



NSC 2019 - Round 10 - Tossups

This round is sponsored by Greater Pennsylvania Quiz Bowl

1. The ratio of the intensities of anti-Stokes and Stokes lines from the Raman effect is dependent on this quantity. The diffusion equation is similar to an equation modeling the time evolution of this quantity in a homogeneous and isotropic medium, which states that its time derivative is equal to alpha times the Laplacian ("luh-PLAH-see-un") of this quantity. The gradient of this quantity, times a constant, appears on one side of (*) Fourier's law. The product of this quantity with Boltzmann's constant serves as a scale factor for the energy of molecular systems. This quantity is the conjugate variable of entropy, and thus its product with entropy has units of energy. For 10 points, name this quantity, whose absolute variety is measured by the Kelvin scale.

ANSWER: absolute temperature

<Mukherjee, Science - Physics>

2. In 1893, a German businessman started offering this kind of service for tourists in Taipei's Xinbeitou ("sheen-bay-toe") neighborhood. A form of this service known as *hanjeungmak* ("han-jung-mahk"), is the main attraction of South Korean *jjimjilbang* ("jim-jeel-bahng"). In another country, the city of Beppu is nicknamed the "Las Vegas" of this service, and it mostly does not allow customers to have *irezumi* while undergoing it. A *pefletti* seat cover is used by those using this service, which is so popular in (*) Finland that Helsinki's Parliament has a chamber for it. In Japan, this service can be done in gender-separated rooms of businesses called *sentou*. Geothermically heated *onsen* is another type of business that offers, for 10 points, what service of washing in a communal environment?

ANSWER: spa service [accept cleaning oneself; accept any answering indicating bathing or using public baths; or using a hot spring; or using a sauna or steamroom; prompt on staying at a resort or staying at a hotel]

<Bentley, Geography - World>

3. This composer ended the final movement of one orchestral piece with the *tutti* sustaining a dissonant chord at a dynamic of quadruple *f*, before the non-strings drop out and the strings play a hymn-like melody at a dynamic of triple *p*. This composer imitated a folk band by deliberately including several wrong notes in that piece's second movement, which he re-arranged from his *Country Band March*. This composer quoted "Old Black Joe" and (*) "Marching through Georgia" in the first movement of his first orchestral set, which depicts a memorial to Robert Gould Shaw. Movements titled "The Housatonic at Stockbridge," "Putnam's Camp," and "The St. Gaudens in Boston Common" comprise, for 10 points, what composer's *Three Pieces in New England*?

ANSWER: Charles Ives [accept Charles Edward Ives]

<Alston, Fine Arts - Music>

4. A historical novel centering on a ruler of this country calls him a "dweller in truth." Gossip from "common people" called the title *harafish* figure into another novel from this country. The cabaret dancer Melissa falls in love with the writer L.G. Darley in a novel sequence set here. A cafe owner named Tarzan and the prostitute Nur help a convict get revenge against Ilish for stealing his wife in another book from this country. Both a quartet of novels by Lawrence Durrell and *The (*) Thief and the Dogs* are set in this country, as is a sequence centering on the family of Al-Sayyid. *Palace Walk*, *Sugar Street*, and *Palace of Desire* comprise three novels named for this country's capital. For 10 points, name this home country of Naguib Mahfouz.

ANSWER: Egypt [or the Arab Republic of Egypt]

<Narayan, Literature - World and Miscellaneous>

5. People who had this trait were banned from using animal-drawn chariots or from possessing too much gold by the 215 BC law, the Lex Oppia. One of Ovid's fragmentary works is a didactic poem discussing how to create mixtures used by people who have this trait. Only people who had this trait were permitted to observe the Bona Dea festival, which is why Publius (*) Claudius Pulcher ("POOL-care") was prosecuted for trying to assume it. People who had this trait would often wear a cloak known as a *palla* over their *stola* to social gatherings. This trait was indicated in names of *gens* where the "-us" ending was replaced by "-a." Voting could not be done by those who had, for 10 points, what demographic trait possessed by around 50% of ancient Rome's population?

ANSWER: being a woman [accept equivalents such as being female; prompt on not being a man; do not accept or prompt on "being a virgin" or "being married" or "being single."] (Editor's Note: While today's forward-thinking society may recognize more than two genders, ancient Roman writers generally did not; all of the clues are drawn from such literary sources, and thus this question uses the gender dichotomy presented as such.)

<Jose, History - European>

6. This character is given a white shield marked with the blood of Josephus after King Bademagu takes it from an abbey. He rescues a duke's daughter by defeating, but not killing, seven knights at the Castle of Maidens. The conception of this character is facilitated by Dame Brusen, who gives a magic ring to Pelles that is then used by this character's mother, Elaine of Corbenic. In a Tennyson poem, this character declares "my (*) strength is as the strength of ten, because my heart is pure." This illegitimate son of Lancelot is the first person able to sit in the Siege Perilous, after which he is joined by Bors and Percival on a quest inspired by a vision at Camelot. For 10 points, name this "most perfect" Knight of the Round Table who successfully achieves the Holy Grail.

ANSWER: Sir Galahad [accept Galeas or Galath]

<Carson, RMP - World Mythology>

7. This writer conceived of his morality as filling a "vacant place" created by "speculative reason" into which natural causality may not enter. This philosopher posited a "hermeneutical rule" for interpreting morality from the Bible in a tract advocating for analyzing religion using "reason alone." In response to the French philosopher Benjamin Constant, this author called for *not* using an action's expected outcomes to argue that one should *not* (*) lie to a murderer to prevent a man's death. This writer advocated for deontological ("dee-AWN-toh-LAH-juh-kull") ethics in calling for doing actions that are only in accordance with "universal law." For 10 points, name this German philosopher who formulated the "categorical imperative" in his *Critique of Practical Reason*.

ANSWER: Immanuel Kant

<Jose, RMP - Philosophy>

8. An X denotes the non-crossing rule on state correlation diagrams plotting these structures against energy. These structures must maintain their overall symmetry between reactants and products in an allowed peri-cyclic reaction. The stabilization energy for forming these structures is highest when their substituents have similar symmetry and energy to mix the best. These structures are plotted on horizontal lines in the middle of a diagram that uses dashed diagonal lines that indicate the (*) linear combinations that formed them. When these structures are formed in pairs, the higher-energy one is labelled with an asterisk to indicate that it's antibonding. For 10 points, name these structures labelled by Greek letters like sigma and pi, which form when atomic orbitals combine.

ANSWER: molecular orbitals [accept MOs; prompt on orbitals]

<Silverman, Science - Chemistry>

9. Joanne B. Freeman's book *The Field of Blood* chronicles the history of 19th century violence in this building suppressed by commission-dependent local newspapers. German spy Erich Muentner planted dynamite under a switchboard in this building in 1915, and a bathroom in this building was bombed by the Weather Underground in protest of the invasion of Laos. Sandstone columns from this building were moved to an arboretum after a 1950s restoration. Boston's Old State House Museum owns part of a gutta-percha object (*) broken in 1856 during a notorious incident in a chamber in this building that took place after one man gave the "Crime Against Kansas" speech. For 10 points, Preston Brooks caned Charles Sumner in what building where Congress meets?

ANSWER: United States Capitol Building

<Bentley, History - American>

10. This book's main character asks an old man if his country prays to God, to which the old man replies "no ... we have nothing to ask him." The protagonist of this book rides in a coach pulled by six flying sheep to meet a country's king, and at one point is almost eaten by a tribe of cannibals that mistakes him for a Jesuit. After the protagonist of this novella loses the riches he acquired in El (*) Dorado, he proclaims that we "must cultivate our gardens." When this novella's protagonist learns that Baron Thunder-ten-Tronckh's daughter has become ugly, he finally rejects the Leibnizian optimism of Doctor Pangloss. A woman named Cunegonde ("COO-neh-gond") is beloved by the title character of, for 10 points, what novella by Voltaire?

ANSWER: Candide, ou l'Optimisme

<Jose, Literature - European>

11. This country is home to an albino multi-instrumentalist musician named Hermeto. Horace Silver claimed to have heard his "father's song" while visiting this country, whose music inspired Silver's track "Song for My Father." Instruments such as the *cabasa* ("cah-BAH-sah") shaker and *surdo* ("SUR-doo") drum are used in a style of dance in this country which is typically notated in 2/4 ("two-four") time, much like this country's (*) *choro* ("SHOW-roo") music. Stan Getz popularized a genre of music from this country in his song "The Girl from Ipanema" and worked with its native composers Antonio Carlos Jobim ("zhoh-BEEM") and Joao Gilberto ("zhuh-WOW zheew-BARE-too"). For 10 points, name this Latin American country whose *bossa nova* music is rooted in the *samba* dance, and where you can still hear both in Rio de Janeiro.

ANSWER: Brazil [accept Federative Republic of Brazil or Republica Federativa do Brasil]

<Alston, Fine Arts - Miscellaneous>

12. One of this author's novels opens on the 81st birthday of its narrator, who is informed that an archbishop wants him to help canonize a man named Carlo Campanati. Another novel by this author contains a scene in which the protagonist reads aloud the words "I raise my sword-pen" and "to ooze juicily at the last round the bearded lips of God" from a manuscript authored by the fictional author F. Alexander. This author depicted the life of the writer Kenneth Toomey in *Earthly (*) Powers*. In another of his books, the protagonist goes to Korova to drink "milk-plus," and later has the Ludovico technique performed on him when he is arrested. For 10 points, name this author who depicted the miscreant Alex and his gang of "droogs" in his novel *A Clockwork Orange*.

ANSWER: Anthony **Burgess** [or John Anthony **Burgess** Wilson]

<Jose, Literature - British>

13. The first European writings on this system are found in a Spanish manuscript called the *Codex Vigilanus*, which describes a variety of this system called *gobar*. Pope Sylvester II developed a number of *apices* ("ah-PEE-chays") to represent this non-philosophical system, whose major advantages included incorporating a concept of "the void" originally termed *sunya*. Treatises on the use of this system were published by both al-Kindi and (*) al-Khwarizmi. This system, which was popularized in medieval Europe by the *Liber Abaci* ("LEE-bear ah-BAH-chee") of Fibonacci, incorporates a concept of nullity developed by Brahmagupta with one of its ten constituent signs. For 10 points, name this superior counting system which, in Europe, replaced one named for the Romans.

ANSWER: **Arabic numerals** [or **Hindu-Arabic numerals** or **Indo-Persian numerals** or **Indian numerals**; accept **numbers** in place of "numerals"; prompt on numbers or numerals; do not accept or prompt on "mathematics"]

<Alston, History - Cross, Historiography, and Miscellaneous>

14. So-called "third-generation" types of these programs typically work on the application level of the OSI model, and are more advanced than "stateful" types of these programs, which operate by examining, but not touching, a datagram. One example of how these programs work is only allowing the usage of UDP or TCP, and completely disallowing FTP, or the file transfer protocol. These programs are often put in front of a load balancer, and they often cannot prevent a (*) denial of service attack since they cannot keep track of every IP address. It is common to make a "pinhole" in these programs to allow for some kinds of traffic through. For 10 points, name these programs that monitor traffic on a network, one of which is the flagship product of John McAfee's namesake company.

ANSWER: **firewalls** [prompt on packet sniffer; prompt on anti-malware or virus detector]

<Jose, Science - Computer Science>

15. A group of "Naturalists" splintered from an art movement in this city after disagreeing over how many works to send to the 1904 St. Louis World's Fair. That movement based in this city published the magazine *Ver Sacrum* and organized their 14th exhibition around a marble statue of a musician sculpted by Max Klinger. For that exhibition in this city, an artist created a wall painting depicting the nude gorgon daughters of Typhoeus ("TIE-fee-us"). This city houses the (*) *Beethoven Frieze* and is home to a pair of Baroque palaces called the Belvedere complex, which once held the "woman in gold" portrait of Adele Bloch-Bauer. For 10 points, name this home city of a "Secession" movement headed by the gold-leaf loving painter of *The Kiss*, Gustav Klimt.

ANSWER: **Vienna** [accept **Wien**; accept **Vienna** Secession]

<Bentley, Fine Arts - Painting>

16. Two answers required. Ordinance No. 19 required residents of one of these two countries to adopt a family name in the style of the other. An 1875 naval battle between these two countries described in Peter Duus's *The Abacus and the Sword* was provoked by one issuing an imperial decree to the other. The March 1st Movement opposed the rule of one of these countries by the other. Some 6,000 immigrants from this country were massacred in the (*) capital of the other following a devastating 1923 earthquake. In 1909, a man from one of these countries who was Resident-General in the other was assassinated by An Jung-geun. For 10 points, name these two East Asian countries, one of which annexed the other soon after the end of the Joseon ("JOE-sun") dynasty.

ANSWER: **Japan** AND **Korea** [accept **Japan** and the Kingdom of **Korea**; or **Japan** and South **Korea**; or **Japan** and North **Korea**; accept **Nippon** for Japan; accept **Hanguk** for Korea]

<Bentley, History - World>

17. Histidine biosynthesis begins from a tri-phosphorylated derivative of this compound. This compound's Fischer projection has its three epimeric carbons oriented with their hydroxyls on the right. Hydroxy-urea blocks the reduction of this sugar by an enzyme that unusually requires a radical mechanism. The pentose phosphate pathway is named for the fact that it makes a (*) phosphorylated derivative of this sugar. This sugar makes up the backbone of NADH and is found in its linear form bound to a flavin in Vitamin B2. This sugar is bonded to a nitrogenous base in nucleosides like uridine and guanosine, and removing its 2' (two prime) carbon's hydroxyl forms a deoxy- derivative. For 10 points, name this core sugar found in RNA.

ANSWER: **ribose** [do not accept or prompt on "deoxyribose"]

<Silverman, Science - Biology>

18. When transcribing Semitic languages, a small dot often indicates "emphatic" examples of these things, all of which are obstruents ("OB-stroo-ents"). The Kru languages feature many of these things that typically develop from doubly-articulated, glottalized, or ejective examples of them. In Russian, the *yer* typically indicates when one of these things is palatalized ("PAL-uh-tuh-lized"). The voice onset time of plosive examples of these things is increased when they undergo (*) aspiration. Grimm's Law exemplifies a common pattern in which voiced examples of these sounds become voiceless. Producing these sounds, which include fricatives, requires closure of the vocal tract. For 10 points, name these sounds exemplified by p, k, and t, which appear alongside vowels in most words.

ANSWER: **consonants** [accept any answer which mentions **consonants**; prompt on **sounds** before "sounds"]

<Alston, Social Science - Linguistics>

19. In an appendix to his first book, this author refutes the suggestion that he is "an enemy of all religion," suggesting he only hates the "horrible hypocrisy" of Christianity. In one of his books, this author recounts his friend Nathan Johnson giving him a new surname from Walter Scott's *Lady of the Lake*. In that book, this author describes receiving a "magical root" from a woman named Sandy Jenkins before he fights with Edward (*) Covey, a man who tried to "break" him. This man credited a schoolbook called *The Columbian Orator* for his literacy in an autobiographical work that ends with his marriage to Anna Murray, a freewoman. For 10 points, name this abolitionist who described his escape from slavery in a namesake "narrative."

ANSWER: **Frederick Douglass** [accept either underlined part; accept Frederick Augustus Washington **Bailey**]

<Jose, Literature - American>

20. Religion and type of structure required. Circumambulation rituals in these structures are typically done in a clockwise manner, but during funeral rites or on the thirteenth day of the lunar month, they are to be done counterclockwise instead. These highly symmetrical structures are usually laid out on an 8-by-8 grid. A term meaning "womb chamber" refers to the innermost part of these locations, which is where offerings of coconuts and food are made before an idol called a (*) *murti* ("MOOR-tee"). In the city of Puri, people perform *mahaprasad* at one of these places dedicated to Jagannath. The staff of these places typically conduct a regular schedule of *pujas* throughout the day. For 10 points, give these locations where one worships such deities as Shiva and Vishnu.

ANSWER: **Hindu temples** [accept **mandirs**; accept **Vaishnava temples** or **Vaishavite temples** or **Shaivite temples**] (The word meaning "womb chamber" is *garbhagriha*.)

<Alston, RMP - Other Religion>

21. The excavation of Tungrian relics from a construction project ordered by this man has unearthed the only known sculpture showing Mithras emerging from an egg. Apollodorus of Damascus was supposedly killed for criticizing the design of the Temple of Venus and Roma that this emperor built where Nero's Domus Aurea once stood. This emperor housed a replica of Praxiteles's sculpture of Aphrodite at his sprawling (*) villa in Tivoli. The city of Antinopolis was founded by this emperor in honor of his lover who drowned in the Nile River. A defensive structure built under this man's rule was superseded by one built 100 miles to the north by Antoninus Pius. For 10 points, name this Roman emperor who erected a namesake wall in modern-day Britain.

ANSWER: **Hadrian** [or Publius Aelius **Hadrianus** Augustus; accept **Hadrian's Wall** or **Vallum Aelium** before "this man's"]

<Husar, History - European>



NSC 2019 - Round 10 - Bonuses

1. This piece is written for two choirs of four and five voices, respectively, and features a treble solo with an impressive high C. For 10 points each,

[10] Name this choral piece by Gregorio Allegri written for the Tenebrae ("TEN-eh-brye") service of the Sistine Chapel. Transcribing this piece was forbidden for over 120 years.

ANSWER: Miserere mei, Deus ("mih-zuh-RARE-ay may DAY-oos")

[10] This composer received the Order of the Golden Spur from Pope Clement XIV after secretly transcribing the *Miserere* from memory while on a tour of Italy with his father Leopold.

ANSWER: Wolfgang Amadeus Mozart

[10] This other choral piece by Mozart was completed by Franz Süssmayr ("SEUSS-may-ur") after his death, and includes such movements as "Dies Irae" and "Lacrimosa."

ANSWER: Requiem Mass in D minor, K. 626 [accept either underlined portion]

<James, Fine Arts - Music>

2. A type of literature named for members of this profession often drew on the *payadas* they sing. For 10 points each:

[10] Give this original-language term for the profession of Don Segundo Sombra, whom the narrator follows across the pampas ("PAHM-pahs").

ANSWER: gauchos [prompt on cowboy or horseman]

[10] *Don Segundo Sombra* is often considered the national epic of this Latin American country. Its other gaucho literature includes *Martin Fierro*.

ANSWER: Argentina [accept Argentine Republic]

[10] The narrator of *Don Segundo Sombra* christens his sheepskin pad "misery" after he listens to a story about a man in this profession also named Misery. Thomas Keneally used the word for this profession as the surname of a half-Aboriginal title character, who goes on a killing rampage against white people.

ANSWER: blacksmith [accept smith; accept *The Chant of Jimmie Blacksmith*]

<Bentley, Literature - World and Miscellaneous>

3. A transdermal patch of this substance sometimes resolves the symptoms of ulcerative colitis. For 10 points each:

[10] Name this alkaloid which stimulates the parasympathetic nervous system. Common ways of imbibing it are in the form of cigarette smoke or via Juul pod.

ANSWER: nicotine

[10] Nicotine functions by serving as a receptor agonist to receptors meant to respond to this neurotransmitter; those receptors for this neurotransmitter are typically found at neuromuscular junctions.

ANSWER: acetylcholine [or ACh]

[10] This other class of acetylcholine receptors forms GPCR complexes. They are named for a quaternary ammonium salt found from a toxic mushroom.

ANSWER: muscarinic acetylcholine receptors [or mAChRs; accept muscarine]

<Wang, Science - Biology>

4. For 10 points each, answer the following about the intersection of popular music and European politics:
[10] In 2018, youthful protestors in this country petitioned parliament with the slogan "We Dance Together, We Fight Together" after raids on nightclubs. Fifteen years earlier, pro-Western protestors staged its Rose Revolution.

ANSWER: **Georgia** [or **Sakartvelo**]

[10] One of the signals of the coup that started this country's Carnation Revolution was the performance of a song in the 1974 Eurovision competition.

ANSWER: **Portugal** [or **Portuguese** Republic]

[10] The Singing Revolution led to the independence of three countries commonly named for this body of water. Peter the Great sought to gain control of this sea by founding Saint Petersburg as a port on it.

ANSWER: **Baltic** Sea [accept **Baltic** States; anti-prompt on the **Gulf of Finland**]

<Bentley, History - European>

5. Shakuni owned several of these objects that magically obeyed his will. For 10 points each:

[10] Give these objects used in a game that Yudhishtira ("yood-heesh-thir") repeatedly loses, resulting in the loss of the Pandavas' wife Draupadi and later their thirteen-year exile.

ANSWER: **dice** [or **die**]

[10] The results of that dice game later set the stage for this conflict, a protracted war between the Kauravas and the Pandavas. This war is named for an ancient Vedic kingdom.

ANSWER: **Kurukshetra** War [prompt on, but do not otherwise reveal the *Mahabharata War*]

[10] Both the Dice Game and the Kurukshetra War are major episodes in this Sanskrit epic attributed to the sage Vyasa.

ANSWER: the **Mahabharata**

<Jose, RMP - World Mythology>

6. In one novel named for this group Olenin falls in love with Maryanka, the wife of the hero Lukashka. For 10 points each:

[10] Name this group that titles an 1863 novel published in *The Russian Messenger*. Their lifestyle is depicted in a valley nearby the title river in the novel *And Quiet Flows the Don*.

ANSWER: **Cossacks** [accept *The Cossacks*]

[10] This author wrote about the Cossack Ivan Mazepa in his poem *Poltava*. Another of his poems concerns Evgeny, who witnesses a statue come to life after the Neva River floods.

ANSWER: Alexander **Pushkin** [or Alexander Sergeyevich **Pushkin**]

[10] The protagonist of Pushkin's other poem *Prisoner of the Caucasus* is modeled on the archetypal "hero" of this English poet, seen in his *Childe Harold's Pilgrimage* and *Don Juan*.

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

<Keyal, Literature - European>

7. This extremely symmetric crystal system is sometimes called the isometric group, and 36 space groups are found within it. For 10 points each:

[10] Name this crystal system which contains three axes of identical length which are mutually orthogonal.

ANSWER: **cubic** crystal system

[10] A crystal structure in which a lattice point is present at the center of each of these parts of the cubic lattice has a packing efficiency of roughly 0.74, which meets the limit set by the Kepler conjecture.

ANSWER: **face** [accept face-centered **cubic**]

[10] This crystal system has the lowest possible amount of symmetry, because all three axes of the unit cell are different lengths and none of them intersect at 90 degrees.

ANSWER: **triclinic**

<Rosenberg, Science - Physics>

8. This man proclaimed, "My God, I've shot myself!" after accidentally switching an empty pistol with a loaded one while defending Thomas McGehan. For 10 points each:

[10] Name this Democratic politician, a leader of the Copperheads whose treason sentence was commuted by President Lincoln.

ANSWER: Clement L. **Vallandigham** [accept Clement Laird **Vallandigham**]

[10] While in exile in Canada, Vallandigham ran for Governor of this state. Ulysses S. Grant was one of five Union veterans born in this Buckeye State who was elected President.

ANSWER: **Ohio**

[10] Vallandigham responded to this man's General Order Number 38 with a speech attacking "King Lincoln." This commander at Fredericksburg led the Army of the Potomac after George McClellan and before Joseph Hooker.

ANSWER: Ambrose **Burnside** [accept Ambrose Everett **Burnside**]

<Singh, History - American>

9. In architecture, pilasters are surfaces raised from an underlying flat surface, and they resemble these objects. For 10 points each:

[10] Name these building components which typically consist of a "shaft" between a "base" and a "capital." In the Doric order, these objects may possess grooves called flutes.

ANSWER: **columns**

[10] In the Renaissance, this order of architecture was considered the simplest, as it consists of Doric elements with a plain entablature. This order was sometimes called "Roman Doric," but it takes its name from an Italian region.

ANSWER: **Tuscan** Order [accept any answers indicating the order of **Tuscany**]

[10] This architect used several different orders, such as Tuscan columns surrounding a Doric-appearing set of pilasters, for the *martyrium* he made in San Pietro, the *Tempietto*.

ANSWER: Donato **Bramante** [accept Donato di Pascuccio **d'Antonio**; or Bramante **Lazzari**; or Donato **d'Augnolo**; or Donino **Bramante**; prompt on **Donato**]

<Jose, Fine Arts - Architecture>

10. For 10 points each answer the following about crossmodal perception, or the many ways one perceives a stimulus:

[10] This lobe of the brain is thought to integrate various stimuli into a single set of information, and is home to the "dorsal" stream of vision. It sits behind the frontal lobe.

ANSWER: **parietal** lobe

[10] The crossmodal connections within the parietal lobe have been shown to be stronger in people with this condition, exemplified by a person who associates colors with letters of the alphabet.

ANSWER: **synesthesia** [accept **synesthetes**]

[10] Research on crossmodal stimuli in synesthetes has been inspired by an effect named for these two nonsense words. In a classic experiment, these words refer to shapes that have jagged and smooth edges. Please give two answers.

ANSWER: **kiki** AND **bouba** [accept answers in either order]

<Jose, Social Science - Psychology>

11. For 10 points each, answer the following about works of literature depicting mummified flesh as a medicine.
[10] In the play *Macbeth*, these characters concoct a potion made with "mummy, maw and gulf." They chant "double, double, toil and trouble" at the beginning of the play.

ANSWER: **Weird Sisters** [or the Three **Witches**]

[10] This author claimed Francis I used mummified flesh as a "panacea" in his treatise *Fragment on Mummies*. Cambyses's ("kam-BY-see'z") mummified flesh was a valuable Egyptian commodity according to this author's meditation *Hydriotaphia* ("high-dryo-TAY-fee-uh").

ANSWER: Sir Thomas **Browne**

[10] Gasparo tells Ludovico "your followers have swallowed you like mummia, and being sick ... vomit you up" in this author's play *The White Devil*. Another of his revenge dramas is *The Duchess of Malfi*.

ANSWER: John **Webster**

<Jose, Literature - British>

12. For 10 points each, answer the following about Belgian engraver Theodor de Bry:

[10] Despite never having been to the New World, De Bry produced popular engravings of the "cannibals" of this modern-day country biting the legs off their enemies. In the 19th century, this country gained independence from Portugal.

ANSWER: **Brazil** [accept **Brasil** or Federative Republic of **Brazil**]

[10] De Bry illustrated scenes from *A Short Account of the Destruction of the Indies*, a text by this Spanish friar who argued for native rights against Juan de Sepúlveda in the Valladolid ("BUY-ah-doh-lead") debate.

ANSWER: Bartolome de **las Casas**

[10] De Bry's illustrations contributed to a "legend" described by this adjective that held that the Spanish colonial empire was unique in its atrocities.

ANSWER: **black** legend [accept leyenda **negra**]

<Bentley, History - Cross, Historiography, and Miscellaneous>

13. This artist's best-known painting, *The Banjo Lesson*, was based on sketches he made in the Blue Ridge Mountains and produced after his brief return to America in 1893. For 10 points each:

[10] Name this African-American artist, a student of Thomas Eakins who moved to Paris to further his career.

ANSWER: Henry Ossawa **Tanner**

[10] Tanner's paintings include a realist version of this scene in which a woman sits on a bed and gazes at a brilliant light to her left. An angel often carries a white lily in paintings of this religious scene.

ANSWER: The **Annunciation**

[10] This artist's painting *Saying Grace*, one of his works for *The Saturday Evening Post*, echoes Tanner's painting *The Thankful Poor*. This artist painted the "Four Freedoms" series.

ANSWER: Norman **Rockwell**

<Alston, Fine Arts - Painting>

14. For 10 points each, give the following types of matrices ("MAY-truh-seez"):

[10] This type of square matrix has ones along the main diagonal and zeros everywhere else. Multiplying this matrix with another matrix will leave the other matrix unchanged.

ANSWER: **identity** matrix

[10] These matrices named for a Russian mathematician are used to model stochastic processes. Those matrices model namesake "chains," which treats event probabilities as being dependent *only* on the state of the previous event.

ANSWER: **Markov** matrices [or **Markov** chains; accept Andrei **Markov**]

[10] The inverse of this type of matrix equals its conjugate transpose. These matrices can diagonalize normal matrices and are often used in quantum mechanics.

ANSWER: **unitary** matrix [or **unitary** matrices]

<Reinstein, Science - Math>

15. For 10 points each, identify the following about an Islamic celebration called an *aqiqah* ("ah-KEE-keh"):

[10] The celebration, which includes a naming ceremony, traditionally takes place seven days after one of these events. In Judaism, the bris occurs 8 days after one of these.

ANSWER: child**birth** [accept **birth** of a male child or child being **born**]

[10] At the ceremony, this action is performed on the infant to determine how much silver to donate to charity. The Hindu *chudakarana* ("choo-duh-kuh-RAH-nah") ceremony centers on this action.

ANSWER: **cutting** the child's **hair** for the first time [accept synonyms for **haircuts**; accept **tonsure** or **tonsuring**]

[10] An animal is usually sacrificed at an *aqiqah*, with its meat given to the poor in an act of *sadaqah* or voluntary almsgiving. Give the Arabic term for the mandatory almsgiving and counterpart of *sadaqah* which is one of the Five Pillars of Islam.

ANSWER: **zakat** [accept **zakat** al-mal]

<Bentley, RMP - Other Religion>

16. For 10 points each, answer the following about the problem of referring:

[10] Philosophers concerned with the problem of referring often discuss how one of these things "picks out" its underlying object. Saul Kripke held that "proper" ones always picked out the same object or person.

ANSWER: **names** [accept proper **names** or personal **names**]

[10] This philosopher argued that a referent's meaning should be analyzed with respect to a whole sentence in an 1892 paper theorizing that the reference of a sentence is merely its truth value.

ANSWER: Gottlob **Frege** [accept Friedrich Ludwig Gottlob **Frege**] (That paper is "On Sense and Reference.")

[10] The view that a name's meaning is merely the underlying object to which it refers is presented in this philosopher's book *A System of Logic*. In another work, he advocates for the "harm principle."

ANSWER: John Stuart **Mill**

<Jose, RMP - Philosophy>

17. This acid is typically used to adjust the pH of Tris solutions. For 10 points each:

[10] Name this strong acid that reacts with sodium hydroxide to form table salt and water.

ANSWER: **hydrochloric** acid [accept **HCl**]

[10] Hydrochloric acid is often used to adjust pH because it is relatively inert, whereas nitric acid also acts as one of these species in reactions. This type of species solubilizes ("SOL-yuh-buh-LIE-zus") metallic copper by converting it to Cu^{2+} .

ANSWER: **oxidizing agent** [accept **oxidizer** or **oxidant**]

[10] Oddly, this element actually dissolves better in *non-oxidizing* acids like HCl because its oxide is so prevalent and insoluble. This element breaks the octet rule by forming stable covalent compounds with four valence electrons.

ANSWER: **beryllium** [accept **Be**]

<Silverman, Science - Chemistry>

18. For 10 points each, answer the following about literature concerned with eating meat:

[10] A 2004 David Foster Wallace essay asks whether it is alright to boil this creature alive for "our gustatory pleasure."

ANSWER: **lobster** [accept "**Consider the Lobster**"]

[10] This author wrote "to believe we can live without taking life is delusional" in a book describing her turn to eating only locally raised meats, *Animal, Vegetable, Miracle*. One of her novels centers on the Price family, who goes to the Congo to convert the village of Kilanga.

ANSWER: Barbara **Kingsolver** (The novel is *The Poisonwood Bible*.)

[10] A poem from this movement called "Steak" attacks carnivorism by depicting "stockmen in Denver suits" eating meat. Another poem from this movement repeatedly states "I'm with you in Rockland!"

ANSWER: **Beat** Poetry [accept **Beatniks** or **Beat Generation**; prompt on San Francisco Renaissance] (The two poems referenced are "Steak" by Gary Snyder and "Howl" by Allen Ginsberg.)

<Jose, Literature - American>

19. During an action orchestrated by this man, Mansour bin Muqrin was killed when his helicopter was shot down in an escape attempt. For 10 points each:

[10] Name this man who placed several wealthy political opponents under house arrest at a Ritz-Carlton hotel in 2017.

ANSWER: **Mohammad bin Salman** bin Abdulaziz al Saud [accept **MBS**; prompt on Mohammad; do NOT reveal this answer otherwise, but prompt on Saud; do not accept or prompt on "Salman" or "bin Salman"]

[10] Mohammad bin Salman is the royal heir and most powerful man in this Middle Eastern monarchy, which granted women the right to drive in 2018.

ANSWER: **Saudi Arabia** [accept Kingdom of **Saudi Arabia** or **as-Sa'ūdiyyah**]

[10] The Saudis partnered with this Japanese company, run by Masayoshi Son, to establish the massive Vision Fund for tech investing. This company's huge investments in firms such as Uber and WeWork may be contributing to a general tech bubble.

ANSWER: **SoftBank** [accept **SoftBank** Group Corp.]

<Minarik, Current Events - World>

20. For 10 points each, answer the following about horrible methods of execution employed by Chinese emperors:

[10] According to historian Sima Qian ("sih-mah ch'yen"), Qin Shi Huangdi ("chin shur hwong-dee") executed 460 scholars in this specific manner and burned thousands of their books.

ANSWER: **burying** them **alive** [accept **live burial** or equivalent answers indicating **burying** a **living** person; accept **interring** for "burial"; prompt on **burying** or **interring**]

[10] Another method of execution was to pull the victim apart by attaching them to two of these horse-drawn vehicles, which were widely used in ancient warfare.

ANSWER: **chariots** [prompt on **cars**]

[10] This method of execution, reserved for the worst enemies of the state, was finally outlawed by the Qing in 1905. Missionary Auguste Chapdelaine ("aw-GOOST shop-duh-LEN") was killed by this method, whose English name gives rise to a phrase describing a failure which results from many small problems.

ANSWER: death by a **thousand cuts** [accept **slow slicing** or **lingchi**; prompt on **cuts**; prompt on **slow process**]
<Alston, History - World>

21. In this experiment, electrons were accelerated from a hot filament to a nickel target. For 10 points each:

[10] Name this experiment, whose results showed strong peaks in the scattered electron intensity as a function of the square root of accelerating voltage.

ANSWER: **Davisson-Germer** experiment

[10] The Davisson-Germer experiment confirmed this Frenchman's hypothesis that matter has properties of both waves and particles. His namesake wavelength equals Planck's constant divided by a particle's momentum.

ANSWER: Louis **de Broglie**

[10] The Davisson-Germer experiment did for electrons what this earlier experiment did for light. The light and dark interference bands in this experiment provided evidence for the wave nature of light.

ANSWER: Young's **double-slit** experiment [prompt on **Young's experiment**]

<Rosenberg, Science - Physics>