

## **Bulldog High School Academic Tournament 2015 (XXIV): It's more than good...it's Grace!**

Written by Yale Student Academic Competitions (Isaac Kirk-Davidoff, Laurence Li, Grace Liu, Jacob Mitchell, Frederick Muth, Jacob Reed, Basil Smitham, Jacob Lawrence Wasserman, Nicholas Wawrykow, Mitchell Weldon, Haohang Xu)

Edited by Jacob Reed, with Grace Liu

### **Packet 14 Tossups**

1. **The introduction of a term with units of *this* quantity allowed Maxwell to formulate the equation for light as an electromagnetic wave. That term was introduced into Ampère's law and is called "displacement [this]." This quantity squared is proportional to the energy stored in inductors. Devices that measure this quantity are hooked up in (\*) series, and have very low internal resistance. It times voltage gives power. It only flows in one direction through diodes. For 10 points, name this flow of charge, which comes in "alternating" and "direct" types.**  
ANSWER: electric current [prompt on "*I*"; accept direct current; accept alternating current] <JR>

2. **One of these works notes that saints have lips, "and holy palmers too" and begins "If I profane with my unworthing hand." Another of these works claims that it will last "so long as men can breathe or eyes can see." A work in this form notes that "every fair from fair sometimes declines" and that "rough winds do shake the darling buds of May." A series of these works includes descriptions of a Fair Youth and a (\*) Dark Lady. An alternating rhyme scheme for these poems replaced the interlocking one used by Petrarch, yielding three quatrains and a couplet. For 10 points, name this fourteen-line poetic form of works like Shakespeare's "Shall I compare Thee to a Summer's day?"**  
ANSWER: sonnets [or sonetto; or sonetti; prompt on "Shakespeare plays" or anything involving *Romeo and Juliet* before "so long as men can breathe"] <JR>

3. **In honor of this deity, Numa Pompilius dedicated an order of 12 priests, the Salii, who carried the *ancilia* as they leapt around. Augustus built a temple in his Forum to this god, who served as "The Avenger" of Julius Caesar and Carthage. An Alban princess impregnated by this god was buried alive because she was a (\*) Vestal Virgin. Animals sacred to this seducer of Rhea Silvia include the woodpecker and the wolf, the latter of which suckled his twin sons, Remus and Romulus. For 10 points, identify this deity who cuckolds Vulcan by sleeping with Venus, the Roman god of war.**  
ANSWER: Mars [or Ares] <FM>

4. **One character in this work sneaks onto the lawn at midnight and proclaims, "When I'm bad, I AM bad!" Edmund Wilson highlighted the "ambiguity" of this work, which features a character who "said things" to those he liked, resulting in his expulsion from school. The narrator of this novel sees a hatless red-headed man on the tower; that man was "much too (\*) free with everyone," according to the housekeeper. Mrs. Grose takes a girl back to her uncle after the narrator catches her at the lake, meeting "a horror," her predecessor at Bly. For 10 points, identify this novella in which the governess fails to save little Miles from Peter Quint, a ghost story by Henry James.**  
ANSWER: *The Turn of the Screw* <GL>

5. **A concerto for this instrument begins with the timpani playing four soft Ds before the woodwinds enter. Beethoven wrote two *Romances* for this instrument and orchestra and ten sonatas for it and piano. The last of Mozart's five concerti for this instrument is in A major and is nicknamed "Turkish." Pieces for this instrument with difficult double stops have nicknames like "Devil's Laughter" and "Devil's (\*) Trill." Beethoven wrote the "Spring" and "Kreutzer" sonatas for it. 24 *Caprices* were written for this instrument by Paganini. Vivaldi's *The Four Seasons* features this instrument. For 10 points, name this highest string instrument.**

ANSWER: violins <JR>

6. Under the rule of the PDPA, this country saw the Khalq faction take power after the Saur Revolution. Operation Cyclone, which supplied Stinger missiles to rebels in this country, was masterminded by Michael Vickers and Gust Avrakotos. While trying to downplay the unpopular atheist reputation of this country's government, Babrak Karmal had to be propped up by Brezhnev. This country, which is divided between Tajiks and (\*) Pashtuns, is home to *mujahideen* fighters, who received covert aid from the CIA and Congressman Charlie Wilson. For 10 points, name this country from which Soviet forces withdrew in 1989, in which a Kabul-based government was overthrown by the Taliban.

ANSWER: [Democratic] Republic of Afghanistan [or DRA; or Jumhuri-ye Dimukratee-ye Afganistan; or D' Afganistan Dimukrati Jumhuriyat; or Jumhuri-ye Afganistan; or D' Afganistan Jumhuriyat] <JW>

7. In *A Farewell to Arms*, the major tells Frederick Henry that Lieutenant Rinaldi believes he has symptoms of this disease. Composer Adrian Leverkühn claims that he acquired this disease in exchange for musical genius in Thomas Mann's *Doctor Faustus*. Helen considers euthanizing her son Oswald Alving after she learns that he has this disease in Ibsen's (\*) *Ghosts*. A character who believes that he lives in the "best of all possible worlds" is infected with this disease after he cavorts with Paquette. For 10 points, identify this sexually-transmitted disease which, according to Pangloss, came from the New World via the Columbian exchange.

ANSWER: sypphilis <GL>

8. This process, which is stimulated by zeatin, is induced by aleurone cells secreting alpha-amylase. A type of cell involved in it secretes waxy suberin. In some roots, this process occurs in the pericycle. This process is induced by cytokinins and inhibited by abscisic acid. It is mostly vertical in (\*) apical dominance. The "secondary" type of it follows an annual cycle, making dendrochronology possible. This process occurs in the cambium and meristem. It occurs in the direction of light in phototropism. For 10 points, name this process that is induced by gibberellins and auxins in plants, and by HGH in humans.

ANSWER: growth [accept budding; accept any more specific type of growth, including in specific directions or at specific locations; accept any answer about getting bigger or longer or making more cells; accept cell division] <JR>

9. Practitioners of a field described by this adjective can use the VIA-IS and the CSV handbook to assess themselves; that field may have its roots in Aristotle's concept of eudaimonia, and was pioneered in its modern form by Martin Seligman. This adjective names the philosophy that rigorous, "scientific" logic and math are the only sources of true knowledge. In conditioning, when a subject (\*) receives something following an action, this adjective is attached to things like punishment and reinforcement. A branch of psychology described by this adjective studies emotions like optimism and happiness. For 10 points, name this opposite of "negative."

ANSWER: positive [accept positive psychology; accept positivism; accept positivist; accept positive punishment; accept positive reinforcement] <HX>

10. Many drums were created during this time period by the Dong Son culture in the Red River delta. This period started in the Americas with the Moche culture. The Dorian invasion occurred at the end of it. Earlier in this time period, Greece had been home to the (\*) Minoans. The end of this time period was a "collapse" including the fall of the Mycenaean and Hittite kingdoms. The earliest writing, and cities like Harappa and Uruk, appeared during this time period. For 10 points, name this time period in which early civilizations like Ancient Egypt flourished, which was preceded by the Neolithic and succeeded by the Iron Age.

ANSWER: the Bronze Age [prompt on "chalcolithic" or "Copper Age," since those are often considered to be the early Bronze Age; prompt on "Mycenaean" ] <JR>

11. In 1987 the starting center for this team clotheslined Larry Bird, and he went on to sponsor Nintendo's "Bill Laimbeer's Combat Basketball." Joe Dumars was one of the two primary ball handlers along with Isiah Thomas, on this team, which won two NBA championships during its Bad Boys era. More recently this team's starting point guard, who decided to play for Lottomatica Roma instead of playing in the NCAA, (\*) tore his Achilles tendon. Their current roster includes Andre Drummond and Brandon Jennings. For 10 points name this NBA team that plays in the Palace of Auburn Hills outside of the largest city in Michigan.

ANSWER: Detroit Pistons [accept either] <NW>

12. The entropy of one form of this process can often be determined using Trouton's rule. By Ehrenfest's classification of them, the lambda point occurs at a second-order one of these for Helium II. The Clausius-Clapeyron equation gives the slopes of the (\*) coexistence curves on a diagram of this process. The changes in the temperatures at which this process occurs are two of the colligative properties of solutions. During this process, latent heat is released or absorbed. This process does not occur past the critical point. Types of it include deposition and sublimation. For 10 points, name this process exemplified by freezing and melting.

ANSWER: phase transitions [accept any answer that describes changing phase and/or state] <JR>

13. An art movement from this city issued the magazine *Ver Sacrum*. An artist from this city depicted a half-dressed Judith with a barely-visible head of Holofernes. A painting in this city includes sections like "Paradise Chorus." Oskar Kokoschka spent his early career in it, and Egon Schiele was from it. In one painting, an artist from this city used black rectangles and flower-colorful ovals to represent "Man" and "Woman." That artist from this city painted many (\*) eyes on the dress of Adele Bloch-Bauer, and used gold leaf throughout the *Beethoven Frieze* and *The Kiss*. For 10 points, name this home of an expressionist "secession" led by Gustav Klimt.

ANSWER: Vienna [or Wien; accept Vienna Secession] <JR>

14. An island in this sea is home to the "King's Chair" and other chalk cliffs. A city on it includes the Eduskunta parliament building. Another city on this sea is home to Santiago Calatrava's "Turning Torso." Islands in it include Rügen and Gotland. It is separated from the Kattegat by the "Little" and "Great" Belts. Provinces on it include (\*) Mecklenburg-Vorpommern. A city on it is home to the Winter Palace and the Hermitage Museum. At Kiel, a canal was built from it to the North Sea. It includes the Gulfs of Riga, Bothnia, and Finland. For 10 points, name this sea surrounded by Scandinavia, Russia, and Poland.

ANSWER: Baltic Sea [or Ostsee] <JR>

15. This material was used for several pieces produced in Longquan during the Song Dynasty. Pieces made from it were often decorated using cords of rope. This material was used for "Am I Not a Man And a Brother?" It's mostly made of kaolinite, and types of it include celadon. Asian pieces in this material were imitated by craftsmen in Delft. A kind of it that integrates bone powder was made by Josiah (\*) Wedgwood, and it comes in soft- and hard-paste kinds. It's often decorated in blue and white. Qin Shi Huang Di's tomb contains an "army" made of this material, which vitrifies, or turns glassy, at high temperatures. For 10 points, name this material, types of which include terracotta and porcelain.

ANSWER: ceramics [accept any answer to do with pottery, or any more specific type of ceramic, e.g. earthenware, terracotta, porcelain, china, etc.] <JR>

16. There are this many zeroes in a one's complement representation system, and in general, a single parity bit cannot detect bit errors that are multiples of this number. One loop nested inside another loop can result in a runtime of big O of N to this power because each iteration of the outer loop requires an iteration of the inner loop. In C++ and Java, there are this many bytes in a "short" integer. There are this many (\*) nibbles in a byte. For computer storage, "mega" and "giga" are defined in terms of powers of this number, not ten. A bit can

take on this many values. The boolean AND and OR gates take this many inputs. For 10 points, how many children can a node of a binary tree have?

ANSWER: two <HX>

17. A ruler of this country founded the Arcadian Academy in Rome after being converted to Catholicism by Pope Alexander VII. That ruler of this country invited Hugo Grotius and René Descartes to come to it, and they both died in it. This country's golden age started after the death of its King Charles (\*) XII and the Treaty of Nystad. A king of this country won the Battle of Breitenfeld but was killed by Albrecht von Wallenstein's troops at the Battle of Lützen. That king of this nation was known as the "Lion of the North" during the Thirty Years' War. For 10 points, name this country home to Queen Christina and Gustavus Adolphus, with capital Stockholm.

ANSWER: Kingdom of Sweden [or Konungariket Sverige] <JR>

18. Performing this action twice symbolizes the commandment to "keep" and "remember" or *shamor v'zakhor*. The direction in which to perform successive instances of this action was disputed between Hillel and Shammai, with the outcome being that it is done from left to right. This action is performed to commemorate a (\*) Yahrzeit. The central object of this action is braided in the havdalah ceremony, which ends by doing the opposite of this action using some wine. This action is performed on Friday nights as part of the ritual to begin Shabbat. A shamash is used to perform this action on Hanukkah. For 10 points, name this activity, the result of which is held in a menorah.

ANSWER: lighting candles [accept any answer involving any kind of candles] <JR>

19. A character in this novel prevents all ships from leaving England in order to facilitate the delivery of some diamond studs. Those studs are retrieved by Planchet's master, a man who owns a yellow nag and nearly skewers the Comte de Rochefort due to his Gascon pride. In this novel, John Felton is fooled by a woman branded with a (\*) *fleur de lis*; that wife of the Comte de Fere makes him murder the Duke of Buckingham. In this novel, Cardinal Richelieu's servant, Milady de Winter, is foiled by a group of men who declare, "All for one, one for all!" For 10 points, identify this work in which Athos, Porthos, and Aramis are joined by D'Artagnan, an Alexandre Dumas novel.

ANSWER: *The* Three Musketeers [or *Les Trois Mousquetaires*] <GL>

20. During one of these events, Ella Mae Wiggins took a leadership role in Gastonia, North Carolina. A non-Canadian Great Upheaval was one of these events, and another in 1875 was coordinated by the Molly Maguires. One of these nicknamed "Bread and Roses" occurred in Lawrence, Massachusetts and was co-led by (\*) "Big Bill" Haywood. Henry Clay Frick called on the Pinkertons in response to one in the steel town Homestead, Pennsylvania, and Grover Cleveland broke up an 1894 "wildcat" one by railroad workers of the Pullman Company. For 10 points, name these stoppages of work often organized by labor unions.

ANSWER: labor strikes [prompt on "labor violence" or equivalents; prompt on "work stoppages" until mentioned] <JW>

*Tiebreaker*

21. A city in this country lies in the shadow of Mount Entoto and is home to Meskel Square. The extremely hot and volcano-laden Danakil Depression is in this country. A staple food of this country is *injera* flatbread, and a province in this country is home to most of the Afar people. (\*) Coffee originated in this country. Lake Tana, the source of the Nile, is located in this nation. This most populous landlocked country in the world is bordered to the east by Somalia. For 10 points, name this country located on the Horn of Africa, a neighbor of Djibouti with its capital at Addis Ababa.

ANSWER: Federal Democratic Republic of Ethiopia [or It'vop'iya Federalawi Demokrasiyawi Ripeblik] <JR>

## Packet 14 Bonuses

1. This entity was said to have extended “From Stettin in the Baltic to Trieste in the Adriatic.” For 10 points each:

[10] Give this term that was used to signify the dividing line between the Western and Soviet blocs.

ANSWER: **Iron Curtain**

[10] The phrase “Iron Curtain” was originated by this Briton in his “Sinews of Peace” speech.

ANSWER: Winston [Leonard Spencer] **Churchill**

[10] Churchill was succeeded in his last stint as Prime Minister by Anthony Eden, who resigned after *this* 1956 event, in which France and England “denounced” an Israeli invasion, but then turned out to have planned the whole thing!

ANSWER: **Suez Crisis** [or **Tripartite Aggression**; prompt on answers involving “The Sinai War”] <LL>

2. This word is sometimes taken to mean a “Commonwealth of Believers.” For 10 points each:

[10] Give the Arabic term for the entire global community of Muslims.

ANSWER: **ummah** [or **ummat al-Islamiyah**; accept **ummat al-muminin**]

[10] More locally, Sunni mosques are lead by these religious figures.

ANSWER: **imam** [or **aimmah**]

[10] Muslims also feel something of a kinship for Christians and Jews, who they call *this*, because they read the Bible and believe in a lot of the same stuff that’s central to Islam.

ANSWER: **People of the Book** [or **ahl al-Kitab**] <JR>

3. Let’s suppose you’re joining a ballet troupe—name some words you’d learn, for 10 points each.

[10] As a quizbowler, you’re probably rather new to ballet, so you would be a dancer in this section, which is comprised of non-soloists. You form backdrops for more exalted artists and are effectively a backup dancer.

ANSWER: **corps** de ballet

[10] You may dream of earning this title, which was awarded to the world’s most renowned ballerinas. This title, which means “before” or “first” in Italian, also modifies “donna” to denote a leading operatic soprano.

ANSWER: **prima** ballerina

[10] If you really make it big, you might even dance for the New York City Ballet, which was co-founded by this choreographer. His version of *The Firebird* for Maria Tallchief [“tall” “chief”] secured her *prima ballerina* status.

ANSWER: George **Balanchine** [or Giorgi **Balanchivadze**] <GL>

4. A form of this technique that works with DNA is called ChIP. For 10 points each.

[10] Name this process for isolating proteins. It uses antibodies to make a specific protein come out of solution.

ANSWER: **immunoprecipitation** [prompt on “IP”]

[10] After immunoprecipitating out some protein, you can use SDS-PAGE, MALDI, and *this* technique to sequence it. In this technique, a magnetic field deflects charged particles, determining the ratio of that charge to another property.

ANSWER: **mass spectrometry** [or **MS**; accept **mass spectroscopy**]

[10] In ChIP, you have to reversibly cross-link the chromatin. You can do that using UV light, or *this* compound, which is also used for embalming dead bodies. It’s the simplest aldehyde.

ANSWER: **formaldehyde** [or **methanal**] <JR>

5. Answer some questions about accidental fatherhood in Greek mythology, for 10 points each.

[10] According to the *Telegony*, Odysseus is killed by a stingray spear wielded by a son he didn’t know he had. That son was borne by this sorceress, who also turned Odysseus’ crew into swine on her island of Aeaea.

ANSWER: **Circe**

[10] This shepherd didn't know about the fifty daughters he fathered because he was asleep the whole time, courtesy of his liaison with Selene.

ANSWER: Endymion

[10] Selene is the Greek goddess of this celestial body, which was later represented by the Roman goddess Luna.

ANSWER: the moon <GL>

6. As part of General John Forbes' force, this colonel accidentally attacked a fellow British regiment in the dark. For 10 points each:

[10] Name this Virginia militia commander whose killing of Joseph de Jumonville helped spark the Seven Years' War. During the war, he surrendered Fort Necessity but later salvaged the retreat of the 1755 Braddock Expedition.

ANSWER: George Washington

[10] In North America, the Seven Years' War actually lasted nine years and was known by this name, referring to Britain's two major opponents. It helped fuel the colonial grievances which later led to the American Revolution.

ANSWER: French and Indian War

[10] George Washington's misadventures at Fort Necessity and Jumonville Glen occurred in what is now this state, where the Battle of Brandywine Creek was fought.

ANSWER: Commonwealth of Pennsylvania <JW>

7. To construct these diagrams, you must count the valence electrons, and place lone pairs in a way that satisfies the octet rule. For 10 points each:

[10] Name these diagrams in which electrons are represented as dots.

ANSWER: Lewis structures [or Lewis dot diagrams; prompt on any answer involving "electrons" and/or "dots" with "diagrams" and/or "structures"]

[10] With really devious molecules, you have to compute this quantity to determine the correct Lewis structure, which minimizes it. In general, it equals "valence electrons minus nonbonding electrons minus one-half bonding electrons."

ANSWER: formal charge [prompt on "FC"]

[10] Luckily, it's easy to find the Lewis structure of this molecule, and the formal charge on all three of its atoms is zero. Still, it deviously becomes less dense when it freezes into ice.

ANSWER: water [or H2O] <JR>

8. This dish is usually served with a sweetish peanut sauce. For 10 points each:

[10] Name this popular dish of southeast Asia, which, like *yakitori* and *shish kebabs*, is more or less just grilled meat on a skewer.

ANSWER: satay [accept more specific answers like chicken satay]

[10] Another hugely popular food in southeast Asia is this stir-fried noodle dish, which is named for the country where it originates. Among its many ingredients are tamarind, tiny shrimps, lime wedges, and crushed peanuts.

ANSWER: Pad Thai [or phat Thai]

[10] A popular southeast Asian salad is made from this fruit while it is still green, or unripe. In Thai, that salad made with this fruit is known as *som tam*, while in Viet, it is called *goi du du*.

ANSWER: green papaya <JR>

9. Richard Maunder and Robert Levin have written "Amen" fugues to go with this piece. For 10 points each:

[10] Name this piece of sacred music. It includes a dramatic "Confutatis maledictis" and a trombone solo in its "Tuba Mirum."

ANSWER: Mozart's Requiem in D minor [both underlined parts required; or K. 626; or KV 626; or Köchel number 626]

[10] In the first movement of Mozart's *Requiem*, the words "Te decet hymnus deus in sion" are set to one of these

melodies. These really, really old liturgical songs were the main music of the Catholic church for over a thousand years.

ANSWER: Gregorian chants [or plainchants; or plainsongs]

[10] The “Te decet” solo is given to a singer of this voice type. The high “coloratura” variety of this voice type has a solo in Mozart’s “Exsultate, Jubilate.”

ANSWER: sopranos <JR>

10. [Note to moderator: please pay attention to the note after the first bonus part]

This thing resembles “a monument open to the public,” a “hook to hang your hat upon,” and “either a big cucumber or a little watermelon.” For 10 points each:

[10] Identify this appendage which may “hold your pen and ink” or simulate the Red Sea when it bleeds. It would be “a fine sign for a perfume shop,” according to a series of sample insults delivered by Viscount Valvert’s enemy.

ANSWER: nose [note (do **NOT** read this note out loud!): it’s Cyrano de Bergerac’s nose, so accept answers mentioning that, but **DO NOT** mention him otherwise]

[10] The aforementioned prodigious nose belongs to this French poet, who writes Christian’s letters to Roxanne and always maintains his panache, according to an Edmond Rostand play.

ANSWER: Cyrano de Bergerac [accept either underlined part]

[10] The historical Cyrano wrote some science fiction, like this French Enlightenment writer, who used the Sirian alien Micromégas to satirize Aquinas’ ideas. Another of his novels centers on the Babylonian philosopher Zadig.

ANSWER: Voltaire [or Francois-Marie Arouet] <GL>

11. Answer some questions about inclined planes, for 10 points each:

[10] A block sitting on an inclined plane on earth moves relative to an inclined plane instead of staying still because of the influence of this fundamental force.

ANSWER: gravity [or gravitation]

[10] On the surface of the earth, a block of mass M moving down a plane of angle  $\theta$  [“theta”], will experience a net force in the direction of the downward slope equal to this quantity.

ANSWER:  $Mg\sin(\theta)$  [ Mass times acceleration of gravity times the sine of the angle theta]

[10] This simple machine is just an inclined plane turned on its side. Its mechanical advantage is equal to its slope length divided by its width.

ANSWER: wedge <BS>

12. Answer some questions about African writers criticizing Europeans, for 10 points each.

[10] An author from this country wrote the highly critical essay “An Image of Africa” attacking portrayals of Africa in European fiction. Its native writers include Ben Okri and the author of *Death and the King’s Horseman*.

ANSWER: Federal Republic of Nigeria [the other author is Wole Soyinka]

[10] Chinua Achebe’s “An Image of Africa” is focused on *Heart of Darkness*, a novella by this Polish-British author of *Typhoon* and *Lord Jim*.

ANSWER: Joseph Conrad [or Józef Teodor Konrad Korzeniowski]

[10] This African author pioneered non-western forms with his play *I Will Marry When I Want*, and attacked African writers who use English in *Decolonising the Mind*. He also wrote *A Grain of Wheat* and *Petals of Blood*.

ANSWER: Ngugi [“un-GOO-khee”] wa Thiongo [accept James Ngugi] <JR>

13. This leader ended Ottoman-Egyptian rule, or the “Turkiyah.” For 10 points each:

[10] Name this leader who successfully besieged Khartoum and killed “Chinese” Gordon in 1885.

ANSWER: Muhammad Ahmad [bin Abd Allah] [or the Mahdi]

[10] The siege of Khartoum took place in this modern-day country, which includes the troubled region Darfur.

ANSWER: the Sudan

[10] This British general later defeated Muhammad Ahmad's successor at the battle of Omdurman. He was also commander during the Boer war, and he "wants YOU" according to a 1914 World War 1 recruitment poster.

ANSWER: Lord **Kitchener** [or Horatio Herbert **Kitchener**, 1st Earl Kitchener] <LL>

14. In the third part of this poem, the author tells Carl Solomon, "I'm with you in Rockland." For 10 points each:

[10] Identify this poem which describes some people "starving hysterical naked."

ANSWER: **Howl**

[10] This Beat Generation poet wrote about "angel-headed hipsters" and an industrial monster called Moloch in *Howl*. He hears another poet ask, "What price bananas?" in his "A Supermarket in California."

ANSWER: [Irwin] Allen **Ginsberg**

[10] Ginsberg states that it is "strange now to think of you, gone without corsets & eyes" in a 1959 poem dedicated to this person.

ANSWER: **his mother** [or **Naomi** Ginsberg; accept clear equivalents; do **NOT** accept or prompt on "your mom"; the poem is "Kaddish"] <GL>

15. This philosopher postulated that a blind person who suddenly gains vision would have to use reconcile it with their other senses to understand it, in his *Letter on the Blind*. For 10 points each:

[10] Name this French Enlightenment philosopher. His dialogues include *D'Alembert's Dream*, and he wrote a novel in which *Jacques the Fatalist* imagines that everything that happens is written on a big scroll in the sky.

ANSWER: Denis **Diderot**

[10] Diderot is most famous for co-editing a mammoth one of these projects with d'Alembert. Ernest Rutherford and Bertrand Russell contributed to the famous Eleventh Edition of the "Britannica" one of these reference works.

ANSWER: **encyclopedia** [or **Encyclopédie**; accept **Encyclopædia Britannica**]

[10] Diderot wrote a book about the "Promenade" of one of *these* people. The French philosopher Michel de Montaigne worked within this tradition, influencing Descartes' desire to start entirely afresh from first principles.

ANSWER: **skeptics** [accept **skepticism**] <JR>

16. In the Middle Ages, these institutions focused on the seven "liberal arts," divided between the *trivium* and the *quadrivium*. For 10 points each:

[10] Name these institutions, which were centers of Scholasticism. Early ones in Europe were founded in Bologna, Oxford, and Cambridge.

ANSWER: **universities**

[10] Oxford University was more or less a breakaway from the prestigious university in this city, which later became known as the Sorbonne.

ANSWER: **Paris**

[10] This city is home to the oldest university in Spain and the fourth oldest in Europe. It was given the name "university" by Alfonso the Wise of Castile, and cool people like Miguel de Cervantes studied here.

ANSWER: **Salamanca** <JR>

17. Chinese entrepreneurs have lately been investing in interoceanic connections in Latin America. For 10 points each:

[10] Name this first Atlantic-to-Pacific waterway, for which Chinese businessmen recently proposed building a fourth set of locks, though the ongoing construction of its third set isn't even complete yet.

ANSWER: **Panama Canal** [or **Canal de Panamá**]

[10] Protests have recently erupted in this Central American country, led by Daniel Ortega, over plans for a longer, competing canal. Also centered on an inland lake, this country's canal will be funded by Wang Jing's HKND Group.

ANSWER: Republic of **Nicaragua** [or República de **Nicaragua**]



[10] The Chinese government is also looking at funding an interoceanic railroad in this country led by Juan Manuel Santos. Starting north of Buenaventura, the route would traverse areas now controlled by rebel groups.

ANSWER: Republic of Colombia [or República de Colombia] <JW>

18. Some of his sculptures are eerily reminiscent of Slender Man, for 10 points each:

[10] Name this Swiss sculptor of the mantis-like *Woman with her Throat Cut*, an emaciated-looking *Cat*, and the group of long, attenuated *Three Men Walking II*.

ANSWER: Alberto Giacometti

[10] Giacometti worked primarily in this material, which was used widely in antiquity and the Renaissance for works like the equestrian statue of Marcus Aurelius and Donatello's *David*.

ANSWER: bronze

[10] The figures in *Three Men Walking II* have long, emaciated versions of these body parts. They are notably missing in many ancient sculptures, like the *Venus de Milo* and the *Winged Victory of Samothrace*.

ANSWER: arms <FM>

19. Cramer's rule gives a way to do this under certain conditions. For 10 points each:

[10] Name this action that can be done by rearranging one component and substituting it into the others. Another method is to eliminate by subtracting or adding multiples of one component from another.

ANSWER: solving systems of linear equations [accept equivalents like finding solutions of systems, but do NOT accept or prompt on just "systems of equations," which are a thing, not an activity]

[10] Solving systems of linear equations is the central activity of linear algebra, which mostly involves manipulating *these* mathematical objects. Manipulations of them include the transpose, inverse, and determinant.

ANSWER: matrices [or matrix]

[10] Pencil and paper ready. Find the determinant of the 2-by-2 matrix where the first row is "2," "3" and the second row is "one half," "three quarters."

ANSWER: zero <JR>

20. This author wrote about Christopher Banks' quest to discover what happened to his parents in the novel, *When We Were Orphans*. For 10 points each:

[10] Identify this author who described Norfolk as a place where "lost things go" in his novel about the "carer" Kathy H in *Never Let Me Go*.

ANSWER: Kazuo Ishiguro

[10] Christopher Banks' mother is actually still alive, but that's not true for this Dickens orphan. This title character falls in with Fagin and the Artful Dodger after Mr. Bumble castigates him for saying "please sir, I want some more."

ANSWER: Oliver Twist [accept either underlined part]

[10] In this play by George Bernard Shaw, Andrew Undershaft's arms manufactory is inherited by Undershaft's daughter's beau, Adolphus Cusins, since the company can only be passed to an orphan foundling.

ANSWER: Major Barbara <GL>

*Tiebreaker*

21. For a convex lens, if this quantity is greater than the object distance, a virtual image will be formed. For 10 points each:

[10] Name this length, which is negative for a concave lens, and equal to the negative radius of curvature over two for a spherical lens. It can be calculated using the lensmaker's equation.

ANSWER: focal length [prompt on "f"]

[10] On the right hand side of the lensmaker's equation, *this* quantity times minus one is multiplied by the thickness of the lens, and divided by the product of *it* and the radii of curvature of the two surfaces of the lens.

ANSWER: index of refraction [prompt on "n"]

[10] This law explains the bending of light at surface boundaries by setting the ratio of the sines of the incident angles equal to the reciprocal of the ratio of the indices of refraction.

ANSWER: **Snell**'s law <NW>