

ACF Fall 2015

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Tossups

1. This play's protagonist refers to another character by saying that he is "As disproportion'd in his manners, as in his shape." One character in this play sings that a drowned body "doth suffer a sea-change into something rich and strange," in a song that begins "Full fathom five thy father lies." This play's epilogue asks the audience to release the main character by virtue of their applause. That character had earlier promised to break his staff and drown his books, even though it would mean losing control of the fairy Ariel and his servant Caliban. For 10 points, name this Shakespeare play in which Ferdinand marries Miranda after being washed up on Prospero's island.

ANSWER: *The Tempest*

2. This property describes why electrons form patterns in LEED. In the debate resolved by this concept, Poisson argued that one side must be false since otherwise a small spot would be present, and that spot was later shown to exist by Arago. Electrons following Bragg's law after being fired at a nickel crystal provided evidence for this phenomenon in the Davisson-Germer experiment. An equation describing this phenomenon sets a certain value equal to Planck's constant over the momentum. This property is the subject of the de Broglie hypothesis. For 10 points, name this concept that resolved a debate over the nature of light by treating it as having two natures.

ANSWER: wave-particle duality [or de Broglie until it is read; accept answers along the lines of "matter has wave nature" or "waves have particle nature"]

3. In a novel by this author, a character is inspired to buy a Bigburger franchise after seeing the economic growth caused by the building of the "New Domain". In another novel by this author, a stream distracts a child who has never seen water before, leading to his father's death by drowning. He wrote a novel in which Ferdinand frees Salim from jail in a country ruled by the Big Man. In another of his novels, the title character marries into the Tulsi family in order to achieve his goal of owning property. For 10 points, name this Trinidadian author of *A Bend in the River* and *A House for Mr. Biswas*.

ANSWER: V. S. Naipaul [or Vidiadhar Surajprasad Naipaul]

4. This artist showed a man wearing a crown over a turban in a painting in which a woman dressed in red spills a drink as she cowers from the central action. The title character of that painting by this artist is glaring at some illuminated text. Another of his paintings shows a man wearing a gold chain with a medallion representing Alexander the Great resting his hand on a marble statue. This artist of *Belshazzar's Feast* and *Aristotle Contemplating a Bust of Homer* made many self portraits throughout his life. A chicken hangs off of a girl's dress in a painting by this artist that shows the militia company of Franz Banning Cocq. For 10 points, name this Dutch artist of *The Night Watch*.

ANSWER: Rembrandt Harmenszoon van Rijn [or Rembrandt Harmenszoon van Rijn]

5. In the *Metamorphoses*, Helios transforms Clytie into one of these objects after her sister Leucothoe is buried alive. One of these objects memorializes a young man who is fatally struck with a stray discus in the aftermath of a love triangle between him, Zephyrus, and Apollo. Another of these objects appears at the place where Adonis is killed by a boar. A transformation into this object ends the life of a mortal who rejects the love of the nymph Echo, and is consequently drawn to a pool where he stares at his reflection until he decays into one of these objects. For 10 points, identify this type of object into which that youth, Narcissus, is transformed.

ANSWER: flowers [or heliotrope; or sunflower; or hyacinth; or anemone; or narcissus before "Narcissus" is read]

6. The premature retreat of this city's Argive allies led to its defeat by its perennial enemy Orchomenus in one battle, while earlier, this city had won the Battle of Haliartus, where they had killed Lysander. This city's hegemony began after a battle in which its echeloned phalanx had a very deep left wing, allowing it to defeat the elite Spartan right wing at the Battle of Leuctra. Critical to that victory was this city's elite unit of 150 pairs of male lovers, which was wiped out at the Battle of Chaeronea. For 10 points, name this Greek city-state which led the Boeotian League, employed a "sacred band," and was legendarily founded by Cadmus and ruled by Oedipus.

ANSWER: Thebes

7. One structure with this shape exhibits a double peak at 208 and 222 nm in circular dichroism spectroscopy. Certain structures with this shape are formed via Hoogsteen interactions. A molecule with this structure typically exists in a B form and contains a major and minor groove. A protein which takes this shape has glycine at roughly every three residues, and contains high amounts of proline and hydroxyproline. Collagen's three strands form this shape. This structure was elucidated by the X-ray crystallography of Maurice Wilkins and Rosalind Franklin. For 10 points, name this shape, a "double" variety of which forms DNA.

ANSWER: helix [or double helix; or triple helix; or quadruple helix]

8. A second-act scene from this ballet begins with a solo oboe playing a long F-sharp, and then an ascending B minor scale from B back up to the original F-sharp. In its third act, thirty-two consecutive fouettés ["fwee-TAYZ"] end a pas-de-deux between the male lead and female antagonist, who traditionally is clad in black and performed by the same ballerina as the female lead, despite being the doppelganger Odile. At the end of this ballet, the sorcerer Von Rothbart has his power broken when Siegfried drowns himself alongside his transformed love. For 10 points, name this Pyotr Ilyich Tchaikovsky ballet in which Odette turns into the title bird.

ANSWER: Swan Lake [or Lebedinoye ozero]

9. An argument about this concept comes from the idea that all knowledge is what was previously learned. While speaking to Cebes and Simmias, a man gives the cyclical, recollection, and affinity arguments about this concept. The *Republic* ends with the myth of Er, who witnesses a phenomenon governing this concept, called *metempsychosis*. This concept is the subject of *Phaedo*, which is set the day before Socrates' suicide. The ancient Greeks believed plants, animals, and all living things possessed this concept, whose "transmigration" includes its reincarnation. For 10 points, Aristotle's *De Anima* discusses what concept that Plato argued is immortal?

ANSWER: the soul [or immortality of the soul; or anima until it is read; or psyche; prompt on "life" or "being alive" until it is read]

10. The losing commander of this battle was so ashamed by his defeat that he ordered his subordinate, Charles O'Hara, to present his sword to the winning commander, who in turn gave the sword to Benjamin Lincoln. After this battle, a band played "The World Turned Upside Down." Alexander Hamilton led an attack in this battle on Redoubts No. 9 and 10. It was preceded by a naval battle in which Thomas Graves' fleet was decimated by the Comte de Grasse. Rochambeau's French forces assisted the colonial army at this battle in capturing Charles Cornwallis. Fought in 1781 in coastal Virginia, this is, for 10 points, what final battle of the American Revolution?

ANSWER: Battle of Yorktown [or Siege of Yorktown]

11. The community of Rankin Inlet in this territory lost a plebiscite to be the capital when this territory was first established. In July 2015, this territory's community of Repulse Bay changed its name to Nauyasat. This territory's highest point is Barbeau Peak, located in the British Empire Range on this territory's Ellesmere Island. This territory is home to the military base CFB Alert, which is the northernmost permanently inhabited settlement in the world. This territory split from the Northwest Territories in 1999. For 10 points, name this Canadian arctic territory whose capital is Iqaluit, populated mostly by Inuit.

ANSWER: Nunavut

12. This character argues that Frenchmen are not men because they do not speak English. He owns a supposedly magic hairball that he took from the stomach of an ox. Two characters dress him up as a "Sick Arab" to execute the "Royal Nonesuch" scam. This character is discovered by the protagonist when they are both hiding on Jackson Island. Two characters engage in an overblown rescue attempt to free this character from a shed on the Phelps' farm. At the end of the novel he appears in it is announced that Miss Watson has died, meaning that this character is free. For 10 points, name this escaped slave who travels down the Mississippi with Huck Finn.

ANSWER: Jim

13. Knut Wicksell wrote about the "natural" form of this quantity in a book titled for this concept "and Prices". Irving Fisher developed an equation to relate two forms of this quantity and the inflation rate. This quantity is the dependent variable in the L-M curve, and is plotted on the y-axis of the IS-LM model. LIBOR ["lie-bor"] is an indexed reference for this quantity, which is overseen by the Federal Open Market Committee. The federal version of this quantity has not been raised since 2006. For 10 points, name this key economic variable, which is paid on deposits and charged on loans.

ANSWER: interest rate [or nominal interest rate; or real interest rate; prompt on "r" or "i"]

14. An elimination that is also this sort of reaction occurs at the end of catalytic cycles found in the Heck and Suzuki reactions. A zinc amalgam and HCl are used to perform this sort of reaction on a carbonyl, which turns it into an alkane. Lithium aluminum hydride is used to perform this sort of reaction. Hydrogenations, such as the transformation of an alkene to an alkane, are this sort of reaction. Standard electrode potentials are defined in terms of voltage changes that occur during these reactions. This sort of reaction takes place at the cathode of a voltaic cell. For 10 points, name this sort of reaction involving a gain of electrons, the opposite of an oxidation.

ANSWER: reduction [do NOT accept "redox reactions" or "reduction/oxidation reactions"]

15. A pope of this name was accused of being a necromancer by one of his enemies, Benno of Meissen. Another pope of this name is best known for his collaborations with astronomers Aloysius Lilius and Christopher Clavius. Henry IV walked to Canossa in a hair shirt to have an excommunication that was given to him by a pope of this name rescinded during the Investiture Controversy. For his contributions to the development of Catholic liturgy, the first pope of this name is nicknamed "the Great." For 10 points, give this name shared by sixteen popes, including the one who created a namesake calendar that is still in use today.

ANSWER: **Gregory** [accept **Gregorian** Calendar]

16. The opening theme of this composer's Piano Sonata No. 8 is accompanied by A minor block triads in the left hand. A horn concerto in D major is followed by three more in E-flat major that this composer wrote for the virtuoso Joseph Leutgeb. The nickname of his penultimate symphony contrasts it with his Symphony No. 25, the "little G minor." The F major Andante from his *Elvira Madigan* piano concerto is often excerpted as a separate piece. This composer's Piano Sonata No. 16 in C major is labelled "for beginners," while his Piano Sonata No. 11 ends with the Rondo alla Turca. For 10 points, name this composer of *Eine kleine Nachtmusik*.

ANSWER: Wolfgang Amadeus **Mozart**

17. The infrared spectra of cold examples of these are dominated by methane, while hot spectra contain signatures of water. Queloz and Mayor discovered one of them around 51 Pegasi, and the first discovery of these objects was made around a pulsar. These objects, along with brown dwarfs, can be detected with Doppler spectroscopy. The TESS mission intends to study nearby ones, which can be detected by observing dips in stellar light curves in the transit method. In July 2015, one of these named Kepler 452b was announced as Earth's "bigger, older cousin." For 10 points, name these objects, including "hot Jupiters" and "super Earths," that orbit stars other than our Sun.

ANSWER: **exoplanets** [or **extrasolar planets**; prompt on **planets**]

18. One of this country's many embassies to a European nation was depicted in a Jean-Leon Gerome painting. This country's government transitioned to a constitutional monarchy during the Promoter's Revolution. After its soldiers killed Inspector Groscurin, this country tangled with a colonial power in the Paknam incident. Taksin was the only king of its Thonburi dynasty. Although it often warred with France, this country was the only Southeast Asian state to avoid colonization by Europeans. This country's king Mongkut, a member of its Chakri dynasty, allowed Anna Leonowens to educate his children. Kings named Rama have ruled, for 10 points, what country formerly known as Siam?

ANSWER: **Thailand** [or **Siam** until mentioned]

19. According to this religion, each person has a "big" and a "little" guardian angel. This religion's stories include the banishment of Obatala by Olorun. Symbols for this faith's deities are created using flour and ash, and those with great Ashe in this religion become Bokors. In this religion, the Kanzo ceremony can be used to initiate houngan priests and mambo priestesses. The gods in this faith are divided into the Petro and Rada families, with the supreme god Bondye ruling over Papa Legba and the top hat wearing Baron Samedi. For 10 points, name this religion which is popular in Haiti and which venerates spirits called loa and does not actually involve sticking pins in dolls.

ANSWER: **Voodoo** [or **Vodoun**]

20. A play by an author from this country documents the rise to power of a Polish prince who had been imprisoned by his father. Another author from this country wrote about travels with a silvery donkey in the collection *Platero and I*. A character created by an author from this country is the subject of Pushkin's *The Stone Guest*. This country was the home to the "Generation of '27", and authors from this country wrote *The Dog in the Manger* and *Life is a Dream*. The protagonist plans to blow up a bridge during this country's civil war in Hemingway's *For Whom the Bell Tolls*. For 10 points, name this home country of Lope de Vega and Pedro Calderon de la Barca.

ANSWER Spain

Extra

One of these structures was proposed by Indiana entrepreneur Carl Fisher and named after Abraham Lincoln. Residents of San Francisco led one of the most successful "revolts" against a variety of these structures during the 1960s. Tulsa resident Cyrus Avery is nicknamed the "father" of one of these structures. An urban legend alleges that a system of these structures were built wide enough to land a B-52. A 1956 bill authorized the federal government to build these structures and was partially inspired by President Eisenhower's wartime experience with the autobahn. For 10 points, name these means of travel that include I-35 and Route 66.

ANSWER: roads [or interstate highways; or freeways; accept any answer that suggests roads travelled by automobiles; do not accept or prompt on "railroads"]

A formalism used in this technique uses a pulse sequence and a gradient field to encode spatial information which is Fourier transformed from the k-space image. Since they lower T1 relaxation times, paramagnetic substances such as gadolinium are commonly used as contrast agents in this technique. Seiji Ogawa developed a form of this technique which uses BOLD contrast to observe blood flow in the brain. This technique with a "functional" variety targets hydrogen nuclei found in the water in most tissues, and does not use ionizing radiation like CT scans do. For 10 points, name this medical imaging technique which uses a magnetic field to visualize the body.

ANSWER: MRI [or nuclear magnetic resonance imaging; or functional magnetic resonance imaging; or f-MRI]

Bonuses

1. It was convened by a man who published the Syllabus of Errors and was the longest-serving Pope in history. For 10 points each:
[10] Name this ecumenical council convened by Pius IX, the first to be named after the city governed by the Holy See. It officially defined papal infallibility.
ANSWER: First Vatican Council [or Vatican 1]
[10] Pius IX also defined the doctrine of Immaculate Conception, which states that this woman was born free of the original sin. This woman later conceived Jesus through the Holy Spirit.
ANSWER: Virgin Mary
[10] Vatican 1 ruled that the Pope is only infallible when he is defining doctrine for the entire church. Use of that power is labeled with this two word Latin phrase.
ANSWER: ex cathedra
2. This man's studies resulted in his Law of Independent Assortment and Law of Segregation. For 10 points each:
[10] Name this Austrian monk whose study of pea plants laid the foundations for genetics.
ANSWER: Gregor Mendel
[10] In Mendelian genetics, these two terms describe the expression patterns of alleles. When using a Punnett square, uppercase and lowercase letters are used to differentiate between alleles described by these two terms.
ANSWER: dominant and recessive
[10] The presence of alleles over various generations can be shown with one of these charts, which are effectively family trees that also shows phenotypes.
ANSWER: pedigree chart
3. Name the following Major League Baseball Hall of Famers who spent their entire careers with one team, for 10 points each.
[10] This New York Yankees first baseman played in 2,130 straight games from 1923 to 1939 before dying of ALS, which is commonly referred to as this man's disease.
ANSWER: Lou Gehrig
[10] This slick fielding third baseman for the Baltimore Orioles from 1955 to 1977 was known as the "Human Vacuum Cleaner" and won 16 consecutive Gold Glove Awards. He hit into a record four triple plays in his career.
ANSWER: Brooks Calbert Robinson Jr.
[10] This outfielder for the St. Louis Cardinals made 24 All-Star teams in 22 seasons between 1941 and 1963. He won three National League Most Valuable Player awards and was nicknamed "The Man."
ANSWER: Stan Musial

4. This composer included two "Praise" movements, one to the "eternity" of Jesus and the other to his "immortality," in a chamber piece scored for clarinet, violin, cello, and piano. For 10 points each:
 [10] Name this composer of the *Quartet for the End of Time*.
 ANSWER: Olivier **Messiaen**
 [10] This American composer's string quartet has one movement for each season of the year. His 4'33" ["four minutes, thirty-three seconds"] is completely tacet, the music instead coming from sounds in the listener's environment.
 ANSWER: John **Cage** [or John Milton **Cage**, Jr]
 [10] This other American composer quoted his own *Fanfare for the Common Man* towards the end of his Symphony No. 3, and wrote the ballets *Rodeo* and *Appalachian Spring*.
 ANSWER: Aaron **Copland**

5. Answer the following about a British anthropologist, for 10 points each:
 [10] This man's *Witchcraft, Oracles and Magic Among the Azande*, as well as his studies of the Nuer people in the Nile region, were foundational to 20th century social anthropology.
 ANSWER: Edward Evan **Evans-Pritchard**
 [10] Evans-Pritchard wrote a book about "primitive" ones of these systems, in which he outlines Nuer theology, despite the lack of a written liturgy. Emile Durkheim wrote about the *Elementary Forms of* [this kind of] *Life*.
 ANSWER: **religion** [or **religious** life; accept *Theories of Primitive Religion* or *Elementary Forms of Religious Life*]
 [10] In *The Azande: History and Political Institutions*, Evans-Pritchard described Gbudwe ["ge-bood-wey"], one of these people. In *The Golden Bough*, James Frazer describes how old religions linked these people with solar deities.
 ANSWER: **kings** [or **rulers**; or **monarchs**; or similar answers]

6. In a play by this author, the young boy Michael is turned over to Grusha, who refuses to pull him out of a drawn border. For 10 points each:
 [10] Name this German playwright of *The Caucasian Chalk Circle* who collaborated with Kurt Weill on the *Threepenny Opera*.
 ANSWER: Bertolt **Brecht**
 [10] In another Brecht play, this title character foretells that of her three children, Eilif will die due to his bravery and Katrin due to her kindness.
 ANSWER: **Mother Courage** [or **Anna Fierling** (accept either); accept **Mutter Courage**; accept *Mother Courage and her Children* or *Mutter Courage und ihre Kinder*]
 [10] This younger son of Mother Courage is the first to die. This overly-honest character is killed for hiding a cash-box from the Catholics.
 ANSWER: **Swiss Cheese** [or **Feyos**]

7. In a self-caricature, this man depicted himself sharpening a giant pencil like a spear. For 10 points each:
 [10] Name this late-19th century cartoonist credited with mobilizing public opposition to Tammany Hall and its leader, William "Boss" Tweed.
 ANSWER: Thomas **Nast**
 [10] Nast's cartoons were the first to associate the Republican Party with this animal, which still serves as its symbol.
 ANSWER: an **elephant**
 [10] Nast's nativist views are visible in his cartoon "The American River Ganges," which depicts catholic clergymen as these animals menacing a group of schoolchildren.

ANSWER: crocodiles [or alligators]

8. This theory predicts structures using the number of bonds and number of lone pairs around the central atom. For 10 points each:

[10] Name this theory developed by Gillespie and Nyholm for predicting molecular geometry.

ANSWER: VSEPR ["vesper"] theory [or valence shell electron pair repulsion theory]

[10] VSEPR theory predicts that a molecule with two bonds and three lone pairs will have this geometry. Molecules with this geometry only have two rotational degrees of freedom.

ANSWER: linear

[10] The repulsion between electrons is primarily caused due to this principle as opposed to electrostatic repulsion. This principle is why only two electrons can occupy the same orbital.

ANSWER: Pauli exclusion principle

9. This country contains the oldest amusement park in the world, Dyrehavsbakken, which dates to the 16th century. For 10 points each:

[10] Name this nation whose rulers included Valdemar I and Christian X, who freely rode through Copenhagen on his horse Jubilee during the Nazi occupation.

ANSWER: Denmark

[10] A Danish regent with this name formed an alliance with Haakon VI of Norway in 1363 before conquering Sweden. A Maid of Norway with this first name died on a trip to Scotland to meet her new husband Edward.

ANSWER: Margaret

[10] Margaret I's marriage to Haakon VI led to the formation of this union, whose first king was Margaret's adopted son, Eric of Pomerania. In 1523, the rise of the Gustav I Vasa of Sweden led to its dissolution.

ANSWER: Kalmar Union

10. The narrator of this poem encounters Murder, Fraud, and Hypocrisy, which represent Castlereagh, Lord Eldon, and Sidmouth. For 10 points each:

[10] Name this poem that promoted a message of nonviolence in response to the Peterloo massacre.

ANSWER: "The Masque of Anarchy"

[10] The speaker of this sonnet by the same poet meets a man who has seen a pedestal on which the title "king of kings" proclaims "Look on my works, ye Mighty, and despair!"

ANSWER: "Ozymandias"

[10] This author of "The Masque of Anarchy" and "Ozymandias" proclaimed "Hail to thee, blithe Spirit!" at the beginning of his poem "To a Skylark."

ANSWER: Percy Bysshe Shelley

11. This artist's gothic-inspired *St. George and the Dragon* shows a princess holding a dragon on a leash as St. George spears it in the face. For 10 points each:

[10] Name this early Renaissance artist of the frescoes *Funerary Monument to Sir John Hawkwood*. This proponent of linear perspective depicted Niccolò da Tolentino in the *Battle of San Romano* series.

ANSWER: Paolo Uccello [or Paolo di Dono]

[10] The *Battle of San Romano* series depicts the victory of this Italian city over Siena. Some of Uccello's paintings are held in this city's Uffizi Gallery.

ANSWER: Florence, Italy

[10] This Masaccio painting in the Brancacci Chapel helped develop linear perspective. Jesus and the tax collector are large in the foreground, while Peter appears small in the middleground as he kneels by a riverbank.

ANSWER: *The Tribute Money*

12. Let's talk about memory management. For 10 points each:

[10] This language uses an automated form of memory management called garbage collection. It was developed by Sun Microsystems, and its Virtual Machine supports the "Write Once, Run Anywhere" ideology.

ANSWER: Java

[10] In languages like C, you need to use memory from this structure to avoid a stack overflow. It also names a data structure based on a tree that can be used to implement priority queues and sort data in big O of $n \log n$ time.

ANSWER: the heap

[10] Attempting to dereference a pointer that had its memory freed, called a dangling pointer, will result in this access violation error. Dereferencing a null pointer can also cause it, as can dereferencing a wild pointer.

ANSWER: seg fault [or segmentation fault]

13. In one novel by this author, a hired singer reveals her prior affair with the father of the bride during a wedding. For 10 points each:

[10] Name this author who created the character al-Sayyid al-Ahmed in his novel *Palace Walk*. He also wrote *Sugar Street* and *Children of Gebelawi*.

ANSWER: Naguib Mahfouz

[10] Mahfouz is from this country, which is the setting of his *Cairo Trilogy*.

ANSWER: Egypt

[10] In the Mahfouz story "Under the Shelter", a policeman shoots people in a crowd at one of these places after they complain about illegal activities outside. Cherie agrees to marry Bo in a William Inge play titled after one of these places.

ANSWER: bus stops [or a bus shelter]

14. Answer the following about American military shenanigans in the Caribbean, for 10 points each.
[10] The United States declared the right to intervene in this country's affairs with the Platt Amendment. The United States sponsored the failed Bay of Pigs invasion to depose Fidel Castro as this country's ruler.
ANSWER: Cuba [or Republic of Cuba]
[10] In 1983, the United States launched Operation Urgent Fury to invade this Caribbean island nation after the overthrow of its president, Maurice Bishop.
ANSWER: Grenada
[10] After Mexico imprisoned a group of American sailors in the Tampico Affair, the United States occupied this Mexican port city on the Caribbean for seven months.
ANSWER: Veracruz
15. The Hamiltonian for an atom of this element is not exactly solvable because it is a three body problem containing a term for electron-electron repulsion. For 10 points each:
[10] Name this element. Superfluidity was first discovered in liquids of this element.
ANSWER: helium
[10] A mixture of helium-3 and helium-4 is used in one type of these devices, which use coolants like Freon or CFCs to keep their contents at a low temperature.
ANSWER: refrigerators
[10] Along with his teacher Einstein, this physicist designed a refrigerator that used no moving parts. He also wrote a letter signed by Einstein that encouraged the development of an atomic bomb.
ANSWER: Leo Szilard
16. Answer the following about mythical decapitations, for 10 points each.
[10] Heracles finds that decapitating one of this monster's heads only causes two more to grow back in its place until his nephew Iolaus uses a brand to cauterize the neck stumps.
ANSWER: the Hydra [or the Lernaean Hydra]
[10] After Tantalus dismembers his son Pelops and feeds him to the gods, he is sent to Tartarus and given this punishment.
ANSWER: he stands in a pool as food and water recede from his grasp [or anything that suggests that he is unable to obtain food and/or water placed near him]
[10] In the mythology of these people, Bran the Blessed orders his own decapitation after he and Pryderi [pree-"dairy"] are one of the only survivors of a battle against Matholwch [mah-THOLL-ook].
ANSWER: Welsh people [or Wales; or Cymru]
17. Strassen's algorithm is a method for performing this operation quickly. For 10 points each:
[10] Name this matrix operation. Unlike the numerical operation of the same name, it is not commutative, and for an M by N and N by O matrix, it returns an M by O matrix.
ANSWER: matrix multiplication
[10] Multiplying any matrix by its inverse yields a matrix of this type. These matrices' only nonzero elements are 1's on the main diagonal, and multiplying a matrix by this matrix returns the same matrix.
ANSWER: identity matrix [prompt on "I"]
[10] In vector calculus, this matrix contains a function's first-order partial derivatives. It is often used to change coordinate systems, which helps simplify potentially messy double and triple integrals.
ANSWER: Jacobian matrix

18. Answer the following about art at the Palace at Fontainebleau, for 10 points each.

[10] Francis I commissioned this Italian sculptor to design the *Nymph of Fontainebleau* for the main entrance. This sculptor also created a bronze *Perseus With the Head of Medusa*.

ANSWER: Benvenuto **Cellini**

[10] The Barbizon School, which developed in the Fontainebleau Forest, was part of this art movement that sought to depict unembellished scenes from everyday life in works like Gustave Courbet's *Stone-Breakers*.

ANSWER: **realism** [or **realists**]

[10] Barbizon School artist Jean Francois Millet made this painting that shows three women picking up wheat after a harvest.

ANSWER: *The **Gleaners*** [or *Des **Glaneuses***]

19. This man's secretary, Edward Drummond, was mistaken for him and shot by a Scottish lumberjack. For 10 points each:

[10] Name this British Prime Minister who refused to replace Lord Melbourne during the Bedchamber crisis. He also created the Metropolitan Police in London, which explains why they're called "bobbies."

ANSWER: Sir Robert **Peel**, 2nd Baronet

[10] That lumberjack was this man, who now lends his name to common law rules regarding the insanity defense.

ANSWER: Daniel **M'Naghten** [or Daniel **McNaughton**]

[10] Peel's handling of the Irish Potato Famine involved the repealing of these laws which imposed harsh tariffs on grain imports.

ANSWER: **Corn** Laws

20. Answer the following about American poets from New England, for 10 points each.

[10] This poet lived on a farm in New Hampshire, where he wrote poems like "Birches" and "Mending Wall." The refrain "and miles to go before I sleep" ends his poem "Stopping by Woods on a Snowy Evening."

ANSWER: Robert **Frost** [or Robert Lee **Frost**]

[10] This New England resident described a night spent "watch[ing] for love-cars" in "Skunk Hour." The old Boston aquarium is juxtaposed with a monument to the 54th Massachusetts Regiment in his poem "For the Union Dead."

ANSWER: Robert **Lowell** [or Robert Traill Spence **Lowell** IV]

[10] Lowell dedicated "Skunk Hour" to this New England-based female poet. The line "the art of losing isn't hard to master" begins her poem "One Art."

ANSWER: Elizabeth **Bishop**

Extra

Protests against this policy were brutally suppressed in Sharpeville and Soweto. For 10 points each:

[10] Name this policy of state-mandated segregation in South Africa finally discontinued after Nelson Mandela was elected as president.

ANSWER: apartheid

[10] This Anglican Archbishop of Cape Town won the Nobel Peace Prize in 1984 for his peaceful opposition to apartheid.

ANSWER: Archbishop Desmond Tutu [or Desmond Mpilo Tutu]

[10] This other anti-apartheid activist led the Black Consciousness Movement. He was beaten to death in police captivity, inspiring worldwide outcry.

ANSWER: Steve Biko [or Steven Bantu Biko]