Tossups

1. The three Magon brothers were early 20th century anarchist leaders in this country. Until recently, rural workers in this country had a right to communal lands called *ejidos* [ee-heed-ohs]. Dwight Morrow negotiated an end to one conflict in this country, during which a group of women called the Brigades of St. Joan of Arc smuggled weapons. Supporters of Juan Almazan cried fraud during this nation's 1940 presidential election, where 93% of the votes were allegedly cast for Manuel Avila. This nation faced a crisis when its president-elect was assassinated in 1928; that killing of Alvaro Obregon led to a period when this nation was controlled by *El Jefe* Plutarco Calles, known as the "Maximato." Famous armies in this nation's history include the Colorado Army of Pascual Orozco and Vicente Guerrero's Army of the Three Guarantees. One dictator of this nation ruled with the help of the *technicos*, only to be overthrown in the 1910 Revolution. For 10 points, name this Latin American nation once ruled by Porfirio Diaz.
ANSWER: **Mexico**

2. The usual version of this mathematical object results from ensemble averaging the Klimontovich density, which is also known as the microscopic version of this quantity, and which is a sum of 6-space delta functions. The moment of given order of an equation that gives this quantity will contain a term with the next-highest-order moment, which known as the closure problem. The one of these for N+1 particles can be found from the one for N particles via the BBGKY hierarchy equation. This function times a differential of phase space volume gives the number of particles likely in that volume, so its integral over velocities is the number density. The dependent function in the Boltzmann and Vlasov equations, for 10 points, name this quantity, which is Maxwellian for a gas in thermal equilibrium.
ANSWER: the **distribution** function [prompt on **f**]

3. In the *Argonautica*, this person is reminded that Echetus put spikes through the eyes of his own daughter Metope, and that Nycteus and Acrisius were cruel to their daughters Antiope and Danaë; that speech from this man's wife sways him to promise not to return his guest to Aeëtes. Thus, this man's court on Drepane sees the hasty wedding of Medea and Jason. In another work, this ruler's palace is on Scheria, where he employs the blind minstrel Demodocus, whose songs about Achilles and the Trojan Horse upset another of his guests. For 10 points, name this husband of Arete and father of Nausicaa, a king of the Phaeacians who hosts Odysseus.
ANSWER: **Alcinous** [or **Alkínoös**]

4. Possibly first described by Huygens, organisms in this genus have a polyploid macronucleus and a diploid micronucleus, This genus are preyed upon by genus *Didinium*. UGA is the only stop codon in this genus, which can exchange genetic material with other members through conjugation, and which reproduces by binary fission. The species *aurelia* forms endosymbiotic relationships with Gram-negative bacteria, while species *bursaria* has an endosymbiotic relationship with the green algae *Zoochlorella*. They range from 50 to 300 microns in length, with a characteristic irregular oblong shape which gives them their name. For 10 points, name this widespread genus of ciliate protozoa.
ANSWER: ***Paramecium*** [or **paramecia**]

5. One of this author's plays is named for a woman who dreams of being covered with holes which pour out huge numbers of Africans into a boiling sea where they are attacked by lobsters. The protagonist of one of this author's novels gorges herself on plums before rebuffing an attempt at seduction by her companion Marija. This author wrote about a woman who drowns herself after her husband becomes rich trading slaves to Europeans in her play *Anowa*, and included short stories such as "Everything Counts" and "For Whom Things Did Not Change" in her collection *No Sweetness Here*. This author wrote a novel about Esi, who leaves her husband Oko after he commits marital rape and decides to marry Ali Kondey. She also wrote a prose poem subtitled "reflections from a black-eyed squint" about Sissie, who travels to Germany from her native Ghana. For 10 points, name this Ghanaian author of *Changes: A Love Story* and *Our Sister Killjoy*.
ANSWER: Ama Ata **Aidoo**

6. Following this event, a Parks and Recreation employee named Donald Lobsinger started an armed group named "Breakthrough." During this event, police shot two innocent men in the Algiers Motel Incident. Future Secretary of State Cyrus Vance authored a report that criticized the use of force during this event. This event was sparked when police attempted to arrest 82 people who were celebrating the return of Vietnam Veterans in an illegal bar. Both a professional baseball player and a Congressman independently tried to stop this event by speaking into a megaphone on top of a car. This event doomed the career of Mayor Jerome Cavanagh, and it was ended when the National Guard was called in by George Romney. This event exacerbated white flight to places such as Livonia, Sterling Heights, and Dearborn. For 10 points, name this 1967 riot in the largest city in Michigan.
ANSWER: **Detroit** Race **Riot** [or **12th Street Riot**]

7. Evidence that this painting may be confessional comes from the capital depicting the drunkenness of Noah directly above the patron's head. The parish church depicted in the background of this work may be a celebration of the recently signed Treaty of Arras. Reflectograms revealed that a gold purse was originally to hang from the figure on the left of this work, who is positioned near a small table with a blue tablecloth over it. The namesake patron of this work also commissioned Rogier van der Weyden's *Last Judgment Altarpiece*. Underneath the central arch in this painting, a man in black holding a walking stick stands next to a man in red who is leaning over a wall. On the right-hand side of this painting, an angel with multi-colored wings holds up an ornate crown, while on the left the patron kneels and prays over a Bible. For 10 points, name this van Eyck painting named for a politician.
ANSWER: *Chancellor **Rolin** **Madonna*** [or the *Virgin and Child with Chancellor **Rolin***; or the *Virgin of Autun*; or *Chancellor **Rolin**'s Virgin*; or anything else involving Chancellor **Rolin** and the Virgin **Mary**]

8. This theory has inspired dyadic developmental psychotherapies such as Watch, Wait, and Wonder. Peter Fonagy attempted to extend this theory to include mental representations. Carol George and Mary Main developed the AAI to measure the central concept of this theory. It was originally proposed by an English psychologist dissatisfied with Object Relations Theory, who used it to explain the formation of "internal working models." An experiment testing this theory determined three styles of its namesake phenomenon: secure, insecure avoidant and insecure ambivalent. That "strange situation" experiment was created by Mary Ainsworth. This theory was proposed by John Bowlby, who was inspired by Lorenz' imprinting studies and Harlow's experiments with wire mothers. For 10 points, name this psychological theory, which argues that babies have a biological drive to seek proximity to a protective caregiver.
ANSWER: **attachment** theory

9. This body of water is home to a distinctive species of dolphin, which has the longest beak of any cetacean and is nicknamed the Franciscana. It's not in Brazil, but at one end of this body of water you can find Sugar Loaf Hill. Less-famous cities on this body of water include Quilmes and Maldonado. The brackish Samborombon Bay is found where this body of water receives the Salado River. A sandbar called the "Sandbar of the Indian" separates this body's freshwater and saltwater areas. Neighborhoods on this body of water include La Boca. By some definitions, this body is the widest river in the world, and it receives the delta of the Parana River. For 10 points, name this massive estuary of South America, found near Buenos Aires between Argentina and Uruguay.
ANSWER: **Rio** de la **Plata** [or **River Plate**; prompt on "Parana" or "Uruguay" until mentioned]

10. This book proposes installing members of Bedlam in prominent positions because all military conquests, philosophical systems, and new religions are caused by madness. It satirizes a certain group as the Aeolists, who worship the winds and preach by belching. This book's introduction distinguishes between the three "oratorical machines" of the Pulpit, the Ladder, and the Stage-Itinerant, following its dedication to "Prince Posterity." Narrated by a hack writer who intersperses the plot with "A digression in the Modern kind" and "A digression in praise of digressions," its main story describes a series of alterations to a will which represents the Bible. Named for an object thrown over a ship to distract a whale, it was published along with "The Battle of the Books." For 10 points, name this book which parodies religious abuses among the three brothers Peter, Martin, and Jack, a satire by Jonathan Swift.
ANSWER: A *Tale of a Tub*

11. Evidence for this type of reaction include a large deuterium isotope effect. Necessary conditions for this type of reaction include antiperiplanar geometry, which requires axial groups if this type of reaction is carried out in substituted cyclohexanes . It is a concerted process with a single transition state and second order kinetics, whose rate-determining step is the breaking of the bond between carbon and the leaving group, as concluded by Ingold. Seen in the dehydrohalogenation of alkyl halides, this mechanism requires a strong base, and does not always follow Zaitsev's rule unlike a comparable mechanism. For 10 points, give the name of this mechanism where the loss of a leaving group and production of a double bond is triggered by basic attack.
ANSWER: **E2** mechanism [or **bimolecular elimination**; prompt on **elimination**]

12. This man wrote a biography of his distant relative, St. Willibrod. Along with his correspondent Beatus of Liebana, this man opposed the teachings of Felix of Urgel. At the Council of Frankfurt, this man personally condemned the Adoptionist heresy then popular in Islamic Spain. This man's students nicknamed him "King David", and he gave his pupils Latin nicknames based on Virgil's Eclogues. Shortly before his death, this man became Abbot of St. Martin at Tours. His letters and poetry are the major contemporary source for the Viking attack on Lindisfarne, which took place in his native Northumbria while this man was at the Palace School in Aachen. For 10 points, name this English monk who became the leading scholar at the court of Charlemagne.
ANSWER: **Alcuin** of York [or **Albinus**; or **Flaccus**]

13. One man in this profession, Celestino, is visited by his town's patron saint, Saint Andrew, and given the power to kill bad people in a Roberto Rossellini film. The songs "Think Pink" and "'S Wonderful" are sung in a musical about a man in this profession named Dick Avery whose business is saved by salesgirl Jo Stockton, played by Audrey Hepburn. One man in this profession ends the film he appears in by watching two mimes playing a pantomime game of tennis, while another observes characters he nicknames "Miss Lonelyhearts" and "Miss Torso." Those characters with this profession respectively believe they have discovered a murder involving Vanessa Redgrave's character Jane and a murder committed by Lars Thorwald. For 10 points, name this profession shared by David Hemmings' character Thomas in Michelangelo Antonioni's *Blow-Up* and Jimmy Stewart in *Rear Window*.
ANSWER: Fashion **Photographer** [or Professional **Photographer**]

14. The ATLAS code was used to generate a commonly used model grid of these structures by Robert Kurucz. The properties of some of these structures are significantly affected by the presence of the negative hydrogen ion. If the source function for one of these structures is linear, the Eddington-Barbier approximation becomes an exact relation. In simple models of these structures, the source function can be calculated as an inverse Laplace transform of the limb darkening function. One portion of these structures is defined from the result that under the assumptions of local thermal equilibrium, the Eddington approximation, and a plane-parallel structure, an optical depth of 2/3 in these structures marks the point at which the effective temperature occurs. The uppermost portion of these structures sometimes extends into an outflowing wind. For 10 points, name these structures that include the corona and photosphere, the outer layers of stars.
ANSWER: stellar **atmosphere**s [prompt on **corona** or **photosphere**]

15. The protagonist of this poem becomes entranced by three drops of blood left on snow by a wounded goose, which remind him of his lover's face. It begins with two books about Gahmuret, who is treacherously slain by Babylonians after winning the hand of Herzeloyde. Its main character falls in love with the beautiful Condwinamurs, and is raised ignorant of chivalry until meeting three knights in a forest and resolving to follow them on their adventures. Its main character becomes lord of the castle Munsalvaesche in its second half, which describes the romance between Orgeluse and Gawain. Based on an incomplete poem on the same subject by Chretien de Troyes, it ends with its title character healing the wound of Anfortas. For 10 points, name this medieval German poem about a knight who finds the Holy Grail, the masterpiece of Wolfram von Eschenbach.
ANSWER: *Parzival* [or *Parsifal*]

16. Gaspar Cassado passed off one of these pieces for cello and piano as a transcription from Frescobaldi, who published two books pairing these pieces with partitas. Robert Schumann's opus 7 is an extremely difficult example of one of these pieces in C. Debussy composed one of these works as the third and final piece in his suite *Pour le piano*. Charles-Marie Widor's fifth organ symphony ends with a movement of this type. Examples of these pieces in the 20th century include Prokofiev's Opus 11, which begins with rapidly repeated D's. This musical form gained prominence in the Baroque period, when it was used for free-form keyboard pieces that showed off manual dexterity. For 10 points, identify this type of piece that J. S. Bach paired with a fugue in D minor, and whose name comes from the Italian for "touch."
ANSWER: **toccata**s

17. *(Note to moderator: read the following to both teams before the tossup)*
Editor's Note: The correct answer to this tossup contains both a nationality and a religious affiliation; we're looking for something like "Japanese Zoroastrians" or "Chilean Sunnis"
This group lost much of their political power at the Peace of Aarau, which followed their defeat in the Toggenburg War and the Second Battle of Villmergen. A famous unit of soldiers from this group are commemorated in the "Sleeping Lion" monument. Members of this group formed an alliance called the Christian Union and provided the milk while their rivals provided the bread to resolve a bloodless 1529 war. In response to a political liberalization called the "Regeneration", members of this group formed the "Separate Alliance", which fought and lost the Sonderbund War. Many of these people live in the regions of Uri and Zug, and members of this group killed one of their arch-rivals at the Second Battle of Kappel. For 10 points, name this group that acknowledges the spiritual authority of the Pope in cities such as Lucerne and Lausanne.
ANSWER: **Swiss Catholic**s

18. One character in this poem implores another "tell me about it if it's something human. Let me into your grief" after apologizing that his words "are nearly always an offense." That character exclaims "I shall laugh the worst laugh I ever laughed" in response to being chastised for discussing "everyday concerns" such as "how long it takes a birch to rot." At the end of this poem, a woman insists that she needs to leave her house, causing a man to declare "I'll follow and bring you back by force. I will!" Earlier, that woman cries "Don't, don't, don't, don't" when her husband begins to talk about seeing a mound. Beginning "He saw her from the bottom of the stairs / before she saw him," this poem was published in its author's collection *North of Boston*, and follows a man who discovers his wife Amy looking out of a window at a graveyard. For 10 points, name this poem by Robert Frost about a couple's conflict over a dead child.
ANSWER: "**Home Burial**"

19. At the conclusion of one of his works, this thinker analogized his method to a man who uses a ladder to ascend to a high place, after which he kicks the ladder away, suggesting that after achieving its task the method could be discarded. Writing about this thinker, Roderick Chisholm argued that this thinker's most important contribution was a theory of signs which rejected the "indicative" sign but defended the "recollective" or "commemorative" sign. This non-Husserl thinker integrated the Ten Modes of Aenesidemus, intended to show how *epoche* could be achieved, into his major work, which also discusses various phrases such as "No more" and "Nothing should be determined" as manifestations of a certain attitude. In that work, this author of volumes collected as *Against the Professors*, divided philosophers into three types: "Academics" who have "asserted things that cannot be apprehended," "Dogmatists" such as Epicurus and the Stoics, "who think they have discovered truth," and those who are "still investigating," such as himself. For 10 points, identify this Greek philosopher most famous for his exposition of Pyrrhonian thought titled *Outlines of Skepticism*.
ANSWER: **Sextus Empiricus**

20. John Spong has controversially argued that this man was a homosexual, and it is likely that this man placed the penis of Eunice's adult son into his mouth while performing *mesisah*. A Coptic text describes this man convincing a young woman named Thecla to remain a virgin. This man was a student of Gamaliel the Elder, the grandson of Hilel. This man cryptically claimed to have "fought wild beasts" in Ephesus, and a conspiracy to kill this man failed when he was smuggled in a basket through a hole in the wall. Coats were laid at this man's feet when he attended the stoning of St. Stephen. This man was found praying near the House of Judas, and scales fell from his eyes after he met Ananias. This man's notable pronouncements include that women should stay silent in church and that Christians do not need to follow Jewish law. For 10 points, name this man who was converted to Christianity on the Road to Damascus and wrote many epistles found in the New Testament.
ANSWER: Saint **Paul** of Tarsus [or **Saul** of Tarsus]

Bonuses

1. For many years, this country's economic policy has been based on the so-called "Polder Model." For 10 points each:
[10] Name this European country, whose discovery of natural gas deposits in 1959 led to currency appreciation that crippled its manufacturing industry. That situation is known as its namesake "disease."
ANSWER: the **Netherlands** [or **Holland**]
[10] Dutch disease often leads to a decline in this quantity, often measured as the percent increase in a country's GDP over time. Solow and Swan developed the neoclassical model of it.
ANSWER: economic **growth**
[10] This American economist argued that countries begin with traditional economies, which then industrialize, "take off," and reach mass consumption, in his five-stage model of economic growth.
ANSWER: Walt Whitman **Rostow**

2. A Tao Yuanming fable describes a fisherman who stumbles upon a utopia full of these. The attributes of the personification of Canopus known as the Old Man of the South Pole are a long beard, a deer, and two of these. For 10 points each:
[10] Name these mythological objects, at one point guarded by Sun Wukong.
ANSWER: the **Peach**es of Immortality [or Xiǎn**táo**]
[10] Ultimate ownership of the Peaches of Immortality falls on this celestial grandfather and his wife, Xi Wangmu.
ANSWER: the **Jade Emperor** [or **Yù Huáng** or **Yù Dì**]
[10] Another Jade deity is Yùqīng, a member of this top echelon of Taoist gods. Laozi is sometimes believed to be a manifestation of another of them, Tàiqīng.
ANSWER: the **Three Pure Ones** [or **Sānqīng**; accept **Three Purities**]

3. The condition for this gauge is to set the vector potential divergence to zero. For 10 points each:
[10] Name this gauge, which renders Maxwell's equations invariant under the gauge group of special relativity.
ANSWER: the **Lorenz** gauge
[10] An additional bonus of using the Lorenz gauge is that it renders Maxwell's equations for the potentials in this form, with source terms proportional to the charge and current densities. This is by far the most commonly studied hyperbolic PDE.
ANSWER: the **wave equation**
[10] Lorenz of gauge fame also discovered the Lorenz-Lorentz equation, which gives this quantity for a medium in terms of its density and polarizability.
ANSWER: **index of refraction** [prompt on **n**]

4. After the introduction of linear tactics, infantry forces typically entered this formation when threatened by a cavalry charge. For 10 points each:
[10] Name this defensive infantry formation, which opposing forces would attempt to "break" or "turn"
ANSWER: **square** or hollow **square**
[10] The most famous use of square formations may be by this Spanish military unit, which dominated European warfare during the 1500's.
ANSWER: **tercio**
[10] This type of heavy cavalry unit, common in the militaries of the 17th – 19th centuries, used impact weapons to break infantry formations. They are distinguished from light cavalry, or hussars.
ANSWER: **lancers** or **uhlans**

5. Its namesake vein carries oxygenated blood while its two arteries carry deoxygenated blood. For 10 points each:
[10] Name this structure that forms from the allantois and yolk sac.
ANSWER: **umbilical** cord [or funiculus **umbilicalis**]
[10] This substance composed primarily of mucopolysaccharides protects the umbilical blood vessels. This material constricts after partution to clamp flow in the cord.
ANSWER: **Wharton's jelly**
[10] Umbilical cord tissue contains a high concentration of this type of stem cell with the potential to germinate to any fetal or adult cell type, but not extraembryonic tissues.
ANSWER: **pluripotent** stem cells

6. For 10 points each, name these English authors who wrote about gardens.
[10] This metaphysical poet described the mind "annihilating all that's made / to a green thought in a green shade" in his poem "The Garden." The speaker of one of his carpe diem poems hears "time's winged chariot hurrying near."
ANSWER: Andrew **Marvell**
[10] This doctor discussed the many appearances of the quincunx in nature in his essay *The Garden of Cyrus*. He also wrote *Religio Medici*, and is renowned for the prose rhythm of sentences such as "Man is a noble animal, splendid in ashes, and pompous in the grave."
ANSWER: Thomas **Browne**
[10] This author put together the children's poetry collection *A Child's Garden of Verses*. He included detective stories like "The Suicide Club" and "The Rajah's Diamond" in his short story collection *New Arabian Nights*.
ANSWER: Robert Louis **Stevenson**

7. Late in his life, this composer wrote the Walloon opera *Peter the Miner*. For 10 points each:
[10] Name this Belgian violinist, who dedicated his six Opus 27 violin sonatas to contemporaries such as George Enescu and Fritz Kreisler.
ANSWER: Eugene **Ysaye**
[10] The first movement of Ysaye's second violin sonata, "Obsession," heavily quotes this plainchant hymn about the day of judgment. In Verdi's *Requiem*, it is accompanied by pounding brass chords.
ANSWER: "**Dies Irae**"
[10] This composer wrote an A major violin sonata as a wedding gift for Ysaye. He taught Vincent d'Indy as a professor at the Paris Conservatoire, and composed a popular setting of the motet "Panis Angelicus."
ANSWER: Cesar **Franck**

8. For 10 points each, answer these questions about things that birds have and you don't.
[10] Birds conduct their excretion and reproduction through this single opening at the bottom.
ANSWER: **cloaca**
[10] Birds have a bony structure called the keel, to which their flight muscles attach. The keel is an extension of this other bone.
ANSWER: **sternum** [prompt on breastbone]
[10] Birds inherited this characteristic from dinosaurs. This characteristic creates additional space for air sacs inside the body, which are connected to the lungs and used for air storage.
ANSWER: postcranial skeletal **pneumaticity** [prompt on "hollow bones"]

9. This book's opening section links the times of day with the seasons, and begins "in spring it is the dawn that is most beautiful." For 10 points each:
[10] Name this book, which mixes observations about nature, vignettes about court life, and anecdotes that show off its author's skill at writing witty poems. It may be best known for its many lists, such as "Hateful things" and "Embarrassing things."
ANSWER: The ***Pillow Book*** [or ***Makura no Soshi***]
[10] In *The Pillow Book*, Sei Shonagon provides a close look at everyday life at the Japanese court during this period. Other literature written during this period includes *The Tale of Genji*.
ANSWER: **Heian** period
[10] *The Pillow Book* is often considered one of the earliest examples of this Japanese literary genre, whose name roughly translates as "following the brush." This genre consists of loosely-related short pieces about random topics, such as Kenko's *Essays in Idleness*.
ANSWER: **zuihitsu**

10. In one of the most shocking crimes of the 7th century BC, this tyrant kicked the Eleian judges out of the Olympic Games and presided over them himself. For 10 points each:
[10] Name this tyrant, who won the battle of Hysiae versus Sparta and might possibly have invented phalanx warfare
ANSWER: **Pheidon**
[10] Pheidon was tyrant of this prominent city in the Peloponnese. While its not Mycenae, it was the home of Agamemnon in the Oresteia and was also the birthplace of Perseus.
ANSWER: **Argos**
[10] Some ancient historians credited Pheidon with being the first ruler to mint coins. Herodotus instead credits this Anatolian kingdom, conquered by the Persians at the battle of Thymbra.
ANSWER: **Lydia**

11. For 10 points each, name these American plays that involve sexual abuse.
[10] This 2004 play by John Patrick Shanley is set in New York City's St. Nicholas Church School in 1964. It centers on school principal Sister Aloysius, who accuses Father Flynn of molesting his student Donald Muller.
ANSWER: *Doubt: A Parable*
[10] The 1998 Pulitzer Prize for Drama was awarded to this play by Paula Vogel, in which Li'l Bit is repeatedly molested by her Uncle Peck during a series of lessons.
ANSWER: *How I Learned to Drive*
[10] The main character of this Tennessee Williams play attempts to form a relationship with Mitch, but is taken away to an insane asylum after being raped by the husband of her sister Stella.
ANSWER: A *Streetcar Named Desire*

12. Ansanus, Sabinian, Crescentius and Victor, the four patron saints of Siena, kneel towards the central figure in one panel from this painting. For 10 points each:
[10] Identify this work originally located in the Cathedral of Siena by the artist of the *Rucellai Madonna*. It makes heavy use of a gold background.
ANSWER: *Maesta* [or *Madonna Enthroned with Saints*]
[10] This other early Renaissance artist painted the Santa Croce frescoes for the Bardi and Peruzzi chapels. He's best known for his fresco cycle in the Arena Chapel.
ANSWER: **Giotto** di Bondone
[10] Scholars still dispute whether Giotto painted any of the frescoes in a chapel named for this saint. He's passed out and supported by an angel in a Caravaggio painting, while El Greco depicted him in a gray cloak with a rope extending from it as he prays towards a green book and a skull.
ANSWER: St. **Francis of Assisi** [or Giovanni **Francesco di Bernardone**; prompt on **Francis**]

13. When modeled in lambda calculus or another formal system, this process is known as reduction and is subject to a system of strategies. Call-by-reference and call-by-value are strict rule sets for it. For 10 points each:
[10] Name this basic process in computing, in which an expression is replace by its equivalent.
ANSWER: **evaluation**
[10] This non-strict evaluation strategy, the opposite of eager evaluation, will return the same results as a call-by-name strategy in languages that lack side effects. It is employed by Miranda and Haskel.
ANSWER: **call-by-need** evaluation [or **lazy** evaluation]
[10] Haskell is an example of a pure variety of this family of programming languages. Originating as implementations and extensions of lambda calculus, they usually iterate by recursion exclusively.
ANSWER: **functional** programming languages

14. This character owns the legendary swords Colada and Tizona and rides the horse Babieca. For 10 points each:
[10] Name this title character of an early medieval Spanish epic poem, who is initially exiled from Castile by Alonso VI, but later defeats the Almoravids to conquer Valencia.
ANSWER: El **Cid** [or **Rodrigo** Diaz de Vivar; or Rodrigo **Diaz** de Vivar]
[10] Two infantes from this place marry the daughters of El Cid. However, they turn out to be cowards in battle, and lose a duel after beating up El Cid's daughters and abandoning them on the side of a road.
ANSWER: **Carrion**
[10] The Infantes of Carrion first reveal their cowardice when one of these animals escapes from its cage. In a romance by Chretien de Troyes, one of these animals becomes the companion of Yvain after Yvain rescues it from a serpent.
ANSWER: **lion**s

15. In his appropriately titled paper "The Future of Philosophy," this thinker argued that all philosophical problems will either turn out to be confusions of language, or will actually turn out to be problems of science. For 10 points each:
[10] Identify this philosopher who advocated for verification as a criterion of meaning in his "Meaning and Verification," and attempted a systematic grounding of scientific epistemology in *A General Theory of Knowledge*.
ANSWER: Moritz **Schlick**
[10] Along with Otto Neurath and Rudolf Carnap, Schlick was a member of this philosophical group, which met in its namesake city on and off from 1924 to 1936.
ANSWER: **Vienna Circle** [or **Weiner Kreiss**]
[10] In 1920, Schlick published a philosophical exposition of this new theory, whose "ABC" titled an exposition of the same theory by Bertrand Russell.
ANSWER: Einstein's theory of **relativity** [accept either **special** or **general relativity** if given]

16. Answer the following about refrigeration cycles, for 10 points each:
10]The effectiveness of heat pumps and refrigeration cycles is often given in this quantity, the ratio of the heat absorbed at the lower temperature to the net work.
ANSWER: **coefficient of performance** [or **cop**]
[10]A deviation from Boyle's law, in this effect, most gases are cooled when expanded through a throttling process, provided they start below a characteristic inversion temperature.
ANSWER: **Joule-Thomson** effect or **Joule-Kelvin** effect
[10] This industrial process used in the liquefaction of gases includes a Joule-Thomson throttling process, a step which simplifies it compared to the Siemens cycle.
ANSWER: **Hampson**-**Linde** cycle (accept either or both names)

17. These entities lack free will and serve as the messengers of Allah. For 10 points each:
[10] Name these beings from Islam, the most notable of which is Jibreel, who delivered the Koran to the Prophet Muhammad.
ANSWER: **angels** [or **mala'ikah**; or **malak**]
[10] Angels are beings made out of this substance, which makes them different from humans or Jinn.
ANSWER: **light**
[10] This angel will blow a trumpet to announce the Islamic Judgment Day. He is the Islamic equivalent of Raphael.
ANSWER: **Israfil** [or **Israfel**]

18. Identify the following about the photographer Bill Brandt, for 10 points each.
[10] Brandt once worked in the studio of this Dada photographer, who used colored paper to create his *The Rope Dancer Accompanies Herself with Her Shadows* and photographed a woman's backside in *Le Violon d'Ingres*.
ANSWER: **Man Ray** [or Emmanuel **Radnitzky**; prompt on just "Ray"]
[10] Brandt drew influence from this Hungarian-born photographer who wrote books like *Henry Miller: The Paris Years* and *Proust in the Power of Photography* but may be best known for his 1932 monograph, *Paris By Night*. He's most commonly known by a one-word pseudonym.
ANSWER: **Brassaï** [or Gyula **Halász** or Jules **Halasz**]
[10] Besides his nudes, Brandt may be best known for his photos of the ruins of this city. This city is home to an Aquatics Center designed by Zaha Hadid, and a Norman Foster building nicknamed for its resemblance to a type of cucumber.
ANSWER: **London**, England

19. This ruler was assisted by his chief priest, Okomfo Anokye. For 10 points each:
[10] Name this ruler who destroyed the Denkyira Empire and established a capital at Kumasi. His control of the coast meant that the polity he created had control of trade with Europe.
ANSWER: **Osei Tutu** I [or **Osei** Kofi **Tutu** I]
[10] Osei Tutu was the founder of the Ashanti Empire, whose ruler famously sat on this mystical object.
ANSWER: **Golden Stool** [or **Sika Dwa**]
[10] In 1871, Great Britain purchased a Dutch colony in modern day Ghana, which the Ashanti invaded. That led to this British general attacking the Ashanti and sacking Kumasi.
ANSWER: Garnett **Wolseley**

20. During the War of 1812, the British conquered this future US state and turned it into the short-lived colony of New Ireland. For 10 points each:
[10] Name this US State, whose disputed borders with British New Brunswick would be settled by the Webster-Ashburton Treaty.
ANSWER: **Maine**
[10] Many residents of the area disputed during the Aroostook War were members of this French-speaking ethnic group, descendants of Acadians who moved to New Brunswick. They founded the unrecognized Republic of Madawaska.
ANSWER: **Brayons**
[10] Maine was colonized in 1622 by Sir Ferdinando Gorges, who split a grant of land with this more famous colonizer, who is considered the founder of New Hampshire.
ANSWER: John **Mason**