



### Question #1: Science

10 points

This technique, discovered by Isidor **Rabi** [**RAH-bee**] in 1938, is used in continuous-wave **spectroscopy** [**spek-TRAH-skuh-pee**] and **Fourier** [**for-ee-ay**]-transform spectroscopy to detect various elements in a sample. This process occurs when the Larmor frequency is matched by an external frequency. In this process, precession is changed by the introduction of a radio-frequency pulse in a B-field. This method can be used to detect hydrogen nuclei, which makes it effective at locating water and fat. Name this phenomenon that is taken advantage of by a T1 spin-lattice and T2 spin-spin type of body scan that does not use ionizing radiation or X-rays.

**MRI** or **NMR** [or nuclear **magnetic resonance** imaging; prompt on **resonance**]

### Question #2: Social Studies

10 points

This person negotiated with the Duke of Buckingham for English ships that were used in the Recovery of Ré island. This person negotiated the Treaty of Monzón after directing the capture of **Valtellina** [**val-tay-LEE-nuh**]. This person found out about a conspiracy between the **Marquis de Cinq-Mars** [**mahr-kee duh sank-mar**] and King Philip IV of Spain, which led to the beheading of Cinq-Mars. This person paid a person to kill Count of **Soissons** [**swuh-sawn**] in revenge for a plot to kill this person. This person often had conflicts with Marie de' **Medici** [**MEH-duh-chee**]. Name this minister who curtailed the Habsburgs during the Thirty Years' War and who was succeeded by Cardinal Mazarin.

Armand du **Plessis**, Cardinal **Richelieu** [accept either underlined name]



**Question #3: Literature**

10 points

In this book, a mouse warns against trying to change the status quo, because if you kill a cat, another one will replace it. The mouse in this book makes that argument when a procession of rats decides to tie a bell to the cat's collar. Near the beginning of this book, the protagonist learns about the Tower of Truth. In this book's Vision 3, which begins with Passus 8, the protagonist looks for Do-Well, and he eventually looks for Do-Best. Much of this book's plot takes place during Will's dreams. Name this 14th-century verse book by William Langland.

*Piers Plowman* or *Visio*  
*Willelmi de Petro*  
*Ploughman*

**Question #4: Science**

10 points

The bacteria that cause this disease can be cultured in Regan-Lowe agar, which has replaced Bordet-Gengou [bor-day zhen-goo] agar. The bacteria is in the *Bordetella* genus. This disease goes through catarrhal [kuh-TAR-ull], paroxysmal [puh-“ROCKS”-iss-mull], and convalescent phases. This disease releases tracheal cytotoxin [TRAY-kee-ull “sight-oh-toxin”], which is one way that it induces vomiting. Because the whole-cell vaccine for this disease had more side effects, the a-cellular [ay-“cellular”] form is now more common. This bacterial disease is characterized by an inward breath following a severe coughing spell. Name this disease whose vaccine is often combined with those for diphtheria and tetanus.

pertussis or whooping cough



**Question #5: Social Studies**

10 points

<p>The Supreme Court ruled that this constitutional amendment does not apply to pen registers in <i>Smith v. Maryland</i>, strengthening the third-party doctrine. In 2018, this amendment was applied—in the case of <i>Carpenter v. United States</i>—to cellphones. This amendment does not apply when the plain view doctrine does apply, including the fact that the incriminating character of evidence must be immediately apparent. Name this part of the Bill of Rights that begins “The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated.”</p>	<p><u>4</u>th Amendment</p>
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**Question #6: Fine Arts**

10 points

<p>The fourth movement of one work by this composer is labeled “Scene and Gypsy Song” and has sections in which the string instruments imitate guitars. That work’s last section is labelled “<b>Fandango asturiano</b>” [fahn-DAHNgoh ah-stoo-ree-AH-noh]. An opera by this composer features “The Song and Dance of the Birds” and is about the daughter of Spring Beauty and Grandfather Frost. This composer of <i>The Snow Maiden</i> and <i>Capriccio Espagnol</i> [kah-PREET-choh ess-pahn-YOHL] wrote a concert overture set during an Orthodox holiday and a symphonic suite based on <i>One Thousand and One Nights</i>. Name this Russian composer of the <i>Russian Easter Festival Overture</i> and <i>Scheherazade</i> [shuh-HAIR-uh-zahd].</p>	<p>Nikolai <u>Rimsky-Korsakov</u></p>
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**Question #7: Mathematics**

*10 points per part*

This term describes a relationship between shapes if one can be transformed into the other by an <b>isometry</b> ["eye"-SAH-meh-tree].		
<b>1</b>	Give this term. It can refer to segments of the same length or angles of the same measure.	<b>congruence</b> or <b>congruent</b>
<b>2</b>	In this type of arithmetic, two numbers are called "congruent" if their difference is divisible by a particular fixed number.	<b>modular</b> arithmetic [prompt on <b>modulus</b> or <b>clock</b> arithmetic]
<b>3</b>	Find the smallest positive number congruent to 5 to the 10th power, mod 11. You may want to use <b>Fermat's</b> [fur-mah'z] little theorem.	<b>1</b>

**Question #8: Mathematics**

*10 points per part*

This coordinate system uses two distances and one angle.		
<b>1</b>	Name this three-dimensional coordinate system that uses polar coordinates plus a $z$ -coordinate.	<b>cylindrical</b> coordinates
<b>2</b>	In cylindrical coordinates, what is the shape when you graph the equation " $z$ equals $r$ "?	(right circular) <b>cone</b> [accept double <b>cone</b> ]
<b>3</b>	Find the volume between the cone generated by " $z$ equals $r$ " and the $xy$ -plane, as $r$ goes from 0 to 1.	<b>2 pi/3</b> or <b>2/3 pi</b>



**Question #9: Literature**

10 points per part

This novel begins by discussing the idea of eternal return, saying that Nietzsche [NEET-chuh] called it the heaviest of burdens.		
1	Name this novel about the surgeon Tomáš [toh-mahsh], who moves to the countryside with his wife Tereza and their dog Karenin.	<i>The Unbearable Lightness of Being</i> [or <i>Nesnesitelná lehkost bytí</i> ]
2	This Czech author wrote <i>The Unbearable Lightness of Being</i> .	Milan Kundera [koon-DEH-rah]
3	In <i>The Unbearable Lightness of Being</i> , Sabina moves to this city, which she says she prefers to Palermo. The novel describes it as “a city of fountains large and small, of parks where music once rang out from the bandstands”.	Geneva, Switzerland

**Question #10: Literature**

10 points per part

In this novel, the protagonist has a college roommate who is a neat freak and gets nicknamed “Storm Trooper”.		
1	Name this novel in which some of the characters have trouble dealing with Kizuki’s suicide.	<i>Norwegian Wood</i> [or <i>Norwei no Mori</i> ]
2	This author wrote <i>Norwegian Wood</i> . He wrote about missing cats in novels such as <i>The Wind-Up Bird Chronicle</i> .	Haruki Murakami [accept names in either order]
3	Name the wife of Toru Okada in <i>The Wind-Up Bird Chronicle</i> . Her sister had died by suicide, and she disappears after their cat does.	Kumiko Okada [accept names in either order]



**Question #11: Science**

*10 points per part*

On the Hertzsprung-Russell diagram, these stars are below and to the left of the main sequence.		
<b>1</b>	Name these stars that are supported by electron pressure and have a mass similar to the Sun but are much smaller. More massive stars become neutron stars instead of these stars.	<b><u>white dwarf</u></b> stars or <b><u>white dwarfs</u></b> [prompt on <b><u>dwarf</u></b> stars or <b><u>dwarfs</u></b> ]
<b>2</b>	When a white dwarf forms, it ionizes the other material that used to be in the star, forming this type of nebula.	<b><u>planetary</u></b> nebula or <b><u>emission</u></b> nebula
<b>3</b>	Planetary nebulas are technically this type of region because they have a lot of ionized hydrogen, though this type of region has become synonymous with diffuse nebulas.	<b><u>H II</u></b> ["H two"] region(s)

**Question #12: Science**

*10 points per part*

The equinox is when the Sun is directly over the Equator.		
<b>1</b>	Give the name common to the times in June and December when the Sun's apparent path is farthest north or south.	<b><u>solstice</u></b>
<b>2</b>	During a solstice, the longitude angle named for this path is 90 or 270 degrees. This path is the apparent path taken by the Sun.	<b><u>ecliptic</u></b> [ee-KLIP-tik]
<b>3</b>	This apparent or real oscillation of the moon is caused by its elliptical shape and inclination to the ecliptic.	lunar <b><u>libration</u></b>



**Question #13: Social Studies**

*10 points per part*

This lake is the deepest lake in the world.		
<b>1</b>	Name this lake that is north of Mongolia in Russia.	Lake <b>Baikal</b>
<b>2</b>	Like many crescent-shaped lakes, Baikal is a part of one of these geologic features found where plates are diverging. Give a two-word answer.	<b>rift valleys</b>
<b>3</b>	This name is shared by the <b>oblast</b> [OH-blahst] west of the lake, the major city north of the southern end of the lake, and the dam that caused the water level of the lake to rise. An oblast is a region of Russia.	<b>Irkutsk</b> [eer-KOOTSK]

**Question #14: Social Studies**

*10 points per part*

The White Nile River flows out of this lake.		
<b>1</b>	Name this largest lake in Africa <i>by surface area</i> . It is on the border of Kenya, Uganda, and Tanzania.	Lake <b>Victoria</b>
<b>2</b>	This Uganda city with an international airport is on the shore of Lake Victoria. This city is not the capital of Uganda, though they are close to each other.	<b>Entebbe</b> [en-TEB-ee]
<b>3</b>	This lake is the largest lake <i>by volume</i> in Africa. It is southwest of Lake Victoria and northwest of Lake Malawi.	Lake <b>Tanganyika</b>



**Question #15: Literature**

*10 points*

Some of the servants of this goddess were called **assinnu** [ah-SEE-noo] and dressed in women's clothes. This goddess could change a man into a woman, which she may have done to some of her followers called **kurgarru** [kur-GAR-roo]. Because this goddess oversaw war, which was viewed as masculine, she was sometimes pictured with a beard. This goddess's father gave her the Bull of Heaven, which she used in an unsuccessful attack against **Enkidu** [en-KEE-doo] and Gilgamesh. This goddess was forced to remove a piece of clothing each time she entered one of the seven gates to the underworld, eventually reaching her sister naked. Name this Akkadian and Sumerian goddess.

**Ishtar** [or **Inanna**;  
prompt on **Astarte**]

**Question #16: Miscellaneous**

*10 points*

A 19th-century attempt to make this process cheaper was pushed by Pierre **Leroux** [leh-roh] and was called "**circulus**" [SIR-kyuh-lus]. A similar modern idea used for this process is **Milorganite** [muh-LOR-guh-"night"]. Overdoing this process can cause salt toxicity, which appears as leaf scorch. The material used to promote this process is often given an N-P-K label [pause] and is made by granulating potassium chloride and combining it with triple super-phosphate, ammonium phosphate, and ammonium nitrate. Name this process that improves the productiveness of plants by applying substances to the plant or soil.

**fertilization** or  
**fertilizing** [accept  
**fertilizer**]





**Question #17: Science**

10 points

The 1975 Nobel Prize in Physics went to Leo Rainwater and two Danes who determined that this region is not always round. John Archibald Wheeler and Niels Bohr worked together using the liquid drop model to explain why these regions split. The size of one of these regions is a few femto-meters [FEM-toh-“meters”], or fermis, a unit that was developed while studying them. Mesons [MAY-zahnz] were first hypothesized to explain the stability of this region. The existence of this region was demonstrated by Ernest Rutherford’s Geiger-Marsden gold foil experiment because alpha particles that went close to these regions were scattered. Name this region where the strong interaction binds protons and neutrons.

atomic nucleus or  
nucleus of an atom or  
nuclei

**Question #18: Social Studies**

10 points

Abraham Lincoln wrote a letter to this person stating “My paramount object in this struggle is to save the Union, and is not either to save or to destroy slavery.” That letter was in response to this person’s open letter titled “Prayer of Twenty Millions”. When this person later ran for President, most of his electoral votes were given to Thomas Hendricks because this person died between the popular and electoral votes. This person served briefly in Congress but was unpopular among congressmen because his newspaper uncovered congressional corruption. Name this founder of the *New York Tribune* who was credited with saying “Go West, young man.”

Horace Greeley



**Question #19: Mathematics**

10 points

In reaction to a notation created in 1976, this symbol drawn in a particular way can represent nested logs. That notation from 1976 uses one of these symbols to represent exponentiation and two of these symbols to represent raising a number to its own power repeatedly. That notation, which is used to represent Ackermann numbers, was developed by Donald Knuth [kuh-NOOTH]. When this symbol is drawn a different way, it can represent implication or it can be placed between the domain and range of a function. Another version of this symbol represents the relation “implies”, while a version with two heads represents “if and only if”. Name this symbol that can be placed above a letter to indicate a vector, and which is also used to draw vectors and rays.

arrows

**Question #20: Literature**

10 points

A play by this writer contains the dialogue “We got frightened”, “We got scared”, “We were frightened”. That dialogue is between a married couple in their 50s named Agnes and Tobias. Another play by this writer ends with both characters successively saying “Oh my God!” shortly after a character says “You’ve lost your bench.” This writer set that story about Peter and Jerry in Central Park. In another play by this writer, the protagonists talk about their imaginary son after inviting Nick and Honey to their house. Name this American playwright who wrote *A Delicate Balance*, *The Zoo Story*, and *Who’s Afraid of Virginia Woolf?*.

Edward (Franklin) Albee  
(III)



**Question #21: Fine Arts**

*10 points per part*

This painting is set on the border of Suffolk and Essex counties.		
<b>1</b>	Name this 1821 painting that shows the title vehicle crossing a river.	<i>The <u>Hay Wain</u></i>
<b>2</b>	This British artist painted <i>The Hay Wain</i> as well as <i>The Vale of Dedham</i> .	John <u>Constable</u>
<b>3</b>	Constable made multiple paintings of the cathedral in this town, showing it from the Bishop’s Grounds and from the Meadows.	<u>Salisbury</u> , Wiltshire, England [accept <u>Salisbury Cathedral</u> ]

**Question #22: Fine Arts**

*10 points per part*

Name these painters who portrayed weddings and related events.		
<b>1</b>	This painter used a green dress that may signify wealth, hope, and fertility in his <i>Arnolfini Portrait</i> .	Jan <u>van Eyck</u> [ <u>yahn van “Ike”</u> ] [prompt on <u>Eyck</u> ]
<b>2</b>	This painter placed the bride at the center of his <i>The Wedding Feast of Samson</i> and also painted <i>The Jewish Bride</i> . He is more famous for <i>The Night Watch</i> .	<u>Rembrandt</u> (Harmenszoon <u>van Rijn</u> ) [accept either underlined portion]
<b>3</b>	This 16th-century Italian artist placed Jesus at the center of <i>The Wedding at Cana</i> .	Paolo <u>Veronese</u> [ <u>vair-oh-NAY-zay</u> ]



**Question #23: Science**

*10 points per part*

This substance may be uniformly distributed throughout the universe.		
<b>1</b>	Name this substance used to explain the accelerating expansion of the universe.	<b>dark energy</b> [do not accept “dark matter”]
<b>2</b>	Some models of dark energy use this “constant” developed by Albert Einstein in his general relativity theory.	<b>cosmological</b> constant
<b>3</b>	In the Einstein field equations, the cosmological constant is multiplied by this quantity. It is symbolized “ $g$ sub <b>mu nu</b> [myoo noo]” and is analogous to distance.	<b>metric tensor</b> [prompt on partial answer]

**Question #24: Science**

*10 points per part*

This quantity is the rotational analogue of mass.		
<b>1</b>	Name this property calculated by adding up mass times the square of the distance from the axis of rotation, for each bit of an object.	<b>moment of inertia</b> [accept <b>rotational inertia</b> but do not prompt on “inertia”]
<b>2</b>	The moment of inertia of a solid ball rotating around its center equals this number times the sphere’s mass times the square of the sphere’s radius.	<b>2/5</b> [or <b>0.4</b> ]
<b>3</b>	The calculation of the moment of inertia of two objects rotating at different radii can be found using this quantity, equal to the product of the masses divided by the sum of the masses.	<b>reduced</b> mass



**Question #25: Literature**

*10 points per part*

The characters in this story state a few times “Strange they don’t see us.”		
<b>1</b>	Name this story about a captain, an oiler, a cook, and a correspondent.	“The <b><u>Open Boat</u></b> ”
<b>2</b>	This author wrote “The Open Boat” and <i>The Red Badge of Courage</i> .	Stephen <b><u>Crane</u></b>
<b>3</b>	Stephen Crane also wrote “The Blue Hotel”, in which a man from this country repeatedly says that he will not leave the room alive.	<b><u>Sweden</u></b>

**Question #26: Literature**

*10 points per part*

When this man has an affair with Anne Stanton, Anne’s brother—Adam—kills him.		
<b>1</b>	Name this fictional governor who Jack Burden goes to work for.	<b><u>Willie Stark</u></b> [accept either]
<b>2</b>	Willie Stark appears in this author’s novel <i>All the King’s Men</i> .	Robert Penn <b><u>Warren</u></b>
<b>3</b>	When Jack Burden finds out about the relationship between Stark and Stanton, he drives to this city and lies on a hotel bed.	<b><u>Long Beach</u></b> , California



**Question #27: Social Studies**

*10 points per part*

This legislative body is now called the House of Delegates.		
<b>1</b>	Name this group that met in addition to the General Assembly in the Colony of Virginia.	<b><u>House of Burgesses</u></b> [prompt on <b><u>Burgesses</u></b> ]
<b>2</b>	This person was a member of the House of Burgesses when he delivered his “give me liberty or give me death” speech.	Patrick <b><u>Henry</u></b>
<b>3</b>	This Speaker of the Virginia House of Burgesses was the first president of both the First and Second Continental Congresses.	Peyton <b><u>Randolph</u></b>

**Question #28: Social Studies**

*10 points per part*

This person’s rebellion killed about 60 people, and the reaction to it killed over 100 people. While awaiting trial, this person confessed his acts to Thomas Ruffin Gray.		
<b>1</b>	Name this slave who led a rebellion in Southampton County, Virginia in 1831.	Nat <b><u>Turner</u></b>
<b>2</b>	This person planned a slave rebellion in 1822 in Charleston, South Carolina. He was caught, tried, and executed before the rebellion started.	Denmark <b><u>Vesey</u></b> [or <b><u>Telemaque</u></b> ]
<b>3</b>	Some historians consider the most successful U.S. slave rebellion to be the alliance between slaves and these Native American people led by <b>Osceola</b> [ah-see-OH-luh] in Florida in 1835.	<b><u>Seminoles</u></b> or the <b><u>Seminole</u></b> people



**Question #29: Science**

*10 points*

These objects are maintained by an enzyme named for them and shelterin: TERRA and the CST Complex. Elizabeth Blackburn, Carol Greider, and Jack Szostak shared a Nobel Prize studying the functions of these objects and their enzyme. These objects get too small at the Hayflick limit. Recent research suggests a relationship between the shortening rate of these objects and the lifespan of an organism. When these structures get too small, cells stop dividing and sometimes initiate **apoptosis** [ay-“pop”-TOH-siss]. Name these repetitive nucleotide sequences at the ends of chromosomes.

**telomeres**  
**[TELL-oh-meerz]**

**Question #30: Social Studies**

*10 points*

In 1961, this leader ignored the advice of his biggest allies and used force to gain control of what had been a Portuguese colony. A year later, this leader was criticized for not being prepared when his country was attacked by China. This leader worked with Yugoslavian President Josip Tito to not side with the United States and Soviet Union as part of the Non-Aligned Movement. This person tried to work with Muhammad Ali Jinnah, but they ended up leading separate countries. Name this person who became the president of the Congress Party in 1929 and who in 1947 became the first Prime Minister of India.

(Pandit) Jawaharlal  
**Nehru**



**Question #31: Mathematics**

10 points

This person's book *Metrica* includes a method for approximating square roots by averaging a guess with the ratio of the number being square rooted to the guess. That method is named for this person or called the Babylonian method. This person is the namesake of a formula that can be derived from the law of cosines and the fact that sine theta equals the square root of 1 minus cosine squared of theta. This person's formula can also be derived by setting one side equal to 0 in **Brahmagupta's** [brah-muh-GOOP-tuh'z] formula, which is an analogous formula for quadrilaterals. Identify this ancient mathematician who is the namesake of a formula that finds the area of a triangle using the semiperimeter.

Heron of Alexandria

**Question #32: Literature**

10 points

This playwright often collaborated with Elisabeth Hauptmann; their most famous work shares lines with their play *Happy End*. In that famous work, this person depicted Police Chief Jackie "Tiger" Brown trying to help somebody who is sentenced to hang anyway. This writer and Hauptmann also collaborated with Kurt **Weill** ["vile"], who wrote the music for that play. This person collaborated with Margarete Steffin on a play in which the title characters sell provisions to soldiers during the Thirty Years' War. A member of that family is nicknamed "Swiss Cheese". Name this playwright who worked on *Mother Courage and Her Children* and *The Threepenny Opera*.

(Eugen) Bertolt (Friedrich)  
Brecht [BAIR-tohlt  
brekt]





### Extra Question #1: Science

10 points

This substance is the lighter of two substances injected into plutonium or uranium to make a boosted fission weapon. In a liquid state, this substance was used in early thermonuclear weapons, and it is now combined with lithium to make the primary fusion fuel in thermonuclear weapons. This substance combines with a similar but heavier substance to make helium and a neutron. This substance was discovered by Harold Urey [YUR-ee], who was able to explain it a year later once the neutron was discovered. This isotope is part of heavy water but is negligible in standard water. Name this isotope that has one proton and, unlike normal hydrogen, one neutron.

**deuterium**  
[doo-TEER-ee-um]  
[prompt on hydrogen-2  
or heavy hydrogen]

### Extra Question #2: Social Studies

10 points

In a 1644 book, this person wrote “God requireth not a uniformity of religion to be enacted and enforced in any civil state.” That opinion, and this person’s belief that American colonies should have been purchased from Native Americans, caused him to be exiled. This author of *The Bloody* [“bloody”] *Tenent of Persecution for Cause of Conscience* eventually got a charter for land he purchased from the Narragansetts [nair-uh-GAN-sets]. Some of the people who moved to this person’s colony were Anti-nomians who supported Anne Hutchinson. Name this founder of Rhode Island.

Roger **Williams**



**Extra Question #3: Mathematics**

10 points

<p>A conic section named for this number of points is generated by the diagonal points and midpoints of a complete quadrangle. To calculate log tables, John Napier used a decimal number that consisted of this digit repeated seven times after the decimal. Each rod used in Napier’s bones has this many sections. 10 raised to any positive power is equivalent to 1, mod this number. A polygon with this many sides has interior angles that measure 140 degrees and central angles that measure 40 degrees. This number is the only single-digit composite odd number, and it is also a perfect square. Name this largest digit in the decimal system.</p>	<p><u>9</u></p>
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**Extra Question #4: Literature**

10 points

<p>One novel by this author states that Granger had been hired for his height and his color. In that novel, this author describes Granger—who is Aimee’s bodyguard—traveling to West Africa with the narrator to set up a school for girls. In that novel, this author portrays Tracey as a troubled dance prodigy in London. In another novel by this author, <b>Magid [muh-GEED]</b> is sent to Bangladesh to be raised Muslim, which he rejects. Magid’s father <b>Samad [sah-MAHD]</b> is close friends with Archie Jones, who almost commits suicide in this author’s first novel. Name this contemporary London-born author of <i>Swing Time</i> and <i>White Teeth</i>.</p>	<p>Zadie <b>Smith</b></p>
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**Extra Question #5: Fine Arts**

*10 points*

This artist portrayed Nicholas of Bari, John the Evangelist, Mary, Pieter, and Benedict in the pentagonal panels of his *Badia Polyptych* [BAH-dee-ah PAH-lip-tik]. Andrea Pisano [ahn-DRAY-uh pee-ZAH-noh] completed work on a bell tower that this artist worked on, which is called this artist's *campanile* [kahm-pah-NEE-lay] and is in the Piazza del Duomo in Florence. This artist studied under Cimabue [chee-mah-BOO-ay] during the late 13th century. This artist's *Madonna Enthroned* is commonly referred to as the *Ognissanti* [ohn-yee-SAHN-tee] *Madonna*. Name this artist who painted a fresco cycle depicting the lives of Mary and Jesus for the *Scrovegni* [skroh-VEHN-yee] Chapel—also known as the Arena Chapel—in Padua.

Giotto di Bondone  
[JOH-toh dee  
bohn-DOH-nay] [prompt  
on Bondone]



**Extra Question #6: Science**

*10 points per part*

This person wrote four postulates about how microorganisms cause disease.		
<b>1</b>	Name this German microbiologist who determined the cause of tuberculosis and anthrax.	Robert <b>Koch</b> [" <b>coke</b> "]
<b>2</b>	Koch also found the cause of this bacterial disease that only affects humans and is caused by unsafe drinking water or undercooked seafood.	<b>cholera</b> [KAH-luh-ruh]
<b>3</b>	When Koch beat out Louis Pasteur at finding the cause of cholera, Pasteur turned his attention to this disease, developing a series of vaccines that saved nine-year-old Joseph <b>Meister</b> [MY-stur].	<b>rabies</b>

**Extra Question #7: Science**

*10 points per part*

This phenomenon is sometimes caused by exposure to ultraviolet light or ionizing radiation.		
<b>1</b>	Name this permanent change in a genome that can be passed to future generations.	genetic <b>mutation</b> (s) or <b>mutating</b> genes [or <b>mutagenesis</b> ]
<b>2</b>	In this type of mutation, a single nucleotide base or base pair is changed.	<b>point</b> mutation [prompt on <b>substitution</b> ]
<b>3</b>	In this type of point mutation, a stop codon is put into a sequence in place of an amino acid instruction.	<b>nonsense</b> mutation



**Extra Question #8: Social Studies**

*10 points per part*

The United Nations has had peacekeeping operations around the world starting in 1948.		
<b>1</b>	This country, which was formed in 1948, was the site of the first peacekeeping mission after this country fought the Arab League.	(State of) <b>Israel</b> [or Medinat <b>Yisrael</b> ]
<b>2</b>	Since 1991, the U.N. has had peacekeepers in this territory, which was supposed to hold a referendum to choose between independence and joining its northern neighbor, Morocco.	<b>Western Sahara</b> [or <b>Tanezroft Tutrimt</b> ]
<b>3</b>	From 1989 to 1991, the U.N. oversaw the removal of Cuban troops from this African country where the MPLA fought <b>UNITA</b> [“unite-uh”] in a civil war.	(Republic of) <b>Angola</b> or (República de) <b>Angola</b>

**Extra Question #9: Social Studies**

*10 points per part*

The Commonwealth of Nations contains 53 countries, nearly all of which are former British colonies.		
<b>1</b>	In 1867, this large North American country joined with New Brunswick and Nova <b>Scotia</b> [SKOH-shuh] to become self-governing.	(Dominion of) <b>Canada</b>
<b>2</b>	This modern country was two separate countries when it joined, one on the African mainland and the other consisting of islands in the Indian Ocean.	(United Republic of) <b>Tanzania</b> [or (Jamhuri ya Muungano wa) <b>Tanzania</b> ]
<b>3</b>	This former Portuguese colony joined the Commonwealth in 1995 after supporting British sanctions against its neighbors, South Africa and Rhodesia.	(Republic of) <b>Mozambique</b> or (República de) <b>Mocambique</b>