

VCU Open '15 – Packet 7

Questions by Cody Voight, Will Nediger, Evan Adams, Kenji Golimlim, Matt Bollinger, and Akhil Garg

1. **The cross of the velocity and vorticity vector plus the temperature times this quantity equals zero according to Crocco's theorem. The mass density multiplied by the time derivative of the "specific" form of this quantity is greater than the negative divergence of heat flux over temperature, plus mass density times heat source per unit mass over temperature, according to the Clausius-Duhem inequality. Because Liouville's theorem requires flows in phase space to evolve incompressibly, one obtains a (*) counterintuitive result when considering this quantity as the logarithm of a volume in phase space. The heat transferred is equal to the area under the curve of a process when it is plotted on a diagram of temperature versus this quantity. A process with constant value for this quantity is adiabatic and reversible. For 10 points, name this quantity that is a measure of the disorder of a system.**

ANSWER: **entropy** [or: delta **S**]

2. **A painter with this surname is known for his canvases of formless scribbles with words like "yuka" and "burrito" written on them. Another painter with this surname included cherubs struggling to hold up a cloud at the bottom of a painting nicknamed "The Colossal," which unusually features a full moon at the bottom. A painter of this surname showed a woman resting her chin on her hand next to a woman covering her mouth with her veil in his painting (*) *Two Women at a Window*. That 17th-century artist of this surname is known for his paintings of the Immaculate Conception, as well as genre scenes like *The Young Beggar* and *Boys Eating Grapes and Melon*. For 10 points, identify this surname of the Spanish Baroque painter Bartolomé Esteban.**

ANSWER: **Murillo**

3. **A signatory of this treaty was convinced to negotiate after a hailstorm on "Black Monday" devastated his army. Louis I, the Duke of Anjou, one of the forty hostages ceded as a result of this treaty, escaped captivity three years after it was signed. This treaty was finalized at Calais five months after it was first negotiated. The franc was first minted after a signatory of this treaty had to pay three million gold crowns as ransom money. John II, a signatory of this treaty, was previously taken prisoner at the Battle of (*) Poitiers. The period of peace that followed this treaty ended when Charles V declared war on Edward the Black Prince in 1369. For 10 points, name this 1360 treaty that led to a nine-year break in the Hundred Years' War.**

ANSWER: Treaty of **Brétigny** [until "*Calais*" is read, accept: Treaty of **Calais**]

4. **A book named after this man has been translated by Robert Hunter, who is better known as the lyricist for The Grateful Dead. A poem about this man is addressed to "breath, you invisible poem!" In one poem, this man walks down a path and his "steps ate up the path in huge bites without chewing." That poem also describes a woman who "was in a new virginity and untouchable" and who "was already root." A poem about this man begins "A (*) tree ascended there. Oh pure transcendence!" The death of Wera Ouckama Knoop inspired a collection of 55 poems about this man. A set of 87 hymns in hexameter attributed to this figure were a key text in the religious movement named for him. For 10 points, name this Greek musician who is the subject of a sonnet sequence by Rainer Maria Rilke.**

ANSWER: **Orpheus**

5. In the kabuki play *Yoshitsune Senbonzakura*, Minamoto no Yoshitsune relinquishes a magic drum to one of these animals on a quest to honor its parents. Another of these beings invents the *paolao* torture method, involving a slowly-heating metal bar, as the consort to King Zhou of Shang in *The Investiture of the Gods*. The Korean *kumiho* and the Chinese *huli jing* are examples of these creatures, which store power in white-gold “star balls” that hover around their faces. A tunnel of ten thousand (*) *torii* gates snakes up a mountain to a shrine for a god of these animals, an androgynous *kami* of rice. In East Asian myth systems, demonic spirits of these animals possess human women. For 10 points, name this animal whose form is taken by the *kitsune* demons and the *kami* Inari.
ANSWER: foxes [or specific examples, such as kitsune]

6. Only when both indices are zero can the Wigner D-matrix be written in terms of these functions. For scattering from a central potential, a partial wave expansion in terms of these functions can be done for the wave function and scattering amplitude. Expanding the reciprocal of the root of quantity one, minus two $a x$, plus a squared, as a power series yields these functions multiplied by a power of a ; that reciprocal is a generating function that appears in some (*) multipole expansions. They are scaled by the square root of two l plus one over four pi in a definition of the spherical harmonics for m equals zero. The n th of them is equal to the reciprocal of two to the n , times n factorial, all times the n th derivative of quantity x squared minus one, to the n , according to a Rodrigues formula. For 10 points, name these orthogonal polynomials that appear in solutions to Laplace's equation in spherical coordinates.
ANSWER: Legendre polynomials [or: associated Legendre polynomials; in place of “polynomials”, accept: “functions”; prompt on: “Jacobi polynomials”, “spherical harmonics”]

7. This city's civil rights movement was largely led by a Catholic priest named Father James Groppi. Its native son Increase Lapham created the National Weather Bureau, which became the National Weather Service. Originally built as two settlements separated by a river, this city was the site of an 1845 skirmish set off when a bridge united Juneautown and Kilbourntown. This city was a popular destination of the European emigrants known as “Forty-Eighters,” whose presence partially led to its nickname of (*) “Deutsches Athen.” The Congressional district made up of this city elected Victor L. Berger to the House even though he was under indictment on Espionage Act charges. Berger was one of the leaders of this city's “Sewer Socialism” movement. For 10 points, name this most populous city in Wisconsin.
ANSWER: Milwaukee

8. In a shot from this film, the protagonist stands in front of a poster for *Swing Your Lady*, a real-life musical considered the worst movie featuring this film's star. Low-angle shots in this film emphasize the large gut of a character who says “I distrust a man who says ‘when’” while pouring the protagonist a spiked drink. The director's father Walter has an uncredited role in this film as Captain (*) Jacobi, who staggers into the protagonist's office and drops a bundle before falling dead onto a couch. At the end of this movie, Mary Astor's character is taken away by the police behind an elevator cage reminiscent of prison bars, after the protagonist describes the title object as “the stuff that dreams are made of.” For 10 points, name this John Huston noir starring Humphrey Bogart as Sam Spade.
ANSWER: *The* Maltese Falcon

9. **This sound opens a song that describes New York as a place where “you can do a half a million things all at a quarter to three.” This sound opens both Metallica’s album *Death Magnetic* and the 1983 album *Sports*. A loud brass chord precedes this sound at the beginning of Michael Jackson’s “Smooth Criminal.” This sound introduces the song “Speak To Me” and is played while an Irishman states “There is no (*) dark side of the moon, really. As a matter of fact, it’s all dark.” This sound is mimicked by the drums in “Teardrop” by Massive Attack, a cover of which is the theme song of *House*. The title of Charli XCX’s “Boom Clap” refers to this sound, which titles a song whose singer says that it’s “been so long I forgot how to turn it up, up, up, up, all night long.”** For 10 points, identify this sound that titles a 2015 Kelly Clarkson hit and may become faster under stress or excitement.

ANSWER: a heartbeat

10. **In a novel by this author, the leader of a coup in Lilliput-Blefuscu dresses up as Commander Akasz, a character created by the protagonist. That protagonist, who moves to New York after an incident in which he stands over his wife Eleanor with a knife before deciding not to kill her, is a professor-turned-dollmaker who becomes famous for his creation “Little Brain.” Another of his novels includes a sequence about a woman who attempts to walk across the (*) Arabian Sea with her followers. That sequence is presented as the dream of a voiceover artist, like a controversial sequence about a prophet known as “the Messenger.” In that novel, a hijacked plane blows up over the English Channel, but both Saladin Chamcha and Gibreel Farishta miraculously survive.** For 10 points, name this author of *Fury* and *The Satanic Verses*.

ANSWER: (Sir Ahmed) Salman Rushdie

11. **A book on this concept started a dispute between the author and Benedetto Croce, who, along with Stephen Pepper, accused the book of being overly Hegelian. According to Nelson Goodman, instead of asking *what* this concept is, we should ask *when* it is. Arthur Danto argued that this concept can only be understood in the context of a broader namesake (*) “world.”** A book on this concept characterized it in terms of the interaction between a “live creature” and its environment. Walter Benjamin wrote about how examples of this concept lose their “aura” when they are reproduced. John Dewey wrote about this concept “as experience.” For 10 points, name this concept which is the object of inquiry in aesthetics.

ANSWER: art

12. **This character donates most of his fortune to monks who train German police dogs. He regularly crosses the Chinese border into Paris, where he leaves taunting notes in the sewers. His companions include a giant tongueless Mongolian and a loveable dwarf named Omba. The son of missionaries, this character acquires his signature appearance as a baby when Chinese bandits squeeze his head in a vise. This owner of a timber-wolf named (*) Black Wing wears a red poppy mask to conceal his lethal ugliness, but removes it as he is killed by his archenemies, the Dufarges. The creator of this bandit abruptly kills him off after Mary Hudson breaks up with him at a kids’ baseball game.** For 10 points, name this subject of stories told by The Chief to the Comanche Club in a J.D. Salinger story.

ANSWER: the Laughing Man

13. **Information about this organization's employees was released through a Blind SQL exploit by a hacker nicknamed "E," who is part of a group called 3301. Before targeting ACORN, James O'Keefe teamed up with Lila Rose to secretly record their conversations with this organization. This organization sued Texas over the passage of Senate Bill 5, which was previously filibustered by (*) Wendy Davis. Michael Bloomberg donated \$250,000 to this organization after the Susan G. Komen Foundation defunded them in 2012. A member of this organization, Deborah Nucatola, was secretly filmed at a restaurant by members of the Center for Medical Progress. For 10 points, name this organization targeted by a massively edited video that describes the collection of fetal organs.**
ANSWER: Planned Parenthood

14. **The sodium pump of *K. aerogenes* uses energy from the decarboxylation of this molecule. This metabolite binds to a sulfhydryl group of succinate dehydrogenase in order to inhibit it, making it the most potent inhibitor of that enzyme. This intermediate, along with 2-ketoglutarate and glutamate, is necessary for the efficient transportation of NADH from the cytosol into the mitochondria via the malate-aspartate shuttle. This molecule is present in gluconeogenesis but (*) not glycolysis, since it helps bypass the pyruvate kinase step. Pyruvate carboxylation and aspartate transamination are two ways of ensuring adequate concentrations of this metabolite, and both of those reactions are anaplerotic. This four-carbon molecule is a substrate of citrate synthase. For 10 points, name this molecule that combines with acetyl-CoA to begin the citric acid cycle.**
ANSWER: oxaloacetate [or: oxaloacetic acid]

15. **During a battle at this site, Aristocles and Hipponoidas disobeyed an order to fill a hole on the left wing, allowing their side's overextended *sciritae* to be surrounded, but their army improbably won anyway. At that battle at that site, Agis II's army survived his incompetent command to defeat an opposing army supported by Athenian soldiers in contravention of the Peace of Nicias. At a 418 BC battle at this site, Sparta avenged its defeat at Sphacteria by overcoming an Argos-led alliance of democratic states. At another battle here, a humbled Athens allied with Sparta against the Boeotian League, whose elite (*) Sacred Band prevailed with the same tactics it had used at Leuctra. For 10 points, name this battle site in Arcadia where, in 362 BC, Thebes defeated Sparta, but lost its leader Epaminondas.**
ANSWER: Battles of Mantineia

16. **This composer's fourth symphony was once played twice at a concert where it was the only piece on the program, likely at the suggestion on Willem Mengelberg, who promoted this composer's work at the Concertgebouw. This composer's symphonies often instruct the woodwinds to play with their bells up. The third movement of Luciano Berio's *Sinfonia* is based on a scherzo from a symphony by this composer, marked (*) *In ruhig fliessender Bewegung*. His fifth symphony opens with a trumpet solo reminiscent of the opening of Beethoven's Fifth. His second symphony includes a movement named "Urlicht," based on a song from *Des Knaben Wunderhorn*. His fifth symphony includes a famous "Adagietto." For 10 points, name this composer of symphonies nicknamed "Titan" and "Resurrection."**
ANSWER: Gustav Mahler

17. **The energy flow of this habitat was first elucidated, in detail, by Eric Heald and Bill Odum, including analyses of its detrital food cycle. Some of these habitats exhibit a distinct zonation pattern, with the “associate” buttonwood, *Conocarpus erectus*, forming the outlying edge. These habitats are supported by viviparous autotrophs that reproduce via “propagules.” This habitat can be based on the *Avicennia* and *Sonneratia* genera, which have developed (*) aerial roots known as pneumatophores, but its most common genus is *Rhizophora*, which is supported by stilt roots. This nursery habitat is replaced by one supported by the Nipa palm as salinity decreases. For 10 points, what upper intertidal zone habitat, found in in tropical climates, is formed by namesake halophytic trees?**

ANSWER: mangroves [or: mangrove forests, mangrove swamps]

18. **Obesity hypoventilation syndrome is sometimes named after this novel because a character named Joe suffers from it. In this novel, the misanthropic sexton Gabriel Grub is kidnapped by goblins, who teach him to be a better person. A character in this novel is first seen polishing eleven and a half pairs of shoes, the half pair being for a man with a “vooden leg,” at the White Hart Inn. In this novel, (*) Arabella Allen elopes with Nathaniel Winkle, and Rachael Wardle tries to elope with Alfred Jingle. This novel’s most popular character frequently quotes proverbs, appending them with the tag “as the x said to the y.” That character, Sam Weller, works as the protagonist’s valet. For 10 points, name this Charles Dickens novel about the members of the title club.**

ANSWER: *The Pickwick Papers* [or: *The Posthumous Papers of the Pickwick Club*]

19. **Three Jesuits, including the son of the Minister of Justice, Charles Doherty, were arrested at a novitiate over this policy. A debate over this policy eventually led to the Terrace Mutiny. The mayor of Montreal, Camilien Houde, was placed into an internment camp for opposing this policy, which earlier caused Wilfrid Laurier’s faction of the Liberal Party to sever ties with Robert Borden’s Unionists. This policy was implemented by the NRMA, which created many so-called “zombies” that never went (*) abroad. The Tim Buck-led “Yes” committee concerning this policy gained support from nearly two-thirds of all Canadians, but only a quarter of Quebec residents thanks to the efforts of Henri Bourassa. For 10 points, name this policy that led to two Canadian “crises” in 1917 and 1944 concerning forced service in the military.**

ANSWER: conscription [or: the draft, obvious equivalents]

20. **One ritual in this religion involves constructing a tiny wedding pavilion from sugarcane stalks for the symbolic marriage of a basil plant dressed in traditional bridal attire. A controversial ritual in this religion involves poor people rolling around in the leftovers of food eaten by the rich. At one festival, adherents of this religion balance milk on their heads and pierce their bodies with (*) spikes and hooks. Some adherents of this religion become known as “twice born” after receiving a sacred thread in an initiation ceremony. Weddings in this religion include the bride and groom walking around a small fire four times. In this religion, the ancient rite of sacrificing clarified butter in a sacred fire is one form of “yajna.” For 10 points, name this religion whose adherents may choose which puja to engage in depending on whether they want to worship Vishnu or Shiva.**

ANSWER: Hinduism

1. Answer the following related to Japanese mathematicians whose work has spawned new fields of math, for 10 points each.

[10] Shigeru Mukai used just algebraic geometry to show that an abelian variety and its dual have equivalent derived categories of coherent sheaves, which is analogous to this transform. This transform converts a continuous time-domain function to a function in the frequency domain.

ANSWER: **Fourier** transform [or: **FT**]

[10] Some problems in representation theory can be solved using combinatorics because Masaki Kashiwara's crystal bases for q equals zero quantum groups can be represented as one of these structures. These objects are termed acyclic when lacking loops from a node back to itself.

ANSWER: **directed graph** [or: **digraph**, prompt on: **graph**]

[10] Morihiko Saito developed his theory of mixed modules named for this mathematician from the Riemann-Hilbert correspondence of regular holonomic D-modules and perverse sheaves. His namesake star operator is often studied on complex Kähler manifolds.

ANSWER: W. V. D. **Hodge** [or: William Vallance Douglas **Hodge**]

2. A portrait of this man in the Frick Collection is hung opposite a portrait of one of his enemies, so that it looks like he is glaring at the other portrait. For 10 points each:

[10] Name this subject of a portrait in which he faces left with a rather angry look on his face, tightly holding a piece of paper. In front of him is a letter calling him a "trustworthy and right well-beloved master of our jewel house."

ANSWER: **Thomas Cromwell**

[10] The aforementioned portrait of Thomas Cromwell is by this court painter to Henry VIII, who painted *The Ambassadors*.

ANSWER: Hans **Holbein** the Younger

[10] In the very top left of *The Ambassadors*, one of these objects peeks out from behind a green curtain. Some commentators have suggested that it, along with the anamorphic skull, was intended as a vanitas symbol.

ANSWER: a **crucifix** [or: a **cross**]

3. Answer the following about World War II-era Norway, for 10 points each.

[10] This Nazi collaborator headed Norway's puppet government after forcing Haakon VII into exile.

ANSWER: Vidkun **Quisling**

[10] As a sign of resistance, students at Oslo University wore these items. An operation named for these items brought several German scientists, including Wernher von Braun, to the United States.

ANSWER: **paperclips**

[10] During the failed Operation Freshman, the British targeted Vemork, a Norwegian facility that produced this commodity for the Nazis. The follow-up, Operation Gunnerside, successfully destroyed the facility.

ANSWER: **heavy water** [or: **deuterium oxide**, **D₂O**; prompt on: "**water**," "**H₂O**"]

4. This figure consults with a Delphic sibyl in Pär Lagerkvist's novel *The Sibyl*, and Lagerkvist also wrote a novel about his death. For 10 points each:

[10] Name this figure, who also titles a novel by Eugène Sue.

ANSWER: the **Wandering Jew** [or: **Ahasuerus**]

[10] Eugène Sue inaugurated the "city mystery" genre with a novel set in the underworld of this city, which is also the setting of *Our Lady of the Flowers*. Baudelaire wrote a book about this city's "spleen."

ANSWER: **Paris**

[10] The super evil title character of this Lagerkvist novel assassinates a bunch of the rivals of an Italian prince.

ANSWER: *The Dwarf* [or: **Dvärgen**]

5. While playing on Mount Oeta, this princess took her pet tortoise onto her lap, but was nastily surprised when it turned into a snake and raped her. For 10 points each:

[10] Name this woman who underwent a metamorphosis herself after plucking flowers off the tree that had been the nymph Lotis.

ANSWER: **Dryope**

[10] Dryope had been raped by this Greek god of light and music.

ANSWER: **Apollo**

[10] Dryope's companions on Mount Oeta were these tree nymphs. Each of them is bonded to a specific tree, and if their tree dies, they die as well.

ANSWER: **hamadryads**

6. These n minus one dimensional surfaces are used to study n -dimensional flows in phase space; the set of all points where the flow crosses these things is its namesake's "map". For 10 points each:

[10] Name this stroboscopic view of phase space trajectories that lets one characterize motion into periodic, quasiperiodic, or chaotic based on the presence of a finite number of points, a closed loop, or a lot of irregular and densely packed points.

ANSWER: **Poincaré** section [or: **Poincaré** cross-section, **Poincaré** surface, **Poincaré** surface of section; *do not accept*: "Poincaré map", "Poincaré plane"]

[10] Quasiperiodic trajectories in 3-dimensional phase space occur on this surface. The phase space of integrable Hamiltonian systems is foliated by invariant examples of these surfaces, which are defined using action-angle coordinates.

ANSWER: **torus** [or: **tori**, **toruses**]

[10] Action-angle coordinates can be used when the Hamiltonian of a system is independent of this quantity. It is added as a fourth dimension in special relativity.

ANSWER: **time** [or: **t**]

7. This colony expelled Anne Hutchinson for her heretical teachings. For 10 points each:

[10] Name this strongly puritan colony which fought the Pequot War and which was centered on Boston.

ANSWER: **Massachusetts Bay Colony**

[10] During King Philip's War, the Massachusetts Bay Colony squared off against an alliance led by this confederacy, whose leader Metacomb was the son of its great Sachem Massasoit.

ANSWER: **Wampanoag**

[10] One of the incidents that sparked King Philip's War was the 1675 assassination of this Christian convert, who had helped translate between the locals and the colonists.

ANSWER: John **Sassamon** [or: **Wussausmon**]

8. This building, which is sometimes named for the Capra brothers, was completed by Vincenzo Scamozzi. For 10 points each:

[10] Name this Andrea Palladio masterpiece best known for its four projecting porticos.

ANSWER: Villa **Rotonda** [or: La **Rotonda**, Villa la **Rotonda**]

[10] The Villa Rotonda was an important influence on this Charlottesville, Virginia estate, which was designed by Thomas Jefferson.

ANSWER: **Monticello**

[10] Palladio designed this church which sits on a namesake Venice island and has a bright white façade. Tintoretto's *The Last Supper* is housed in this church.

ANSWER: Basilica di **San Giorgio Maggiore**

9. A Chris Cagle song notes "we were stumblin' our way through life 'til our senior year but man we sure did learn a lot" in one of these places. For 10 points each:

[10] Name these places which also frequently serve as RV waystations as relayed in the documentary *This Is Nowhere* and the photography of Nolan Conway.

ANSWER: **Walmart parking lots**

[10] This 2011 film was allegedly set in a Walmart parking lot and allegedly depicted a woman being dragged from a Mercedes. It apparently does not exist despite Adam Schefter and Mike Florio's reporting to the contrary.

ANSWER: Dez **Bryant** video [accept any answer that includes Dez Bryant]

[10] Dez Bryant plays for this NFL team. It is owned by Jerry Jones and employs Tony Romo.

ANSWER: Dallas **Cowboys**

10. Answer the following about *The Pilgrim's Progress*, for 10 points each.

[10] *The Pilgrim's Progress* is by this author, who was greatly influenced by the Puritan author Arthur Dent.

ANSWER: John **Bunyan**

[10] A real wetland in Ontario is named after this fictional bog, which Christian and Pliable sink into under the weight of their sins. Pliable escapes and leaves Christian behind, but a man named Help arrives and helps him.

ANSWER: **Slough of Despond**

[10] This dufus thinks he can get into the Celestial City on the strength of his good deeds, even though he hasn't accepted Jesus as his savior. Naturally, he doesn't have the required certificate, so he is thrown into Hell.

ANSWER: **Ignorance**

11. Ashley Montagu listed a number of traits of this racial group which he claimed showed that it was more neotenized than the Caucasoid group. For 10 points each:

[10] Name this racial classification, whose name is now considered derogatory, in part because the presence of epicanthic folds in Down syndrome patients led to its association with Down syndrome.

ANSWER: **Mongoloid**

[10] Ironically, Ashley Montagu became known for his criticisms of the idea of race as a biological concept, such as in this book subtitled "The Fallacy of Race."

ANSWER: **Man's Most Dangerous Myth**

[10] Another critic of the idea of race as a biological concept is this author of *The Mind of Primitive Man*.

ANSWER: Franz (Uri) **Boas**

12. The speaker of this poem asks “Does my sassiness upset you?” and “Did you want to see me broken?” For 10 points each:

[10] Name this poem which opens by stating “you may write me down in history with your bitter twisted lies.”

ANSWER: “**Still I Rise**”

[10] “Still I Rise” was written by this poet whose memoirs include *I Know Why the Caged Bird Sings*.

ANSWER: Maya **Angelou**

[10] The image of “A Rock, A River, A Tree” opens this Angelou poem which she read at Bill Clinton’s inauguration.

ANSWER: “**On the Pulse of Morning**”

13. Appropriately, this place has candleholders that hold thirteen candles and clothes hooks arranged in groups of thirteen. For 10 points each:

[10] Name this landmark legendarily haunted by people who were killed by a popular brand of rifle produced in the late 1800s. Three stories were removed from this landmark after the 1906 San Francisco Earthquake.

ANSWER: the **Winchester Mystery House**

[10] This most populous city in Silicon Valley is home to the Winchester Mystery House.

ANSWER: **San Jose**

[10] The foundations of the Winchester Mystery House were built to withstand liquefaction, allowing it to also survive this earthquake that notably interrupted a pre-game broadcast of the 1989 World Series.

ANSWER: **Loma Prieta** earthquake

14. The granules of connective tissue mast cells contain this compound, as opposed to the chondroitin-sulfate-containing granules of mucosal mast cells. For 10 points each:

[10] Name this popular and highly negatively charged anticoagulant that accelerates the reaction of antithrombin III.

ANSWER: **heparin**

[10] Heparin is closely related to heparan sulfate, whose disaccharide backbone is made up of *N*-acetylglucosamine and glucuronic acid. A polymer of NAG and NAM is a major component of bacterial cell walls that are “positive” for what stain?

ANSWER: **Gram** stain

[10] Antithrombin III has been called a “suicide trap” by some, because thrombin attempts to cleave the bond between arginine and this amino acid at the reactive site of antithrombin, accidentally creating a stable complex from which they cannot escape. This amino acid is activated by histidine in thrombin’s catalytic triad.

ANSWER: **serine** [or: **ser**, **S**]

15. This man assisted Rudolf Peierls on the “Tube Alloys” project, and he provided information that led to the arrest of Harry Gold. For 10 points each:

[10] Name this British citizen and theoretical physicist for the Manhattan Project. Information this man gave the Soviet Union accelerated the Soviet nuclear program by a year.

ANSWER: Klaus **Fuchs**

[10] The Aldermaston Marches against nuclear proliferation started during the tenure of this PM, a Conservative who resigned in 1963 in the aftermath of the Profumo Affair.

ANSWER: Harold **Macmillan**, 1st Earl of Stockton

[10] In this 1962 agreement, negotiated between Harold Macmillan and John F. Kennedy, the United States agreed to provide missiles for the British nuclear program. In retaliation, Charles de Gaulle vetoed the UK’s entry into the EEC.

ANSWER: **Nassau** Agreement

16. A set of 36 piano variations on this song instructs the performer to whistle and slam the piano lid at various points. For 10 points each:

[10] Name this song composed by Sergio Ortega, which inspired a set of variations by Frederic Rzewski.

ANSWER: “The **People United Will Never Be Defeated**” [or: “El **pueblo unido jamás será vencido**”]

[10] “The People United Will Never Be Defeated” is a song from the “New Song” movement, which was concentrated on this continent. Composers from this continent include Heitor Villa-Lobos.

ANSWER: **South America**

[10] The Chilean dance known as the *cueca* is typically in this simple time signature, much like the minuet.

ANSWER: **3/4** time [prompt on: “**triple** meter”]

17. This reagent is popularly used to reduce carbon-sulfur bonds to carbon-hydrogen bonds and can be created by using sodium hydroxide as a solvent in which a nickel-aluminum alloy is dissociated. For 10 points each:

[10] Name this compound, a type of nickel, developed as a catalyst for the hydrogenation of vegetable oils.

ANSWER: **Raney** nickel [or: **RaNi**, **Raney** mud; do not accept: “radium nickel”]

[10] The activity of Raney nickel for different preparations is tested against beta-naphthol, which is both moieties in this compound that famously exhibits axial chirality.

ANSWER: **BINOL** [or: **1,1'-bi-2-naphthol**, do not accept: “BINAP”]

[10] Care must be taken when using Raney nickel because it can ignite spontaneously when exposed to oxygen, a predilection known by what term? Raney nickel shares this property with many other organometallic reagents.

ANSWER: **pyrophoricity** [prompt on: **air-sensitive**]

18. This novel's two narratives are told from the perspective of a teenage girl named George and the Renaissance painter Francesco del Cossa, who is revealed to be a woman in disguise. For 10 points each:

[10] Name this 2014 novel by Ali Smith, which was published in two versions, one beginning with George's story, and one beginning with Francesco's story.

ANSWER: **How to Be Both**

[10] Another book which can be read in two different orders is *Hopscotch*, a novel by this Argentinean author.

ANSWER: Julio **Cortázar**

[10] This author's novel *The Unfortunates* has its chapters packaged in a box instead of being bound, so they can be read in any order. He shares his surname with the author of *Lives of the Most Eminent English Poets*.

ANSWER: Bryan Stanley “B.S.” **Johnson**

19. In 2013, the army of one of these two countries mistook Venus and Jupiter for drones from the other. For 10 points each:

[10] Name these two most populous countries in the world.

ANSWER: **China** and **India** [in place of “China,” accept: **People's Republic of China**, **Zhongguo**; in place of “India,” accept: **Bharat**; do not accept: “Republic of China”; do not prompt on partial answer]

[10] In 1962, China and India went to war over the Aksai Chin region. Following the war, the Sino-Indian border was set at a line arrogantly given this name by the Chinese.

ANSWER: Line of **Actual Control**

[10] China and India went to war again in 1967 over this region, which China recognized as an Indian state in exchange for Indian recognition of Tibet as part of China. This region lies between Nepal and Bhutan and is home to Nathu La, the only open border pass between India and China.

ANSWER: **Sikkim**

20. This prohibition caused the development of special partnership forms called “mudarabah” and “musharaka.”
For 10 points each:

[10] Name this practice which most Muslim scholars agree is referred to in the Qur’an by the Arabic word “riba.”

ANSWER: charging **interest** on loans [or: **usury**]

[10] Charging interest is among the activities encompassed by this Arabic word, which roughly translates to “sinful.” It is the opposite of halal.

ANSWER: **haram**

[10] Muhammad explicitly addressed the prohibition on riba in this sermon, which was delivered from Mount Arafat and noted that Arabs and non-Arabs are equal since all are descended from Adam and Eve.

ANSWER: Muhammad’s **Farewell Sermon** [or: **Last Sermon** of Muhammad, **Khutabal Wada**]