**Chicago Open 2016: "An Insatiable Kingpin of International Meme-Laundering"**

**Packet by Make America Jolly Good Again (Will Alston, Andrew Wang, Richard Yu, and Joey Goldman, the last of whom didn't write for this packet)**

**Edited by John Lawrence, Mike Cheyne, Matt Jackson, Adam Silverman, Mike Bentley, Aaron Rosenberg, Jake Sundberg, and Shan Kothari, with contributions from Ewan Macaulay and Jonathan Magin**

**Tossups**

1. **The psi-vector method developed by Daniel Keyser can be used to partition between this phenomenon and an alphabetically-prior orthogonal component. This is the alphabetically-latter phenomenon that A.E. Gill defined in a 1980 paper as a symmetric solution to the shallow-water equations. This eponymous phenomenon is defined as meridionally-averaged zonal flow, and was named by Jacob Bjerknes. This phenomenon has two weak** (\*) upward branches over North Africa and the Caribbean and a strong one above the Pacific Warm Pool of Southeast Asia. This loop is, respectively, weakened and intensified by El Niño and La Niña. For 10 points, name this atmospheric circulation of warm tropical air rising in the west and falling in the east as it cools, named for the British scientist who first described the Southern Oscillation.
ANSWER: **Walker** circulation [or **Walker** cell]

2. **A book on this society's *Ceremonial Landscapes* was edited by Harvard divinity school professor David Carrasco. Like the Kwakiutl and the Nazis, its ever more elaborate religious ceremonies were linked to crises of legitimacy in *Envisioning Power* by Eric Wolf. In the eleventh month, this society's commoners took part in a Festival of Sweeping the Roads. These people might have believed they came from a Land of White Herons. This society built over seventy temples in a Sacred Precinct ringed by a wall decorated with images of** **snakes, and baked edible** (\*) idols out of amaranth dough containing honey and blood. Their New Fire ceremony happened every 52 years when two types of calendar year overlapped, and their largest sacred building was a twin temple containing racks of skulls. For 10 points, name this society whose religion was led by a *tlatoani*, and whose Templo Mayor sat in Tenochtitlan.
ANSWER: **Aztec**s [or **Mexica**; or **Tenochca**]

3. **The cold-sensitive mutants brr1 and brr2 have defects in the assembly of this structure. Another protein required for the assembly of this structure has the Tudor domain, complexes with GEMINs and the UNRIP protein, and is named because it's deficient in spinal muscular atrophy. It co-precipitates with the DEXD/H box proteins p68 and p72. Proteins in this magnesium-dependent complex share an N-terminal alpha helix followed by five consecutive beta sheets, which is called the** (\*) Sm motif, and links the proteins B, D1, D2, D3, E, F, and G in a heptameric assembly. The P element in *Drosophila* is a silencer for this complex when it acts on DSCAM or fibronectin. The U2 component of this structure hybridizes to the branchpoint sequence and causes an adenosine to "bulge". This structure catalyzes two transesterifications marked off by the poly-pyrimidine tract. For 10 points, name this complex of snRNPs [snurps] that removes introns from pre-mRNA.
ANSWER: **spliceosome** [prompt on snRNPs; prompt on any alphanumeric protein beginning with U like U1, U2, U6, etc.]

4. **This artist's first book paired photographs of California and Florida domestic architecture with typewritten musings on the people who lived inside. Actors playing art critics and political strategists yell slogans such as "Get out of my face!" at each other in this artist's 2004 video installation, *Twelve*. An exhibition of this artist at the Hirshhorn Museum in DC in 2012 sprawled her works onto both the (\*)** floor and escalator of the museum and was titled "Belief + Doubt". The alternate title of one of her works comes from a Hans Johst quote, and divides a picture of Howdy Doody into three panels. A woman gazes into a mirror which has been shattered by a large bullet hole in one work by this artist of *When I hear the word culture I take out my checkbook*. She used Futura Bold Oblique for the phrase, “I shop therefore I am” in one of her works. For 10 points, name this feminist artist of *Your Body is a Battleground*.
ANSWER: Barbara **Kruger**

5. **This author created a philosopher who argues that human souls cannot be measured by divine standards just like clocks in China should not be set to the time in Greenwich. In a novel by him, a woman admires an old Frenchman’s tattoos, and then shocks onlookers by lifting her skirt to show off her own. This author included a dedication to the “Imperial Purple Majesty” of Mount Greylock in a novel that features a pamphlet on “Chronometricals and Horologicals” written by** (\*) Plotinus Plinlimmon. The protagonist of that novel by him has a vision of Enceladus and, with his half-sister Isabel, drinks poison in The Tombs. In a novel by this author, a man who is crippled by a swollen leg is given Kory-Kory as a servant by king Mehevi. This author gained fame for a novel about Tom and Toby, who leave the ship *Dolly* to encounter the title people on the island of Nuku Heva in Polynesia. For 10 points, name this American author of *Pierre: or, the Ambiguities* and *Typee*.
ANSWER: Herman **Melville**

6. **Repression of this ethnic group prompted the creation of the Movement for Rights and Freedoms party, which was excluded from round table discussions in 1990, a year after several thousand of them migrated in the so-called “Big Excursion.” During the 1980s, over 500 members of this ethnicity were taken to the Belene Island concentration camp. As part of brutal assimilation policies called the "Process of Rebirth," members of this ethnic group were forced to Slavicize their surnames from 1984 to 1989 by a (\*)** Communist government. This was the largest of the groups that migrated *east* as a result of a Fridtjof Nansen organized agreement created at the 1923 Conference of Lausanne. Todor Zhivkov’s government heavily persecuted this ethnic group in Bulgaria. For 10 points, identify this ethnic group, many of whose members migrated from Greece after the collapse of the Ottoman Empire.
ANSWER: **Turk**s [prompt on Bulgarian Muslims or Greek Muslims or similar]

7. **The title figure holds a skull in her left hand and reclines in a pose similar to the Vatican’s *Sleeping Ariadne* in this sculptor’s *Penitent Magdalen*. In another of his works, a young woman is brought before an armless altar of the title god, whose garland is being held up by a putti. This artist of *Vestal presenting a Young Woman at the Altar of Pan* shared an Italian studio with Jean-Antoine (\*)** Houdon after winning the 1759 Prix de Rome. A two-foot tall sculpture by this artist depicts the title nude woman pouring wine into the mouth of the figure who is embracing her. Putti haul up hay for fuel at the bottom of a sculpture planned for the Tuileries Gardens by this artist. In that same work by this sculptor, Fame blows a trumpet and Aeolus guides the title spherical invention. For 10 points, name this French sculptor of the Rococo *Nymph and Satyr Carousing* and *Monument to Commemorate the Invention of the Balloon*.
ANSWER: **Clodion** [or **Claude Michel**]

8. **Three years after becoming infamous for actions at this location, a non-Ferguson related Michael Brown was arrested in West Virginia for kidnapping someone who sold him worthless coins at a flea market. The families of Marcus Gill, Rodrico Harp, and Kendrick Letet initially claimed the government of this place persecuted them because they were black. Admiral Richard Macke was fired for suggesting the aforementioned three men at this location should have hired a prostitute instead. Incidents at this location in 1995 and 2002 led to calls to revise the (\*)** SOFA agreement. Those incidents here included an attack on a Filipina bartender and the gang rape of a 12-year-old, and have raised considerable public anger at the 34 U.S. military installations located on this island. For 10 points, what island was the site of the largest amphibious assault in the Pacific theater of World War II, a battle that began on April 1, 1945?
ANSWER: **Okinawa** [or Camp **Courtney**; or Camp **Hansen**; prompt on Japan]

9. **In one of this author’s novels, a doctor’s wife tells a cautionary tale about a lady from Somerset who was assaulted by her washerman after his lust was inflamed by the underwear she gave him to iron. The protagonist is horrified when an Italian angel monument causes her to find the grave of that woman’s child while strolling through a cemetery, in that novel by this author. This author wrote a novel in which a repeated scene features characters tying red strings to the Baba Firdaus shrine. Marcia gives Harry a set of letters written in 1923 that inspire the narrator to retrace the steps of a woman to the town of X in the** (\*) Himalayan foothills, in a Booker Prize-winning novel by this author, whose narrator has an affair with Inder Lal that mirrors Olivia Rivers’s affair with the Nawab of Khatm in colonial India. She wrote screenplays for films like *The Remains of the Day* and *A Room with a View* for Merchant Ivory Productions. For 10 points, name this author of *Heat and Dust*.
ANSWER: Ruth Prawer **Jhabvala** [or Ruth **Prawer**]

10. **An ethnography of this country calls a sixty-year old matriarch cradling a white doll a “disorienting caricature of motherhood,” and describes “Marginality in an Out-Of-The-Way Place.” Fieldwork in this country’s forests inspired a book analyzing the “frontier zones” of capitalism, which uses the rubbing together of sticks as an alternative metaphor to the “clash of cultures.” The books *In the Realm of the Diamond Queen* and *Friction* were both based on Anna Tsing’s fieldwork in this country. Forms of traditional cultivation in this country such as** (\*) *sawah* are examined in the book *Agricultural Involution*. Benedict Anderson died in this country. An essay set in this country describes a truck full of policemen showing up to disrupt the author's feeling of joining a "superorganism" surrounding a super-high-stakes game. For 10 points, in what country did Clifford Geertz observe "deep play" at a Balinese cockfight?
ANSWER: Republic of **Indonesia** [or Republik **Indonesia**]

11. **A writer who lived in this city was defended from treason charges thanks to a poem by his friend Venantius Fortunatus. That writer from this city used the line “Nero and Herod of our time” to attack a king who killed his wife Galswintha at the behest of his mistress Fredegund. A man with a shrine in this city left the Roman army by saying “I am a soldier of Christ--I cannot fight” and once legendarily cut his military cloak in half to share with a beggar who was Jesus in disguise. That man who became bishop here was (\*)** Martin. Another religious leader here wrote the twenty hagiographies collected in *Lives of the Fathers*, as well as ten books of histories that offer a Constantine-like depiction of Clovis’ conversion to Christianity. The author of the *Historia Francorum* was a bishop of this city named Gregory. For 10 points, what French city names a 732 victory for Charles Martel?
ANSWER: **Tours**

12. **This poem’s speaker complains about those of turbulent temperament by saying: “The sudden blood of these men! at a word — / Praise them, it boils, or blame them, it boils too.” The speaker of this poem recalls “kingly days” when “Too live the life grew, golden and not grey,” and repeatedly expresses a desire to retreat to “sober pleasant Fiesole.” This poem praises the “...perfect brow / And perfect eyes, and more than perfect mouth” of a woman, but laments that she cannot inspire beyond her beauty, saying “Had you, with these the same, but brought a** (\*) mind!” This poem’s narrator meditates on the success of rivals who access “a heaven that’s shut to [him],” and in whom “there burns a truer light.” This poem’s final line of “Again, the Cousin’s whistle!” references the ongoing infidelity of its speaker’s wife, Lucrezia. For 10 points, name this Robert Browning poem about an Italian painter of “faultless” but soulless works.
ANSWER: “**Andrea del Sarto**”

13. **The pilgrim Sung Yun, who encountered one of these people’s kings in the Wakhan corridor, described them as fire-worshippers. These non-Persian people requested that *catholicos* Mar Aba I appoint a priest as bishop for their empire. According to the *Rajatanagini* chronicle, their devout Shaivite king destroyed 1,400 temples in Gandhara. Women wore one horn on their headdress for each husband they had in this people’s polyandrous society. The accounts of Cosmas Indicopleustes give the name (\*)** “Gollas” to a powerful ruler of these people named Mihirakula. Until Khosrau I teamed up with the Gokturks to kick these peoples’ ass at the 557 Battle of Bukhara, they extracted huge amounts of tribute from the Sassanid Empire. For 10 points, identify these nomadic peoples who overran much of the Gupta empire whose common name is similar to a Europe-ravaging group led by Attila.
ANSWER: **White Huns** [or Sveta **Huna**s; or **Hephthalite**s; do NOT accept or prompt on “Huns” alone]

14. **One of this man's sons faced off against a *Gandharva* with the son's same name in a three-year-long battle. Mahabhisha of Ikshvaku was reincarnated as this man after ogling a goddess whose robe blew off her shoulders. This man married a woman who sat on his meditating father Pratipa's right thigh. While hunting, he caught the sweet scent of a fisherwoman from miles away, whose fishy odor had been replaced by the gods. This father of** (\*) Chitrangada gave one of his sons the gift of being able to choose when to die. After not questioning her seven prior times, this man stopped his wife from drowning their eighth child, thereby finding out that she was the goddess of the Ganges river. Before this man married Satyavati, his son Devavrata took a vow of chastity and changed his name to Bhishma. For 10 points, name this king of Hastinapura, a common ancestor of the Pandavas and Kauravas in the *Mahabharata*.
ANSWER: **Shantanu** [or **Śantanu**]

15. **This thinker claimed that animals are fully absorbed in the “contemplation” of objects, and that only the human subject can know itself through the “desire” that constitutes its being. This thinker therefore declared that “Man is Self-Consciousness” in the first sentence of his most famous work, which was compiled by his student Raymond Queneau and edited in its English edition by Allan Bloom. He originated the claim that law will become actualized only when all of humanity is beholden to a final stage of justice that he dubbed the “universal and homogenous state.”** (\*) Leo Strauss engaged in lifelong dialogue on tyranny with this philosopher and friend of his. This 20th-century philosopher inspired Francis Fukuyama by arguing that the uniting of master and slave would cause the “end of history,” which he interpreted as a reason to support Stalin. For 10 points, name this Russian-born French philosopher, best known for his *Introduction to the Reading of Hegel*.
ANSWER: Alexandre **Kojève** [koh-ZHEV]

16. *Note to players: Ingredient AND cooking method required. So, we’re looking for something like “flambéed chocolate” or “barbecued lima beans.”* **These items are served with artichokes, slices of tongue, and cheese sauce in a dish named for Metternich. Portuguese braised peas with chorizo, or *ervilhas guisadas*, are traditionally topped with these items.These items are cooked in a red wine sauce when they are *en meurette* [awn murr-ett].They are served with yogurt in a Turkish dish called *Çilbir* [chill-birr]. These items are served inside artichoke bottoms with creamed spinach in a dish named for playwright Victorien Sardou. These are surrounded by a spicy tomato sauce in the North African dish** (\*) *shakshouka.* These traditionally top a warm salad of bacon and curly endive in *frisée aux lardons* [free-zay oh lahr-dawn]. Vinegar is traditionally added to their cooking water, which is often swirled in a vortex, to prevent “feathering.” A brunch dish that serves them with spinach is called Florentine. For 10 points, name these items that are served on top of English muffins with Canadian bacon and hollandaise in a dish named for Benedict.
ANSWER: **poached egg**s [do NOT accept or prompt on “boiled eggs”]

17. **Richard Larock wrote a series of papers detailing uses of this element in organic chemistry. Nishizawa pioneered the use of this element’s triflate for olefin cyclizations. In China, but basically nowhere else, vinyl chloride monomer is made using a catalyst containing this metal. Oxides or chlorides of this metal are added to deprotect dithianes and reform carbonyls. Aromatic nitration done with this element’s nitrate forms trinitrophenol. The Chisso corporation manufactured acetaldehyde by reacting** (\*) acetylene with a catalyst containing this metal, which normally converts terminal alkynes to methyl ketones in water. This element’s acetate, a soft acid, forms a cationic three-membered ring, which is then attacked at the more substituted carbon and reduced by sodium borohydride, in a Markovnikov hydration of alkenes. The alternate name for thiols reflects their affinity for this metal. For 10 points, name this metal found in amalgams.
ANSWER: **mercury** [or **Hg**]

18. **A society named for this conductor releases his recordings on the Cala label. He made an infamous 1966 recording of Beethoven’s *Emperor Concerto* in collaboration with Glenn Gould.At the end of his career, this conductor made a series of “Phase 4 stereo” recordings for Decca with mostly British orchestras. His advocacy for the music of Rachmaninoff included premiering his Fourth Piano Concerto and *Rhapsody on a Theme of Paganini,* with the composer himself at the piano. His encouragement of free bowing first produced the namesake “sound” of the** (\*) Philadelphia Orchestra, which he led until he was succeeded by Eugene Ormandy. His trademark was conducting without a baton. His most famous appearance opens with his own arrangement of Bach’s Toccata and Fugue in D minor and includes a truncated version of *Rite of Spring* accompanying animated dinosaurs. For 10 points, name this flamboyant conductor of the original Disney *Fantasia*.
ANSWER: Leopold (Anthony) **Stokowski**

19. **Tantalum arsenide was shown to exhibit properties of a material named for this man after observations of crescent-shaped structures using ARPES. That material named for this man exhibits Fermi arcs instead of circles on its surface, and is believed to consist of a namesake particle oriented in monopole and anti-monopole states. Roger Penrose proposed that the universe’s low entropy was due to the vanishing at the Big Bang of a construct named for this man. Though he is not** (\*) Riemann, his namesake rank-4 tensor expresses the tidal force experienced by a body moving on a geodesic. This man proposed a massless fermion that is both charged and chiral that could be combined to form a Dirac fermion. For 10 points name this physicist from the University of Göttingen who introduced gauge invariance while attempting to combine electromagnetism with general relativity.
ANSWER: Hermann **Weyl** [“vile”]

20. **In a novel titled for this place, the narrator remarks while returning to his hometown: “You need a village, if only for the pleasure of leaving it.” In that novel titled for this place, the protagonist finds out that his old friend had witnessed partisans murder and burn the body of a woman whom they accused of collaborating with the fascists. In another work, this place is home to a valuable cream cheese-like substance made “chiefly of vegetal juices, tadpoles, bitumen, lentils,” among other things, that is collected by the speaker’s deaf cousin.** (\*) Santina’s death is revealed to a narrator named “Eel” by Nuto in Cesare Pavese’s novel titled for this location *and the Bonfires*. After this place passes by the Zinc Cliffs, Mrs. Vhd Vhd and Old Qfwfq are stuck on it, in the first story of Italo Calvino’s *Cosmicomics*. Astolfo flies a hippogriff to, for 10 points, what place where the bottle containing Orlando’s wits is located in *Orlando Furioso?*
ANSWER: the **moon** [or *La* ***luna*** *e i falo*]

21. **Early in this film, superposed images of a man’s mistress watch him as he lies on his back in a beached boat and thinks about the ID cards of modern society. In this film, frenzied “demon-killing” drums play as villagers in animal masks shine spotlights on two fighting lovers. It uses extreme close-ups of faces and necks to display two characters’ thirst as they are being deprived of water. This winner of the 1964 Jury Prize at Cannes concludes with an official “Notification of Missing Persons,” and opens with microscopic shots of crystals that zoom out to form rippling waves of (\*)** sand. It stars former *Hiroshima, mon amour* lead Eiji Okada and, similar to the director’s films *Pitfall*, *The Face of Another*, and *The Ruined Map*, was scored by Toru Takemitsu. For 10 points, name this Hiroshi Teshigahara film adaptation of a novel about amateur entomologist Niki Junpei’s travails in a pit of sand, written by Kobo Abe.
ANSWER: ***Woman in the Dunes*** [or ***Suna no Onna***]

**Bonuses**

1. Some students get caught quote-unquote "immigrating" to take this test in less populous provinces in the northeast, because passing grades are lower in provinces with fewer test takers. For 10 points each:
[10] Give the common name of this insanely competitive, two-day-long Chinese standardized test. It almost wholly determines which Chinese universities will let a student in.
ANSWER: ***gaokao*** [prompt on National Higher Education Entrance Examination]
[10] Many top scorers on the *gaokao* choose to attend this university in Beijing, which was founded using Boxer Rebellion indemnity money. It and nearby Peking University are usually considered the best in China.
ANSWER: **Tsinghua** [CHING-hwa] University [or **THU**; or **Qīnghuá Dàxué**]
[10] Due to rampant cheating, the city of Luoyang uses these devices to detect unusual radio signals as the *gaokao* goes on. Commercial ones are way smaller than the military's Predator and Reaper models.
ANSWER: surveillance **drone**s [or **UAV**s; or **unmanned aerial vehicle**s; prompt on remote control systems; prompt on robots]

2. In a poem titled for this group, the speaker asks “shall I say that man / Is not as men have said: a wolf to man?” while watching a member of this group whistle the aria “O Paradiso!” For 10 points each:
[10] Name this organization. Writing about this organization, one poet declared “we burned / The cities we had learned about in school” in the title poem of his collection *Losses,* and declared “It happens as it does because it does” in the poem “Siegfried.”
ANSWER: United States **Air Force** [accept “Eighth **Air Force**”; accept United States Army **Air Forces**; prompt on the army or United States Armysince the air force was part of the army during WWII; prompt on answers like the military or United States Armed Forces]
[10] This American poet’s wartime experiences in the Air Force inspired those three poems, as well as his “The Death of the Ball Turret Gunner.”
ANSWER: Randall **Jarrell**
[10] This other Air Force veteran, the author of “The Strength of Fields,” accused Jarrell of treating servicemen like “killable puppets.” He wrote about his experiences on the Pacific Front in poems like “The Firebombing,” which opens his collection *Buckdancer’s Choice*.
ANSWER: James (Lafayette) **Dickey**

3. This musician's obsession with space reached its height with his 1950s album names, such as *We Travel the Space Ways*, *Super-Sonic Jazz*, and another titled [this man] *Visits Planet Earth*. For 10 points each:
[10] Identify this eccentric jazz musician who led the Arkestra musical collective.
ANSWER: **Sun Ra** [or Herman Poole **Blount**; or **Le Sony’r Ra**]
[10] In May 2016, this saxophonist of *Karma* and *Thembi* performed with Sun Ra's Arkestra in Brooklyn, over half a century after joining the Arkestra to record an album in 1964. A song by this artist for jazz octet, "The Creator Has a Master Plan," is over half an hour long.
ANSWER: Pharoah **Sanders**
[10] Pharoah Sanders featured on this artist's album *Meditations*. This saxophonist’s other albums include *A Love Supreme*.
ANSWER: John **Coltrane**

4. A mountain in Moravia's segment of the Beskid range is named for this god, and features a statue of him as well as a chapel to Cyril and Methodius. For 10 points each:
[10] Identify this West Slavic god attested by the chronicler Adam von Bremen, who was worshipped most extensively by the medieval Luticians. The moon goddess Hors bore unrequited love for him.
ANSWER: **Radegast** [or **Radigost**; or **Radhost**]
[10] Radegast presided over this social duty, which the old couple Baucis and Philemon do super well in Ovid's *Metamorphoses*. In the *Odyssey*, the swineherd Eumaios exemplifies this virtue, called *xenia* in ancient Greek.
ANSWER: **hospitality** [or being a good **guest**; or being a good **host**; prompt on courtesy or etiquette or generosity]
[10] Before they die, there are this many suitors in the Odyssey, all of whom *lack* hospitality. It shows up often in Asian religion, e.g. as the number of canonical Upanishads and of non-head beads on a *japa mala* necklace.
ANSWER: **108**

5. A reagent commonly used for this purpose consists of a benzene substituted with two nitro groups and a fluorine. For 10 points each:
[10] Name this task, which is also done by a reaction with phenyl-iso-thio-cyanate, which reacts under basic hydrolysis to form a phenyl-thio-hydantoin that can be identified using HPLC.
ANSWER: **protein sequencing** [or poly**peptide sequencing**; accept answers like finding the **order of amino acids** in a protein; prompt on sequencing alone]
[10] Theoretically, an Edman degradation of a eukaryotic pre-processed protein would find this amino acid at the N-terminus. This amino acid, the first to be translated, is then usually post-translationally removed.
ANSWER: **methionine** [or **Met**; or **M**]
[10] In this form of proteomics, the protein of interest is first cleaved into peptides, then undergoes GC/MS/MS, and then the fragments are combined using shotgun sequencing. John Yates' MudPIT technique exemplifies this form of proteomics, which is contrasted with a similar method that sequences intact proteins.
ANSWER: **bottom-up** proteomics [as contrasted with "top-down" proteomics]

6. The war diary that contains most of this man’s poetry ends where it does because he was killed by a stray bullet, an event portrayed in Kim Hoon’s *Song of the Sword.* For 10 points each:
[10] Name this man who wrote poetry about keeping a lonely watch on Hansan island. He’s the source of the quote “those who seek death shall live, and those who seek life shall die.”
ANSWER: (Admiral) **Yi** Sun-Sin
[10] Like Admiral Yi, this Korean poet referenced the ephemeral nature of morning dew in his collection *Morning Dew*. This perennial contender for the Nobel Prize in Literature wrote the multi-volume collection *Ten Thousand Lives* following his imprisonment.
ANSWER: **Ko** Un
[10] Ko Un’s other main massive poetry collection is named for one of these places called Baekdu. Chinese landscape poetry is often named for “rivers and” these places, whose “sound” titles a novel by Kawabata Yasunari.
ANSWER: **mountain**s [accept Rivers and **Mountains** poetry or ***shan****shui* poetry; accept *The* ***Sound of the Mountain*** or ***Yama*** *no Oto*; accept **Mount** Baekdu or Baekdu-**san**]

7. This state was led by the Walashma dynasty like its predecessor, the Ifat sultanate. For 10 points each:
[10] Identify this sultanate located on the western shores of the Gulf of Aden. Its general Ahmad Ibrahim al-Ghazi led several successful campaigns against Ethiopia and killed Emperor Dawit II.
ANSWER: **Adal** Sultanate
[10] A Portuguese adventurer with this surname led 400 musketeers on a futile adventure to assist Ethiopia against an invasion by the Adal Sultanate. An explorer with this surname made the first voyage from Portugal to India.
ANSWER: da **Gama** [Cristóvão da **Gama** or Vasco da **Gama**]
[10] On his 1499 voyage, Vasco da Gama bombarded this African city, which managed to maintain independence from the Portuguese, the Adal, and the Warsangali sultanates. This city issued its own currency, which was used by the Ajuran sultanate that later absorbed it. It later fell under Italian control.
ANSWER: **Mogadishu** [or **Muqdisho**]

8. Andrea Pozzo created an illusionistic ceiling fresco of this saint’s *Glorification* for a Baroque church on Rome’s Campus Martius named for him. For 10 points each:
[10] Identify this saint. He points to a page reading “Ad maiorem Dei gloriam” in a Rubens painting.
ANSWER: St. **Ignatius** of Loyola [or Chiesa di Sant'**Ignazio** di Loyola]
[10] Another illusionistic ceiling fresco was this artist’s *Allegory of Divine Providence*, which makes use of *quadratura* and was created for the Palazzo Barberini.
ANSWER: Pietro da **Cortona** [or Pietro **Berrettini**]
[10] On the left of Cortona’s 1631 version of this scene, a child cries as his mother is being carried off, despite orders that the title action should only be carried out on unmarried people. Romulus raises his cloak in Nicolas Poussin’s version of this scene.
ANSWER: **rape of the Sabine Women** [or **abduction of the Sabine Women**]

9. This music theorist divided music into three kinds: *musica mundana* that holds the celestial objects in harmony, *musica humana* that regulates our bodies, and lastly the actual instrumental music we hear. For 10 points each:
[10] Name this thinker whose 6th-century treatise *Fundamentals of Music* or *De institutione musica*, was the single most influential source for Greek-derived musical thought in the medieval era.
ANSWER: (Ancius Manlius Severinus) **Boethius**
[10] Boethius’ treatise popularized Pythagoras’ ratio-driven derivation of the perfect consonances, for example a ratio of 2:1 for a *diapason* or octave. From what ratio was the *diatessaron* or perfect fourth derived?
ANSWER: **4:3** [also accept **12:9**, since those are the exact numbers in the Pythagorean myth]
[10] In his non-musical works, Boethius tackled the subject of *Fortuna*. *Fortuna* plays a big role in this medieval manuscript of bawdy poems, which were famously set as a cantata by Carl Orff.
ANSWER: ***Carmina Burana***

10. The formation of physical defects like grain boundaries limits this technique’s usefulness in growing graphene on copper foils. For 10 points each:
[10] Name this technique that uses a chemical reaction to put vaporized solid materials onto a heated substrate. It can be combined with a similarly-named “physical” technique to grow magnesium diboride.
ANSWER: **chemical vapor deposition** [or **CVD**]
[10] Magnesium diboride obtains this property at a relatively-high temperature, or T-sub-c, of 39 Kelvin; materials like BSCCO (“biss-ko”) and YBCO acquire this property at even higher temperatures, and are not fully explained by BCS theory.
ANSWER: **superconductivity** [or word forms]
[10] One of the more popular physical deposition techniques is this one, in which heavy ions bombard a target of the desired material, ejecting it onto the substrate.
ANSWER: **sputtering**

11. Answer the following about Islam in Africa, for 10 points each.
[10] The tombs of these wandering African Islamic teachers, from an Arabic word root meaning "garrison," often serve as pilgrimage sites. A "Grand" one leads the Mouride brotherhood, which about 40% of Senegal belongs to.
ANSWER: **marabout**s [or **marbut**; or **murabit**; prompt on murshid]
[10] Some *marabout*s are also *murshid*, a type of spiritual guide in this mystical sect of Islam. Idris I descended from the founder of its Senussi order, and it also includes the Turkish Mevlevi.
ANSWER: **Sufi** Islam [or **Sufism**]
[10] A female scholar of this ethnicity, Nana Asma'u, compiled teachings on the *sunnah* in early 19th century West Africa as her father took this ethnic group on *jihad*. They follow a moral code called *pulaaku*.
ANSWER: **Fula**ni people [or **Fulbe**; or **Peul**; prompt on Hausa-Fulani; do NOT accept or prompt on "Hausa"**][**Nana Asma'u was the daughter of Usman dan Fodio.]

12. This character’s conception is recalled by his father while on the way to Paddy Dignam’s funeral, and both parents recall the lamb’s-wool sweater that his mother knitted for him, when he died after eleven days. For 10 points each:
[10] Name this unseen character, who would be eleven years old, were he alive at the date of the novel’s setting. His death leads to ten years of celibacy between his father and mother.
ANSWER: **Rudy** Bloom [prompt on Bloom; prompt on descriptions, such as Leopold Bloom’s son]
[10] In the final long sentence of Joyce’s *Ulysses*, this character, who is Rudy’s mother, plans to reinstate sexual relations with her husband Leopold. The novel ends with her words “yes I said yes I will Yes.”
ANSWER: **Molly** Bloom
[10] In the *Scylla and Charybdis* chapter of *Ulysses,* Stephen Dedalus suggests Shakespeare’s loss of his own son and an unsuccessful encounter with Ann Hathaway in a rye field as possible reasons for why Shakespeare decided to undertake this action.
ANSWER: **acting** the role of the **ghost** of Hamlet’s father [both parts required; accept obvious equivalents for “acting” such as **playing**]

13. An example of one of these ligands is the heme in a cytochrome P450 monooxygenase. For 10 points each:
[10] Name this term for a ligand that is redox-active, which results in the oxidation state of the metal changing over the course of a reaction.
ANSWER: **non-innocent** ligand [or **suspect** ligand; prompt on radical ligand]
[10] The cytochrome P450 mechanism has an oxo intermediate, where the ferric iron is oxidized to this unusual oxidation state by losing a single electron. This value is also the oxidation state of carbon in CO2.
ANSWER: **+4** [or **positive four**; or **4+**; prompt on just 4]
[10] The oxidation of the porphyrin ring in the P450 mechanism to make a pi cation radical is accommodated by this last step, in which the iron atom is re-reduced to a +3 oxidation state and the alkyl radical is hydroxylated. Most oxidase mechanisms involve this step.
ANSWER: radical **rebound** [or oxygen **rebound**]

14. This city developed its own school of painting, which included Stefano di Benedetto and Cosimo Tura, under the patronage of its duke Bosso I. For 10 points each:
[10] Identify this Italian city, the birthplace of Savonarola. Its rulers, who built the Palazzo Schifanoia, descended from the House of Este, a junior branch of the House of Welf, through Fulco I of Milan.
ANSWER: **Ferrara**
[10] Ferrara had a serious problem with the plague in the 1430’s, so Eugene IV’s church council started there but packed up and moved to this other Italian city, where Savonarola’s men committed the Bonfire of the Vanities.
ANSWER: **Florence** [or **Firenze**]
[10] The main Este line died out after a Duke of Ferrara with this name produced no male heir with his wife, Lucrezia de’Medici. Another duke with this name led Ferrara during the War of the League of Cambrai and was married to Anna Sforza.
ANSWER: **Alfonso**

15. These two economists extended a namesake collaboration in 2015 by adding factors that account for investment strategy aggression and profitability. For 10 points each:
[10] Name these two economists, whose “three-factor” model of stock returns improved on the Capital Asset Pricing Model by adding factors to account for excess return in growth and small cap stocks. One of them developed the efficient market hypothesis.

ANSWERS: Eugene **Fama** and Kenneth **French** [accept **Fama-French** three-factor model]
[10] The Carhart four-factor model adds a fourth factor of this name, representing a trading strategy which purchases and holds stocks that have previously been successful. Like contrarian strategy, the success of this type of strategy violates Fama's efficient markets hypothesis.
ANSWER: **momentum** factor [or **momentum** trading strategies; or monthly **momentum**; or **MOM**]
[10] In implementing a momentum strategy, one may take this kind of position on stocks that have been doing poorly by borrowing the stocks, selling them to a third party, and repurchasing them later. Thus, you will profit if the stock continues to do poorly, and lose if it rises.
ANSWER: **short** position [or **short** selling position]

16. For a vector field q, this kind of equation can generally be expressed in integral form as [read slowly] the partial of q with respect to t plus the surface of integral of the flux of q equals some constant. For 10 points each:
[10] Identify this type of equation, which is essentially a stronger, localized statement of a conservation law governing some moving quantity.
ANSWER: **continuity** equation
[10] This equation can be considered a continuity equation in six-dimensional velocity and position phase space. The Vlasov equation is derived by setting this equation’s collision term equal to zero.
ANSWER: **Boltzmann** transport equation
[10] Because the Boltzmann equation is so hard to solve, many computational models of it use this approach in which the variables, including the direction of the velocities, are limited to discrete values.
ANSWER: putting it on a **lattice**

17. One member of this group tried to impeach another member shortly after the secret Treaty of Dover was negotiated. For 10 points each;
[10] Name this group of politicians, whose members include George Villiers and Anthony Ashley Cooper, who later fled the country after trying to get the Duke of Monmouth on the throne.
ANSWER: The **Cabal** Ministry [prompt on the Privy Council; prompt on the Committee for Foreign Affairs; prompt on answers involving ministers of Charles II]
[10] The Exclusion Crisis was part of the larger unrest surrounding this scheme, in which Titus Oates and Israel Tonge fabricated a Catholic conspiracy to assassinate Charles II.
ANSWER: **Popish** Plot
[10] While the supporters of the king during the Exclusion Crisis eventually became Tories, they were originally known by this name, referring to their reaction to the “Petitioners” that sought the Exclusion Bill’s passage.
ANSWER: **Abhorrer**s

18. In a Lope de Vega work titled for the Peace of Kings and this woman, she confesses her belief in Christianity on her deathbed to her lover. For 10 points each:
[10] Name this character depicted in a drama by Vincente Garcia de la Huerta, who is typically murdered by the nobles of her lover Alfonso VIII.
ANSWER: **Rahel la Formosa** [or **Rahel Esra** or **Rachel the Beautiful**; prompt on The Jewess of Toledo or Rachel the Jewess]
[10] Rahel la Formosa is the title character of this Austrian dramatist’s *The Jewess of Toledo*. He delivered Beethoven’s funeral oration and also wrote plays about Sappho, the fall of king Ottokar II, and Blanche of Castille.
ANSWER: Franz (Seraphicus) **Grillparzer**
[10] Grillparzer’s trilogy *The Golden Fleece* ends with a play titled for this sorceress, who kills her own children after being spurned by Jason in a play by Euripides.
ANSWER: **Medea**

19. In protest for his support of this campaign, an explosive was thrown into the home of Zabdiel Boylston. For 10 points each:
[10] What controversial 1721 campaign was inspired by the advice of a slave of Onesimus? While the Reverend John Williams argued this campaign violated the Bible, a number of pastors were extremely supportive.
ANSWER: **smallpox inoculation** campaign in Boston [do NOT accept or prompt on "smallpox vaccination campaign"]
[10] The owner of Onesimus had previously been involved in another controversy when he wrote this 1693 book defending his conduct in the Salem witch trials. This text argues an "army of devils" was attacking "the Puritan colony."
ANSWER: ***Wonders of the Invisible World***
[10] This man wrote *Wonders of the Invisible World.* Along with his father, Increase, he supported attempts at inoculating the community.
ANSWER: Cotton **Mather**

20. This dialogue analogizes a man’s unrestrained desires to holes in a leaky jar, which guarantee that the jar shall never be full no matter how large its size. For 10 points each:
[10] Identify this Platonic dialogue in which Socrates agrees to debate himself and concede any points his opponent names, thus demonstrating that the central concept is best employed against oneself.
ANSWER: ***Gorgias***
[10] Plato’s dialogue *Gorgias* compares practitioners of this skill to tyrants and argues that it is mere flattery. This subject was part of the *trivium* along with grammar and logic.
ANSWER: **rhetoric**
[10] By telling a story of how *these figures* received their roles at the end of the *Gorgias*, Socrates concludes that it must be possible for the body to be stripped “naked” of its soul.
ANSWER: **judge**s of the **dead** [or **dikastes**; or **Minos**, **Rhadamanthys**, and **Aeacus**; prompt on judges]

21. These constructs are analogous to Kalman filters, but may have discrete and non-Gaussian distributed variables. For 10 points each:
[10] Name these sequences of random variables. They can be decoded by using the Viterbi algorithm to calculate the most probable state path given observations of random variables.
ANSWER: **hidden Markov** models [or **HMM**s; do NOT accept or prompt on "Markov chains"]
[10] HMMs are widely used in processing this type of audio signal. Its dynamic range is restricted by A-law or mu-law companding when it is encoded for applications such as VoIP and mobile telephony.
ANSWER: human **speech** [or **speech** processing; or **spoken** communication; or the human **voice**; or **language**]
[10] The Baum-Welch algorithm for estimating HMM parameters is a special case of this algorithm developed by Dempster, Laird, and Rubin. It iteratively repeats its two namesake steps to compute the maximum likelihood estimator.
ANSWER: **expectation-maximization** algorithm [or **EM** algorithm]