled Good Words to Admonish the Age. This movement’s founder asked Issachar Jacox  Roberts to interpret  a series of dreams  he had after repeatedly failing civil service exams, in which he saw that he was a younger brother of Jesus. For 10 points, name this millenarian movement that Hong Xiuquan led  in revolt against the Qing dynasty.




Answer: Taiping Rebellion

 Ice Bucket Challenge

Packet P6 Question 23

Paul Hardcastle composed   a song about this conflict including audio from news broadcasts, titled for the average age of one side's participants. In a film set during this war, "These Boots Are Made for Walking" plays before a scene where the protagonist's camera is snatched; that film set in this war  features "Paint it Black" during its end  credits. A character blasts Ride of the Valkyries from helicopters and claims to "love the smell of napalm in the morning"  in a film set in war. For 10 points, name this war, the setting of Full Metal Jacket and Apocalypse Now.

Answer: Vietnam War

 She Stoops to Conquer  She Stoops to Conquer  World War I

Packet P6 Question 24

Cedric Watts claimed that ■ one author reveled in “stirring things up” by condemning this author. An essay partly titled for this author relates how its author received two letters about “superstitions” from school children in Yonkers. In a novel ● that is a “counter-narrative” or “inversion” of a novel by this author, Mustafa states that “I am no Othello, Othello was a lie” and recounts how he killed himself in the Nile; that book is Season of Migration to the North. For 10 points, name this author derided as a racist in Chinua Achebe’s “An ◆ Image of Africa” for ◆ his book Heart of Darkness. ▲

Answer: Joseph Conrad

■ Ivanhoe ● Chinua Achebe ◆ Chinua Achebe ▲ Joseph Conrad

Packet P6 Question 25

In a short story partly titled for this historical figure, a woman leaves her diaphragm ● at her mother's house, ending any chance for her boyfriend to marry into her family's sink manufacturing business. The "Ave Maria" section of The Bridge is about the actions of this person. In a collection titled for this person, Ozzie threatens to jump off his school unless the crowd admits God could allow virgin birth in the story "The Conversion of the Jews." For 10 points, name this explorer who is said "Goodbye" in the title of a Philip Roth short ▲ story collection. ◆ □

Answer: Christopher Columbus

● Ixion ▲ Goodbye, Columbus ◆ João Guimarães Rosa □ The Illustrated Man

Packet P6 Question 26

During a feast in this poem, an obese doctor of divinity gorges himself on both food and scripture. In this poem, Patience teaches the virtues of poverty to Haukyn the Active Man. Divided into sections known as “passus,” ◆ this poem’s narrator falls asleep in the Malvern Hills and awakes ● to see a valley ■ teeming with “a fair field of folk.” Its author published this poem in a revised B-version, likely to distance himself from Wat Tyler. Its second section concerns the narrator’s quest to find Do-Well, Do-Better, and Do-Best. ▲ For 10 points, name this allegorical poem by William Langland.

Answer: Piers Plowman





Packet P6 Question 27

“Arraignment” by Robin ▲ Morgan speculates about the true cause of death of this poet. In a poem written about this person, the speaker recalls “Bending so briefly at your open coffin” and describes the “mad, execution uniform” that she wore on her first day of work. This author was memorialized in the poem “The Blue Flannel Suit” by her husband, ■ Ted Hughes. A poem ◆ ● ▲ by this author describes a “Polish town scraped flat by the roller of wars, wars, wars.” For 10 points name this American writer of “Daddy” who committed suicide in 1963.


Answer: Sylvia Plath

▲ Miklós Horthy ■ Birthday Letters

Packet P6 Question 28

In one novel set in one of these locations, the narrator tells a story about when he was hit the head by the rector of the Sorbonne and explains how he was fired as head cable fitter for making charts of his coworkers' alcohol  consumption. Lebedev, Rogozhin, and Myshkin meet in one  of these locations in the first chapter  of The Idiot. Pozdnyshev tells the story of how he killed his wife after she had an affair with a violinist in a novella mostly set in one of these locations, The Kreutzer Sonata. For 10 points, name these vehicles, one of which kills the title character of Anna Karenina. 

Answer: Train

 The Idiot  Sacred grove  Leo Tolstoy

Packet P6 Question 29

A character in this novel ● abandons a suicide attempt after seeing himself in the water, though it is later revealed that what he actually saw was a manikin dressed up like him. In order to make amends with his daughter, that character in this novel brings her a goldfinch for her wedding, but it dies before it is found. This novel's title character swears off drinking for 21 years after accepting five guineas in exchange ○■ for his wife Susan at an auction. For ◆ 10 points name this Wessex novel that tells of the decline of Michael Henchard, ▲ a work by Thomas Hardy.

Answer: The Mayor of Casterbridge

● Latin

Packet P6 Question 30

Its not water, but Li ■ Bing developed a process for extracting this commodity from wells. Huo Guang initiated ◆ ● □ a series of debates, or “discourses,” about a Han Dynasty monopoly on iron and this commodity. The Great Hedge of India was planted along the Inland Customs Line to facilitate the collection of a tax on this good. A nonviolent protest was planned for a center of this commodity’s production at Dharasana, but its leader was arrested a month after he arrived in Dandi. For 10 points, name this good whose taxation was protested by a Mohandas ▲ Gandhi march.

Answer: Salt

■ An Lushan Rebellion

Packet P6 Question 31

Seneca credited Pompey ● with first exhibiting the slaughter of these animals in the Circus, which, according to Cicero, led people to think that this animal “has something in common with mankind.” The Romans sometimes called these animals “Lucanian oxen,” referencing ■ their decisive use in defeated Roman forces at the Battle of Heraclea. At the Battle of Ipsus, Seleucus I Nicator defeated Antigonus I using a force of these animals that had been given to him by Chandragupta Maurya. For 10 points, name ■ these war animals with which Hannibal crossed the Alps. ◆ ▲

Answer: Elephant

● Lysosome ■ Diadochi ◆ Horse ▲ Horse






Packet P6 Question 32

A concerto for this instrument ● by John Corigliano features a first movement in which the soloist and the orchestra play a “Tuning Game.” Mozart reworked a concerto for this instrument ○ into his D major Flute Concerto No. 2. ■ Besides his Adagio in G minor, Tomaso Albinoni is best known for his Opus 9 which includes twelve concerti for this instrument. This instrument represents the duck in Sergei Prokofiev’s ▲ Peter and the Wolf. Most orchestras ◆ tune to an A played by, for 10 points, what highest double reed woodwind instrument?

Answer: Oboe

● Garden





Packet P6 Question 33

A composer from this country wrote a highly symmetrical piece  for solo amplified violin called *Strung Out*. That composer from here used an “additive technique” for works like *1+1*, which is played on a table top. A composer from this country used sounds from tin cans, conch shells, and two variable-speed turntables in a set of compositions whose fourth entry calls  for the use of twelve radios. A composer from this country explored the role of chance in his *Imaginary Landscapes* and called for a duration of ambient noise  in 4'33". For 10  points name this birthplace of Philip Glass and John Cage. 

Answer: United States

 John Cage  John Cage  France






Packet P6 Question 34

Philip the Bold commissioned  an international gothic style hexagonal structure named for this person that  was designed by Claus Sluter; that was  this man's namesake "well." Sigmund Freud wrote an essay that ascribed meaning to the minute, sacrilegious details of a statue of this man, who loosely holds a set of tablets with his right hand. Julius II commissioned that sculpture of this figure for his tomb, and it includes horns commonly seen on this figure in medieval art. For 10 points, name this prophet, whom Michelangelo sculpted holding the Ten Commandments. 

Answer: Moses

 Duchy of Burgundy  Walt Disney World Swan  Michelangelo

Packet P6 Question 35

In the Resurrection from the Isenheim Altarpiece, Jesus unusually wears a garment of this color. Robert   Campin used this color  for Mary's robe  in the annunciation  scene of his Merode Triptych. Tintoretto used a beetle based pigment of this color called carmine in the garments of the title character of his painting Miracle of the Slave. Titian highlighted the central figure in his Assumption of the Virgin using a cinnabar-based pigment of this color, vermillion. The bed in the background of The Arnolfini Wedding is, for 10 points, what primary color used to depict blood?

Answer: Red

 Blue  Altarpiece

Packet P6 Question 36

Craig Hartman of Skidmore, Owings and Merrill ■ ▲ designed a curving glass facade for this city's Cathedral of Christ the Light. A portmanteau of this city and Amsterdam names a district north of its downtown, home to "America's first cannabis college."

Emeryville is located north of this city, which is immediately east of Alameda island. This city's downtown is near Lake Merritt, and ◆ its train station is part of Jack London square. This city is connected to its western neighbor by the BART subway system.

For 10 points, name this city south of Berkeley and across the Bay from San Francisco. ○

Answer: Oakland, California

■ Burj Khalifa ▲ Burj Khalifa ○ Melbourne

Packet P6 Question 37

A basketball player who ■ went to a university in this state was a 2 time NBA MVP and led the Hawks to their only NBA Championship. A center for that university in this state went on to break two backboards in the 1992-3 season. While attending school in this state, one player scored 44.2 points per game while coached by his father. A basketball player who went to a university here won Rookie of the Year in 2018 and was the first overall pick in the 2016 NBA Draft. For 10 points, name this state, where Bob Pettit, Pete Maravich, Shaquille O'Neal, and Ben Simmons played for LSU. ♦ ○ ▲

Answer: Louisiana

■ Tracy McGrady ♦ Kansas ○ Michael Jordan ▲ Pennsylvania





Packet P6 Question 38

A November 20 statement on this nation begins “The world is a very dangerous place!” and criticizes Iran. It is home to the Global Center for Combating Extremist Ideology, which was the setting of a photo-op with Abdel Fattah el-Sisi of Egypt and the Trumps. In November, its capital’s Ritz-Carlton served as an ad hoc prison during a corruption crackdown that included several princes. For 10 points, what oil-exporting nation led by Crown Prince Mohammad bin Salman was implicated in the murder of the Washington Post reporter Jamal Khashoggi? ♦ ○ □ ▲

Answer: Saudi Arabia

♦ South Korea ○ Tiger □ George Tenet ▲ Nepal






Packet P6 Question 39

A palace in this country contains the largest collection of Chinese porcelain outside of China. The Basilica Cistern in this country features two columns supported by Medusa heads, and figures in James Bond's plot to steal the Lektor in *From Russia with Love*. In this country, the Sarayburnu Promontory contains the historic Topkapi Palace and  borders a waterway called the Golden Horn. One can take a ferry from this country's largest city to Bursa, over the Sea of Marmara. For 10   points, name this country where bridges cross the Bosphorus near Istanbul. 





Answer: Turkey

 Istanbul  India

Packet P6 Question 40

One of these artworks,   which consists of a woman holding a baby in her arms, was executed in Siena by Jacopo della Quercia, and was named for Gaia. Another of these works, showing a man kneeling on a shell and drinking from another shell, was commissioned by the Barberini. One of these works was built around an obelisk crowned  by a dove holding a tree branch in a piazza next to the Palazzo Pamphili. Nicola Salvi is today remembered for designing one of these works. For 10 points,  name these works such as the Four Rivers and the Trevi, which include flowing water. 

Answer: Fountain

 Tapestry  Medal  Harry Potter fandom  Fontana dei Quattro Fiumi

Packet P6 Question 41

Margo Sappington and the ■ Milwaukee Ballet created a ballet based on this artist's work titled after his cover of a Pulp song in collaboration with Joe Jackson and Ben Folds. This artist recently covered "Seeking Major Tom" on an album that includes versions of "Space Oddity". This artist included a speech from Henry V and a spoken word cover culminating in him screaming "Mr. Tambourine Man" on his debut ◆ album, The Transformed Man. For 10 points, name this man whose musical career followed up acting ▲ success on Star Trek where he played Captain ■ Kirk. ○

Answer: William Shatner

■ The Big Money ▲ William Hung ○ Alexander Stirling Calder

Packet P7 Question 1

This game contains an easter egg based on fan art of blocks spelling out “P A M” and an insect in a top hat, and its launch was declared a holiday by Jim Justice on November 14, 2018. The “Personal Matters” quest requires the player to kill Evan, who was the now-scorched fiancé of the Overseer. Locations in this game include the Whitespring Resort, which is based on the real-life Greenbrier resort in Solphur Springs, West Virginia. A multiplayer game centered on a control vault, for ten points name Bathesda’s most recent entry in the Fallout franchise. ♦ ○ □ ▲

Answer: Fallout (series)

♦ HaLo ○ Who Wants to Be a Millionaire? □ Halo: Combat Evolved ▲ The Legend of Zelda: Skyward Sword

Packet P7 Question 2

In one scene in this movie, a girl orders a Chocolate Milk, cold before presenting her theory of the case to Yoko Ono. The title place's northern most point is called the Far-away cuticles extending from the Middle Fingers and is visited by an owl who reports the mayor's death sentence for the main characters, ostensibly because they contracted snout fever. Characters recount their favorite foods-Kobe ribeye, yakitori sausage, green tea ice cream, and Doggy Chop-as they search for the lost dog of Atari, who crash-landed in the title location. For ten points, name this 2018 stop-motion animated film about the canine exiles from Magasaki by Wes Anderson. ◆ ○ □ ▲

Answer: Isle of Dogs (film)

◆ Moonrise Kingdom ○ Ode on a Grecian Urn □ Amarcord ▲ Django Unchained

Packet P7 Question 3

Alan Hajek “waged war” on it by suggesting a mixed strategy: make the decision based on whether you win the lottery. His ● suggested fixes were to require overriding utility and distinguishable expectations. Diderot’s contemporaneous objection was that it assumed the existence of a single entity, and Schlesinger attempted to refute the “many gods” critique by arguing that its formulator’s ◆ God was more probable than any other. Assuming a payoff matrix with an infinite gain regardless of how small the probability, for ▲ ten points, is what philosophical argument for God by French ■ mathematician?

Answer: Pascal’s Wager

● Shirley Jackson

Packet P7 Question 4

Many creation myths from this country refer to the first sunrise with the phrase “Zep Tepi.” A creation myth from this country holds that human beings were formed from the tears of a disobedient eye that was separated from its holder. In a story from this country, four frog gods and ● four snake goddesses combine to form a mound of earth that emerges from a vast, lifeless ocean called Nu. Atum created the first deities, Shu and Tefnut, in a myth that originated in this country’s city of Heliopolis. For 10 points, name this country where other myths explain the origins of Osiris. ◆ □ ▲

Answer: Egypt

● Japan ◆ Central African Republic □ Ra ▲ Japan

Packet P7 Question 5

In one of these works, a woman earns a living playing a lute during a twelve-year search for her husband. A character in one of these works exhumes the corpse of a woman after dreaming of their mutual love. Performers in these works were often called “Disciples of the Pear Garden.” After Wu Han wrote one of these works that ignited public controversy, all but eight “model” examples of these works were banned during the Cultural Revolution. Tale of the Pipa and The Peony Pavilion ▲ are, for 10 points, which Chinese works that often include musical performances? ◆ ○ □

Answer: Opera

▲ Harry Potter fandom ◆ Constantin Brâncuși ○ Harry Potter fandom □ Amy Tan

Packet P7 Question 6

These molecules can undergo ■ a change called remodeling or recruitment, ● perhaps explaining why only twenty two varieties of these molecules are encoded in mitochondrial DNA. The D arm of these molecules is named for the presence of dihydrouridine, and in eukaryotes ○ they possess a CCA tail. A namesake aminoacyl synthetase catalyzes □ the “charging” of these molecules. The secondary structure of these molecules is often visualized as a clover leaf. Amino acids are carried to the ribosome by, for 10 points, what molecules that ▲ bind to mRNA during ◆ translation?

Answer: Transfer RNA

■ Major histocompatibility complex ● RNA





Packet P7 Question 7

An experiment using Chara provided evidence for the pressure-based model of the impact of this phenomenon, by which it can reverse the polarity of cytoplasmic streaming. This phenomenon is perceived by a specialized variety of amyloplast in statolith cells, which then redirects auxins laterally away from the elongation zone. Generally, roots grow in the direction of this phenomenon, while stems grow in the opposite direction of this phenomenon. This phenomenon that, like light, names a “tropism” that prominently shapes plant development. For 10 points, name this fundamental force that pulls plants (and everything else on Earth) downward. ♦ ○ □ ▲

Answer: Gravity

♦ Fire ○ Polyploid □ Phototropism ▲ Diffraction

Packet P7 Question 8

This type of reaction occurs in the second, isobaric step of a normal Brayton Cycle. This type of reaction names a type of synthesis also known as SHS that is used to produce nanomaterials. Initiating this type of reaction often requires one reactant to make a forbidden transition from a triplet state to a singlet state.    This type of reaction, whose incomplete form can produce carbon monoxide, occurs at temperatures above the flash point. Catalytic converters process the byproducts  of, for 10 points, what type of reaction that names an “internal engine” found in automobiles?

Answer: Combustion

 Addition reaction

Packet P7 Question 9

Ernst Bauer first described a “low energy” variety of these devices that can analyze thin films. The resolution of these devices can be improved by using a lanthanum hexaboride cathode instead of a tungsten cathode. Before use with one type of these devices, samples ● are often either stained with osmium or coated in a layer of gold. Surface morphology can be determined using the “scanning” variety of these devices, while their “transmission” variety requires the use of an ultrathin sample. For 10 points, ◻ name these magnification devices that use negatively charged particles. ◆ ▲

Answer: Electron microscope

● Laser ◆ Ion trap ▲ Microscope





Packet P7 Question 10

Caffarelli et al. showed that a singularity predicted by these equations would not exist for any finite duration of time. They are the subject of a widely cited 1968 paper by Alexandre Chorin. By starting ● with these equations in three dimensional cylindrical coordinates, one can apply Newton's first law to derive the Hagen-Poiseuille equation. The "existence and ▲ smoothness" problem of completely solving these equations is one of the Millenium Prize problems. Unlike the Euler equations, non-inviscid flow is described by, for 10 points, what equations that describe viscous fluid motion? ◆ □

Answer: Navier–Stokes equations

● Compact finite difference ▲ Compact finite difference ◆
Compact finite difference □ Lakoff

Packet P7 Question 11

A speculative NASA project seeks to send small, spiky, “hedgehog” probes to explore a moon of this planet. In 2011, Russia  launched a probe named “grunt” or “ground” intended to sample a moon of this planet, but it never left the earth’s orbit. This planet’s largest, tidally locked moon has a decaying  orbit and will be destroyed within fifty million years. Asaph Hall discovered this planet’s moons, which were photographed by the rovers Spirit and Opportunity. For 10 points, identify  this planet whose two moons are named Deimos and Phobos. 

Answer: Mars

 Neptune  Neptune





Packet P7 Question 12

A version of this formula is used in the first step of deriving the Black-Scholes model to establish the equation for delta V. Faa di Bruno's ● formula is a higher-level generalization of this formula, whose counterpart in stochastic calculus is called Ito's Lemma. By this formula, the Jacobian of the composition ■ of two functions □ is equal to ▲ the product of each function's Jacobian. Using this rule and ◆ the product rule, one can derive the quotient rule. For 10 points, name this calculus "rule" which states that the derivative of f of g of x is f prime of g of x multiplied by g prime of x.

Answer: Chain rule

● Clausius–Clapeyron relation ■ Derivative

Packet P7 Question 13

In eastern Europe, many   Jews craft this substance into the shape of a bird or a ladder during Rosh Hashanah. In the Tashlikh ceremony, some Jews symbolically toss pieces of this substance into a river to cast off their sins. In the Torah, Sarah prepares this food for some visiting angels, and it miraculously does not spoil for seven days. Because of the haste of the Exodus from Egypt, Jews prepared an unleavened form of this food that is today eaten during Passover.  For 10 points, name this food, traditional varieties of which include matza and challah. 

Answer: Bread

 Comecon  Comecon  Honey  Bread

Packet P7 Question 14

During the formation of this object, a hero receives a purple and red mantle decorated with depictions of gods, monsters, and chariots. Part of this object falls on and kills a mythological hero as he rests on a beach at Pagasae. A part of this object could supposedly speak because it was constructed from sacred oak wood taken from Dodona. To distract pursuers of this object, Absyrtus is murdered and ● cut up into pieces by his sister Medea. A voyage to Colchis was undertaken aboard, for 10 points, what ship used by Jason on his quest for ■ the Golden Fleece? ◆ ▲

Answer: Argo

● Golden Fleece ■ Golden Fleece ◆ Argo ▲ Moon

Packet P7 Question 15

A book partly titled for ■ this man claims that the simplest machine that can convert scrambled eggs to a whole egg is a hen. This man's ideas were synthesized with Christian theology by Asa Gray. This is the more recent of the two people whose ideas were combined into the "modern synthesis" of Julian Huxley, whose grandfather Thomas was nicknamed this man's "bulldog." □ The ideas of this man are compared to a "universal acid" in a Daniel Dennett ♦ book named after this man's "dangerous ○ idea." For 10 points, name this originator of the theory ▲ of evolution.

Answer: Charles Darwin

■ Secularization





Packet P7 Question 16

A monologue by this writer concludes with a character saying that he would have rather been born as a seagull or a fish than as a man. A woman created by this author wishes that humanity could conceive of “God the Mother” instead of “God the Father” and regrets not consummating her engagement to Gordon Shaw. This author wrote a play about the lovers of Nina Leeds and a play in which ■ Mary’s morphine ◆ ● addiction and Jamie’s □ drinking cause problems for the Tyrone family. For 10 points, ▲ name this author of Strange Interlude and Long Day’s Journey into Night.

Answer: Eugene O’Neill

■ Strange Interlude ▲ Long Day’s Journey into Night

Packet P7 Question 17

This poem calls Waterloo “where the sword united nations drew”. This poem urges a woman to “Smile on,”  not “venture to unmask / Man’s heart, and view the Hell that’s there” in its digression “To Inez.” The line “There is a pleasure in the pathless woods” opens this poem’s “Apostrophe to the Ocean.” This poem’s title character witnesses a bullfight in Spain and  laments on the state of modern Greek culture. For 10 points, name this Lord Byron   poem about a Romantic youth’s journey through Europe.

Answer: Childe Harold’s Pilgrimage

Packet P7 Question 18

In *Pride and Prejudice*, Mr. Darcy meditates ■ on the “very great pleasure” that “fine” these things can provide. Ben Jonson’s poem “To Celia” opens with the command “Drink to me only with” these things. William Shakespeare’s 130th Sonnet begins by stating that these body parts of his mistress are “nothing like the sun.” In *King Lear*, a servant kills the Duke of ◆ Cornwall after witnessing Regan and Goneril removing these body parts from the Earl ○ ▲ of Gloucester. For 10 points, the loss of what body parts causes Gloucester to wander blindly through a stormy heath?

Answer: Eye

■ Elizabeth Bennet ▲ Wing

Packet P7 Question 19

The speaker of a poem by this author, who claims to be “the world’s mindless dweller,” relates the story of a woman named Naima who turns into a dragon and tells of a man who draws a sword from the massive severed head of the wizard Chernomor’s dead brother. This man wrote a poem in which Parasha’s lover wanders the streets of his home city ● in insanity after she dies in a flood. This author of Ruslan and Ludmila wrote ◆ ■ a poem about Evgenii, who curses a statue of Peter the Great ▲ that pursues him to his death. For 10 points, name this author of “The Bronze Horseman.”

Answer: Alexander Pushkin






Packet P7 Question 20

An essay from this literary ■ ▲ movement was among the first to argue that Shakespeare's plays should be not be judged using the Aristotelian Unities, and was published in a collection about "Character and Art." A member of this movement wrote the plays The Soldiers and The Tutor and names a Georg Buchner novella. A play by Friedrich von Klinger provided the name □ of this movement, which ● included the dramatist Jakob Lenz. The Sorrows of Young Werther is from this movement. For 10 points, name this German ◆ literary movement whose name translates as "storm and stress."


Answer: Sturm und Drang

■ An Lushan Rebellion ▲ Transcendentalism

Packet P7 Question 21

A playwright from this country wrote a drama  about war crimes  trials titled Between  God and Man and adapted a folktale in which a man discovers that his wife is a  bird who uses her feathers to produce textiles. The phrase “beginning, break, rapid” outlines the plots of dramas from this country whose stage backgrounds depicted a single pine tree. The play Twilight Crane is from this country, as are the over four hundred types of masks used  in Noh performances. Bunraku and Kabuki are genres of drama from, for 10 points, what country where plays debuted in Osaka?

Answer: Japan

 Germany

Packet P7 Question 22

This poet claimed that ■ he was unworthy to write about wars in a work in which he instead sings “of banquets, of girls fierce in battle / with closely-trimmed nails, attacking young men.” The fourteenth poem in a collection by this author advises “The Ship of State” to “avoid the glistening seas.” The phrase “Now’s the time for drinking deep” opens his poem about Cleopatra. Wilfred Owen titled a poem from this author’s line “Dulce et decorum est pro patria mori.” ◆ ● ▲ The phrase “carpe ■ diem” was originated by, for 10 points, what Latin poet of three books of Odes?

Answer: Horace

■ Anne Sexton

Packet P7 Question 23

A raid on three banks in this state by Confederate paramilitary cavalymen who subsequently escaped to Canada is considered the northernmost land action of the Civil War. John Stark's ● ◻ forces defeated a unit under Friedrich Baum in a Revolutionary War battle in this state that caused mass desertions among John Burgoyne's native allies prior to the Saratoga Campaign. The St. Albans ■ Raid and the Battle of Bennington occurred in, for 10 points, what state where ◆ Ethan Allen led the Green Mountain Boys ▲ militia in a dispute over its eastern border with New Hampshire?

Answer: Vermont

■ Saratoga campaign

Packet P7 Question 24

The founder of Salon, ■ David Talbot, wrote a book about this city's history titled Season of the Witch. The Golden Dragon Massacre led to a crackdown on gang violence in this city, which was the headquarters of the Peoples Temple directly before Jim Jones relocated to Guyana. A "diminished capacity" legal strategy derisively called the Twinkie Defense was used to secure a manslaughter conviction for Dan White in this city ● after he killed Harvey ■ Milk and George ◆ Moscone. For 10 points, name this California city where The Castro became one of the U.S.'s first ▲ LGBT neighborhoods.

Answer: San Francisco

■ Germaine de Staël

Packet P7 Question 25

A 1363 decree designed to promote the use of this weapon banned most sports on Sundays. Roger Ascham's book *Toxophilus* is about these weapons, 172 of which were recovered from the wreck of the *Mary Rose*. A popular myth holds that the gesture of the middle finger arose from a French practice of mutilating prisoners of war so that they could not use these weapons. Henry V's army made devastating use of these weapons to harass ▲ French knights at the Battle of Agincourt. For 10 points, name these tall ■ weapons used by British archers in the medieval era. ◆ ○

Answer: Longbow






▲ V-weapons ◆ Arrow ○ Spar torpedo

Packet P7 Question 26

Emile Boissonade largely wrote a legal code that specifically promoted penal transport to this island. Jules Brunet organized a force that unsuccessfully defended a star fort on this island. In 1870, former Secretary of Agriculture Horace Capron was hired to modernize ● this island. Shakushain's Revolt challenged a fiefdom controlled by the Matsumae Clan on this island, where the Republic ◆ of Ezo briefly ■ resisted the Meiji Restoration. For 10 points, name this primary home of the Ainu people, an island ▲ where fortifications were constructed in Hakodate and Sapporo.

Answer: Hokkaido

Packet P7 Question 27

In 1994, this country's president denounced his wife Susana and made his daughter its official first lady. In 2000, videos surfaced of a man from this country offering bribes to TV stations to deny interviews with opposition members; that scandal brought down the leader of the SIN intelligence service in this country, Vladimiro  Montesinos.   It was the location of terrorist attacks by Maoist guerillas  called the Shining Path during the administration  of Alberto Fujimori. For 10 points, name this country where a revolutionary movement took the name of Inca rebel Tupac Amaru.

Answer: Peru

 Alberto Fujimori

Packet P7 Question 28

This man proposed that general relativity could arise from independent physical parameters in his model ● of induced gravity. He postulated that the universe was comprised of two “sheets.” This scientist, ◆ who names three conditions at which baryonic matter and antimatter are produced at different rates, worked with Igor Lamm to develop the first tokamak. This man’s “third idea” was used in the RDS-37 hydrogen bomb, though ■ he was later exiled to Gorky for speaking out against anti-ballistic missile systems. For 10 points, name this Soviet nuclear scientist and □ human rights advocate. ▲

Answer: Andrei Sakharov






● Albert Einstein ◆ Albert Einstein ■ Edward Teller ▲ Andrei Sakharov

Packet P7 Question 29


These objects are the main subject of Vasily Vereshchagin's painting ● The Apotheosis of War. A photograph by Philippe Halsman shows Salvador Dali standing in front of one of these objects formed from the bodies of seven nude women. The subtitle "Red, White, and Blue" is appended to a Georgia O'Keefe painting of one of these objects that originally belonged to a cow. An anamorphic one of these objects is stretched across the floor of Hans Holbein's The Ambassadors. For 10 points, ■ ▲ name these objects often used as a vanitas ◆ symbol of death.

Answer: Skull

Packet P7 Question 30

This man appears standing and wearing a green coat on the left side a Matthew Pratt painting that shows this man giving an art lesson. Three angels hold the line of a kite on the right side of a painting by this artist, who served as the second president of the  Royal Academy. This  artist of Benjamin Franklin Drawing Electricity from the Sky  ahistorically showed Simon Fraser behind  a man in a green jacket in a painting in which a Native American  warrior contemplates a British general's last moments. For 10 points, name this artist of The Death of General Wolfe.

Answer: Benjamin West

 Joshua Reynolds

Packet P7 Question 31

A musical depiction of a landmark in this city uses its composer's poem "Moving- Marching- Faces of Souls" and builds to a C major chord played by the entire ensemble to depict a pitched battle. An orchestra in this city premiered Sergei Prokofiev's Fourth Symphony under the direction of Serge Koussevitzky. The Tanglewood is a summer venue ■ near this city, where Arthur Fiedler was the director of an orchestra known for its Fourth of July concert. The first of Charles Ives's Three Places in New England is in, for 10 points, what Massachusetts city home to a pops orchestra? ♦ ○ ▲

Answer: Boston

■ Boston Symphony Orchestra ♦ Fall River, Massachusetts ○ Los Angeles ▲ New York City



Packet P7 Question 32

A sculptor from this country ■ created a relief for a “Carousel” triumphal arch showing the conquest of Munich and is known for many terracotta sculptures of drunken nymphs and satyrs. A sculptor from this country adapted his cast of the torso of Adele Abruzzesi into his sculpture of two embracing lovers, Eternal Springtime. This birthplace of Clodion is the home country of an artist who was accused of casting a living model ● to produce his sculpture The Age of Bronze. For 10 points, name this birthplace of the sculptor of The Thinker, Auguste Rodin. ◆ ▲

Answer: France

■ Bertel Thorvaldsen ● Auguste Rodin ◆ Brazil ▲ Japan

Packet P7 Question 33

The leader of this country for much of the 2000s used a campaign slogan of “Peace and Love.” In November 2018, a politician in this country reversed his pledge to combine its environmental and agriculture ministries. The losing candidate in an October 2018 runoff election in this country was the Workers’ Party candidate Fernando Haddad; the election’s winner was stabbed on the campaign trail and has opposed the distribution of LGBT educational materials in schools. For 10 points, what country’s leader-elect is a former army captain named Jair Bolsonaro?  



Answer: Brazil

 South Korea  South Korea  Luiz Inácio Lula da Silva  Peru

Packet P7 Question 34

This actor plays a father ■ who is upset when he encounters his soon-to-be suspended daughter singing “Hollaback Girl” in a school hallway. A character played by this actor is telling a story about Mardi Gras when he hears that a Russian missile strike has caused a chain reaction of satellite explosions. He portrayed the Hawaii lawyer Matt King, who comes to terms with the death of his comatose wife. He also played Matt Kowalski, who becomes trapped aboard a space station with an astronaut played by ▲ Sandra Bullock. For 10 points, name this star of The Descendants and Gravity. ◆ ○

Answer: George Clooney

■ Samuel L. Jackson ▲ Matthew McConaughey ◆ Tom Cruise ○ John Malkovich





Packet P7 Question 35

In this city, a vase showing marching soldiers in full armor, the Warrior Crater, was discovered in Grave Circle A. A stone archway whose top depicts two lions forms a gate in this city, which contains nine surviving tholos tombs including the ● Treasury of Atreus and is nearby the similar site of Tiryns. ■ A gold funerary mask was unearthed in this city by Heinrich Schliemann. A culture ◆ named for this city used the Linear B script and was the final dominant culture of Bronze Age Greece. For 10 points, name this city where the Mask of Agamemnon was unearthed. ▲


Answer: Mycenae

▲ New York City

Packet P7 Question 36

A painting in this location that renders silver shillings strewn on the floor in gold paint is titled Art and Money, and contains  a characteristic blue-green background. In this location, a painting of a white woman in a pink and grey kimono hangs above a fireplace. The design of this location ignited its creator's feud with Frederick Leyland. This location, which  is currently in the Freer Gallery at the Smithsonian, contains The Princess from the Land of Porcelain. For 10 points,  identify this Asian-inspired room designed by James Whistler, which is named for a colorful bird. 

Answer: The Peacock Room

 Washington, D.C.





Packet P7 Question 37

In 2017, scientists unearthed a complete ichthyosaur skeleton in this country, which is unusual since it is not a far northern country. The Lameta Formation is in this country, whose central region contains a series of “Traps” that formed 66 million years ago around the time of the K-T Extinction. This country and Madagascar share many dinosaur species, since the tectonic plate named for this country was joined with Madagascar before it drifted northward and collided with Asia. For 10 points, name this country where Rajasaurus was discovered in Gujarat. ♦ ○ □ ▲

Answer: India






♦ Panama ○ Soviet Union □ Mongolia ▲ France

Packet P7 Question 38


This novel's narrator lies about being a wrestler to borrow ten dollars from a Mexican driver before stating this book's final line, "I been away a long time." A man in this novel sees a rag on a tree branch, reminding him of his first sexual encounter at ten years old, while on a fishing trip that he coordinates with the prostitute Candy Starr. Billy Bibbit commits    suicide after  losing his virginity in this novel that contains a climactic scene in which Chief Bromden smothers the lobotomized Randle McMurphy. For 10 points, name this Ken Kesey novel mostly set in a mental asylum.

Answer: One Flew Over the Cuckoo's Nest (novel)

Packet P7 Question 39

The diary describes this battle with a page for each death in Tanya Savicheva's family. The Green Belt of Glory monument commemorates this battle, during which the attackers were led  by Wilhelm Ritter von  Leeb. Dmitri Shostakovich's Seventh Symphony premiered during and is named after this battle. The  defending side at this battle established the Road of Life to transport supplies across the frozen  top of Lake Ladoga.  For 10 points, name this siege during which a northern Russian city was attacked by German and Finnish forces during World War Two.

Answer: Siege of Leningrad

 Gunfight at the O.K. Corral

Packet P7 Question 40

Yoram Ben-Porath introduced a production function for this concept to predict its rate of creation. Mankiw, Romer, and Weil argued that introducing this concept to the Solow Model was ● necessary for its predictions to corroborate real-world data. Theodore Schultz wrote the paper that formally introduced this concept in 1961. Signaling theory is an alternative to the argument that people are producing this thing by receiving education. A Gary Becker book about people investing in themselves is named after, for 10 points, what non-physical variety of one of the four factors of production? ◆ □ ▲

Answer: Human capital

● Economic growth ◆ Capital (economics) □ Economic growth ▲ Knowledge

Packet P7 Question 41

Amsterdam experienced a riot named for this ▲ crop during World War One. In the 1830s and 40s, Russian peasants on the lower Volga objected to the forced introduction of this crop in a namesake series of riots. Antoine-Augustin Parmentier pushed for the cultivation of this crop in France. This crop provides ■ an alternate name for the War of the Bavarian Succession. ◆ An epidemic of phytophthora infestans devastated the cultivation of this crop in the mid-19th Century. Robert Peel repealed the Corn Laws to counteract a blight of, for 10 points, what crop that caused an Irish famine? ○

Answer: Potato

▲ Soweto uprising ■ Rice ○ Cotton

Packet F1 Question 1

In a poem in this genre, ■ a wealthy merchant sacrifices his only surviving seventh son in order to cure a sick stranger. A ● poem in this genre tells of Heraclius, who is executed when he refuses to abandon Christianity after his capture. The main character of a poem in this genre is unable to walk until he stands up using an iron rod that he fashions into a bow. The Swahili “utendi” are poems in this genre, such as The Story of Tambuka. The founding of the Mali Empire is told in a poem in this genre titled for Sundiata. For 10 points, name this genre of long, narrative poetry that ■ details heroic deeds. ◆ ▲

Answer: Epic poetry

■ Battle of Monmouth ● Noh ◆ Epic poetry ▲ Satire





Packet F1 Question 2

Along with K.W. Wagner, this man names a polarization in which a build up of charge occurs at low frequencies in dielectric spectroscopy. Leo Szilard responded to a construct named for this man by arguing ● that measuring molecular speed would require energy, and therefore would increase the total entropy of a system consisting of two chambers connected by a trapdoor. ■ This man's "addition" to Ampere's Law is part of his ▲ four namesake laws that govern electromagnetism. For 10 points, ○ what scientist names a "demon" that violates the Second Law of Thermodynamics? ◆

Answer: James Clerk Maxwell

● Albert Einstein ■ Maxwell's demon ◆ Josiah Willard Gibbs

Packet F1 Question 3

A maximum bound for the number of elements in a set that has this property is given by the “replacement theorem.” The elements of a matroid possess  a generalized version of this property. Necessarily, the set of objects that are inputted and outputted in the Gram-Schmidt process have this property. A basis is a spanning set whose elements have this property. A set of vectors that  includes the zero vector cannot have, for 10 points, what property of a vector set in which no one vector can be written as a linear combination  of the others? 

Answer: Linear independence

 Linear independence

Packet F1 Question 4

The fourth chapter of T.J. Clark's *The Painting of Modern Life* argues that this painting represents the ● bisection between the proletariat and the bourgeoisie. On the upper right of this painting, a pair of green boots on a trapeze bar are visible ○ above a circular light on a pink wall. On the bottom right ■ of this painting, bottles of Bass Pale Ale appear on a marble counter next to a bowl of oranges. ▲ The maid Suzon looks at the viewer, and also appears to hold a conversation with a patron in a mirror in, for 10 points, what Edouard Manet ◆ painting of a Paris nightclub?

Answer: A Bar at the Folies-Bergère

● Olympia, London

Packet F1 Question 5

A model constitution was published on March 19th during this war in a city that was in the middle of enduring a two and a half year long siege. That siege in this war was initiated by forces under Jean-de-Dieu Soult. During this war, Andre Messena's ● futile assaults on fortifications along the Lines of Torres Vedras failed ○ ■ to capture a national capital. Joseph I abdicated his throne at the end of this war after troops under the Duke of Wellington won decisive ◆ clashes at Salamanca and Vittoria. For 10 points, name this phase of the Napoleonic Wars fought in ▲ Spain.

Answer: Peninsular War

● War of 1812





Packet F1 Question 6

A play set in this country is about the troubled engagement between Billy Dimple and Maria von Rough. William Dunlap wrote a history of the theater in this country, ● which is the setting of Royall Tyler's play The Contrast. Fans of two Shakespearean actors in this country turned violent in the Astor Place Riot. In the early 19th Century, some of the most popular plays in this country were minstrel shows, which often included white actors wearing blackface. For 10 points, name this country where Uncle Tom's Cabin was frequently adapted for the stage. ◆ □ ▲

Answer: United States

● Royall Tyler ◆ China □ Drama ▲ India

Packet F1 Question 7

In a novel with this title, the lead singer of the Terrible Children commits suicide in his basement, leaving his daughter Calliope Bird Morath unable to speak for several years; that book is the debut novel of Andrew Foster Altschul. The speaker of a poem with this title states, “The peanut-crunching  crowd / Shoves in to see / Them unwrap me hand and foot” and lists “A cake of soap, / A wedding ring, / A gold filling” as objects sought by the Nazi “Herr Doktor.”  “I rise with my red hair / And I eat men like air” closes, for 10 points, what Sylvia Plath poem?  

Answer: Lady Lazarus

 The New Life (novel)  Daddy (poem)  Ariel (poetry collection)

Packet F1 Question 8

Oliver Goldsmith attacked ■ the lack of faults in stock characters used in “sentimental” plays in this genre. ● The critic Irving Wardle coined the term of a style within this genre, whose name is a pun that makes use of the word “menace.” Harry Horner feigns impotence in a play in this genre, William Wycherley’s *The Country Wife*. Plays in this genre “of humours” were written by Ben Jonson, which were similar to plays in this genre “of manners.” For 10 points, name this genre whose “Restoration” form amused during the reign of Charles II. ♦ ▲

Answer: Comedy

■ *The Vicar of Wakefield* ● *She Stoops to Conquer* ♦ Morality play ▲ Oratorio

Packet F1 Question 9

The play Moliere, or The ■ Cabal of Hypocrites was shut down after ● only seven performances in this city. Edward Gordon Craig designed a series of movable screens for a performance of Hamlet in this city. A man who worked in this city advocated experiencing a role rather than representing it in his manual An Actor Prepares. A theater based in this city took a seagull as its symbol after a successful performance of Anton Chekhov's The Seagull in 1898. For 10 points, name this city where Konstantin Stanislavski founded an "art theatre," and which is a cultural rival of Saint Petersburg. ♦ ▲

Answer: Moscow

■ The Misanthrope ● Mikhail Bulgakov ♦ Rome ▲ New York City

Packet F1 Question 10

An author who was part ■ of this literary movement wrote the lines, “Traveler, there is no path. / The path is made by walking.” In a novel from this movement, an artist dies of heart trouble shortly after his throat is clasped by a jealous doctor and that artist had earlier created a painting based on Byron’s Cain for his marriage to Helena. This movement included Antonio Machado and the author of Abel ◆ Sanchez. Miguel de ■ Unamuno belonged to, for 10 points, what literary movement named for the year ○ in which Spain lost the Spanish-American war? ▲

Answer: Generation of '98

■ Transitive relation ▲ Generation of '98

Packet F1 Question 11

An author from this country wrote about how his father styled himself a “poliatrist,” or healer of the city, in his book *Oblivion: A Memoir*. A collection set in this birthplace of Hector Abad includes “Artificial Roses,” “Balthazar’s Marvelous Afternoon,” and a story in which an officer waiting for a pension check does not sell his dead son’s prized cockfighting ■ rooster. In a novella from this country, two brothers stab ◆ Santiago Nasar to death. For 10 points, name this birthplace of the author of *No One Writes to the Colonel* and *Chronicle of a Death Foretold*, Gabriel Garcia Marquez. ○ ▲

Answer: Colombia

■ No One Writes to the Colonel ○ Argentina ▲ China

Packet F1 Question 12

The 914 photocopier was developed by a company that was founded in this state, and which today is known as Xerox. In a trial held in this state, Ward Hunt directed the jury to issue a guilty verdict, which he accompanied with a sentence of a one hundred dollar fine. Frederick Douglass founded his newspaper The North Star in this state. Susan B. Anthony was arrested for voting in this state in 1872. George Eastman established his Kodak photography company in this state's city of Rochester. For 10 points, name this state where the Seneca Falls Convention was held. ♦ ○ □ ▲

Answer: New York (state)

♦ Winamac ○ Texas □ Susan B. Anthony ▲ Pennsylvania

Packet F1 Question 13

The sitting president described ongoing events in this city by saying “There is only an American problem.” “Turnaround Tuesday” was held in this city, which is where the minister James Reeb was beaten to death. “Spider” Martin is known for photographing an unconscious Amelia Boynton in this city during ● a series of events ◆ nicknamed Bloody Sunday. A group of white ■ deputies attacked African-Americans in this city as they attempted to cross the Edmund Pettus Bridge. For 10 points, name this starting point of three 1965 civil rights marches to Montgomery. ▲

Answer: Selma, Alabama

▲ New York City

Packet F1 Question 14

Late in his reign, this man repulsed an Arab raid in the Battle of Akroinon. This ruler married his daughter Anna to his ally Artabasdos, who ● nevertheless tried to seize the throne upon this man's death. He came to power when he repulsed the Second Arab Siege of Constantinople, thus ending the Twenty Years' Anarchy. The Patriarch of Constantinople ■ Germanus I resigned ◆ rather than ▲ enforce this man's decree that forbade the veneration of images. The First Iconoclasm was instituted by, for 10 points, what Byzantine emperor who founded the Isaurian Dynasty?

Answer: Leo III the Isaurian






Packet F1 Question 15

A Norman king of Sicily ■ used this campaign as a distraction to send seventy galleys to take Kerkyra. A commander in this campaign divided his forces into a unit that was repulsed at the Second Battle of Dorylaeum and a unit under Otto of Freising that was routed near Laodicea. Eugene ● III announced the ■ bull Quantum praedecessores to call for this campaign after the fall of Edessa. Bernard of Clairvaux ▲ preached in support of this campaign, ◆ in which European forces were led by Conrad III and Louis VII. For 10 points, name this religious campaign that ended in a disastrous siege of Damascus.

Answer: Second Crusade

■ William the Conqueror

Packet F1 Question 16

A politician from this party negotiated the  sale of the Leuna oil refinery to the French conglomerate Elf Aquitaine. This party accepted secret contributions from arms dealers and lobbyists- partly in exchange for allowing Thyssen to export tanks to Saudi Arabia- as part of a namesake “donations scandal” that unseated its leadership in 2000. This party facilitated  a post-World War Two “economic miracle” under chancellor Konrad Adenauer. Helmut  Kohl was succeeded by Angela Merkel as the leader of,  for 10 points, what center-right Germany political party that often aligns with the Christian Social Union? 

Answer: Christian Democratic Union of Germany

 Jeremy Corbyn  Socialist Party (France)

Packet F1 Question 17

On holidays this location ■ is home to a group of portraits known as “the history of shaving.” Its notoriety instigated a statement of “Attitudes and Demands” that shuttered the World □ Economic Herald. Leaders called for a hunger strike at this location near a massive bulletin board nicknamed “The Triangle.” A papier-mache statue of a woman grasping a torch that was constructed at this location is known as the Goddess of Democracy. A lone person stands in front of a column of armored vehicles in this location in the photograph “Tank Man.” Deng Xiaoping ordered ● ▲ troops to fire on student protestors in, for 10 points, what Beijing location, the site of 1989 demonstrations? ◆

Answer: Tiananmen Square

■ New Year ▲ Kunlun Mountains ◆ Tiananmen Square protests of 1989







Packet F1 Question 18

Blood clots in these organs ● ■ can be detected using a V-Q scan. The presence of fibrous tissues in these organs can produce ■ a pattern on a CT scan termed “honeycombing.” In men, the most common cause of death from cancer occurs ▲ in these organs, one variety of which is the asbestos-caused mesothelioma. Long-term exposure to heavy pollution can cause a disease of ◆ these organs alternately called COPD or emphysema. Tobacco smoking can seriously damage, for 10 points, what organs that are impacted by pulmonary fibrosis?

Answer: Lung

● Platelet ■ Platelet ▲ Testicle






Packet F1 Question 19

Translocations of MLL,   which regulates these genes in humans,    often cause aggressive, fatal leukemias in children. Many of these proteins prefer to bind DNA that contains the sequence TAAT. In many organisms,  these genes are expressed in the same order as they appear on the chromosome. They are regulated by gap and pair-rule genes in *Drosophila*, who possess eight of these genes. Antennae and limbs grow in their proper places because of, for 10 points, what genes that control the anterior-posterior axis of a developing animal, which are a subset of 'homeobox' genes?

Answer: Hox gene

 Chromosomal inversion  Chromosomal inversion

Packet F1 Question 20

An application of this law suggests that hydrogen fuel pipelines would often develop problematic, microscopic leaks. Though today often replaced with centrifuges, an application of this law was the basis for the separation of uranium 235 from uranium 238 during the Manhattan Project. Unlike Fick's Laws,   this law can govern a process that occurs through a hole  whose diameter is smaller than the mean free path of some given particles. For 10 points, name this law which states that the rate of effusion for two gases is  inversely proportional to the square root  of their molar masses.

Answer: Graham's law

 Plutonium  Second law of thermodynamics

Packet F1 Question 21

The thesis of Hendrika Johanna van Leeuwen ■ rediscovered a proof ● that this cannot exist under classical physics. It occurs at positive values of the integral function J_{AB} , and is correlated with the strength of A , the exchange stiffness constant, in a Hamiltonian model developed by Heisenberg. A lattice of $+1$ and -1 spins models this phenomenon in a paradigm whose two-dimensional version was solved by Lars Onsager, ○ ▲ the Ising Model. Alnico alloys display high levels of this property, as they are composed of aluminum, nickel, cobalt, ◆ □ or iron. For 10 points, name this property which disappears ▲ at temperatures above the Curie Point in permanent magnets.

Answer: Ferromagnetism

■ Theo van Gogh (film director) ● Niels Bohr ▲ Ising model








Packet F1 Question 22

The oldest fossil of the ▲ eutherian clade of ■ mammals is a Chinese shrew that has been ● dated to this period. The Aurornis genus lived during this period. The Sundance Sea existed as an ○ □ extension of the Arctic Ocean during this period, and sediments ▲ along its shores gradually created the fossil-rich Morrison Formation. The Archaeopteryx genus, which is sometimes considered the first bird, lived during this period, in which Allosaurus sometimes preyed upon Stegosaurus. ◆ For 10 points, name this period that followed the Carboniferous and preceded the Triassic.

Answer: Jurassic

▲ Taung Child ■ Amniote ● Placenta

Packet F1 Question 23

The coalescent named by   this letter is an  instance of lambda coalescents and a generalization of Kingman's. The substrate in a process partly named for this letter is carried to its destination by a carnitine shuttle. A protein family partly  named for this letter provides hardness  to the scales, shells, and skin of reptiles. The most common type of carotene in   plants is named for this letter. A "sheet" named for this letter is a regular secondary structure in proteins. Fatty acids are broken down by an oxidation named after, for 10 points, what Greek letter that can refer to the second carbon to attach to a molecule, after the alpha carbon?

Answer: Beta

 Crow Creek massacre  Crow Creek massacre  Gamma

Packet F1 Question 24

A piece that highlights this instrument has a second movement larghetto in D major, which is followed by a minuet whose second trio is based on a landler peasant dance. A piece intended for this instrument includes no cadenzas, instead opting for three short eingangs that allow improvisation while the accompaniment holds a dominant chord. Mozart wrote a trio in E flat for instrument, as well as a concerto and a quintet for this instrument ▲ in A major for Anton Stadler. For 10 points, ● ■ name this woodwind instrument that today usually plays ◆ in B flat.

Answer: Clarinet





Packet F1 Question 25

A musical genre developed in this country, the semi-opera, is sometimes performed today as an opera or ● a ballet. A dancer from this country adapted the music of Cesar Franck into his ballet Symphonic Variations. Enrico Cecchetti founded a ballet school in this country in 1918. Ninette de Valois essentially founded the leading ballet company in this country. After ■ leaving Russia, Anna Pavlova lived the rest of her life in this country. Frederick Ashton choreographed many productions in this country. For 10 points, name this country where ballets are staged in Covent Garden. ◆ ▲



Answer: Great Britain

● Henry Purcell ■ Bolshoi Ballet ◆ Russia ▲ France

Packet F1 Question 26

A martyrs' monument commissioned  by this empire consists of a  column with a broken white marble top and a large, bronze laurel branch. The Fossati Brothers were employed as architects primarily by this  empire. This empire constructed Kulliye  centers that contained houses of worship and facilities to provide food for the poor. A religious building constructed by this empire in the early 1600s is named for its many blue tiles. The architect Sinan was employed by, for 10 points, what empire that converted the Hagia Sophia into a mosque after the conquest of Constantinople?

Answer: Ottoman Empire

 Washington Monument  Inca Empire

Packet F1 Question 27

Henry argues that the Jayamala is an increasingly common part of this event because of videography. Sometimes, this event includes a symbolic brushing away of defects by using a blade of darbha grass to wipe a woman's eyebrows. A woman in this event places her foot on a block of granite while a man reads prayers for strength. A participant in this event ties an "auspicious thread," or mangalsutra, around a woman's neck. The two main participants in this event take seven steps while making promises around a holy fire that symbolizes Agni. ♦ ● That Saptapadi ritual ■ ▲ occurs during, for 10 points, what event in which the bride may wear a sari?

Answer: Hindu wedding





Packet F1 Question 28

The blood of one of these animals killed a man who lusted after Iole, the princess of Oechalia. One of these animals named Eurytion caused a conflict when he abducted the bride Hippodamia. In one story, ● these creatures are born when Ixion copulates ■ with the cloud Nephele. After consuming wine at the wedding of Pirithous, ◆ these animals fought a namesake war with the Lapiths. One of these animals served as the tutor of Achilles and many other mythological heroes. Nessus and Chiron are, for 10 points, which animals that have a human's upper body and a horse's lower body? ▲


Answer: Centaur

▲ Horse

Packet F1 Question 29

In Serbian tradition, these objects were sometimes  buried with corpses to prevent a spirit from wandering out of its grave. After a god partly named for these objects  turns into the sun, his rival knocks him from the sky using a stone club. One of these objects “of Eight Ta” is joined by a sword and a jewel in the Imperial Regalia of Japan. Tezcatlipoca’s right foot was depicted as one of these objects, which were usually made from obsidian in Mesoamerica. A  “magic” one of these  objects is asked “who is the fairest one of all” in the story of Snow White. For 10 points, name these reflective surfaces.

Answer: Mirror

 Marina Abramović

Packet F1 Question 30

In section 42 of Being ■ and Time, Martin Heidegger ▲ builds upon this earlier thinker's idea that nature perfects the good of god, but care perfects the good of a human being. This man wrote that "I cannot now influence so strong a grief by polite and mild measures: it must be broken down by force" in a "consolation" written to a friend who lost her son, Marcia. This author, whose tract On Mercy originated the genre of "mirror of the princes," wrote the Moral Epistles to his friend Lucilius. For 10 points, ◆ name this Stoic philosopher who served ○ as Nero's tutor.

Answer: Seneca the Younger

■ Tisha B'Av ▲ Martin Heidegger






Packet F1 Question 31

The title of a book by a Cambridge historian uses it to explain the interaction between evidence and realism. Its existence is presented as a paradox in “The Internal Basis of Meaning” by a Wayne State philosopher. Saul Kripke used a statement defining this substance as an example ▲ of a theoretical identity ■ statement. In a thought experiment that supports semantic externalism, Hilary ● Putnam imagined a “twin earth” that ▲ was identical to earth in every way except that this substance is replaced with ○ “XYZ.” Heraclitus said that one cannot step into the same area containing this substance twice. For 10 points, name this substance that, along with air, earth, ◆ and fire, was one of the classical elements.

Answer: Water

■ Naming and Necessity ● Hilary Putnam ▲ Hilary Putnam

Packet F1 Question 32

In 2018, this state rejected  Proposition 1, which would have increased the homestead exemption from fifty thousand to seventy-five thousand dollars. A former governor of this state who won its senate seat in 2018 is nicknamed “Red Tide” for cutting water management funds prior to an algal bloom. This state re-enfranchised 1.5 million ex-felons in 2018. Also in 2018, Rick Scott defeated   the Democrat  incumbent Bill Nelson to win a senate seat in this state, where Ron DeSantis was  elected governor. For 10 points, name this state whose government meets in Tallahassee.

Answer: Florida

 Space telescope  Arizona

Packet F1 Question 33

A major center for the production of these objects in Japan is the Shima Peninsula in Mie Prefecture. In 2017, it was reported that a population of ivory-billed woodpeckers may still be alive near a river of this name, which flows past Jackson, Mississippi. The Bocca Tigris strait is in the delta of a different river of this name, whose shores ▲ contain the city of Guangzhou. The Hickam Air Force Base joined with a naval base partly named for these objects, where tourists can visit the memorial to the USS Arizona. For 10 points, give these objects that name a Hawaii “harbor.” ◆ ○ □

Answer: Pearl

▲ List of rivers of Colorado ◆ Ceratitidis capitata ○ Attack on Pearl Harbor □ Oahu

Packet F1 Question 34

Joel ● Robuchon's restaurant in this city is his only dining establishment ■ in North America to receive three Michelin stars. Julian Serrano is the executive chef of a restaurant in this city whose walls contain reproductions of Picasso's paintings. Giada de Laurentiis opened her first, flagship restaurant in this city. Mario Batali's three restaurants in this city, including Carnevino Steakhouse, closed in this city in 2018 after he was accused of sexually inappropriate behavior. For 10 points, name this Nevada city where ◆ many restaurants are found in casinos along the Strip. ▲

Answer: Las Vegas





● Symmetric matrix ■ T.G.I. Friday's ▲ New York City

Packet F1 Question 35


The main character of this movie becomes upset with a woman when she puts on Bach's sinfonia on a radio. A character in this movie recognizes a woman's identity when he notices she is wearing Carlotta Valdes's necklace. This film pioneered a technique in which a camera zooms in on ● a subject while being pulled away from the subject, called the Dolly Zoom. In this ◆ film, a detective follows a woman into a bell tower at a ■ California mission, but his fear of heights prevents him from ▲ following her to the top. For 10 points, name this movie directed by Alfred Hitchcock.

Answer: Vertigo

Packet F1 Question 36

The narrator of this novel chastises two of his friends as “careless people” who “smashed up things and creatures and then... let other people clean up the mess they had made.” A woman in the final chapter of this novel recalls a time when the narrator told her that “a bad driver was only safe until she met another bad driver.” In its last chapter, this novel’s narrator learns that one of his friends told a man holding a revolver the identity of a man driving a yellow car before he reflects upon the meaning of a “green light” on a dock   in East Egg. For 10 points, name this novel  narrated by Nick Carraway. 

Answer: The Great Gatsby

 My Life in the Bush of Ghosts (novel)  The Great Gatsby

Packet F1 Question 37

Rivkah Harris argued that this man ushered in a period of “secularization”, and Breckwoldt studied falling grain prices which earned him the nickname “bani matim,” or builder of the land. This man subjugated the Assyrian ruler Ishme-Dagan I and conquered the rival states of Larsa, ● Eshnunna, and Elam. ■ ▲ In 1901, Gustave Jequier unearthed a stele bearing a decree promulgated by this ruler in Susa. This ruler declared that a man who breaks the bone of a freeman should pay him a gold mina, which is less severe than his statement “an eye for an eye.” For 10 points, give this Babylonian ruler who developed ◆ a namesake law code.

Answer: Hammurabi





Packet F1 Question 38

An art museum in this ■ city consists of two buildings with limestone paneling connected by an above-ground glass box. That museum, completed in 2012 by Tod Williams and Billie Tsien, houses the collection of the Barnes Foundation. In a painting set in this city, the Girard Avenue Bridge appears in the distance behind a man in a long, racing rowboat. Max Schmitt in a Single Scull depicts ◆ a waterway in this city, which today houses the paintings The Agnew Clinic and The Gross Clinic. ● For 10 points, name this primary workplace of Thomas Eakins. ▲





Answer: Philadelphia

■ Solomon R. Guggenheim Museum ● Thomas Eakins ▲ New York City

Packet F1 Question 39

In 2017, the USS John McCain collided with a merchant ship near this body of water. This body of water is at its narrowest point at Phillip's Channel. The exclave of Cape Rachado is in this body of water, and is part of a state that is located to the northwest of Johor. This waterway connects the Andaman  Sea to the South China Sea. Plans to construct the Kra Canal, which would relieve heavily congested shipping traffic through this body of water, are yet to be implemented by Thailand. For 10 points, identify this straight on which Singapore can be found.   

Answer: Strait of Malacca

 English Channel  North Sea  English Channel  Indian Ocean

Packet F1 Question 40

People engage in this process because of profit, but ignore the relation of misery it causes, according to a 1957 book which holds that people who engage in this process experience self-hatred via a “Nero Complex.” A new society is founded in the “settler” variety of this process, which names the magnum opus of Albert Memmi. The period of time after this process occurs names a discipline ■ of study partly founded by Franz Fanon and Edward Said. For 10 points, name this process by which an imperial power ◆ extends military ● and economic dominance over other polities. ▲

Answer: Colonization

● Convection ▲ Coagulation

Packet F1 Question 41

Thomas Cousineau's *An Unwritten Novel* is about a book from this country in which an accountant for a textile company compiles anecdotes into an autobiography devoid of facts. An author from this country wrote a novel in which a woman who eats raw rabbits is found living in the home of the girl with dark glasses. The *Book of Disquiet* is from ● this country, as is a novel in which the Doctor's Wife is the only character not affected by a sudden debilitating illness. For 10 points, name this birthplace of Fernando Pessoa and ◆ ■ the author of *Blindness*, José Saramago. ▲

Answer: Portugal

▲ Japan

Packet F2 Question 1

Applying this law to anisotropic media normally ●■ requires finding the roots to a sixth-order polynomial equation. Some metamaterials achieve a “reversal” of this law. Two common derivations of this law are from the boundary conditions of Maxwell’s equations and from Fermat’s principle of least time. In fiber optics, this law predicts that total internal reflection will occur at values ◆▲ that exceed the critical angle. For 10 points, name this law which holds that the ratio of two sines of the angles of incidence is equal to the inverse ratio of two indices of refraction.

Answer: Snell’s law





Packet F2 Question 2

Frederick Forsythe's first book was about this war, and he inspired a literary character ● who studies art during this conflict, Richard Churchill. A poem produced during this war contrasts the actions of "the eagles," "the robbers," and "the politicians" and foretells its author's death with the lines "The old star departs" and "The new star appears;" that poem about this war, "Elegy for Alto," appeared in the collection Heavensgate. Half of a Yellow Sun is set during, for 10 points, what war that divided the home country of Christopher Okigbo and Chimamanda Adichie? ■ ◆ ▲

Answer: Nigerian Civil War

● Vietnam War ■ Nigerian Civil War ◆ Thunder ▲ World War I

Packet F2 Question 3

In 2018, researchers announced   a new genus of these organisms, batrachians, which was discovered in a cave in Thailand. That's a relief given that the chytrid fungus is threatening its members such as the 'emerald glass' species. Luigi Galvani noted that the limbs of these organisms moved when they came into contact with  a charged scalpel. Two commonly used model organisms are the laevis and tropicalis species of the genus xenopus. The "poison dart" is a variety of, for 10 points, which amphibians whose young are called tadpoles? 

Answer: Frog

 Space telescope  Space telescope  Fungus  Xenopus

Packet F2 Question 4






A trial class of compounds for use in this process are selective ● inhibitors of KAT6A and KAT6B. A class of compounds used in this process is harvested from Streptomyces bacterium and are called anthracyclines. This process was developed after analysis of the adverse effects of nitrogen mustard on cell division. About half of people undergoing this process receive a form of platinum-based antineoplastic drugs, the most common of which is cisplatin.

Nausea and ○ ■ hair loss are frequent side effects of, for 10 points, what process of using toxic drugs to treat cancer? ◆ ▲


Answer: Chemotherapy

● Voting ◆ Chemotherapy ▲ Protein folding







Packet F2 Question 5

This element is the most  widespread catalyst of the azide-alkyne cycloaddition. Salts  of this element  catalyze the reaction of diazonium salts  into aryl halides in the Sandmeyer reaction. 
A brick-red oxide of this element is created as a precipitate to indicate the presence of reducing sugars in Benedict's test. This element, which produces a blue-green color in a flame test, forms the green surface layer verdigris when exposed to air for long periods of time. For 10 points, name this element that, with tin, forms the alloy bronze.

Answer: Copper

 Cadmium

Packet F2 Question 6

This man supervised an   experiment in which dyed ether-pentane-alcohol was frozen in liquid nitrogen, leading him to theorize that phosphorescence could be caused by electrons in a triplet state. ECW theory describes a set of compounds named for  this man, which are also at the core of the HSAB, or hard-soft, formulation.  This man's theory of the "cubical atom" was quickly discredited. He developed a theory of acids and bases that involves the transfer of an electron pair. For 10 points, what American scientist names "dot structures" that  depict atoms and lone  pairs of electrons?

Answer: Gilbert N. Lewis

 Guglielmo Marconi  Guglielmo Marconi

Packet F2 Question 7

The guardian of a pass at a frontier-mound compares this man to a “wooden bell” that alerts the people of danger. This man says that the strength of the north is in weapon-making, the strength of the south is in gentleness, and the strength of the Noble Man is to stand in the center, in a book attributed to his grandson, Doctrine of the Mean. A tradition named for this man champions five “constants” and four “virtues”, and includes the Four Books and the Five Classics. For 10 points, name this man whose disciple Mencius compiled a collection of his sayings, ▲ the Analects. ◆ ○



Answer: Confucius





▲ Gustav Fechner ◆ Confucius ○ Confucius ■ Analects

Packet F2 Question 8


A Theory of Justice defines the “original position” as this concept “within the framework of an empirical theory.” This concept is defined by an “autonomy formula” and a “humanity formula” that holds that ● we should never use other people solely as a means rather than as an ends. This concept, which is more wide-reaching than similar “hypothetical” statements, is described by the phrase, “act only in accordance with that maxim through which you can at the same time will that it become a universal law.” ■ For 10 points, ▲ name this concept from Immanuel Kant’s moral ◆ philosophy.

Answer: Categorical imperative

Packet F2 Question 9

Many objects used in this activity are made according to the design of Howard Staunton. The “hypermodern” strategy in this activity emerged in the early 20th Century. A group of walrus ivory artifacts used in this activity were discovered in Lewis in the Outer Hebrides. The Thai makruk is a variant of this activity that likewise shares its roots in the Indian chaturanga. Elephants could once move two squares diagonally in early versions of this game. The rule  of en passant for  pawn capture was added to, for 10 points, what board game featuring  knights and bishops? 

Answer: Chess

 Wrestling

Packet F2 Question 10

J. ● Gordon Coogler, who was nicknamed the “last ■ bard” of this region, wrote a poem that laments “her books have grown fewer.” This region was called the most backwards part of its country in the essay “The Sahara of the Bozart.” In a novel’s final ◆ ▲ scene, Shreve asks ■ his college roommate “Why do you hate” this region. It names a “renaissance” partly started by John Crowe Ransom and a style of gothic fiction that includes works by Carson McCullers and William Faulkner. For 10 points, name this large American region that ○ contains Mississippi and Alabama.

Answer: Southern United States

● Symmetric matrix ■ Ming the Merciless

Packet F2 Question 11

The lead-up to this was included a dispute over lead mining rights supposedly granted by the Treaty of St. Louis. In the aftermath of this war, Winfield Scott concluded ● the purchase of the Forty-Mile Strip. In the decisive action of this war, a brigade under Henry Atkinson massacred the members of the ■ “British Band” at the ○ Battle of Bad Axe. Abraham Lincoln’s ▲ only military service was in this war, which was named for a fellow tribesman of Keokuk who refused ◆ to vacate lands in the Illinois Territory. For 10 points, name this 1830s war between American forces and Sauk natives.

Answer: Black Hawk War

● Mexican–American War

Packet F2 Question 12

An artwork produced in ■ this country uses blue, white, black, and grey to depict eight people engaging in the title Baccarat Game. The second cover of a magazine produced in this country shows a large red square and a large black number two, while its first cover, by Vilmos Huszar, shows black geometric shapes on a light green background. A painter from this country decided only to work in yellow, red, ◆ and blue- bounded by black, white, and gray. For 10 points, name this country where neoplasticism was championed by Piet Mondrian and Theo ● van Doesburg. ▲

Answer: Netherlands

■ The Dinner Party ◆ Spain ● De Stijl ▲ Russia





Packet F2 Question 13

HV 905 is an example of the “bump” variety of these objects. Light curves for these objects can have characteristic “sawtooth” or “shark-fin” shapes. Some of the Type II variety of these objects are named for W Virginis and ● typically have periods between 10 and 20 days with spectral class between F6 and K2. The opacity of these objects unusually increases with their temperature in the kappa mechanism. ■ A relationship between the period and luminosity of these standard candles was first identified by Henrietta Swan Leavitt. ◆ For 10 points, name these variable stars named after a King of Jaffa. ▲

Answer: Cepheid variable

▲ Mirror

Packet F2 Question 14

The co-host of the Pittsburgh call-in show “Left Out” was the first author on the paper that showed that the distance between two of these with n elements is at most $2n - 6$. That distance is defined in terms of operations that preserve order but change structure called rotations, which is the first step of the Day-Stout-Warren algorithm. The CART algorithm forms the “decision” type of these structures, and the red-black type of these structures   is among those that keep their height limited in response to additions or deletions; those are the self-balancing binary search variety   of these structures. For 10 points, name these data structures that contain “root” and “leaf” nodes.

Answer: Tree






Packet F2 Question 15

In October 2018, a provincial capital announced plans to launch an artificial moon to replace streetlights. NASA employees are banned from working with businessmen from this country, echoing tensions that began when this country shot down one of its weather satellites in low orbit in 2007. This country's Landspace company plans to offer private space launches. In 2003, this country became the third nation to achieve manned spaceflight with the voyage of the Shenzhou 5. For 10 points, name this country that maintains control centers at Xi'an and Beijing. ♦ ○ □ ▲


Answer: China

♦ Central African Republic ○ Canada □ Malaysia ▲ France

Packet F2 Question 16

In Matthew 12, when the  Pharisees ask Jesus for a sign, Jesus tells “A wicked and adulterous generation”  that there will be none except for the sign of this man. God tells this “son of Amittai,” or truth,   that the lord has concern for “a hundred and twenty thousand people who cannot tell their right hand from their left.” While on a journey to Joffa and then to Tarshish, a group  of sailors throw this man overboard during a terrible storm. For 10 points, name this Old Testament prophet who talks to the people of Nineveh after spending three nights inside the belly of a giant fish.

Answer: Jonah

 Kingship and kingdom of God

Packet F2 Question 17

Frey and Aly cite Laroui's critique of this language as an excuse for a long-delayed translation of Kant. A 2002 Peter Adamson book is titled for a fragment in this language written ▲ by one of many people known by the name of pseudo-Aristotle. ◆ A thinker who wrote ○ in this language adapted Philoponus's argument that the world is not eternal in his text On First Philosophy. A philosopher writing in this language told of ascetic life in The Revival of the Religious Sciences and described twenty errors made by a predecessor in his book The Incoherence of the Philosophers. ■ For 10 points, name this language used by al-Kindi, al-Ghazali, and other Islamic philosophers.

Answer: Arabic

Packet F2 Question 18

In 2017, the holder of this position was criticized ■ for insulting Bashar al-Assad ● by claiming that even Adolf Hitler didn't use chemical weapons. A comic received backlash for joking "I love you as Aunt Lydia in The Handmaid's Tale" about the holder of this position. In June 2018, Stephanie Wilkinson kicked the current holder of this position out of her restaurant, initiating the Red Hen controversy. Sean Spicer briefly held this position in 2017. For 10 points, name this position currently held by Sarah Huckabee Sanders, who is the spokesperson for the president. ◆ ▲

Answer: White House Press Secretary

■ First Lady of the United States ● Syria ◆ Vice President of the United States ▲ First Lady of the United States

Packet F2 Question 19

The majority of people who participate in the Umuganda ritual of compulsory community service are from this ethnic group. These people gained power in a Social Revolution sometimes called the Wind of Destruction. These people are the majority of the population in the habitat of- and once subjugated- the ■ Twa pygmy people. The Interahamwe militia, comprised of these people, turned violent after the assassination of Juvenal Habyarimana. A 1994 ■ genocide was perpetrated by, for 10 points, what ethnic group of Rwanda and Burundi, ● the historic rivals of the Tutsi? ♦ ▲

Answer: Hutu

■ Koreans ♦ Tutsi ▲ Child

Packet F2 Question 20

In early 2018, this college's ■ team became embroiled in a scandal when its star player's name appeared in a black market book for a thirty six thousand dollar payment marked "bad loan." Before playing eight seasons as a point guard for the Washington Wizards, John ▲ Wall played a year for this college. In 2018-2019, this team rebounded with five wins after losing their season opener against Duke. Anthony Davis and Michael Kidd-Gilchrist headlined this team's 2012 national championship winning team. John Calipari coaches, for 10 points, what team nicknamed the wildcats? ♦ ○

Answer: University of Kentucky

■ Space telescope ▲ Gilbert Arenas ♦ Oregon Ducks ○ Montreal Expos





Packet F2 Question 21

Pilley and Reid used play-rewards to teach over a thousand words to one of these animals ● named Chaser. ○ ▲ In an experiment partly conducted by Steven Maier, three groups of these animals were subject to electric shocks in shuttle boxes; those who had previously received “inescapable” shocks demonstrated ■ learned helplessness, according to Martin Seligman. A social scientist developed the theory of classical conditioning while working with these animals, who would salivate at the sound ◆ of a bell for feeding time. For 10 points, name these animals studied by Ivan Pavlov.

Answer: Dog

● David Hume ■ Learned helplessness

Packet F2 Question 22

Possession by these beings can be treated by vigorously blowing air into the victim's mouth while cursing. These beings did not realize the death of their master until a worm gnawed away his staff, causing his corpse to fall to the ground. These  beings, whom Solomon recruited to build  the First Temple, title Sura seventy two of the Quran. The leader of these beings, Iblis, refused  to bow down to Adam because Adam was created from mud but he was created from fire. For 10 points, name these beings from Islamic tradition that can grant wishes and can become trapped in lamps. 

Answer: Jinn

 Amesha Spenta






Packet F2 Question 23

This character devises a plan to ransom two of his captured friends in exchange for ■ four rooks from an exquisite ivory chess set. A novel titled ◆ for this man includes ● two sisters named Judith and Hetty, who are the adopted daughters of “Floating Tom” Hutter. In another novel, this man and the singing teacher David Gamut use a bear disguise as part of their plan to rescue Alice Munro from the Huron Magua. ■ “Hawkeye,” “Deerslayer,” and “Pathfinder” are among the nicknames of, for 10 points, what central character of James ▲ Fenimore Cooper’s Leatherstocking Tales?

Answer: Natty Bumppo

■ The Last of the Mohicans

Packet F2 Question 24

In this country, an officer  tells his mistress, the countess Renata, about his wartime experiences in the Hurtgen Forest. The frame story of a  novel set in this country is a duck-hunting trip undertaken by the dying colonel Richard Cantwell. A soldier is kicked out of a hospital in this country by Miss Van Campen when he contracts jaundice due to his heavy drinking. This setting of Across the River and into the Trees is where Frederic Henry falls in love with the nurse Catherine  Barkley. For 10 points,  what country is the setting of most of Ernest Hemingway's novel A Farewell to Arms? 

Answer: Italy






 A Farewell to Arms  A Farewell to Arms  India

Packet F2 Question 25

The author's preface to this play ironically begins by claiming that it needs a sequel instead of a preface. In this play's final act, a man resents having to lecture for the Wannafeller Moral Reform World ● League, while his daughter refuses to buy a man a new pair of gloves and a tie. Contemporary audiences disliked the lack of a romantic ending to this play, in which the heroine vows to marry Freddy Eynsford-Hill instead ▲ of a British nobleman or her phonetics teacher Henry Higgins. The flower-seller Eliza Doolittle ◆ ■ appears in, for 10 points, what George Bernard Shaw play?

Answer: Pygmalion (play)

Packet F2 Question 26

The fragment “A Ship of Death” was adapted from this language during a years-long translation project in which its author identified a verb meaning “to suffer” that he recognized from his childhood. A cowherd composed a poem about the creation of the world in this language after he was granted the gift  of song in a dream. “Caedmon’s Hymn” is  in this language, as is a poem preserved  in the Nowell Codex about a hero who  dies in combat with a dragon after he helps Hrothgar by slaying the monster Grendel. For 10 points,  name this language used to write “Beowulf.”

Answer: Old English

 Romanian language

Packet F2 Question 27

In this novel, a man relates the story of the “Trial of the Jawbone,” in which he debated an English scientist on the authenticity of a Quaternary fossil. A character in this novel almost starves his nephew to death when he forces him to go without food until they can decode a message written in a runic cipher by the alchemist Arne Saknussemm. ♦ The main characters ■ of this book see a coastal plain full of massive mushrooms and a battle between ● two dinosaurs after entering the crater of an Icelandic volcano. For 10 points, ▲ name this work of “subterranean fiction” by Jules Verne.

Answer: Journey to the Center of the Earth





Packet F2 Question 28

This writer asked for ■ the “sacred threads” of the “works of my beloved teacher” in his poem beginning “If Love or Death do not bring some flaw / to this new cloth that I now weave.” He wrote a posthumously published dialogue with Saint Augustine titled Secretum ◆ ● ■ and, in a letter, told of taking a copy of the Confessions on an ascent of Mont ▲ Ventoux. He disagreed with Augustine’s outline of the Six Ages of the World, instead coining the term “Dark Ages” to refer to the pre-Renaissance era. For 10 points, name this Italian author who balanced his religious views with his obsession for a woman named Laura.



Answer: Petrarch

■ Antonio Machado

Packet F2 Question 29

Aristomenes was honored   as a hero for his role in leading one of these events. According to Thucydides, Pausanias was killed for consorting with Persians and for planning one of these events. Cimon was ostracized after the Spartans ordered his hoplites back to Athens during one of these events, in which the perpetrators established a stronghold on Mount Ithome after an earthquake. Two of these events essentially constitute the Second and Third Messenian Wars. For 10 points, name these events in which Helots sought their freedom from Spartan masters.  

Answer: Slave rebellion






 The Golden Ass  The Golden Ass  Olympic Games 
Witch-hunt

Packet F2 Question 30


Thomas the Rhymer prophesies that this man will lead a glorious life in an epic poem named for him that shares many episodes with a similar work by John Barbour. This man killed the sheriff William Heselrig in a skirmish at Lanark. This subject ● of a poem by Blind Harry resigned his ▲ command after his “schiltron” ■ formations of spearmen were broken by enemy projectile fire at the Battle of Falkirk. This man joined with Andrew Moray to launch a rebellion that won the Battle of Stirling Bridge. For 10 ◆ points, name this Scotsman who was executed in 1305.

Answer: William Wallace

Packet F2 Question 31

This man reached an agreement with the British diplomat George Russell Clerk that allowed his National Army to occupy most of his country's territory. While this man was negotiating with a rival at Klessheim, that rival ordered the occupation of this man's country in Operation Margarethe. Otto Skorzeny kidnapped this man's  son using a carpet in 1944, after which  the Germans took direct control of his country through the Arrow Cross Party.  This former admiral came to power following the Treaty of Trianon. For 10 points,  name this regent of Hungary between the  two world wars.

Answer: Miklós Horthy

 Hungary






Packet F2 Question 32

Elite warriors of this ■ empire wore a distinctive white and black checkered tunic with a red v-neck. Before embarking on a military campaign, priests in this empire sacrificed children and black pack animals. This was the largest empire whose troops regularly used bolas in combat. Jared Diamond argued ◆ that this empire's demise was partly due to their lack of iron working, allowing a force of two hundred adversaries to slay seven thousand of this empire's warriors at Cajamarca. Atahualpa ● was the last □ ▲ emperor of, for 10 points, what empire that was conquered by Francisco Pizarro?

Answer: Inca Empire

■ Rashidun Caliphate

Packet F2 Question 33

A book by Robert Rosenblum partly titled for “Modern Painting” argues that Mark Rothko was directly inspired by this artist. A scene by this artist was re-imagined with downed planes in Paul Nash’s *Totes Meer*. A family of five on a shoreline is represented as five ships at differing distances from the viewer in this man’s painting *The Stages of Life*. A wreck in  a polar landscape is shown in his artwork *The Sea of Ice*.   Solitary figures with their backs turned towards the viewer were often depicted by, for 10 points, what German Romantic  painter of *Wanderer*  above the *Sea of Fog*?

Answer: Caspar David Friedrich

 Arctic ice pack

Packet F2 Question 34

J.S. ● Bach rearranged two parts of a Missa sine nomine by this ■ composer using two cornets and four trombones. This man's contentious relationship with Carlo Borromeo is depicted in a namesake opera by Hans Pfitzner. This composer ○ is represented □ by Aloysius in the second part of Johann Fux's treatise *Gradus ad Parnassum*. According to a popular legend, a composition by this man caused the Council of Trent ▲ to vote not to ban polyphonic music. For 10 points, name this 16th-Century Italian composer of the Pope Marcellus Mass.

Answer: Giovanni Pierluigi da Palestrina

● Symmetric matrix ■ Mass (music)

Packet F2 Question 35

This composer incded accompaniment from a ● glass harmonica in his aria beginning “The sweet sound of his voice struck me!” In an opera by this man, the Marquise of Berkenfield whisks ○ away a relative to make her a lady just as a tenor sings an aria containing nine high Cs, “Ah! mes amis,” to express his ■ joy at joining the military. In another opera by this composer, Nemorino reflects ◆ □ on a solitary tear that he saw on the face of his beloved Adina in the aria “Una ▲ Furtiva Lagrima.” For 10 points, name this composer of The Daughter of the Regiment and The Elixir of Love.

Answer: Gaetano Donizetti

● Arnold Schoenberg ■ La fille du régiment





Packet F2 Question 36

Early photographs of this region, such as Woodward's Gardens, were taken by Carleton Watkins and published under the pseudonym Helios. A Robert Frank photograph taken in this state shows ▲ a tarp-covered car framed by two large trees. A photograph of a man reading a newspaper in front of a public works building and a photograph of young girls performing calisthenics were taken in this state and published in Born Free and Equal. A photographer ● in this state depicted the White Angel Breadline during the Depression; that ■ woman, Dorothea Lange, also shot Migrant Mother here. For 10 points, name this state where both Ansel Adams and Eadweard Muybridge captured images of Yosemite National ◆ Park.




Answer: California

■ Dorothea Lange





Packet F2 Question 37

In this novel, a boy is shocked when his teacher asks him to use crayon rubbings to create the impression of a gravestone from a historical cemetery during a field trip. The protagonist of this book dates an English major named Ruth until she returns from a study abroad in Britain, later taking up with the art historian Maxine Ratliff. A man in this novel survived a train accident by signaling for help  with a page from a collection of Russian short stories, leading him to call his son Gogol. An Indian-American  immigrant family is the subject of, for 10 points, what Jhumpa Lahiri novel?  

Answer: The Namesake

 Jhumpa Lahiri  Interpreter of Maladies  The Power and the Glory

Packet F2 Question 38

Robert Kennedy memorialized his brother by quoting Romeo and Juliet during a DNC held in this city, which nominated Lyndon Johnson in 1964. A politician in this city was known for wearing a suit with a red carnation in his buttonhole. A 1929 summit in this city marked the founding of the National Crime Syndicate. Enoch “Nucky” Johnson was a crime boss in this city, where the modern incarnation of the Miss America Pageant began in 1921. Nelson Johnson’s book Boardwalk Empire is about, for 10 points, what New Jersey resort   town?  

Answer: Atlantic City, New Jersey

 Washington, D.C.  New York City





Packet F2 Question 39

As USAG for the Southern District, he investigated ▲ Bill Clinton's parton of Marc Rich in light of Rich's donations to the Clinton Presidential Library. He was acting attorney general in March 2004 when John Ashcroft was hospitalized and resisted expanding domestic wiretapping. His college thesis compared Reinhold Niebuhr and Jerry Falwell and led to the discovery of this Twitter account. A letter written about him on May 9, 2018 details two press conferences he gave in 2017: July 5 and October 28, where he, in the words of Rod Rosenstein, usurped the Attorney General's authority. For ten points, name this former director of the FBI who was fired by Donald Trump in 2017. ♦ ○ □


Answer: James Comey

▲ Thomas Pinckney ♦ Janet Reno ○ Shepherd □ Kellyanne Conway

Packet F2 Question 40

A group called the Iron and Stone Ramification, or the VVS, advocated against the European rule of this region, which began when a protectorate was established with the Sakalava people. Peasants on this island smeared their clothes with colorful dirt during the “Red Shawl” Rebellion. After she was deposed in 1897, the last independent queen of this island was exiled to Algiers by the French. Ranaivalona III led the Merina   Kingdom on this island,  where the French fought two wars named for the Malagasy people. For 10 points, name this large island east of Mozambique. 

Answer: Madagascar

 Madagascar

Packet F2 Question 41

This dynasty received the French ambassador Victor Collin de Plancy, the subject of the book “The Court Dancer.” An assassination plot in 1456 led to the execution of the six martyred minsters, who wrote death poems affirming their loyalty to this dynasty. A naval commander from this dynasty improved the design of its signature turtle ships. Yi Sun-Sin fought ▲ for this dynasty, whose empress Min was ● killed by Japanese agents in 1895 as part ■ of the Sino-Japanese War. Ruling from 1392 until Japanese ◆ annexation was, for 10 points, what last royal dynasty of Korea?

Answer: Joseon

Packet F3 Question 1

In 2018, the FDA approved ▲ Merck's drugs Delstrigo ■ and Pifeltro to treat this disease, noting that they caused a surprising positive side effect of lowering cholesterol. It is often treated using a cocktail of protease and integrase inhibitors.

Burroughs-Wellcome marketed the first drug used to treat this disease, which is alternately called ZDV or AZT. Maraviroc, a drug used to treat ● this disease, targets the CCR5 receptor on helper T-cells. □ Reverse transcriptase inhibitors and antiretrovirals are commonly used to treat, for 10 points, what sexually transmitted disease? ◆

Answer: HIV

▲ Space telescope ■ Proton-pump inhibitor ◆ Homeopathy






Packet F3 Question 2

The final step of one reaction of this type converts raney nickel ● into two nickel ◆ disulfides and is named for a Merck chemist, Mozingo. Another ▲ of these reactions creates a cyclohexadiene from an aromatic ring, and is commonly performed in liquid ammonia. Usually, a hydrazone is formed and nitrogen gas ■ is emitted in two intermediate steps of one of these reactions named for Wolff and Kishner. Hydrogenations are a type of, for 10 points, what reactions in which a compound gains electrons, and which are commonly contrasted with oxidations?



Answer: Reductions

● Nickel ■ Hydrogenation

Packet F3 Question 3

A discovery involving its parity was awarded  the first Wolf Prize in Physics, and was identified in an experiment in which Wú Jiànxíng cooled a cobalt isotope using adiabatic demagnetization. This interaction can be classified  using Wolfenstein parameters as part of an analysis using CKM matrices. Cronin  and Fitch showed that it violates CP symmetry by analyzing neutral kaons that  decayed into antiparticles. The electromagnetic force was  unified with, for 10 points, what fundamental force that causes beta decay?

Answer: Weak interaction

 Wu experiment  CP violation

Packet F3 Question 4

This leader provided funding for and once ■ named a massive mosque in Kampala, Uganda, whose construction ● had been discontinued in 1976. This man and his followers instigated the One September Revolution by enacting Operation Jerusalem. The king Idris was overthrown □ by this man, who styled himself a “brotherly leader” and outlined his political philosophy in The Green Book. This man ▲ was killed near Sirte ◆ during a 2011 revolution in which he was deposed as part of the Arab Spring. ○ For 10 points, name this longtime dictator of Libya.

Answer: Muammar Gaddafi

■ National Geographic Society ● Idi Amin

Packet F3 Question 5

This philosopher originated the line of reasoning that it is rational to ask what the place of an object is, but it is not rational to ask what the place of a place is. Book VI of Aristotle's Physics is largely about this thinker, and discusses his analysis of three groups of people in three rows running past each other in a stadium. This thinker shares his name with a later philosopher from Citium who founded the Stoic philosophical school. An arrow that is frozen in time was discussed by, for 10 points, what Greek philosopher who outlined ▲ many paradoxes? ◆ □ ○

Answer: Zeno of Elea

▲ Aristotle ◆ Zeno of Elea □ Zeno of Elea ○ John Dewey

Packet F3 Question 6

Selmer Bringsjord articulated strategies to judge if this were passed, including asking ▲ participants to ● write a short story. Levesque, Davis, and Morgenstern propose an alternative: resolving referential ambiguities called the Winograd Schema Challenge. Mark Halpern's "The Trouble with" this criticized the Loebner prize. Searle's Chinese ▲ Room argues that it, along with all strong AI, did not imply consciousness. Name this thought experiment derived from "the imitation game" that ◆ ■ asks a judge to determine whether a conversational partner ○ is human or computer named for a British computer scientist and that, for ten points, is said to determine when a computer is intelligent.

Answer: Turing test

▲ Maharashtra ● Game theory





Packet F3 Question 7

He was the head of a military band at Richmond ■ for the Earl of Darlington and later the organist at the Octagon Chapel in Bath. In unpublished notes taken in May 1776, he claimed to see forests on the moon. His name is attached to an off-axis telescope that tilts ◆ the primary mirror to prevent observer obstruction. His first paper was on the variable star Mira Ceti, and on March 13, 1781 he recorded ■ a comet that was moving at 2.25 seconds per hour. After failing to find a tail, ○ the object was called Georgium Sidus. Assisted by his sister Caroline, for ten points ▲ name this German-British discoverer of Uranus.

Answer: William Herschel

■ Alan Grayson







Packet F3 Question 8

A discipline founded by this man originated so-called “time-and-motion” studies. This man argued for the creation of separate “planning offices” that popularized the modern conceptualization of bulletin boards. A colleague and ideological associate of this man, Henry Gantt, developed a chart for plotting  the time frames for the completion of sequential tasks. He argued for the adoption of universal shovel sizes and developed a tungsten-cutting technique while working at Bethlehem Steel. For 10 points,   name this founder of scientific management. 

Answer: Frederick Winslow Taylor

 Scientific management  Scientific management  Claude Lévi-Strauss





Packet F3 Question 9

A lower-bound temperature   named for this phenomenon is equal to Plank's constant times the spectral linewidth  over two times Boltzmann's constant, and can be exceeded using an optical molasses. Collisions lessen the effect of this phenomenon on spectral lines in the Dicke effect, thus narrowing the impact of this phenomenon's namesake "broadening." It names a commonly used form of laser cooling. Ives and Stilwell measured  the "transverse"  form of, for 10 points, what change in frequency of a wave  caused by the relative motion of an observer and a source?

Answer: Doppler effect





 Egg  Egg

Packet F3 Question 10

This artist probably depicted himself with blond hair and a yellow cloak on the far right of a painting that shows Mary and the infant Jesus inside some Roman ruins. Twelve angels represent the privileges of Mary in a painting by this artist, in which angels in white, red, and green robes are placed on a rooftop. This artist included many members of the Medici family in his Adoration of the Magi and  painted The Mystic Nativity. He showed   the Graces standing to the left of Venus in a painting set in an orange grove. For  10 points, name this Italian Renaissance artist of Primavera.

Answer: Sandro Botticelli

Packet F3 Question 11

An essay titled for this concept expands upon Wilhelm von Humboldt's assertion that a "variety of situations" is necessary for human development. An essay partly titled for this concept claims that Stoics and Buddhists seek self-mastery through   self-denial in its discussion of the "Retreat to the Inner Citadel." A 1958 Oxford lecture analyzed the "positive" and "negative" varieties of this concept. It titles an 1859 essay the formalized the "harm principle."   An Isaiah Berlin essay is titled "Two Concepts of," for 10 points, what subject of a John Stuart Mill essay?

Answer: Liberty

Packet F3 Question 12

This composer's writings refer to his closeted homosexuality using ■ the letter "z" and the phrase "xxx." In a symphony by this composer, the andante second movement contains a horn solo shortly after the key shifts from B minor to D major. This composer, who was patronized for thirteen years by Nadezhda von Meck, included a bassoon solo marked ● with six "p"s and a 5/4 "limping waltz" in his final symphony, ▲ which premiered just over a week before ◆ his death. For 10 points, what Russian composer's sixth symphony in B minor is nicknamed "Pathétique"?

Answer: Pyotr Ilyich Tchaikovsky

■ Fun Home

Packet F3 Question 13

The loss of pericytes can lead to weakness and damage to these structures, which can in turn lead to retinopathy and blindness. Inhibiting the new development of these structures—for instance, by targeting VEGF—is central to a class of cancer-fighting drugs called angiogenesis inhibitors. In these structures, buildup of ■ plaques can lead to atherosclerosis and, in the long term, stroke. These structures release nitric oxide to relax smooth □ muscles cells and induce vasodilation. For ten points, name ● these structures responsible for shuttling endocrine hormones and erythrocytes around the body. They include capillaries, arteries, and veins. ♦ ▲

Answer: Blood vessel

■ Macular degeneration ♦ Vein ▲ Leaf

Packet F3 Question 14

An island in this river contains a Holocaust memorial in which 200,000 lights can be viewed in an underground chamber, the Memorial to the Martyrs of the Deportation. Richard the Lionheart ordered the construction of the Gaillard fortification on the banks of this river. This river's ● mascaret tidal bore ◆ ■ was eliminated through continual dredging starting in the ○ 1860s. The Oise River is a tributary of this river, which is naturally navigable by seagoing vessels as far as Rouen after they pass by the port of Le Havre. For 10 points, what river is crossed by the Pont Neuf in Paris? ▲

Answer: Seine

● Nile ▲ Ohio River

Packet F3 Question 15

The MyZeil shopping center in this city designed Massimiliano Fuksas resembles a Klein bottle. In 1909, the world's first airline, DELAG, was founded in this city, and this city was the origin of the Hindenburg. The headquarters for IG Farben, the Poelzig Building, was the site of the Headquarters of the Allied European Forces and is now the main lecture hall of Goethe University. The ten tallest buildings in Germany are located in this city, including the tallest, Commerzbank Tower. For 10 points, name this Hessian city, the commercial center of Germany on the Main River. ♦ ○ □ ▲

Answer: Frankfurt

♦ Dubai ○ New York City □ Shanghai ▲ New York City

Packet F3 Question 16

A technique named for these organisms has been used to develop monoclonal antibody drugs such as adalimumab. The presence ■ of these organisms did not cause mutations in the Luria-Delbruck Experiment. George ● Smith shared the 2018 Nobel in chemistry for developing a “display” technique named for these organisms, which were tagged with radioactive sulfur and phosphorus ◆ to show that DNA □ carried genetic material in the Hershey-Chase Experiment. ▲ T2 and lambda are varieties of, for 10 points, what type of viruses that target bacteria?

Answer: Bacteriophage

■ Rheumatoid arthritis





Packet F3 Question 17

His aliases include: Pastor ■ Hansford of Free Will Baptist in Coushatta, Louisiana; Viktor with a K St. Claire, a South African who just inherited money from his uncle; Charlie Hustle, a mailboy in the HHM mailroom; and Gene Takavic, a Cinnabon manager in Omaha. His best known alias came from selling burner phones in Albuquerque, New Mexico and was more fitting for a lawyer than his birthname, James McGill. For ten points, name this titular CRIMINAL lawyer from an AMC series who originated on Breaking Bad. ♦ ○ ▲

Answer: Better Call Saul

■ Julius and Ethel Rosenberg ♦ Saul Goodman ○ French language ▲ Ansel Adams

Packet F3 Question 18

Zebulon Vance staunchly opposed a conscription order issued by this man. This man took up residence at the Brierfield Plantation after marrying Sarah Knox Taylor, the daughter of future  president Zachary. As Secretary of War, he oversaw the construction of the Washington Aqueduct and argued in support of the Gadsen purchase during the presidency of Franklin Pierce. He assumed his  highest office after defeating Robert Toombs at a constitutional  convention in Montgomery, Alabama in 1861. For 10 points,  name this first and only president of the Confederate States of America.

Answer: Jefferson Davis

Packet F3 Question 19

This novel includes an aside in which the voice of Socrates declares that knowledge and beauty both lead into an abyss. When confronted with a desperate thirst, this novel's main character buys some overripe strawberries from a street vendor; earlier, he feels the ● urge to travel after seeing a red-headed ■ stranger in a Munich cemetery. In this novel, a jester assures a writer that sirocco is the only plague to fear despite police disinfecting an Italian city for cholera. Gustav ▲ von Aschenbach becomes ◆ obsessed with the Polish boy Tadzio in, for 10 points, what Thomas Mann novel?

Answer: Death in Venice

Packet F3 Question 20

In a novel by this author, a detective wraps his arm to survive a dog attack, thus obtaining a bullet identical to one used to kill the policeman Schmied. This author wrote a play in which yellow shoes symbolize how the town of Gullen turns against Anton Schill, who was once spurned by the rich woman Claire Zachanassian. ◆

■ This author of *The Judge and his Hangman* wrote a play in which a scientist is hounded by spies who ● call themselves Einstein and Newton. For 10 points, name this Swiss author of *The ▲ Visit* and *The Physicists*.

Answer: Friedrich Dürrenmatt





Packet F3 Question 21

The main character of a story by this author opens *Crime and Punishment* to a random page, but finds it to be a copy of *The Brother Karamazov*, and equates himself ▲ with *Monsieur Bovary*. This author wrote a story in which the priest Naigu undergoes a boiling treatment to decrease the size of his nose. This ■ author of “*Cogwheels*” wrote about two ◆ ● people who steal to survive near the southern gate of Kyoto in a story that features inconsistent accounts from a woodcutter, a priest, a widow, and the ghost of a samurai. For 10 points, name this Japanese ▲ author “*Rashomon*.”

Answer: Ryūnosuke Akutagawa

▲ Fyodor Dostoevsky





Packet F3 Question 22

In the last chapters of book set in this country, the narrator's lover is killed in a Gipsy Moth plane that took off from the town of Voi. In another novel set in this country, the main character's brothers kill Jacobo, a landowner supported by Mr. Howlands during a rebellion. Weep Not, Child is set in this country, as is a novel in which Mugo betrays one of his countrymen to the  British army. Denys Finch Hatton is a central  character of a memoir set in this country by a Danish writer. For 10 points, name this setting of Karen Blixen's Out of Africa and Ngũgĩ wa Thiong'o's A  Grain of Wheat. 




Answer: Kenya

 India





Packet F3 Question 23

In G.K. Chesterton's "The  Invisible Man," Isidore Smythe's "Silent Service" provides these figures, one of which murders Moxon after losing a game of chess in a story by Ambrose Bierce. At the end of a play partly named for these figures, the  engineer Alquist realizes that two of them named Primus and Helena have fallen in love. Robbie, Speedy, and Cutie are examples of these figures from an author who created three laws governing their morality. A 1921 play that premiered in Prague coined the name of, for 10 points, what humanoids that feature in works by Karel Capek and Isaac  Asimov? 

Answer: Robot

 The Man Who Was Thursday  R.U.R.  R.U.R.

Packet F3 Question 24

Ritchie Watson commended this play's historical accuracy for getting the price for a dozen eggs right- ten cents- to defend against Elizabeth Hardwick's contention that it was a sentimental history. At the end of this play, a man wonders why a wheelchair is at the top of a staircase, and Alexandra announces that she is leaving her mother. Leo is pressured into stealing a set of valuable railroad bonds in this drama. In this play, which takes its title from the Song of Solomon, Regina Hubbard schemes   to obtain a majority share in a cotton mill. For 10 points,   name this play by Lillian Hellman.

Answer: The Little Foxes





Packet F3 Question 25

In *Our Town*, a character ▲ with this given name explains Grover's Corners' place in the universe. In *The Crucible*, a character ● with this first name contends that the girls' actions are part of their "silly seasons" and is the wife of Francis Nurse. A novel with this name, which conducts hidden messages to Rommel in *The English Patient*, is titled for a character who is killed in a boating accident at Manderley. For 10 points, give this name of a Daphne du Maurier ◆ ■ gothic novel which is also the first name of Miss Sharp, the protagonist of William Thackeray's *Vanity Fair*.

Answer: Rebecca

▲ Thornton Wilder ● Richard

Packet F3 Question 26

This author's poem once claimed that its first line referred to "All our scientific, democratic, fact-accumulating heterogeneous civilization." Initial drafts of this poem included a "winged beast" like that in its author's play *On Baile's Strand*. This poem lables "A shape with lion body and the head  of a man" as "a vast image out of Spiritus  Mundi." This poem begins by describing  "Turning and turning in the widening gyre." For 10 points,  name this W.B. Yeats poem that asks "what rough beast... Slouches towards Bethlehem to be born," one of numerous references to the apocalypse.

Answer: The Second Coming (poem)

Packet F3 Question 27

After this empire's final ■ ruler was assassinated on a parade ground, its lands were invaded by Demetrius I, the Invincible. ● Strabo relates how Deimachus served for many years as an ambassador to this empire. A governing manual produced under this empire has a name that loosely translates as "The Science of Politics." This empire's second ruler, Bindusara, appointed his son as viceroy of Ujjayini; that son conquered Kalinga before converting to Buddhism and promulgated ◆ □ many edicts on stone pillars. ▲ For 10 points name this Indian Empire led by Chandragupta and Ashoka.

Answer: Maurya Empire

■ Arabs

Packet F3 Question 28

A congressman from this state added a set ● of namesake amendments to the Hepburn Act to facilitate its passage through the senate. This state's first republican governor, Ralph P. Lowe, practiced law with the man who became Grant's Secretary of War, William Belknap. Richard Bland co-names an act that restored bimetallism with a senator from this state, William Allison. A politician from this state served as Secretary of Agriculture for most of the Great Depression. Henry Wallace hailed from, for 10 points, what midwestern state where the cities of Davenport and Des Moines were founded? ■ ◆ ▲

Answer: Iowa

● California ■ Iowa ◆ California ▲ South Carolina

Packet F3 Question 29

An army that took its name from this geographical feature had a British doctor, James Paroissien, as its Surgeon General, and recent scholarship by Peter Blanchard revealed its use of slaves. That army crossed this geographical feature according ▲ to Thomas Maitland's ● plans at Uspallata and Los Patos. Spanish forces under Rafael Maroto were defeated in the foothills of these mountains by an army led by José de San Martín and Bernardo O'Higgins. ■ For 10 points, name this mountain range of South America that played a role ▲ in the independence of Chile. ◆

Answer: Andes

▲ Angel Falls ● Mountain ■ Battle of Chacabuco ◆ Battle of Chacabuco

Packet F3 Question 30

A painting by this artist ■ presents a tree as a cupboard with two doors, behind which are a white sphere and a miniature lighted house. A series of three paintings by this man shows a daytime sky with cumulus clouds above a dark house illuminated by a lamppost. This artist of Blood Will Tell and The Empire of Lights depicted a clock set to 12:43 ● as a locomotive speeds out of a fireplace and a man in □ a bowler hat with an ▲ apple in front of his face. For 10 points, name this Belgian surrealist painter ◆ of the Son of Man and Time Transfixed.

Answer: René Magritte






■ Argon

Packet F3 Question 31



Suetonius describes two gigantic boats commissioned by this ruler that were recovered from Lake Nemi and then destroyed by American and German crossfire in 1944. He levied a tax on prostitutes equal to the amount they charged for an embrace. This emperor ordered the construction of a massive pontoon bridge ■ across the Bay of Baiae and then rode ● ▲ across it on his deified horse, Incitatus. The centurion Cassius Chaerea assassinated this man in ◆ 41 CE. For 10 points, name this Roman emperor who reigned between Tiberius and Claudius and who took the nickname "little boot."

Answer: Caligula

Packet F3 Question 32

This author praises “A  Cloud of Pinafores” because it remains alive even after you set it on your bookshelf in “The Modern Essay.” The narrator  of an essay by this  writer lifts a pencil to help a certain  insect but lays the pencil down again when that narrator realizes that the insect is dying. The most famous essay by this author includes an author surrogate who is prohibited from entering an Oxbridge library unless chaperoned by a fellow of the college. That essay later focuses on the prospects of Judith Shakespeare, overshadowed by her  male brother. For 10 points, name this author of “The Death of the Moth” and “A Room of One’s Own.”

Answer: Virginia Woolf

 On the Sublime  Oscar Wilde

Packet F3 Question 33

A significant milestone in this artistic medium was Pierina Legnani's 1893 completion of thirty-two feats described by a term that translates as "whipped." Those fouettés were later inserted into a work in this medium that was completed in 1877 to a poor reception in Moscow. The modern, abstract type of this medium is sometimes ● held to have originated with the piece *Jewels*. Darren Aronovsky directed a 2010 film that revolves around this medium starring Natalie Portman and Mila Kunis. George Balanchine co-founded the New York City company of, for 10 points, what performance art exemplified by "Swan Lake"? ■ ◆ ▲

Answer: Ballet

● Photography ■ Ballet ◆ Tapestry ▲ Photography

Packet F3 Question 34

This thinker described a gap between virtual social identity and actual social identity, in a theory of ▲ how some people become deeply discredited by society. This thinker identified orphanages, sanitariums, and prisons as examples of five types of institutions where members are expected to “resocialize,” termed total institutions. This man ● developed a theory of stigma and described “back region” conduct that is necessary for, but inconsistent with, “front region” performance. For 10 points, name this sociologist who ▲ pioneered the dramaturgical approach in ◆
■ The Presentation of Self in Everyday Life.

Answer: Erving Goffman

▲ Stigma (wrestler)

Packet F3 Question 35

A museum in this country contains the Colonna Venus, which is the best preserved ancient replica of a Praxiteles statue. A sculpture located in this country consists of a stained glass dove above a bronze throne. A bronze canopy in this country is supported by marble plinths that depict an allegory of childbirth. A sculpture housed in this country that was unearthed in 1506 depicts Laocöon and his sons being eaten by serpents during the Trojan War. Gian Bernini's Baldachino is in, ● for 10 points, what very small country that contains Saint Peter's tomb? ♦ □ ▲

Answer: Vatican City

● Laocoön and His Sons ♦ Spain □ Italy ▲ Peru

Packet F3 Question 36

This man wrote a three-part treatise on his failures titled Social Reconstruction, Psychological Reconstruction, and Material Reconstruction. Tōten Miyazaki gave this man the pseudonym Nakayama Shō in Japan. He signed a manifesto with Adolph Joffe stating that the Soviet model was not suitable for his country, and he formed the “First United Front” with the communists against the Beiyang government. Nationalism, democracy, and the livelihood constitute this man’s Three Principles of the People. For 10 points, name this mentor of Chiang Kai-shek and first leader of the Republic of China

Answer: Sun Yat-sen

Rutherford B. Hayes

Packet F3 Question 37

Franco Modigliani argued that this construct was only applicable for values below a level he termed NAIRU. Additional research surrounding the two central parameters ● of this construct was called for in the Phelps Volume. Milton Friedman attacked this construct for ▲ its lack of relevance in the long term, ■ in which it becomes a vertical line at ◆ ○ one of its chief parameter's "natural rate." Stagflation directly contradicts the relationship predicted by, for 10 points, what economic "curve" that shows an inverse relationship ▲ between inflation and unemployment?

Answer: Phillips curve

● Unemployment ▲ Geoid

Packet F3 Question 38

A controversial Donald ■ Trump tweet about this ● disease stated, in all caps, that “THE UNITED STATES HAS ENOUGH PROBLEMS!” STRIVE is an trial for a vaccine of this disease, whose most significant epidemic occurred between the years of 2013 and 2016. The presence of Mai-Mai militias has hindered international efforts to stop an outbreak of this disease, which began in Beni in 2018 and threatens the province of North Kivu in ■ the Democratic Republic of the Congo. For 10 points, name this African virus with incredibly high mortality rates. ◆ ▲

Answer: Ebola virus

■ The Shadow of a Gunman ● Kellyanne Conway ◆ Yellow fever
▲ Tuberculosis





Packet F3 Question 39

The German name for these events comes from the title of a Stefan Zweig novel that combines the German ● word for runner with an Indonesian term- Amokläufer. A set of fingerprints implicated the filipino woman Marilou Danley in one of these events in 2017. In Florida, one of these events was carried out at the Pulse gay nightclub in 2016, and another occurred at Marjory Stoneman Douglan High School in Parkland in 2018. For 10 points, name these events, such as when Stephen Paddock opened fire on a crowd at a country concert. ♦ □ ▲

Answer: Mass shooting

● LETTERS ♦ Fires □ Genocide ▲ Witch-hunt






Packet F3 Question 40

This country's First Armoured Division held Hill 262 during the Battle of the Falaise Pocket. A force of troops from this country, Anders' Army, marched through Iran to Palestine in mid-1942. Infantry from this country's II Corps led the frontal assault during the Battle of Monte Cassino, eventually raising their country's flag over the ruined abbey. After a false flag operation in the Gleiwitz Incident, Nazi Germany ordered the invasion of this country in the  September Campaign, triggering the onset of World War Two. For 10 points, name this country whose city of Danzig was seized by the Germans.   


Answer: Poland

 Italy  Belgium  France

Packet F3 Question 41

This man's first wife was Elisaveta, the daughter of Yaroslav the Wise of Kiev. This king once served  as a mercenary in the Byzantine Varangian guards, in one apocryphal story kidnapping Princess Maria. This one-time co-monarch alongside his nephew, Magnus the Good,   gained the throne of Denmark after fighting  Sweyn Estridsson until 1064. This man seized York following his defeat of Morcar, the Earl of Northumbria, at the Battle of Fulford, just five days before his final defeat. For 10 points, name this Norweigan king who was defeated by Harold Godwinson at  the Battle of Stamford Bridge.

Answer: Harald Hardrada

 William the Conqueror