

LIMIT 2015: A Limit to Learning is a Dangerous Thing

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Packet 12

Tossups

1) **This author wrote a novel in which the wealthy boy Harvey Cheyne is rescued by the crew of the fishing boat *We're Here*, while in a short story by this man, Daniel Dravot and Peachy Carnahan try to become rulers of Kafiristan. This author of *Captains Courageous* and (*) “The Man Who Would Be King” wrote a poem in which he tells a water-bearer that “You’re a better man than I am.” In one of his short stories, the title mongoose protects a family from the cobras Nag and Nagaina, which was included in a collection with many stories about Mowgli. For 10 points, name this author of “Gunga Din,” “Rikki-tikki-tavi,” and *The Jungle Book*.**

ANSWER: (Joseph) Rudyard Kipling <CC>

2) **The virtual form of this quantity occurs due to an object’s constraints. The relativistic type of one form of this quantity is multiplied by *quantity gamma minus 1*. For a rigid body in two dimensions, this quantity is the time integral of a couple times angular velocity. This quantity changes sign based on the directions of cyclic processes. A path integral in a force field (*) gives this quantity. Because the centripetal acceleration is always tangent to an object in circular motion, rotating objects do not “do” this quantity. This quantity is not torque, but it has units of Newton-meters. For 10 points, name this product of force and distance.**

ANSWER: work; do not accept **energy**

3) **In one of this man’s novels, four cadets led by Jaguar form a gang called “The Circle” at the Leoncio Prado Military Academy. This author of *The Time of the Hero* wrote a novel in which the journalist Santiago and the chauffeur Ambrosio meet up in the title (*) bar. In his most famous work, the protagonist works at Radio Panamericana with Pedro Camacho, whose soap operas make up that novel’s even-numbered chapters. For 10 points, name this Peruvian author of *Conversation in the Cathedral* and *Aunt Julia and the Scriptwriter*.**

ANSWER: (Jorge) Mario (Pedro) Vargas Llosa; prompt on “Vargas” or “Llosa” <CC>

4) **Bats and owls gathering above a man asleep on his desk make up this man’s *The Sleep of Reason Produces Monsters*, one of 80 etchings in his *Los Caprichos*. In his old age, this artist created a series of 14 paintings originally made directly on the walls of his house which include *Fight with Cudgels* and (*) *Saturn Devouring his Son*; that series is known as his Black Paintings. This artist’s painting *The Charge of the Mamlukes* was paired with another work in which faceless French soldiers point their rifles at a brightly illuminated man wearing a white shirt and raising his arms into the air. For 10 points, name this Spanish painter of *The Third of May, 1808*.**

ANSWER: Francisco Jose de Goya y Lucientes <JG>

5) **In the Popol Vuh, the Hero Twins pass the challenge of the dark house by using these objects to imitate the light of a torch. After Argus was killed, his 100 eyes were moved onto these objects. In Australian mythology, some of these objects were pure white, but when an animal brought fire to mankind, many of these objects (*) were burned black. The cloak of Freyja is made of these objects. One**

man escaped from Crete with his son using a construct made of these objects and wax. For 10 points name these objects, that in Egyptian mythology represented truth and justice, and were weighed against the heart after death.

ANSWER: feathers <KD>

6) **Senator William Giles opposed this man's appointment of Albert Gallatin as Secretary of State. This man kept James Wilkinson as the governor of the Louisiana Territory despite his incompetence. This man argued for a "Necessary and Proper Clause" and defended the Supremacy Clause in (*)** Federalist Paper #44. This President ordered Choctaw, Creek, and Chickasaw land to be protected from settlers, though his general Andrew Jackson ignored that order. His wife Dolly supposedly saved the Lansdowne Portrait during the War of 1812. For 10 points, name this fourth President of the United States, succeeded by James Monroe.

ANSWER: James Madison <AS>

7) **Males in these groups meet on courtship grounds called leks. Plants in these groups have ruderal, competitive, and stress tolerant types. "Contest" and "scramble" are types of competition in one of this type of group. Genetic differentiation and sexual dimorphism are defined in one of these groups. All individuals in one of these groups are a (*)** population's geographic range. Ways of making new ones of these groups are called peripatric, sympatric, and allopatric. The total number of chromosomes is constant for any one of these groups. For 10 points, name this group of organisms that can interbreed, with "invasive" and "endangered" types.

ANSWER: species; do not accept anything else

8) **One person from this country often collaborated with Hans Wittwer on projects such as the Palace of the League of Nations and the ADGB Trade Union School. Other buildings from this country include a yellow brick building with glass-paneled walls and a cylindrical chimney and a white-ribbed glass house on stilts. The founder of a school in this country built the (*)** Fagus Factory, and the last director of that school codesigned the Seagram Building with Philip Johnson. Walter Gropius and Mies van der Rohe were from this country. For 10 points, name this country, in which the Bauhaus was founded in Weimar.

ANSWER: Germany <HW>

9) **Two games in this franchise have maps called Terminal, based on a scene in which terrorists used only American weapons and equipment. In one game in this franchise, the multiplayer map Hijacked is visible from the Cove map. Three games in this franchise allow players (*)** to call in attack dogs, while others have weapons like the Desert Eagle and the Makarov. The EMP was introduced in the fifth game in this franchise, in which "noob tubes" were popular, and in which the ACR was the best weapon. For 10 points, name this franchise that includes the Modern Warfare and the Black Ops serieses.

ANSWER: Call of Duty

10) **Participants in one of these events raided Hutcheson's store and were led by a man named Jemmy. One of these events, whose participants were often in "coffles", was led by a man with a motto of "Death or Liberty" who was betrayed by a man named Pharoah. Another saw several "Cuba People" hanged. Charles Deslondes led one of these events named for the (*)** German Coast. One man who led this type of event planned to march to Jerusalem, Virginia and was eventually captured in the Great Dismal Swamp. For 10 points, what type of event was organized by men like Denmark Vesey and Nat Turner?

ANSWER: slave revolts; accept slave rebellions, slave uprisings, or other equivalents involving slaves fighting their masters <CC>

11) James Galbraith and Travis Hale used the Theil index to measure this quantity. The Kuznets Curve claims that this phenomenon is least prevalent in the most and least developed countries. The higher the deviation of a Lorenz curve is, the more present this phenomenon is. It is commonly measured by the (*) GINI coefficient. This phenomenon is a natural feature of a capitalist economy according to Thomas Piketty, and wage dispersion and household disposable income are other ways to measure it. For 10 points, name this gap in wealth between the rich and poor.

ANSWER: income or economic inequality <CC>

12) These places, including Tin Can, have hinterlands that are also called spheres of influence. Most free and foreign trade zones were called “free” *these places*, like the Zona Franca east of the Olympic one in Barcelona. One relieving traffic to Hampton Roads is called (*) “dry” because it’s inland. Their namesake “authorities” manage their terminal operators. Baltimore’s Inner Harbor area and London’s Canary Wharf used to be these places. For 10 points, name these places on the coast where ships dock.

ANSWER: ports; accept harbors or wharves or docks before mentioned

13) Jacques Futrelle wrote stories about a man with this profession named Augustus S.F.X. Van Dusen. Meyer Landsman works in this profession in a Michael Chabon novel. After the murder of publisher Donald Willson, one person of this profession starts a gang war in Personville; that person is in several stories by Dashiell (*) Hammett such as *Red Harvest*. Raymond Chandler wrote about Philip Marlowe, a character with this profession, in novels such as *The Big Sleep*, while Edgar Allen Poe created one who solved “The Purloined Letter.” For 10 points, name this profession that includes C. Auguste Dupin, who solved cases the Paris police could not.

ANSWER: detective; accept equivalents like private investigator, PI, or private detective; prompt on “police(man)” <JG>

14) Mordenite and clinoptilolite [kly-nohp-tih-lo-light] are zeolites used to trap wastes from these places via cation-exchange. PUREX is a method to prepare reactants used here. The Szilard–Chalmers effect is used on “hot atom” reactions in these places. Alkali metals and salts melted at high pressures absorb heat in this type of device. Moderators (*) used in these devices include boron, graphite and water, which capture stray electrons. “Fast” and “slow” thermal neutrons target “piles” of reactants within control rods in these places, which have “light-water” and breeder varieties. For 10 points, name these devices that use plutonium or uranium to make power.

ANSWER: nuclear fission reactors or nuclear power reactors; accept “plants” for “reactors” <HW>

15) The “ghetto clearance” of this city’s Josefov district ended in 1912. A resistance movement supporting the Four Articles arose after one rector of this city’s university was killed after the Council of Constance. This city was the home of “normalization” under (*) Gustav Husak after a Soviet invasion. Klement Gottwald’s coup in this city saw the fall and death of Foreign Minister Jan Masaryk. Alexander Dubcek promised “socialism with a human face” in this city’s namesake “Spring” of 1968. For 10 points, name this site of two defenestrations, the capital of the Czech Republic.

ANSWER: Prague or Praha <CC>

16) A Chopin piece in this genre that begins with a pattern of fifteen repeated B-Flats was rearranged by Stravinsky for his ballet *Les Sylphides*. Another piece of this type dedicated to the Countess Delfina Potocka was inspired by the movement of George Sand’s pet. One of these pieces was composed to celebrate the friendship between the leaders of Germany and Austria. Another

piece in this genre that is often played as an encore at the (*) Vienna New Year's Concert is *On the Beautiful Blue Danube*. For 10 points, name these dances in three-four time whose "king" was Johann Strauss Jr.

ANSWER: waltzes <DS>

17) In this language, the CMPLXF macro constructs a complex number with floats as real and imaginary parts. Ratfor, a combination of FORTRAN and this language, was developed soon after its release. Linus Torvalds said that this language "is the only sane choice..." in a complaint about a different programming language. This language was the first to use an ampersand to signal commands to the preprocessor. The implementation of (*) Python is in this language. This language by Dennis Ritchie influenced the D language and its own "sharp" counterpart. For 10 points, name this language that notably is not named with a "plus plus".

ANSWER: C; **do not accept anything else** <HW>

18) Members of this religious movement practice "disfellowshipping", but most later "come back to their spiritual senses". This denomination has a small "Governing Body". Birthday celebrations are off-limits to this religious movement, and they use Proverbs 23:20 as justification for refusing disease treatments. They were initially called (*) Bible Students, and were founded by Charles Taze Russell. This movement does not believe in hell or icons, and members worship in "Kingdom Halls". For 10 points, name this aggressive, often door-to-door preaching Christian denomination.

ANSWER: Jehovah's Witnesses; accept Bible Students before mentioned

19) A colony in this nation was under the Chartered Company of Guipuzcoa. The Welser family that owned Galician mines also ruled part of this country as a fiefdom. Bartholomew de las Casas began a failed colony at Cumana in what is now this country. The US mediated a territorial conflict among Germany and Britain (*) in 1904 in this country that prompted the Roosevelt Corollary. The battle of Carabobo helped Simon Bolivar win its independence from Spain, and oil reserves around Lake Maracaibo kept its President Hugo Chavez in power. For 10 points, name this country with a capital at Caracas.

ANSWER: Venezuela

20) In this play, Aunt Julie cares for her sister Rina and hints that one character is pregnant, while another character exclaims that she destroyed a child. One character in this play visits Mademoiselle Diana's and accidentally shoots himself in the gut, after earlier being given a pistol to kill himself. That character in this play is having an affair with (*) Thea Elvsted and writes a paper on the history of Brabant. The protagonist of this play is married to George Tesman, and she eventually burns Eilert Lovborg's manuscript. For 10 points, name this play in which the title character shoots herself with her uncle's pistol, a work of Henrik Ibsen.

ANSWER: Hedda Gabler <CC>

Bonuses

1) These include the giving of alms called zakat and the hajj, a yearly pilgrimage to Mecca. For 10 points each:

[10] Name this group of five core, mandatory acts required of the adherents of a religion founded by Muhammad.

ANSWER: **Pillars of Islam**

[10] This Arabic word for the entire Muslim community initially referred to small groups in Muhammad's time.

ANSWER: **ummah**; grudgingly accept **qawm**

[10] Ummah can also refer to leaders like this man, who received dreams to kill his own son Ismail, and attempted to so do at Mina while blindfolded. Instead, he ended up sacrificing a goat.

ANSWER: **Ibrahim** or **Abraham**

2) World stock markets were roiled by the prospect of a nation leaving the Eurozone. For 10 points each:

[10] This country's 2009 debt crisis was an offshoot of the Great Recession. Under Prime Minister Alexis Tsipras, it recently held a referendum on paying back European creditors where its people voted "No".

ANSWER: **Greece**

[10] In July 2015, the European Central Bank confirmed that Greece had paid this organization the roughly 2 billion euros that it owed. This organization was led by Dominique Strauss-Kahn from 2007 to 2011.

ANSWER: **IMF** or **International Monetary Fund**

[10] Syriza is opposed to this set of economic policies, in which countries try to lower budget deficits relative to GDP. Paul Krugman wrote in 2012 that these measures in the Eurozone have drastically lowered economic growth.

ANSWER: **austerity** <AS>

3) Ethidium bromide and doxorubicin are examples of these types of compounds. For 10 points each:

[10] Name these kinds of compounds, which can reversibly insert between DNA's base pairs.

ANSWER: **intercalators**; accept word forms

[10] DNA intercalation causes the "frameshift" type of these genetic changes, which also have "point", "mismatch", and "deletion" types.

ANSWER: **mutations**

[10] Mutagenicity is often confused with this concept, which is any compound's ability to damage genetic material directly, like by intercalators mutating DNA.

ANSWER: geno**toxicity**, accept specific types of **toxicity**

4) Name a few ways to make people mad on the Internet, for 10 points each:

[10] One easy way is to link other people to this song, in which Rick Astley sings that "we're no strangers to love". If you are tricked into clicking on a link to this song, you have, unfortunately, been "rickrolled".

ANSWER: **Never Gonna Give You Up**

[10] When a person on the Internet asks you what the name of a song is, a popular way of annoying them, especially on Twitch, is to falsely claim that it's in fact this lyricless song by Darude.

ANSWER: Darude-**Sandstorm**

[10] Posting one of these blocks of text, one of which claims the poster has extensive training in "gorilla warfare", can generate anger and confusion as well.

ANSWER: **copypastas** <DS>

5) Name some things about the group of French composers known as Les Six, for 10 points each:

[10] The members of Les Six were considered to be practitioners of this kind of music. This term indicates a willingness to experiment artistically and translates as "advance guard" in French.

ANSWER: **avant-garde**

[10] Works by this member of Les Six include the piano works Dessicated Embryos and the Gymnopedies.

ANSWER: Erik **Satie**

[10] Brazilian, African and jazz music inspired this member of Les Six' ballets The Ox on the Roof and The Creation of the World.

ANSWER: Darius **Milhaud** <JG>

6) In one scene in this play, a prostitute named Yvette sings "The Fraternization Song." For 10 points each:

[10] Name this play set during the Thirty Years' War, in which the title character tries to take care of Kattrin, Elilif and Swiss Cheese.

ANSWER: **Mother Courage and Her Children**

[10] *Mother Courage and Her Children* was written by this man, a proponent of "Epic Theatre" who also wrote *The Threepenny Opera* and *The Caucasian Chalk Circle*.

ANSWER: Bertolt **Brecht**

[10] In *The Resistible Rise of Arturo Ui*, Brecht satirized the rise to power of this man, who was also satirized in Chaplin's *The Great Dictator* and shown getting punched in the mouth on the cover of *Captain America* #1.

ANSWER: Adolf **Hitler** <JG>

7) The Direct Legislation League was part of this state's namesake system, and it was the destination of "prairie schooners" going west from Independence in a namesake fever. For 10 points each:

[10] Name this state, where Senator Charles McNary was from, formed from a territory below the 54°40' line and later the 49th parallel.

ANSWER: **Oregon**

[10] These two men, as part of the Corps of Discovery, went on an expedition up the Oregon Trail in 1804. They were helped by Sacagawea.

ANSWER: **Lewis** and **Clark**

[10] The Oregon Trail was one of this group of trails going west by a certain means, which also named a stagecoach company run by Ben Holladay.

ANSWER: **Overland** Trails

8) This law can be derived from Hess' law by integrating its differential form based on changing temperature. For 10 points each:

[10] Name this law, which takes the temperature integral of a change in heat capacity and sets it equal to the difference of two changes in latent heat.

ANSWER: **Kirchhoff** [KEER-koff]'s law (thermodynamics)

[10] Hess's law describes this state function, also called latent heat, at constant temperature. It is symbolized by a capital H and equals the sum of internal energy and pressure times change in volume.

ANSWER: **enthalpy**

[10] The Joule-Thomson effect used to liquefy gases relies on this type of expansion at constant enthalpy. *Pressure times volume all raised to the seven-fifths power* stays constant in one of these processes for a diatomic gas.

ANSWER: **adiabatic** <HW>

9) This man helped organize the North German Confederation and later absorbed it into Prussia. For 10 points each:

[10] Name this Iron Chancellor who started the Seven Weeks War and the Franco-Prussian War, uniting Germany in the process.

ANSWER: Otto von **Bismarck**

[10] In 1878, Bismarck passed laws against this ideology, and opponents called his later welfare reforms the "state" type of this ideology.

ANSWER: **Socialist**/m

[10] Bismarck's Prussia defeated Austria in this 1866 Seven Weeks' War battle where superior Prussian breech-loading guns helped beat forces under Ludwig von Benedek in the Czech Republic.

ANSWER: Battle of **Königgrätz** or **Sadowa**, **Sadová**, or **Hradec Králové** <AS>

10) Name some works by H.G. Wells, for 10 points each:

[10] In this novel by Wells, famously dramatized over the radio by Orson Welles, martian invaders of Earth wreak havoc before being defeated by disease.

ANSWER: *The* **War of the Worlds**

[10] The title character of this novel is Griffin, a former medical student who tries to kill Dr. Kemp after that man betrays to the police his plans to use his condition to begin a "Reign of Terror."

ANSWER: **The Invisible Man**; **do not accept or prompt on Invisible Man**

[10] A shipwrecked sailor named Prendrick is told about The Law, which bans "bestial" behavior in this novel by Wells, in which the title character is ultimately killed by one of his Beast Folk, animals he was trying to turn human.

ANSWER: *The* **Island of Doctor Moreau** <JG>

11) This painting is paired with Thomas Lawrence's *Pinkie* in San Marino's Huntington Library, and its subject is thought to be Jonathan Buttall. For 10 points each:

[10] Give the name of this painting, a full-length portrait of a young male holding a hat and wearing an outfit of the title color.

ANSWER: *The* **Blue Boy**

[10] *This Blue Boy* is a painting by this British artist and rival of Sir Joshua Reynolds. He also painted a double portrait of *Mr. and Mrs. Andrews*.

ANSWER: Thomas **Gainsborough**

[10] Gainsborough created a portrait of Sarah Siddons, who was a member of this profession. Reynolds also painted a portrait of her as "the Tragic Muse."

ANSWER: actress <JG>

12) The Blancmange curve is a continuous function that has this property everywhere it is defined. For 10 points each:

[10] Name this property of a function, which the Weierstrass function has. The ceiling function necessarily has this property where x equals an integer, because the function is discontinuous there.

ANSWER: non-differentiable; accept equivalents and descriptions like “can’t take a derivative”; accept nowhere differentiable or undifferentiable

[10] A function is complex non-differentiable if it does not satisfy this doubly-eponymous set of equations. They may be concisely written as “*the derivative of f with respect to the complex conjugate of z equals zero.*”

ANSWER: Cauchy [Kow-shee]-Riemann equations; both parts required

[10] Even if a function is nondifferentiable, you may be able to do this operation on it. By the fundamental theorem of calculus, it is loosely the opposite of the derivative.

ANSWER: integrals or integration; prompt on “antidifferentiation” or “antiderivatives” <HW>

13) In Vancouver, these areas decrease in completeness and in number with distance from the center of the city. For 10 points each:

[10] Name these usually concrete, paved areas raised above the sides of roads.

ANSWER: sidewalks

[10] Sidewalks are often paired with these protected areas without barriers to traffic located on the shoulders of roads. They usually “flow” in the direction of traffic and are distinct from cycle tracks.

ANSWER: bike lanes

[10] Bike lanes and sidewalks are at the sides of roads, but lanes dedicated to these systems are at the centers of bidirectional roads. They often have off-board payments and are level with their stations.

ANSWER: BRT or Bus Rapid Transit

14) A silver strike at the Laurium deposit resulted in the construction of 100 of these ships by Athens, although they were invented by the Phoenicians. For 10 points each:

[10] Name these three-tiered, two-masted Greek ships that were captained by trierarchs and held epibatai, or marines. They could maneuver easily and quickly ram enemy ships, but carried few soldiers.

ANSWER: triremes

[10] This class of large rowing ships included triremes, penteconters, and many others.

ANSWER: galleys

[10] This empire used the somewhat outdated Phoenician navy in its two invasions of Greece, but it was defeated at Salamis and Mycale.

ANSWER: Persian Empire

15) For 10 points each, answer the following about a man who was part of both the Argonauts and the Calydonian Boar Hunt:

[10] Name this friend of Theseus, who helped him kidnap Helen of Sparta. This son of Ixion was later trapped in the chair of Oblivion for trying to kidnap Persephone.

ANSWER: Pirithous or Perithous

[10] Pirithous was King of this people in Thessaly whose mythological war against the centaurs interrupted the wedding between Pirithous and Hippodamia.

ANSWER: Lapiths

[10] Chiron was the only centaur with this characteristic, so when one of Heracles’ poisoned arrows struck him, Heracles begged Zeus to remove this property from Chiron, and give it to Prometheus.

ANSWER: **immortality** or **living forever**; accept synonyms and word forms for both words <KD>

16) After criticism from the Bishop of Puebla, this author wrote the “Reply to Sister Philotea,” a defense of the education of women. For 10 points each:

[10] Name this nun and poet from Colonial Mexico, one of the founders of Mexican literature, who allegorized Christ as Narcissus in “The Divine Narcissus” and also wrote “First Dream.”

ANSWER: **Sor Juana** Ines de la Cruz or Sor Juana **Ines de la Cruz**

[10] This Mexican author analyzed Sor Juana in *The Traps of Faith*. Other works by this man include *Sun Stone*, a long poem based on the Aztec Calendar, and a collection of essays entitled *The Labyrinth of Solitude*.

ANSWER: Octavio **Paz**

[10] Another Mexican author, Juan Rulfo, was an early proponent of this literary style, in which fantastic events are placed within normal settings. Noted practitioners of this style include Gabriel Garcia Marquez and Isabel Allende.

ANSWER: **magical realism** or **magic realism** <JG>

17) Name some musicals by Andrew Lloyd Webber, for 10 points each:

[10] Based on a book by T.S. Eliot, this Webber musical ran on Broadway for 18 years straight and introduced the song “Memory,” sung by the character Grizabella.

ANSWER: **Cats**

[10] This Rock Opera by Webber is loosely based on the Gospels and follows the title character through the last 7 days of his life. Songs in this work include “Everything’s Alright,” sung by Mary Magdalene.

ANSWER: **Jesus Christ, Superstar**

[10] The title character sings “Don’t Cry for Me Argentina” in this Webber musical based on the life of Juan Peron’s wife.

ANSWER: **Evita** <JG>

18) The “turnip winter” occurred during this war, in which one nation used *ersatz* foods rationed by the War Raw Materials Board. For 10 points each:

[10] Name this war, in which horse convoys were sent across the Atlantic and the “Pals Battalions” fought along the “Race to the Sea”, which was the English Channel.

ANSWER: **World War I** or **WWI**

[10] This 1914 Allied victory ended Bethmann-Hollweg’s “diagonal” policy and the September Programme, because of the separation of two German armies. It began the Race to the Sea.

ANSWER: the first battle of the **Marne**

[10] The Maxim and Vickers guns used in WWI were this type of rapid-fire automatic weapon, which were used in the US as Gatling guns earlier on.

ANSWER: **machine guns**

19) Members of this group espoused the wisdom of “First thought, best thought.” For 10 points each, answer some questions about the Beat Generation:

[10] In this poem, the narrator is “shopping for images.” That narrator of this poem sees Walt Whitman “eyeing the grocery boys,” and asks Garcia Lorca what he is doing “down by the watermelons?”

ANSWER: “A **Supermarket in California**”

[10] “A Supermarket from California” was written by this author who opened his poem “Howl” by stating, “I saw the best minds of my generation destroyed by madness.”

ANSWER: (Irwin) Allen **Ginsberg**

[10] “Howl” was published by this friend of Ginsberg and owner of the City Lights bookstore in San Francisco. A poet in his own right, he authored the collection *A Coney Island of the Mind*.

ANSWER: Lawrence **Ferlinghetti** [fur-ling-GET-tea] <CC>

20) Waves that have undergone one type of this process have their electric field vectors in one plane of oscillation. For 10 points each:

[10] Name this process that can occur at Brewster’s angle, with scattering, or by absorption with Malus’ Law. Optical filters and some sunglasses may do this to light.

ANSWER: **polarization**; accept word forms

[10] These kinds of waves have amplitudes perpendicular to their directions of propagation, and they’re not longitudinal or surface waves. They’re initially unpolarized and obey the “one-half rule” with one polarizer.

ANSWER: **transverse**

[10] These birefringent devices can change the polarization of incoming waves, and come in a common “quarter” type. They’re also called “retarders”.

ANSWER: **wave plates**; do not accept **waveguides**