

VCU Open '15 – Packet 1

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

1. After quoting some skeptical Pharisees from the Book of Matthew, this poem's speaker cribs a phrase from a Lancelot Andrewes sermon about an infant "unable to speak a word." This poem includes an image of "white feathers in the snow" after describing the violent winds at the straits of Belle Isle and at the Horn. This poem's fifth stanza is a discourse on "History" which notes that "she gives when our attention is distracted." It coins the term (*) "juvescence" to describe when the time of year when "Came Christ the tiger." This poem introduces the characters Fraulein von Kulp, Madame de Tornquist, Hakagawa and Mr. Silvero. It opens with its speaker "being read to by a boy, waiting for rain." For 10 points, name this poem about "an old man in a dry month" by T.S. Eliot.
ANSWER: "Gerontion"

2. An epic simile characterizes this man as a snake fattened on poison grasses that sloughs off its skin and reappears, young again, after the winter. This man's bones are littered through Ambracia after Orestes murders him in a beef over Menelaus' daughter Hermione. This son of Deidamia also took Andromache as a concubine after the Trojan War. In Sophocles' *Philoctetes*, this hero debates Odysseus on whether to retrieve Philoctetes by force or guile. This man beheads (*) Polites in front of the boy's father Priam, whom he guts in front of an altar in the *Aeneid*, also taking care to launch Astyanax off of the city walls. Troy could not be taken until this man arrived from Skyros, where he was conceived while his father was disguised as a girl. For 10 points, name this psychotic son of Achilles.

ANSWER: Neoptolemus

3. "Maximally localized" functions obtained after application of a theorem of this physicist are useful for their gauge invariance. Those functions are defined as the Fourier transform of eigenstates obtained by applying a theorem of this physicist yields Wannier functions. After turning to experimental physics, he made the first direct measurement of the neutron magnetic moment with Luis Alvarez. This physicist developed a theorem which roughly states that the eigenstates of the Hamiltonian of a lattice can be chosen to have the form of a (*) plane wave times a function with the periodicity of the lattice. He names domain walls whose spins rotate within the plane of the wall. His namesake equations relate the time dependence of the magnetization in nuclear magnetic resonance to the T1 and T2 terms he introduced. For 10 points, name this Swiss physicist who refined nuclear magnetic resonance with Edward Purcell.

ANSWER: Felix Bloch

4. In 1283, a holder of this position became the first recorded nobleman to be hanged, drawn and quartered. A symbol for this position includes three ostrich feathers and a scroll bearing the motto "Ich Dien." During a battle near Pilleth, a holder of this position captured Edmund Mortimer, but later allied with Mortimer and Henry Percy against (*) Henry IV through a "Tripartite Indenture." The person given this position by the Treaty of Montgomery was killed at Orewin Bridge by the invading forces of Edward I. This was the highest title attained by the man who fathered Richard II and won at Crécy during the Hundred Years' War. This position was held by Owen Glendower and Llywelyn the Last. For 10 points, give this title held by the heir to the British throne.

ANSWER: Prince of Wales [or: Tywysog Cymru]

5. **This country is allegorically represented as a woman carrying a sword and a hemp branch with an open shackle next to her feet in a painting created during the Revolutions of 1848. In the early 19th century, painters in this country who sought to reinstate spiritualism in art were known as the Nazarenes. A painter from this country first came to prominence with an altarpiece which unusually depicted the Crucifixion from a (*) distance in the middle of a rocky landscape. That painter depicted five ships at varying distances from the shore in his allegory *The Stages of Life*. A painting from this country shows a man with a walking stick standing on a rocky outcropping with his back to the viewer. For 10 points, name this country which produced Philipp Veit and the painter of *Wanderer Above the Sea of Fog*, Caspar David Friedrich.**

ANSWER: Germany [or: Deutschland]

6. Description acceptable. **A parody of this event involving the delivery of an old lady's birthday cake was included in the *Family Guy* episode "Saving Private Brian." A participant in this event said to another, "If you want my shirt, I will give it to you afterwards" in response to unwanted physical contact. Luis Medina Cantalejo witnessed this event and informed Horacio Elizondo of its occurrence. This event's target, who was accused of calling its perpetrator "the son of a (*) terrorist whore," later revealed that his actual words were "I prefer the whore that is your sister." That target was Italian defender Marco Materazzi. For 10 points, identify this event that resulted in the ejection of an illustrious French midfielder from the 2006 World Cup final.**

ANSWER: Zinedine Zidane headbutting Marco Materazzi in the 2006 FIFA World Cup Final [or: Zinedine Zidane's ejection, obvious equivalents; *prompt on: "2006 FIFA World Cup Final", "headbutt"*]

7. **The protagonist of this novel is arrested for assault after approaching a woman who he mistakes for a prostitute and attempting to convert her. Christina wins the right to marry the father of this novel's protagonist in a card game. As a child, the protagonist enrolls in Roughborough school, whose strict headmaster Dr. Skinner reminds him of his father. The main character of this book is convinced by (*) Pryer to start a College of Spiritual Pathology to treat ailments of the soul. This novel's narrator begins by relating the lives of its protagonist's ancestors, starting with his great-grandfather, a carpenter named Old John. This novel is narrated by Edward Overton, the godfather and biographer of Theobald's son Ernest. For 10 points, name this novel about the Pontifex family by Samuel Butler.**

ANSWER: *The Way of All Flesh*

8. **Although it's not related to John Lennon, the shattered left half of a pair of glasses symbolizes this event. Immediately following this event, state media circulated rumors of a leftist "Plan Z." Songwriter Victor Jara was tortured and killed in a sports stadium-turned-detention center after this event. During an incident leading up to this event, Carlos Prats shot into the car of Alejandrina Cox. The CIA fueled this event by channeling funds through (*) ITT, a company that was bombed by the Weather Underground two weeks after it occurred. A so-called "Caravan of Death" swept the country shortly after this event, whose target supposedly committed suicide while his palace, La Moneda, was bombarded by his military. For 10 points, identify this September 11, 1973 event that led to the rule of Augusto Pinochet.**

ANSWER: the coup against Salvador Allende [or: the 1973 Chilean coup d'etat, death of Salvador Allende, obvious equivalents; *until "Pinochet" is read, accept: the rise of Augusto Pinochet to power*]

9. In Theosophy, enlightened beings are said to belong to a “Great Brotherhood” of this color. According to the Book of Revelation, judgment is entered from a great throne of this color. A hymn called the *Exsultet* is sung by Catholic priests after they bring in the large paschal candle of this color, which stays lit throughout Easter and on special occasions afterward. In Hinduism, this is the standard color worn by (*) mourners. In Judaism, this is the customary color worn by Rabbis and their congregations on Yom Kippur. In Jainism, the Svetambara sect is named for their practice of wearing robes of this color. In Islam, the term “ihram” refers to the clothes of this color that pilgrims wear on the Hajj. For 10 points, name this color which represents yang in Taoism in contrast to the blackness of yin.

ANSWER: white

10. The S1 and S2 subunits of these structures contain KEKE motifs. PGPH is one of three types of active sites in the beta rings of these structures. During the presentation of class I histocompatibility molecules, these structures provide substrates that are translocated into the ER by TAP proteins. Multiple myeloma patients can be treated with an inhibitor of these structures, (*) bortezomib, in part because these objects are critical for cell cycle control. These objects are structured as a central core particle surrounded by two regulatory particles which recognize polyubiquitinated molecules. These structures degrade molecules like cyclins and misfolded polypeptides. For 10 points, name these parts of the cell that use hydrolysis to break down proteins.

ANSWER: proteasomes

11. The last of Rossini’s six quartet sonatas depicts one of these events. In Liszt’s *Years of Pilgrimage*, the piece *Au bord d’une source* is followed by a piece depicting one of these events. Tchaikovsky’s first major orchestral work was an overture named after one of these events. In another work, the trombones, piccolo and timpani enter for the first time during a depiction of one of these events; that depiction transitions smoothly into the next movement, which goes back from (*) F minor to F major. Another work is accompanied by a sonnet detailing a weeping shepherd trembling in anticipation of one of these events. For 10 points, name these events depicted in the fourth movement of Beethoven’s Pastoral Symphony and the third movement of Vivaldi’s “Summer.”

ANSWER: thunderstorms [or: tempests, rainstorms]

12. A king of this name gained Scania after a risky march across the Great and Little Belts, and began the practice of issuing “reductions” to regain crown territory from noblemen. A second king of this name sent a force of 10,000 men to Trondheim, which returned with only 2,000 men due to violent weather. A third king of this name kicked (*) Sigismund III out of his country. A king with this name was inspecting fortifications at Fredrikshald when he was shot in the head. Jean Bernadotte, the founder of his namesake house, took this regnal name. A king of this name escaped to Bendery with Ivan Mazepa after a disastrous 1709 loss at Poltava. For 10 points, give this name of several Swedish kings, one of whom fought Peter the Great during the Great Northern War.

ANSWER: Charles [or: Carl, Charles IX, Charles X, Charles XII, Charles XIV]

13. George Steiner argued that a novel about this character is structured as a string quartet, and that novel’s four sections are named after the four classical elements. In another work, a woman tells this character “Bestir thee now” and commands him to make use of his “speech ornate” to help another character. At one point, this character convinces a giant to carry him to his destination after he is falsely told that there are (*) bridges which will get him there. He rescues another character from a leopard, a lion, and a she-wolf. The gates of Dis slam shut when this character tries to enter, shortly after he praises his companion for no longer showing pity towards sinners. Since this character is not allowed to enter Paradise, he is replaced by Beatrice. For 10 points, name this Roman poet who serves as Dante’s guide in the *Inferno*.

ANSWER: Virgil [or: Publius Vergilius Maro]

14. **Some morpholine-derived compounds containing this functional group have antimicrobial activity. During the addition of a single carbon group from formaldehyde to tetrahydrofolate, this non-acetal functional group may be formed as an intermediate. One pot reactions that wish to chemoselectively reduce this group use sodium cyanoborohydride. A good way of generating carbonyls from nitriles involves first reacting the nitrile with a (*) Grignard reagent to produce this functional group. This group can then be hydrolyzed under acidic conditions into a carbonyl and a primary amine, which is the reverse of the most common way of forming this group. For 10 points, name this functional group that consists of a nitrogen double bonded to a carbon.**

ANSWER: imines [or: Schiff bases, iminium]

15. **Pillars called “latte” are common on islands owned by this country. It’s not France or Brazil, but a territory of this country completely avoided the 1918 flu pandemic. An island currently owned by this country had its native bird population nearly wiped out by an invasive brown tree snake. This country gained several small islands through the Guano Islands Act. Many of this country’s current territories are home to the (*) Chamorro people. This country won a large carrier battle sometimes referred to as the namesake “Turkey Shoot” of one of its territories. Through the Compact of Free Association, this country gives military and economic benefits to its former territories of Micronesia, Palau, and the Marshall Islands. For 10 points, name this country that controls Guam and a namesake portion of Samoa.**

ANSWER: USA [or: United States of America, obvious equivalents]

16. **This man is the namesake of the 2009 Serve America Act, which greatly expanded the scope of AmeriCorps. One of his campaigns was damaged when he gave a stuttering and repetitive answer to Roger Mudd’s question “Why do you want to be president?” In one speech, this man warned that “the doors of the Federal courts would be shut on the fingers of millions of citizens” and “women would be forced into back-alley abortions” in (*) Robert Bork’s America. He concluded “the work goes on, the cause endures, the hope still lives, and the dream shall never die” in his concession speech at the 1980 Democratic Convention. His political career was dogged by the death of Mary Jo Kopechne, who drowned when this man drove his car off a bridge in Chappaquiddick. For 10 points, name this longtime senator from Massachusetts and younger brother of RFK and JFK.**

ANSWER: Ted Kennedy [or: Edward Kennedy; prompt on: “Kennedy”]

17. **Sanfey et al. observed activity in the anterior insula when people played this game, which they used to argue for the role of emotions in decision-making. Henrich’s experiments with this game among the Machiguenga showed that culture matters in economic behavior. A variant of this game with more than two players is the pirate game. A degenerate variant of this game in which one of the participants does not play an active role is called the (*) dictator game. Though the rational strategy in this game is to accept any proposal, people typically reject proposals which are below around 30%. For 10 points, name this two-player game in which one player proposes that a sum of money be divided in a certain way, and the other player can either accept or reject their offer.**

ANSWER: ultimatum game

18. If a smooth example of these things is of the class C^r , meaning r times continuously differentiable, then a diffeomorphism from the class C^r can be used to rectify it. A tangent example of these things is a section of the tangent bundle of a differentiable manifold. A line tangent to one of these things at every point is an integral curve. If these things satisfy the conditions of Helmholtz's theorem, they can be written as the sum of an (*) irrotational and a solenoidal component, using the gradient and curl operators. Their line integral along a curve is equal to the dot product of these things evaluated along the curve and the differential of the parametrized curve. For 10 points, name these constructs that assign a direction and magnitude to every point in a space.

ANSWER: **vector field** [or: **direction field**, **slope field**; prompt on: "**vector** point function", "**vector-valued** function", "**smooth map**"; anti-prompt on: "**flow field**", "**velocity field**", "**force field**"]

19. It's not Canada, but an author from this country wrote a novel in which Anna Wetherell and Emery Staines are mysteriously connected, and each of them bleeds when the other one is wounded. That novel begins with Walter Moody stumbling upon a meeting of twelve men, each of whom is represented by a zodiac sign, and the novel itself is structured after the waning of the moon, with each chapter being (*) shorter than the previous. Eleanor Catton's *The Luminaries* is from this country, as is a short story in which the title event is not canceled despite the death of Mr. Scott, to the chagrin of Laura Sheridan. That story is "The Garden Party." For 10 points, name this home country of Katherine Mansfield.

ANSWER: **New Zealand**

20. The 1983 Canadian Opera Company performance of this opera was the first time supertitles were used. One of its characters describes nightmares in which she is being chased by an avenging spirit in the aria "Ich habe keine guten Nächte" or "I have no good nights." This opera opens with the "fifth maid" being punished for protesting the gossip of her coworkers. Its protagonist, who searches for a buried axe, is often accompanied with a namesake dissonant bitonal chord that combines E major and D major. That protagonist shares a recognition scene with her (*) brother and duets with her sister Chrysothemis before frenziedly dancing to death. For 10 points, name this first collaboration between Hugo von Hofmannsthal and Richard Strauss, an opera about a woman who avenges her father Agamemnon.

ANSWER: **Elektra**

1. This poet's collection *The Legend of the Ages* imagines a wall on which scenes from the whole history of humankind are drawn. For 10 points each:

[10] Name this poet who dedicated a number of poems to his drowned daughter, Léopoldine. He's better known for his novels, whose characters include Quasimodo and Jean Valjean.

ANSWER: Victor (Marie) **Hugo**

[10] Another French Romantic poet is Alphonse de Lamartine, who is most famous for this poem, whose speaker imagines the wind saying "They were in love!" while recalling his lost love Julie Charles.

ANSWER: "The **Lake**" [or: "Le **lac**"]

[10] This Romantic poet co-wrote the libretto for *Giselle* and popularized the phrase "art for art's sake" in his preface to *Mademoiselle de Maupin*.

ANSWER: (Pierre Jules) Théophile **Gautier**

2. Like Uruguay, this country's composers imported and popularized the concertina-esque bandoneón from Germany. For 10 points each:

[10] Name this country where the tango originated, also like Uruguay.

ANSWER: **Argentina**

[10] This Argentinian was an accomplished bandoneón player. By incorporating elements of jazz and classical elements in his compositions, such as *Libertango*, he created the *nuevo tango* style.

ANSWER: Ástor **Piazzolla** (pee-ah-sole-ah) [or: Ástor Pantaleón **Piazzolla**]

[10] During his formative years, Piazzolla studied under Alberto Ginastera, at the advice of Arthur Rubinstein. Rubinstein himself is regarded as the pre-eminent interpreter of what composer of the *Barcarole in F-sharp major* and the *Fantasia-Improvisata*?

ANSWER: Frédéric **Chopin** [or: Frédéric François **Chopin**]

3. This substance makes its first appearance in the Bible when Noah makes some. For 10 points each:

[10] Name this substance that Jesus turns water into.

ANSWER: **wine**

[10] The issue of whether the wine consumed in the Eucharist is actually or symbolically the blood of Christ was the sticking point between Martin Luther and Ulrich Zwingli at this 1529 meeting.

ANSWER: **Marburg Colloquy**

[10] This company, which was purchased by Bain Capital in 2014, has an iron lock on the kosher wine market. Some Orthodox Jews refuse to purchase its sweet concord wine, which contains corn syrup.

ANSWER: **Manischewitz**

4. Synclines and anticlines are characteristic formations due to this process. For 10 points each:

[10] Name this process characteristic of compressional regimes, in which strata are bent or curved, often creating an undulating or wave-like pattern. Extreme tilting of an axial plane in this process leads to an "overtuned" structure.

ANSWER: **folding** [do not accept: "faulting"]

[10] This type of "well-foliated" metamorphic rock is formed by strong ductile deformation during folding and faulting—in which parent rock is completely pulverized. They're often found in shear zones.

ANSWER: **mylonite**

[10] Blastomylonite is formed when this process occurs after deformation has ceased. The "fractional" form of this process creates increasingly felsic magma as more mafic minerals undergo this process, as depicted diagrammatically in Bowen's reaction series.

ANSWER: **recrystallization** [or: word forms; prompt on: "**precipitation**"]

5. The self-whipping Flagellants emerged during this event, which also saw mass violence against Jews accused of poisoning wells. For 10 points each:

[10] Name this mid-14th century event that ravaged Europe, killing nearly half of its population. It was caused by the spread of fleas carrying *Yersinia pestis*.

ANSWER: the **Black Death** [or: **bubonic plague**]

[10] This city slowed the spread of the Black Death by walling up affected households and leaving their occupants to die, even if some occupants were still healthy. The Della Torre family ruled this city until it was supplanted after the Battle of Desio.

ANSWER: **Milan**

[10] The only monarch that died of the Black Death was a king of Castile-León who had this name. El Cid served under another Castilian king of this name who succeeded his brother Sancho II after his assassination.

ANSWER: **Alfonso** [or: **Alfonso VI**, **Alfonso XI**]

6. Answer the following about one of the greatest and most beloved actors of our generation: The Rock. For 10 points each:

[10] One of the greatest moments in this film occurs when The Rock is fighting Memnon, who dips his swords into a ceremonial fire basin and they fucking burst into flame. It's a spin-off of *The Mummy Returns*.

ANSWER: *The **Scorpion King***

[10] In *Get Smart*, The Rock plays the double-crossing Agent 23, whose nuclear football is analyzed by Max to deduce that the final notes of this symphony will trigger a nuclear bomb.

ANSWER: **Beethoven's Symphony No. 9** [or: Beethoven's "**Ode to Joy**" Symphony]

[10] In the famed Halftime Heat match, an empty arena match between The Rock and Mankind that aired during the halftime of the 1999 Super Bowl, one of the craziest pins of all time occurred when the Mankind pinned The Rock with what kind of vehicle?

ANSWER: **forklift** truck

7. This woman inspired characters in the stories "Portrait of a Girl in Glass" and "The Resemblance Between a Violin Case and a Coffin." For 10 points each:

[10] Name this woman who lost much of her personality after undergoing a bilateral prefrontal lobotomy in 1943.

ANSWER: **Rose Isabel Williams**

[10] Rose also inspired Laura Wingfield in this play by Tennessee Williams, her brother.

ANSWER: *The **Glass Menagerie***

[10] In this Williams play, Catharine Holly is threatened with a lobotomy when she reveals the bizarre facts surrounding Sebastian Venable's death.

ANSWER: ***Suddenly, Last Summer***

8. One of these curves gives the locus of conditions for gas-liquid phases to form a stable, phase-separated system while the other gives the locus of conditions at which a metastable gas or liquid spontaneously phase-separates. For 10 points each:

[10] Name these two curves that are equivalent to the coexistence curve and the metastability limit curve.

ANSWER: the **binodal** and **spinodal** curves

[10] The binodal and spinodal curves meet at this point, which is the end of a phase equilibrium curve.

ANSWER: **critical** point

[10] Due to not having a liquid-gas phase boundary, supercritical fluids notably lack this property. The difference in capillary pressure is equal to this quantity times the sum of the reciprocals of the radii of curvature.

ANSWER: **surface tension** [or: **interfacial tension**]

9. This book's chapter "Accounting" discusses the practices that sprang up to identify and dispose of Union and Confederate corpses. For 10 points each:

[10] Name this 2008 book which has chapters titled "Dying" and "Burying" and which focuses on the contemporary response to the enormous death toll in the American Civil War.

ANSWER: **This Republic of Suffering**

[10] Drew Gilpin Faust took the name of *This Republic of Suffering* from this architect's description of the unloading of hospital ships. He published a journalistic look at the south titled *The Cotton Kingdom* in 1861.

ANSWER: Frederick Law **Olmstead**

[10] *This Republic of Suffering* discusses the work of this man, whose battlefield photographs attracted crowds to his Broadway studio.

ANSWER: Matthew **Brady**

10. The English title of an alt-western by Luc Moullet refers to these two things, as does a found-footage piece by Gustav Deutsch. For 10 points each:

[10] Name these two things, which Jean-Luc Godard famously said are the only two things you need to make a film.

ANSWER: a **girl** and a **gun**

[10] Godard was paraphrasing a quote by this director of *Intolerance* and the extremely intolerant film *Birth of a Nation*.

ANSWER: David Llewelyn Wark "D. W." **Griffith**

[10] Godard's *Histoire(s) du cinéma* includes a shot of these sisters reacting to a gun from Griffith's film *An Unseen Enemy*. These sisters acted in *Orphans of the Storm* and many other films by Griffith.

ANSWER: Dorothy and Lillian **Gish**

11. This biologist popularized the idea that the term "species" should be defined in terms of reproductive compatibility in his book *Systematics and the Origin of Species*. For 10 points each:

[10] Name this thinker whose ideas about the philosophy of biology are collected in his book *Toward a New Philosophy of Biology*.

ANSWER: Ernst (Walter) **Mayr**

[10] Pioneering philosopher of biology David Hull wrote a book about the reception of this man's theories by the scientific community. Daniel Dennett wrote about a book about this scientist's "dangerous idea."

ANSWER: Charles **Darwin**

[10] In *Darwin's Dangerous Idea*, Dennett refers to theories of complexity built on solid scientific foundations as "cranes," and uses this term to refer to theories which rely on non-mechanistic or supernatural explanations.

ANSWER: **skyhooks**

12. According to legend, this thing was created after its namesake king entered Telmessos while driving an ox-cart. For 10 points each:

[10] Name this object that was located in the capital of the Phrygian kingdom until its 333 BCE destruction. It was named for the father of King Midas.

ANSWER: the **Gordian Knot**

[10] Years after the time of King Midas, this man succeeded in cutting the Gordian Knot. His other exploits included building a causeway to sack Tyre and fighting against King Porus' elephants at the Hydaspes River.

ANSWER: **Alexander the Great** [or: **Alexander III** of Macedon; *prompt on: "Alexander"*]

[10] After Midas became dissatisfied with his golden touch, he was legendarily told to bathe in this river. This river flows through the Lydian capital of Sardis.

ANSWER: **Pactolus** River

13. A 2011 cartoon showed this person saying “One hundred lashes if you don’t die of laughter!” For 10 points each:

[10] Name this prophet who was satirically made a special editor-in-chief of an issue renamed *Charia Hebdo*.

ANSWER: **Muhammad** [or: **Mahomet**]

[10] The 2015 shooting at *Charlie Hebdo*’s Paris headquarters was perpetrated by members of this Yemen-based group, which constantly competes for territory against the Houthis.

ANSWER: **AQAP** [or: **al-Qaeda** in the **Arabian Peninsula**, **Ansar al-Sharia**; prompt on: “**al-Qaeda**”]

[10] This phrase captions a provocative *Charlie Hebdo* cartoon that shows Muhammad kissing a cartoonist. English or French answers are acceptable.

ANSWER: “**Love is stronger than hate**” [or: any reasonably close answers, “**L’amour plus fort que la haine**”]

14. American literature often deals with the complexities of life in the city. For 10 points each:

[10] This late nineteenth century Henry Fuller novel follows a Bostonian named George Ogden, who moves to Chicago to work in the Clifton skyscraper.

ANSWER: *The **Cliff-Dwellers***

[10] In this Ann Petry novel, Lutie Johnson moves into 1940s Harlem with her son Bub.

ANSWER: *The **Street***

[10] Edward P. Jones’ *Lost in the City* is a series of short stories set in this city. It is also the setting of Henry Adams’ *Democracy* and the brief classic *House Mouse*, *Senate Mouse*.

ANSWER: **Washington** D.C. [or: Washington **D.C.**, the **District of Columbia**]

15. Answer the following about fluid mechanics, for 10 points each.

[10] This approximation is used for buoyancy-driven flows in which temperature, and thus density, have little variation, so density is regarded as constant outside the buoyancy term in the vertical equation of motion. It’s used for “almost” incompressible flows and is sort of a subset of the anelastic approximation.

ANSWER: **Boussinesq** approximation

[10] The Boussinesq approximation conserves volume instead of this quantity. An equation for the conservation of this quantity is: partial time derivative of density plus divergence of, density times flow velocity, equals zero.

ANSWER: **mass**

[10] In fluid mechanics, this principle is a statement of the conservation of energy for inviscid, incompressible flows.

ANSWER: **Bernoulli**’s principle [or: **Bernoulli**’s equation, **Bernoulli**’s effect]

16. In Chinese, the name of this substance literally means “fire medicine”. For 10 points each:

[10] Name this substance invented by accident when Taoist monks searching for an elixir of immortality heated a mixture of honey and saltpeter.

ANSWER: **gunpowder** [or: **huo yao**]

[10] The fire lance, an early weapon that relied on gunpowder, was used heavily during the Song Dynasty’s siege of De’an against this Jurchen dynasty. This dynasty later abducted the Song emperor during their sack of Kaifeng.

ANSWER: **Jin** Dynasty

[10] The invention of gunpowder led to this Chinese official legendarily becoming the world’s first “astronaut.” He supposedly accomplished this feat by tying several rockets to a chair and lighting the fuses.

ANSWER: **Wan** Hu [or: **Wang** Tu]

17. By default, this algorithm will not find matches between sequences that have fewer than 11 contiguous nucleotides of similarity. For 10 points each:

[10] Name this bioinformatics tool that is used to align two nucleotide or amino acid sequences.

ANSWER: **BLAST** [or: **basic local alignment search tool**]

[10] The most commonly-used version of BLAST is hosted on this organization's website, which also hosts Genbank. This branch of the NIH's National Library of Medicine also hosts PubMed.

ANSWER: **NCBI** [or: **National Center for Biotechnology Information**]

[10] In this type of figure, each sequence occupies each axis, and a similarity is indicated by a point, which helps to find similarities between sequences. There is often a diagonal line visible in this type of figure.

ANSWER: **dot plot**

18. This style is exemplified by *Moonrise, The Rainbow*, and other paintings by George Inness. For 10 points each:

[10] Name this style in American landscape painting around the turn of the 20th century, characterized by neutral colors and atmospheric, shadowy scenes.

ANSWER: **tonalism**

[10] Tonalism was influenced by this French art movement, whose major works include *The Gleaners* and *The Angelus*. One of its founders was Charles-François Daubigny.

ANSWER: **Barbizon** school

[10] The tonalist Albert Pinkham Ryder is best known for his painting of Death riding one of these animals.

ANSWER: a pale **horse**

19. The author of this scene made fun of it in his next play by having a character remark that it is "the lewdest, filthiest thing." For 10 points each:

[10] Name this scene in which Sir Jasper and Mrs. Squeamish's grandmother are oblivious to the double entendres in the dialogue taking place offstage between Horner, Lady Fidget and Lady Squeamish.

ANSWER: the **china** scene

[10] The china scene is from this William Wycherley play whose title character, Margery Pinchwife, is a supposedly naive woman who nonetheless cuckolds her husband under the tutelage of Horner.

ANSWER: *The **Country Wife***

[10] *The Country Wife* is an example of a comedy from this period of English history, during which Charles II encouraged the production of sexually explicit comedies of manners.

ANSWER: the **Restoration**

20. This creature and its elder twin were conceived when Diti could not restrain her lust for Kashyapa at dusk, even though sex at dusk was bound to produce demonic children. For 10 points each:

[10] Name this monster that trapped the earth under the water before being defeated by Vishnu in the form of Varaha.

ANSWER: **Hiranyaksha** [do not accept: "Hiranyakashipu"]

[10] When Vishnu rescued the earth from Hiranyaksha, he took the form of one of these animals. In Greek mythology, Atalanta and Meleager hunt one of these animals in Calydon.

ANSWER: a **boar** [or: a **pig**]

[10] Hiranyaksha and Hiranyakashipu are two of these demons from Hinduism, which are distinct from *rakshasas* and are adversaries to the *devas* led by Indra.

ANSWER: **asuras**