Question #1: Social Studies

10 points

During this battle, Marshal Soult [soolt] listened to his commander say "One sharp blow and the war is over", then led a successful charge up the Pratzen Heights. This major battle followed the Ulm campaign, which had the same result. Shortly after this battle, the Holy Roman Empire signed the Treaty of Pressburg. Mikhail Kutuzov [koo-TOO-zuf] wanted to retreat before this battle, but he was overruled by Alexander I. This largest battle in the War of the Third Coalition was a big success for Napoleon. Name this massive 1805 battle that took place in the Austrian Empire.	Battle of **Austerlitz** or Battle of the **Three Emperors**

Question #2: Mathematics

10 points

When used as a noun, this term can refer to a graph formed by deleting and contracting edges. With respect to matrices, this term can refer to the determinant of a matrix when a given row and column are removed, which is multiplied by a power of -1 to calculate a co·factor. As an adjective, this word can describe the premise in a syllogism [SIL-uh-jiz-um] that consists of a specific statement. This word can mean an arc of a circle that is less than 180 degrees. Give this word that in another context is used to describe the shorter axis of an ellipse.	**minor**

Question #3: Literature

10 points

This play begins with a woman calling her husband a "cluck" and describing a Bette [BET-ee] Davis movie to him. Later in this play, that husband tells another man about an old friend who accidentally shot his own mother and then accidentally killed his own father in a car crash. This play was initially awarded the 1963 Pulitzer, but the trustees of Columbia University refused to allow the award to be given for it. The wife in this play invites a biology professor and his wife over for drinks, but the visit becomes very awkward because of the fighting by George and Martha. Name this play in which the guests are Nick and Honey and which was written by Edward Albee.	***Who's Afraid of Virginia Woolf?***

Question #4: Science

10 points

For molecules that exhibit this property, it is appropriate to apply the Cahn-Ingold-Prelog sequence rules, starting with identifying centers and double bonds. The only proteinogenic ["protein"-oh-JEN-ik] amino acid *without* this property is lysine ["LIE-seen"]; the other amino acids have this property centered around a carbon atom adjacent to the carboxyl ["car-BOX-ill"] group. The inclusion of phenyl·alanine [fee-null-AL-uh-neen] and aspartic acid are the reason that aspartame has this property. The centers of molecules with this property can be called stereo·centers. Name this property of molecules or ions that exist in mirror-image stereo·isomers called enantiomers [eh-NAN-tee-oh-murz].	**chiral**ity [**KY-rull** or **ky-RAL**-ih-tee] [prompt on stereo·**isomer**ism or **enantiomer**ism [**en-AN-tee-oh-mur**-izm]; do not accept or prompt on "isomer(s)" or "isomer(ism)"]

Question #5: Social Studies

10 points

When a king returned this woman to her brother, the king told her "I am giving your brother a thousand shekels of silver." This woman is returned after God tells that king "You are as good as dead because of the woman you have taken; she is a married woman." That king was one of several Philistine [FIL-uh-steen] kings named Abimelech [ah-bee-MEL-ek]. Soon after God changed the name of this woman and her husband, he announced that she would have a son. This woman denied that she laughed when she overheard that she would have a son at her very advanced age. Name this mother of Isaac and wife of Abraham in the Book of Genesis.	**Sarah** [accept **Sarai**]

Question #6: Miscellaneous

10 points

Before Bob Novak was told, this reporter learned from Richard Armitage that Joe Wilson's wife Valerie Plame [rhymes with "flame"] worked for the CIA. This writer reported that John Dowd told President Trump "It's either that or an orange jumpsuit" to discourage an interview with Robert Mueller. That book by this journalist was *Fear: Trump in the White House.* This journalist's book *The Secret Man* described his conversations with Mark Felt. Robert Redford, who played this person in a movie, convinced him to focus on himself and his colleagues when co-writing *All the President's Men.* Name this person who worked with Carl Bernstein to investigate Watergate.	(Robert Upshur) "Bob" **Woodward**

Question #7: Science

10 points per part

	Simplistic interpretations of this consequence of relativity theory are addressed by Bell's spaceship paradox.	
1	Name this effect that is similar in some ways to time dilation.	**length contraction** [accept **length contracting**]
2	In this other paradox addressing length contraction, a namesake object travels through a garage or barn.	**ladder** paradox
3	The paradoxes are addressed by the relativity of this concept, which requires the use of local time rather than absolute time.	**simultaneity** [accept being **simultaneous**]

Question #8: Science

10 points per part

	Because this person became more successful than her mathematician father, the names of his theorems include his first name, Max.	
1	Name this scientist whose first theorem states that each symmetry of a system corresponds to a conservation law.	(Amalie) Emmy **Noether** [**NOY-tur**]
2	One of the conservation laws that was known in Noether's time was the conservation of this quantity, equal to moment of inertia times angular velocity.	**angular momentum** [accept **rotational momentum**; do not prompt on "momentum"]
3	Noether's second theorem is based on this function equal to kinetic energy minus potential energy.	**Lagrangian** [**luh-grahn-zhee-un**]

Question #9: Literature

10 points per part

	This book-length essay states "We are truly different. And we are truly alone."	
1	Name this book that also states "The word 'death' is not pronounced in New York, in Paris, in London, because it burns the lips. The Mexican, in contrast, is familiar with death."	*The **Labyrinth of Solitude*** [or *El **laberinto de la soledad***]
2	This Mexican poet wrote *The Labyrinth of Solitude.* As a teenager, he published the collection *Luna Silvestre.*	Octavio **Paz** (Lozano)
3	In this book, Octavio Paz discusses both going to the ruins in Galta in India and the god Hanuman.	*The **Monkey Grammarian*** [or *El **Mono Gramático***]

Question #10: Literature

10 points per part

	During a novel set in this city, Jalila gets drunk while performing at a wedding, and Amina breaks her collarbone, causing her husband to figure out that she leaves the house.	
1	Name this city where Fahmy protests against the English and Kamal [kuh-MAHL] studies philosophy.	**Cairo**, Egypt
2	This author wrote the *Cairo Trilogy.*	Naguib **Mahfouz** (Abdelaziz Ibrahim Ahmed Al-Basha) [nag-EEB **mah-FOOZ**]
3	An assassination attempt against Naguib Mahfouz was made in reaction to this novel, in which the characters represent major people in the development of Judaism, Christianity, and Islam.	***Children of Gebelawi*** [or ***Awlad Haretna*** or ***Awlaadu Haaratena*** or ***Children of Our Alley***]

Question #11: Fine Arts

10 points per part

	In this opera, the Duke of Mantua sings the aria "La donna è mobile" [lah DAW-nah eh MAW-bee-leh].	
1	Name this opera whose title character is the Duke's cursed hunch-backed court jester.	***Rigoletto***
2	This composer wrote *Rigoletto* and *Aida*.	Giuseppe (Fortunino Francesco) **Verdi** [joo-ZEP-peh **VAIR-dee**]
3	For this opera, Verdi wrote "Va, pensiero", which is nicknamed "Chorus of the Hebrew Slaves".	***Nabucco***

Question #12: Fine Arts

10 points per part

	This composer spent half his life in Poland and half in France.	
1	Name this 19th-century composer of the *Minute [MIN-ut] Waltz* and several mazurkas and polonaises [POH-luh-nay-ziz].	Frédéric **Chopin** [**"show-pan"**]
2	Chopin wrote several of these works designed to develop the skills of the musician, including one nicknamed "Revolutionary".	**étude**s [**AY-tood**z]
3	Chopin also wrote one of these pieces usually associated with Venice. Chopin's was in F-sharp major, and Jacques Offenbach's "Belle nuit, o nuit d'amour" [bell nwee, oh nwee dah-mor] from *The Tales of Hoffmann* is also this type of composition.	**barcarolle**(s)

Question #13: Social Studies

10 points per part

The capital of this country contains the Atomium [uh-TOH-mee-um], a building consisting of nine connected stainless steel-clad spheres.		
1	Name this country that consists of the Flemish Region, Wallonia, and the Brussels–Capital Region.	(Kingdom of) **Belgium** [or Royaume de **Belgique** or Koninkrijk **België**]
2	This major city on the Scheldt [shelt] River is the most important port city in Belgium.	**Antwerp**
3	This Belgian city has a famous belfry [BEL-free] first built in the 13th century. This city's Church of Our Lady is an unusually tall brick tower.	**Bruges** [**broozh**] [or **Brugge** [**broo-kh'**]]

Question #14: Social Studies

10 points per part

This country is between Namibia and the Democratic Republic of the Congo on the west coast of Africa.		
1	Name this country whose capital is Luanda [loo-AHN-duh].	(Republic of) **Angola** [or (República de) **Angola**]
2	This landlocked country is east of Angola. Its town of Mongu is near Angola.	(Republic of) **Zambia**
3	This province of Angola is an exclave between the Republic of the Congo and the Democratic Republic of the Congo. This province shares its name with its capital.	**Cabinda**

Question #15: Science

10 points

This structure is not an organism but has tumour-inducing types that cause crown gall disease in plants. When this structure integrates with other structures, it creates episomes [EP-ih-sohmz]. This structure is the primary producer and carrier within organisms of colicin [KOH-lih-sin], which is a type of toxin. This structure is also often responsible for the production of beta-lactamases ["LACK"-tuh-"maces"], which provide antibiotic resistance. This structure does not have essential genetic information, but it carries genes that can benefit its organism. Name this extra-chromosomal DNA that is often found in bacteria and is circular.	**plasmid**s

Question #16: Literature

10 points

This novel says of one of its characters "All the world used her ill" before stating "The world is a looking-glass, and gives back to every man the reflection of his own face." In this novel, that woman works for a family along with the butler Horrocks and marries one of the young men. Part of this novel is set at the Battle of Waterloo, where George Osborne is killed. Osborne's widow, who is pregnant when he dies and eventually marries William Dobbin, is Amelia Sedley. Name this "Novel without a Hero" that features Becky Sharp and was written by William Makepeace Thackeray.	***Vanity Fair***

Question #17: Fine Arts

10 points

A painting by this artist shows a woman leaning forward and wearing a white flower by her ear in front of another woman sitting erectly and wearing a pink dress. That painting is *When Will You Marry?*. The bottom and left parts of another painting by this artist show the backs of several women in head coverings, many of whom are praying. This artist portrayed those women looking past a tree to see a vision of a wrestling match between an angel and Jacob. This artist wrote the title of a different painting in a yellow corner of it, but he left out the question marks. Name this French artist who painted *Vision after the Sermon* and *Where Do We Come From? What Are We? Where Are We Going?*.	(Eugène Henri) Paul **Gauguin** [**goh-gan**]

Question #18: Social Studies

10 points

Because of his service leading troops in this battle, Kentucky governor Isaac Shelby was awarded the Congressional Gold Medal. Shortly before this battle, the losing side had abandoned and burned Fort Malden, which caused dissension between Henry Procter and his allies. This battle was fought near Moraviantown. This United States victory built on success at the Battle of Lake Erie. Like the Battle of Tippecanoe two years earlier, this was a victory for William Henry Harrison. Name this battle fought in 1813 in Canada, at which Roundhead and Tecumseh were killed.	Battle of the **Thames** [**temz**] [accept Battle of **Moraviantown** before "Moraviantown" is mentioned]

Question #19: Science

10 points

One method to diagnose this problem is for the patient to position their body according to the Phalen maneuver. The diagnosis of this problem is the most common use of Tinel's [tih-NELL'Z] sign, which involves the doctor tapping the patient's skin. This problem, which often involves pressure on the flexor tendons, is caused by squeezing or compressing of the median nerve. This problem is named for a passageway that in turn is named for a cluster of eight small bones. Name this problem that doctors used to think was caused by poor ergonomics when typing [pause] and that may require surgery but can sometimes be treated by wearing a splint on one's wrist.	**carpal tunnel** syndrome

Question #20: Literature

10 points

In one novel by this author, it is believed that a woman did not get married because she has a large birthmark. This author described that woman, Chikako Kurimoto [chee-kah-koh kur-ee-moh-toh], as a tea ceremony master who is encouraging a marriage between Yukiko Inamura and Kikuji [kee-koo-jee]. In another novel by this writer, a major character refers to his study of ballet as "research", though it is actually fantasy, as the character has never seen a ballet. That man, Shimamura, has a relationship with Komako, who is a geisha in a hot spring town. Name this Japanese author of *Thousand Cranes* and *Snow Country*.	Yasunari **Kawabata** [accept names in either order]

Question #21: Mathematics

10 points per part

	In this type of graph, there is only exactly one path between any two vertices, assuming you don't backtrack.	
1	Name this type of graph that is often shown with a root and branches.	**tree**
2	Every tree is this type of graph whose vertices can be placed into two sets such that there are no edges between vertices in the same set.	**bipartite** graph
3	If a tree has ten vertices, how many edges does it have?	**nine** edges

Question #22: Mathematics

10 points per part

	This shape looks like a coil and is similar to a spiral.	
1	Name this three-dimensional curve generated by the set of equations "x equals cosine t", "y equals sine t", and "z equals t".	**helix**
2	This property of a helix equals the radius divided by the quantity radius squared plus linear coefficient squared. This quantity equals the reciprocal of the radius of an osculating [AHSS-"cue"-lay-ting] circle.	**curvature**
3	Find the arc length of the helix generated by the set of equations "x equals cosine t", "y equals sine t", and z equals t, as t goes from 0 to 1.	square **root** of **2** [accept **radical 2**; do not prompt on "2"]

Question #23: Social Studies

10 points per part

	This person was nicknamed "the Florence Nightingale of America" and "the Angel of the Battlefield."	
1	Name this founder of the American Red Cross.	(Clarissa Harlowe) "Clara" **Barton**
2	Clara Barton learned about the Red Cross when she visited this city in Europe where it is headquartered.	**Geneva**, Switzerland
3	Immediately after the Civil War, Clara Barton helped identify the remains at this location that, during the war, had been run by Henry Wirz.	**Andersonville** Prison [or Camp **Sumter**; prompt on descriptions of military **prison**s or **prisoner-of-war camp**s or **POW camp**s that do not specify either name]

Question #24: Social Studies

10 points per part

	This group of Native Americans joined the United States and the Choctaws in the Creek War.	
1	Name this group, a faction of which signed the Treaty of New Echota [uh-CHOH-tuh]. This group had its nation status recognized in *Worcester ["WORSE"-tur] v. Georgia.*	**Cherokee** people or the **Cherokee**s
2	This person enabled written communication in the Cherokee language by creating a syllabary [SILL-uh-bear-ee] in 1821.	**Sequoyah** [or George **Gist** or George **Guess**]
3	This person led the Cherokees from 1828 to 1866, including during the Trail of Tears.	John **Ross** [or **Tsan-Usdi** or **Guwisguwi**]

Question #25: Science

10 points per part

	This compound is used naturally in the body, but it is very harmful to skin and eyes.	
1	Name this acid that is the main component of stomach acid.	**hydrochloric** [**"hide"-roh-KLOR-ik**] **acid** [accept **HCl** [**"H C L"**]; accept **hydrogen chloride**]
2	This scientist discovered the chemical composition of hydrochloric acid. He was also the first person to isolate potassium, sodium, calcium, strontium, barium, magnesium, and boron.	Humphry **Davy**
3	Mixing hydrochloric acid and sodium hypochlorite ["hype-oh-CLAW-right"] can be dangerous because it releases chlorine gas. What is the common name of sodium hypochlorite?	(liquid or chlorine) **bleach**

Question #26: Science

10 points per part

	Because this element causes cell apoptosis [ay-"pop"-TOH-siss], it is in many cancer treatments.	
1	Name this metallic element whose symbol is "Pt" [spell out].	**platinum**
2	The mineral sperrylite ["SPARE-uh-light"] is a combination of platinum and this other element. The Marsh test is used to determine whether this element is in a dead body.	**arsenic** [accept **As**]
3	Until recently, an alloy of platinum and this other metal was used to define the kilogram.	**iridium** [accept **Ir**]

Question #27: Literature

10 points per part

	This goddess was born from the left eye of her father, Izanagi [ee-zah-nahg-ee].	
1	Name this Shinto goddess of the sun.	**Amaterasu**(-omikami) [**ah-mah-teh-rah-soo**]
2	This brother of Amaterasu was born from the right eye of Izanagi and became the god of the moon.	**Tsukuyomi**(-no-Mikoto) [**tsoo-koo-yoh-mee**]
3	Amaterasu stays away from Tsukuyomi because he killed Ukemochi [oo-kay-moh-chee], the goddess who is supposed to protect this substance.	**food** [do not accept specific foods]

Question #28: Literature

10 points per part

	Some historians placed these mythological women in what is now Turkey.	
1	Name this race of warrior women whose queen was Hippolyta [hih-PAH-lih-tuh].	**Amazon**s [accept **Amazonian**s]
2	This sister of Hippolyta fought for Troy in the Trojan War but was killed by Achilles [uh-KILL-eez].	**Penthesilea** [**pen-thuh-SEE-lee-uh**]
3	This god was the father of the Amazons.	**Ares** or **Mars**

Question #29: Science

10 points

Several decades after this person died, James Clerk ["Clark"] Maxwell read his notebooks and found that this person had discovered Ohm's law by sending electric currents through his own body. The experiment named for this person used two large lead balls to twist a suspended wire that held two small lead balls. That experiment allowed this person to calculate the density of the Earth, which in turn was used to find the mass of the Earth. People later used this person's experiment to calculate the constant big G. This person also discovered inflammable air, which turned out to be hydrogen. Name this English scientist who used a torsion balance in his namesake experiment.	Henry **Cavendish**

Question #30: Social Studies

10 points

This prime minister shrunk the cabinet from 23 members to 5 members when he replaced H. H. Asquith. While this person was prime minister, the U.K. passed the Fourth Reform Act, giving women the right to vote but with more restrictions than men. This prime minister lost his position after the Carlton Club meeting, which followed this leader's attempt to start war with Turkey. This prime minister and Michael Collins worked out the Anglo-Irish Treaty that created the Irish Free State. Name this person who, along with Vittorio Orlando, Georges Clemenceau, and Woodrow Wilson, worked out the peace at the end of World War I.	David **Lloyd George**(, 1st Earl Lloyd-George of Dwyfor) [prompt on **George**]

Question #31: Literature

10 points

One person in this novel remembers that during her childhood she was told that her mother was a ghost, which meant that her mother should not be talked about. Another person in this novel is told by her father that her mother died because of a new idea inside the mother's head. One woman in this novel worries about telling her mother that she is engaged to Rich Schields because the woman is considered to be a rabbit and the mother is considered to be a horse. This novel, set in San Francisco, is about four women born in China and their daughters. Name this novel about people who play mah jong that was written by Amy Tan.	*The **Joy Luck Club***

Question #32: Mathematics

10 points

The rate at which this theorem takes effect is quantified by the Berry–Esseen [ES-ay-en] theorem. Francis Galton used a board with rows of pegs and a row of bins at the bottom to demonstrate this theorem. Conditions for this theorem use the square root of the sum of variances. The most common such conditions for this theorem are the Lyapunov [lee-AH-poo-nawff] and Lindeberg [LIN-duh-burg] conditions. This theorem states that as the sample size gets larger, the distribution of sample means approaches a normal distribution. Name this theorem that is often used along with the law of large numbers.	**central limit** theorem [prompt on **CLT**]

Extra Question #1: Science

10 points

This species was purposely infected to confirm that DNA is genetic material during the 1952 Hershey-Chase experiment. Since 1988, this species has been the subject of an evolution experiment by Richard Lenski at Michigan State University. Some of these organisms produce a toxin named for the fact that they are similar to the toxins produced by *Shigella dysenteriae* [shig-ELL-uh dis-en-TAIR-ee-ee]. The existence of these organisms on lettuce processed in Yuma, Arizona in 2018 led to food recalls. Name this species of rod-shaped bacteria that often lives in digestive tracts, though some strains are often responsible for food poisoning.	**_E_**(scherichia) **_coli_**

Extra Question #2: Social Studies

10 points

This Supreme Court justice wrote "We do not count heads before enforcing the First Amendment" in a concurrence with the *McCreary County v. ACLU* decision. This person replaced Potter Stewart on the Supreme Court and was replaced by Samuel Alito [uh-LEE-toh]. This person was the first associate justice appointed by President Ronald Reagan. In 1992, meetings between Anthony Kennedy, David Souter [SOO-tur], and this justice preserved the earlier *Roe v. Wade* ruling. In retirement, this person raised awareness for Alzheimer's disease after her husband suffered from it. Name this first female Supreme Court justice.	Sandra **Day** **O'Connor** [accept either underlined name]

Extra Question #3: Fine Arts

10 points

A collection of 21 songs by this composer was inspired by his friendship with Ede Reményi [ED-uh reh-MEE-nee], and this composer sometimes performed them as part of a piano duet. This composer wrote a seven-movement work whose fifth movement was added after the piece was first performed with a soprano solo. This composer put the "Wie lieblich sind deine Wohnungen" [vee LEEB-lik sind "DIE"-nuh VOH-nun-gun] chorus in the fourth movement of that work, and the entire work is based on Martin Luther's Bible. Name this German composer of *Hungarian Dances* and *A German Requiem.*	Johannes **Brahms**

Extra Question #4: Mathematics

10 points

One theorem named after this person states that if an odd prime number is the sum of two perfect squares, then it is 1 more than a multiple of 4. Another theorem named after this person states that if a counting number is raised to a prime power, the result equals a multiple of the prime number plus the counting number. Another theorem named after this person was proved by matching up elliptic curves and modular forms to verify the Taniyama-Shimura conjecture. Name this French mathematician whose "last theorem" was proven by Andrew Wiles.	Pierre de **Fermat** [**fair-mah**]

Extra Question #5: Literature

10 points

In a letter in this novel, the title character asks his wife "You remember the girl student who shot at the public prosecutor on that terrible night of your mother's death?". This novel portrays the affair between its title character and that woman, who eventually abandons their daughter and ends up in one of Joseph Stalin's gulags. This novel's author won the Nobel Prize for writing it, but he declined the prize because he would not have been allowed back in the Soviet Union. Name this novel in which the title character falls in love with Lara, written by Boris Pasternak.	***Doctor Zhivago***

Extra Question #6: Literature

10 points per part

	In the Author's Note at the beginning of this novel, the author claims that he was told the story by Mr. Patel, who is this novel's protagonist.	
1	Name this novel about a boat ride from Japan to Canada with zoo animals.	***Life of Pi***
2	This author wrote *Life of Pi* and then sent Stephen Harper a lot of books, leading to his *101 Letters to a Prime Minister*.	Yann **Martel**
3	In *Life of Pi*, Mr. Patel rides with this type of animal, which—due to a clerical error—is named Richard Parker.	(Royal) Bengal **tiger** [prompt on **feline** or **cat**]

Extra Question #7: Literature

10 points per part

	This novel is narrated by Antoinette Cosway.	
1	Name this novel in which Antoinette is taken to England by her husband, who calls her "Bertha".	***Wide Sargasso Sea***
2	This author wrote *Wide Sargasso Sea* and *Good Morning, Midnight*.	Jean **Rhys** [or Ella Gwendolyn Rees **Williams**]
3	The first part of *Wide Sargasso Sea* is set in what is now this country, which was a British colony during the time when the novel is set.	**Jamaica**

Extra Question #8: Science

10 points per part

	An early embryo has three germ layers.	
1	Name the outermost layer.	**ectoderm** [**EK-toh-durm**]
2	This closure of ectodermal tissue eventually becomes the brain and spinal cord. This structure exists from about the 17th to the 30th day after conception in humans.	**neural tube**
3	Some of the ectodermal tissue becomes these cells that are part of the nervous system but are not neurons, such as astrocytes [ASS-troh-"sites"] and Schwann [shvahn] cells.	**glia**l [**GLEE-uh**ll] cells

Extra Question #9: Science

10 points per part

	Tundra and taiga are examples of this type of region.	
1	Name these large communities of animals and plants that can include a variety of habitats.	**biome**s [**BY-ohm**z] [prompt on **major life** zones]
2	This ecosystem, which contains grass and trees, is usually not considered a biome. One theory states that humans became bi·pedal ["by-pedal"] to survive living in this type of ecosystem.	**savanna**
3	These trees of genus *Adansonia* grow in savannas. These trees are sometimes called "upside-down trees."	**baobab**s [**BAY-oh-bab**z]