

LIMIT 2015: A Limit to Learning is a Dangerous Thing

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Packet 8

Tossups

1) Antonio Salazar called this material's discovery in Angola "a pity". The Blackshirts killed opponents with a small amount of one type of this substance. The UK began getting this good from the North Sea in 1971. Bishops anointed Germanic kings with one type of this material at coronations. Ploiești and Grozny (*) were sites making this good in WWII. Stalin's "five centers" included one at Baku on the Caspian Sea to make this good. France had a shortage of this good in 1917, even though it was helped by Royal Dutch Shell. For 10 points, name this "crude" good.

ANSWER: crude oil or petroleum or castor oil

2) Tippu Tip established a slave trading station at Tabora in this nation. This nation's scenic Stone Town was once part of the Sultanate of Oman and is located on an eastern archipelago. Some rare black rhinos live in the N-gorong-oro Crater in this country's north. This home of Mount (*) Meru has a national park around the Olduvai Gorge. This nation contains Mount Kilimanjaro and Serengeti National Park. For 10 points, name this nation with a former capital at Dar es Salaam, formed by the union of Tanganyika and Zanzibar.

ANSWER: United Republic of Tanzania <CC>

3) It's not resistance, but rheostats are designed to limit this quantity through a sliding contact. Condenser microphones create this phenomenon along a rigid disk. A bimetallic strip surrounded by a heating coil modulates this quantity in devices that also have contact arms. The cross product of the length of a wire and the magnetic field over the force (*) exerted on that wire equals this quantity. This quantity is proportional to the drift velocity of a free electron gas. The "conventional" type of this phenomenon moves toward positive charge. For 10 points, what quantity is charge flow, measured in Amperes?

ANSWER: current; prompt on "I"<HW>

4) This man's helmsman Palinurus is drugged by a god and falls off his boat as a sacrifice to ensure safe passage to his crew. This man quotes the line "invitus, regina, tuo de litore cessi" almost directly from a poem about a lock of Berenice's hair called Catullus 66. This man had a dream in which he is (*) visited by Hector and is ordered to flee from Troy because it was already lost. He married a Queen of Carthage who stabbed herself with a sword on a funeral pyre. For 10 points, name this son of Venus and Anchises, the subject of an epic by Virgil.

ANSWER: Aeneas <KD>

5) "Clouds" and "Sirens" are movements from this composer's *Nocturnes*, which were inspired by James Whistler paintings. The love-death leitmotif from Wagner's *Tristan and Isolde* often interrupts the last movement of a suite by this composer called "Golliwog's (*) Cakewalk." A C-sharp minor second movement of another piece by this composer of the *Children's Corner Suite* is "Play of the Waves." One of his works was inspired by a Stephane Mallarme poem. A Paul Verlaine poem names the third movement of his *Suite Bergamasque*. For 10 points, name this French composer of *La Mer*, *Prelude to the Afternoon of a Faun*, and "Claire de Lune."

ANSWER: Claude Debussy <JG>

6) This poet wrote about a group “moved by a spirit of uselessness” becoming a violent mob in “The Crowd at the Ballgame,” and described the title plant as “a buttercup / upon its branching stem,” in “Asphodel, that Greeny Flower.” This poet wrote “Sat it! No ideas but in things” in “The Delineaments of Giants,” the first in a 6-book epic about a (*) city on the Passaic River, and he defends himself for eating plums out of the icebox by saying that they were “delicious, so sweet, and so cold,” in another poem. For 10 points, name this American poet of *Paterson* and “This is just to say,” who wrote about an object “glazed with rain-water” in “The Red Wheelbarrow”.

ANSWER: William Carlos Williams <CC>

7) One former broadcaster for this team instructed listeners to “get out the rye bread” when a player for this team hit a grand slam. This team which once employed Dave Niehaus won the 1995 ALDS on a walkoff double by designated hitter Edgar Martinez. This team owned by Nintendo played from 1977 to 1999 in the (*) Kingdome. It signed Nelson Cruz in free agency before the 2015 season. Its pitcher Hisashi Iwakuma pitched a no-hitter in 2015, and this team’s other starting pitchers include Felix Hernandez. For 10 points, name this baseball team that plays in the Pacific Northwest.

ANSWER: Seattle Mariners; accept either or both underlined parts <CC>

8) This man refused to create Villard’s proposed National Race Commission. One act that this man passed limited “tying” agreements and price discrimination, so it was called “labor’s charter of freedom”. He passed the Adamson Act to avoid a rail strike, and his Treasury secretary, William McAdoo, created twelve (*) decentralized, regional banks. A ‘Boston Brahmin’ and ‘Strong Reservationists’ opposed a treaty that this President fired Robert Lansing over. The War Aims and Peace Terms speech by this man proposed an independent Poland. For 10 points, name this President who made the 14 Points speech after WWI and succeeded Theodore Roosevelt.

ANSWER: Woodrow Wilson <AS>

9) This entity, the torus, and the Möbius strip can be manipulated to form any connected surface according to the classification theorem. Another theorem proves the nonexistence of a continuous nonzero tangent field on this structure, or, equivalently, the existence of a cowlick. The two-dimensional Euclidean plane maps to one of these named for (*) Riemann. Coordinates in a system named for this structure are designated by r , θ , and ϕ , and in Euclidean space, it can be formed by the graph of $x^2 + y^2 + z^2 = 1$. For 10 points name this round object with surface area $4\pi r^2$ and volume $\frac{4}{3}\pi r^3$.

ANSWER: sphere; accept ball before "two of these entities" is read <HW>

10) In one film set during this conflict, a character played by Humphrey Bogart investigates who ate some leftover strawberries. In another film set during it, Shears leads commandos on a mission to destroy the title structure, which had been partially built by men under the command of a character played by Alec Guinness. *The Bridge on the* (*) *River Kwai* and *The Cain Mutiny* were both set during this war, which was also the setting for a film opening with the title character giving a speech in front of an American flag, as well as a film that ends with Hitler machine gunned to death. For 10 points, name this conflict that *Patton* and *Inglorious Basterds* were set in.

ANSWER: World War II; accept the Second World War, WW2, etc. <JG>

11) The Irish-American Studs Lonigan grows up in this city in a trilogy by William T. Farrell. In a novel set in this city, one character who sets his grandmother’s house on fire at age 4 moves here from the South and joins the Communist Party. Caroline Meeber falls in love with Richard Drouet and moves to this city in one novel. In another work, the title character is described as (*) “an American, [this city] born. This home of Richard Wright and Augie March is also where Jurgis Rudkus works in a slaughterhouse in Upton Sinclair’s *The Jungle*. For 10 points, name this Illinois city described as “Hog Butcher for the World” by Carl Sandburg.

ANSWER: Chicago, Illinois <CC>

12) The activation form of this quantity is denoted with a double dagger and is positive in the Eyring equation. Trouton's rule states that one type of this quantity is 10.5 times the ideal gas constant. The Nernst heat theorem predated one law defining this quantity. At constant temperature, the change in this quantity is proportional to the natural log of the final over initial volumes. The Helmholtz free energy and the (*) Gibbs free energy are $H - T$ times this quantity. In the universe, this quantity is always increasing by the second law of thermodynamics. For 10 points, name this quantity that increases with a system's disorder.

ANSWER: entropy; prompt on "S"

13) One dynasty of this religion burned several works of a philosopher called "the Commentator". Roger de Hauteville supervised Sicilian royal estates with a financial agency, called the *diwan*, founded by it. Leaders of this religion presided over the *con-viv-encia*, and the first *en-co-miendas* were created to manage its former territories. Al-Andalus was its name for (*) Spain. Most Carolingian slaves were sold to people of this religion, whose converted variety were called *mo-ris-cos* during the Reconquista. One leader of this religion gave an elephant to Charlemagne after losing the battle of Tours. For 10 points, name this religion of the Umayyads and Abbasids.

ANSWER: Islam; accept varieties but not sects of Islam

14) This author published a book about the dog of Elizabeth Barrett Browning titled *Flush*, while in another work by her, the title former teenage lover of Queen Elizabeth I lives for over 300 years and spontaneously becomes a woman at age 30. In another novel, this author of (*) *Orlando* wrote a novel in which Lily Briscoe completes a painting as the Ramsay family finally reaches the title location. At the end of another of this author's novels, Septimus Smith commits suicide while the protagonist plans a dinner party. For 10 points, name this member of the Bloomsbury Group, the author of *To the Lighthouse* and *Mrs. Dalloway*.

ANSWER: Virginia Adeline Woolf <CC>

15) This man's administration proposed an Eight-Point Regulation that asked officials to "do real work, say real things". This man declared an Air Defense Identification Zone over the Senkaku Islands. This man promoted the term (*) "Chinese Dream" in order to "revitalize the nation". An anti-corruption campaign started by this man jailed Bo Xilai and Gu Junshan, and he is called the "paramount leader". For 10 points, name this General Secretary of the Communist Party of China, who succeeded Hu Jintao in 2013.

ANSWER: Xi Jinping; prompt on "Xi" <AS>

16) In this novel, a priest has the letters I.N.R.I. or I.H.S. on his back, and one character in it brings an editorial about foot-and-mouth disease to the office of the *Freeman's Journal*. This novel's protagonist gets a letter from Martha Clifford addressed to his pseudonym Henry Flower. That protagonist's wife ends a monologue with (*) "yes i will yes" and has an affair with Blazes Boylan. In the "Nausica" section of this novel, the protagonist dreams about Gerty McDowell on the beach, and this novel opens by introducing "Stately, plump Buck Mulligan." For 10 points, name this novel that follows Leopold Bloom on June 16, 1904, written by James Joyce.

ANSWER: Ulysses <CC>

17) The Ech-mia-dzin Church belongs to this category, and the Arès movement was led by a priest of this religion. Members of this church converted to Hanafite Islam for lower taxes in Albania. One group described by this adjective divides itself into autocephalous bodies and rejects the (*) *filioque* clause. The Russian Old Believers are part of one of these churches. One of these churches is led by the Patriarch of Constantinople. For 10 points, name these churches of conservative Jewish groups and Christians which split from Catholicism in the 1054 Great Schism.

ANSWER: Eastern Orthodox; accept word forms and churches with "Orthodox" in them

Note to all: the answerline is the broadest possible answerline

18) **Ceramides are these types of compounds with sphingosine head groups. In a condition with elevated levels of these compounds, foam cells filled with one type of these compounds adhere to blood vessel walls. One example of this type of compound lines axons (*) except nodes of Ranvier, and is called myelin. They include cholesterol and oils, and one type of these compounds is a glycerol molecule bonded to three carbon chains called fatty acids. For 10 points, name these hydrophobic compounds cleaved by lipases, including triglycerides and a “phospho” type that comprises the plasma membrane.**

ANSWER: lipids; antiprompt on “fats” or “triglycerides” or “cholesterol” before mentioned and say “What general kinds of molecules are fats/triglycerides/cholesterol?”

19) **The Brainerd School in Chattanooga taught these people agriculture, housework, and the Bible. The 1791 Treaty of Holston promoted agriculture to this people, who were organized into Upper, Lower, and Middle Towns. Elias Boudinot edited this group’s newspaper, the *Phoenix*. This tribe ceded land in the (*) Treaty of New Echota, which was not signed by their leader John Ross. The Supreme Court ruled that these people constituted a sovereign nation in the case *Worcester v. Georgia*. Sequoyah created an alphabet for these people. For 10 points, name this Southeastern Native American tribe forced to move west in the Trail of Tears.**

ANSWER: Cherokee Nation <CC>

20) **A snail and a fetus are among several objects floating above a woman lying in bed in a work by this artist painted on sheet metal. The sun and the moon divide the background of one painting by this artist, in which one figure lies bleeding on a hospital gurney behind another sitting and wearing a flower headdress. This artist of *Henry Ford Hospital* and (*) *Tree of Hope* painted a work in which the title animal is studded with arrows, and another in which nails and the title metal object protrude from a unbrowed woman. For 10 points, name this wife of Diego Rivera, a Mexican painter of many self-portraits including *The Little Deer* and *The Broken Column*.**

ANSWER: Frida Kahlo; prompt on “Henry Ford Hospital” before “a work by this artist” is read; prompt on “Frida” <JG>

Bonuses

1) Medical marijuana magnate Ronnie LaFontaine and his wife Tammy live next door to one family on this show. For 10 points each:

[10] Name this ABC comedy centered around the relatives of Jay Pritchett, including his daughter Claire, her husband Phil Dunphy, and their three kids.

ANSWER: Modern Family

[10] This Colombian star plays Jay's wife Gloria on *Modern Family*. She is the highest-paid actress on television, and appears in ads for CoverGirl and Diet Pepsi.

ANSWER: Sofia (Margarita) Vergara

[10] Ed O'Neill, who plays Jay on *Modern Family*, starred as shoe salesman Al Bundy on this '90s FOX sitcom.

ANSWER: Married...with Children <CC>

2) This singer recorded A-Tisket, A-Tasket with the Chick Webb orchestra. For 10 points each:

[10] Name this jazz singer known as the "first lady of song".

ANSWER: Ella (Jane) Fitzgerald

[10] Fitzgerald was an influential user of this technique, in which singers improvise using syllables instead of words.

ANSWER: Scat singing

[10] This other American musician pioneered scat in his recording of "Heebie Jeebies". A recording by this man that does not use scat is "What a Wonderful World".

ANSWER: Louis Armstrong <DS>

3) The Catawba Confederacy was created to counteract this tribe, members of whom started the Jumonville affair by using their tomahawks. For 10 points each:

[10] Name these people whose namesake League comprised five and later six nations in New York. They used wampum belts to record treaties and transactions.

ANSWER: Iroquois

[10] This political and economic agreement between the Iroquois and American colonists lasted for a century until 1777. It was named for a strong silver object that needed to be polished to prevent rusting and breakage.

ANSWER: Covenant Chain

[10] This initially-Mohawk sachem founded the Iroquois confederacy along with Dekanawida. He was nicknamed the "Great Peacemaker" and was a great speaker.

ANSWER: Hiawatha

4) The later works of Paul Cezanne may have inspired this art movement after they were shown at the 1904 Salon d'Automne. For 10 points each:

[10] Name this early 20th-century art movement that heavily utilized three-dimensional shapes and broke up abstracted forms. Members of this movement included Juan Gris, Ferdinand Leger and Jean Metzinger.

ANSWER: Cubism

[10] The foremost Cubist was this spectacularly-gifted Spanish artist whose painting *Les Femmes d'Alger* is considered proto-cubist. In response to the bombing of a Basque town he painted the monumental *Guernica*.

ANSWER: Pablo (Ruiz y) Picasso

[10] This French painter worked alongside Picasso in the early development of Cubism. His painting *Houses at l'Estaque* is a notable early example of the new movement.

ANSWER: Georges Braque <JG>

5) Thomas Mann wrote a novel about the relationship between this author and Charlotte Kestner. For 10 points each:
[10] Name this German author of a novel in which the title character kills himself after his beloved Lotte's engagement to Albert, *The Sorrows of Young Werther*.

ANSWER: Johann Wolfgang von Goethe [GER-tuh]

[10] Goethe wrote a two-part play about this character, whose lover Gretchen drowns their child after this scholar kills her brother. He sells his soul to the devil, Mephistopheles.

ANSWER: Faust; do not accept **Doctor Faustus**

[10] Thomas Mann used the Faust story for a novel in which this composer purposefully gets syphilis from the prostitute Esmeralda and admits his deal with the devil at the performance of his "Apocalypse" oratorio.

ANSWER: Adrian Leverkühn; accept either or both underlined names <CC>

6) This theory features an equivalence principle involving nonrotating laboratory frames and was studied by the Pound-Rebka experiment. For 10 points each:

[10] Name this theory by Albert Einstein, stating that curved space-time affects the motion of masses because light moves along geodesics in spacetime along the shortest path.

ANSWER: general relativity; prompt on "relativity"; do not accept **special relativity**

[10] The lab frames involved in the equivalence principle share are moving in this way and are acted on by no forces because gravity is a curvature in spacetime. This is also the state of any object acted on only by gravity.

ANSWER: freefall; accept word forms

[10] In freefall, this is the force that balances the gravitational force, denoted W. It changes with gravity, while mass doesn't.

ANSWER: weight

7) A form of this action in Judaism is called korbanot, and according to the Old Testament, those coming into contact with a corpse should perform this action on a red heifer. For 10 points each:

[10] Name this action that is metaphorically applied to Jesus Christ as the "Lamb of God."

ANSWER: animal sacrifice

[10] In 1992, a court case in Florida ruled that members of this religion could continue to sacrifice chickens in public. This syncretic religion venerates orishas and is very popular in Cuba.

ANSWER: Santeria

[10] Santeria developed out of the syncretization of Roman Catholicism with this West African religion, which venerates a genderless deity named Olo-dumare.

ANSWER: Yoruba

8) Nelson Goodman formulated a "New Riddle of" this logical process using the concepts of "bleen" and "grue". For 10 points each:

[10] Name this form of reasoning that another philosopher tried to disprove with a thought experiment in which two colliding billiard balls do not collide the same way each time.

ANSWER: induction or inductive reasoning

[10] The example of the billiard balls appears in this book. This empiricist book separates "matters of fact" and "relations of ideas" and posits that "ideas" result from "impressions" via the copy principle.

ANSWER: *An Enquiry Concerning Human Understanding*

[10] The author of that book was this Scottish empiricist philosopher who posited a "missing shade of blue" and wrote *A Treatise on Human Nature*.

ANSWER: David Hume <SC>

9) Jimmy Hoffa led one of these organizations called the Teamsters. For 10 points each:

[10] Name these organizations, the largest one of which was the Samuel Gompers-founded AFL, which later merged with the CIO.

ANSWER: labor unions

[10] This 1935 act established a namesake board to oversee labor disputes. Also known as the Wagner Act, it was later amended by the Taft-Hartley Act.

ANSWER: National Labor Relations Act or NLRA

[10] Grover Cleveland ordered federal troops to put down this Eugene V. Debs-led strike at a namesake sleeping car company, which the American Railway Union basically lost.

ANSWER: Pullman Strike

10) Null mutations are introduced via this technique, which is often done with plasmid microinjections and is also called recombineering. For 10 points each:

[10] Name this process of replacing genes wholesale with different alleles, for one or more target genes.

ANSWER: gene knockout

[10] Genes with this genotype have one recessive and one dominant allele. Testing the success of a gene knockout involves breeding two organisms with this genotype and checking their genotypes.

ANSWER: het or heterozygotes

[10] This process is the mating of heterozygous organisms with a target gene of interest with parents or genetically similar organisms to separate or combine traits of interest in a single group of organisms.

ANSWER: backcrossing or topcrossing

11) In this country's mythology, a salmon gains all the knowledge in the world when it eats hazelnuts that had fallen in the Well of Wisdom. For 10 points each:

[10] Name this country, whose mythology involves Finn MacCool eating that Salmon of Knowledge.

ANSWER: Ireland or Eire

[10] This Irish hero earned his name after killing a guard dog, and later defended Ulster from the armies of Queen Medb [MAVE].

ANSWER: Cù Chulainn [CHOO CULL-en]

[10] Cu Chulainn promised never to refuse a meal and never to eat dog meat, a sacred, unbreakable oath known by this term in Irish mythology.

ANSWER: Geis or Geas <RL>

12) In the final scene of the play in which she appears, this character wipes the brow of her son before drinking a cup of poison. For 10 points each:

[10] Name this Queen who did an "o'erhasty marriage", described by a ghost as "that adulterate beast".

ANSWER: Gertrude

[10] Gertrude is the mother of this Shakespeare title character, a Prince of Denmark who begins a famous soliloquy with "To be, or not to be."

ANSWER: Hamlet

[10] This father of Laertes and Hamlet's love Ophelia is accidentally killed by Hamlet when he mistakes him for Claudius and stabs through a tapestry.

ANSWER: Polonius <JG>

13) In this story, Della sells her long hair to Madame Sofroni for \$20 in order to buy a watch chain for her husband. For 10 points each:

[10] Name this short story in which Della's husband Jim has already sold his watch to buy a set of hair combs for her, rendering both of their gifts useless.

ANSWER: "The **Gift of the Magi**"

[10] This author of "The Gift of the Magi" also wrote about Bill and Sam, who kidnap Johnny but end up paying his father to take him back, in "The Ransom of Red Chief." He lends his name to an annual short story prize.

ANSWER: **O. Henry** or William Sydney **Porter**

[10] "The Gift of the Magi" appears in this collection by O. Henry, along with other stories like "The Cop and the Anthem." Its title refers to the population of New York City at its publication.

ANSWER: *The **Four Million*** <CC>

14) Many of this nation's cities, which have black 'townships' at their fringes, have 'grayed', for which its government has done 'willing-buyer, willing-seller' land reform. For 10 points each:

[10] Name this southernmost African nation whose three capitals are Bloemfontein, Johannesburg, and Cape Town. The De Beers family of companies began here.

ANSWER: **South Africa**

[10] The Sullivan Principles targeted these organizations in South Africa in the 70s. One headquartered in South Africa was Vodacom, and Barclay's and Alcatel are foreign ones that recently invested in the country.

ANSWER: **multinational corporations** or **multinational companies** **MNCs** or **transnational corporations** or **transnational companies** or **TNCs**; prompt on "corporations" or "companies"

[10] This South African minority, which today has entrepreneurs and is centered in Durban, where they often eat 'bunny chow'. They came as 'passenger' or 'free' people to work on Natal sugar plantations in the 1800s.

ANSWER: **Indians**

15) This civilization succeeded one that built hundreds of Tenon heads to show shamans transforming into mythical creatures. For 10 points each:

[10] Name this civilization which succeeded the Chavin indirectly. They also conquered the Chimu.

ANSWER: **Inca**

[10] Giant heads were also built by this "mother civilization" of Central America, which had centers at Tres Zapotes and La Venta. They used balsa rafts to transport those heads across rivers.

ANSWER: **Olmec**

[10] The basalt heads built by the Chavin and the Olmec were of this general material, as were Incan irrigation canals and most peasant houses.

ANSWER: **stone** or **rock** or word forms or synonyms

16) Boron and alkenones are often used in some types of this process. For 10 points each:

[10] Name this process, which comes in "radiometric" and, more commonly, "carbon-14" types.

ANSWER: radiometric or radiocarbon **dating**

[10] These nuclides were created by cosmic rays in spallation reactions and are used for dating surface materials. They include beryllium-10, carbon-14, aluminum-26, and chlorine-36.

ANSWER: **cosmogenic** nuclides or isotopes or radionuclides

[10] Argon used in dating is also measured with the 40-isotope of this alkali metal in igneous rocks. It's found in orthoclase feldspars and reacts the most vigorously with water.

ANSWER: **potassium** or **K**

17) This opera is set in Catfish Row in Charleston, South Carolina. For 10 points each:

[10] Name this opera that features the song “Summertime.” At the end of this opera, one of the title characters leaves for New York with the dope dealer Sportin’ Life.

ANSWER: Porgy and Bess

[10] Porgy and Bess was written by this man and his brother Ira. A train ride to Boston inspired this man’s Rhapsody in Blue.

ANSWER: George Gershwin

[10] Gershwin included taxi horns in this symphonic poem meant to evoke the sounds and feeling of the title European city.

ANSWER: An American in Paris <JG>

18) The violation of this 1713 edict led to the War of the Austrian Succession. For 10 points each:

[10] Name this edict, issued by Holy Roman Emperor Charles VI, which allowed his daughter Maria Theresa to become his successor.

ANSWER: Pragmatic Sanction of 1713

[10] When Frederick the Great violated the Pragmatic Sanction by invading Silesia, the officers of his army were members of this class of Prussian aristocrats and landowners, whose estates were farmed by peasants.

ANSWER: Junkers [YOON-kers]

[10] Charles VI and Maria Theresa, like all Holy Roman Emperors between 1438 and 1740, were members of this Austrian royal house, which also governed Spain.

ANSWER: House of Habsburg or Hapsburg

19) Name some things about the Golden Age of Latin Literature, for 10 points each:

[10] This Golden Age poet wrote the *Metamorphoses*, which chronicled Greco-Roman mythology from the beginning of time until Caesar. This author’s *The Art of Love* was so racy that it got him exiled by Augustus.

ANSWER: Ovid or Publius Ovidius Naso

[10] Another Golden Age poet was Horace, who wrote four books of these lyrical poems. The English form of this composition is often in praise of something, such as Percy Shelley’s one “to the West Wind.”

ANSWER: odes

[10] Stephen Greenblatt’s book *The Swerve* focuses on this poet’s *On the Nature of Things*, a text that explains Epicurean philosophy and atomism, which Greenblatt claims was a pivotal concept in shaping the modern world.

ANSWER: (Titus) Lucretius (Carus) <JG>

20) One form of this property is the average of the first ionization energy and the first electron affinity. For 10 points each:

[10] Name this property, ‘the power of an atom in a molecule to attract electrons to itself’. Mulliken, Allred-Rochow, and Pauling developed scales to determine it.

ANSWER: electronegativity; accept word forms

[10] Homonuclear diatomic molecules do not have this property since both atoms have the same electronegativity. Molecules with this property can have delta-plus and delta-minus signs to show electronegativity differences.

ANSWER: polarity; accept word forms

[10] In infrared spectra, a vibration can be observed if it changes this vector quantity for a molecule. This quantity is commonly observed using microwave rotational spectroscopy calibrated by carbonyl sulfide.

ANSWER: dipole moment; do not accept **dipole**