

Early Autumn Collegiate Novice 3 (Fall 2012), Packet #3

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Edited by Andrew Hart

Tossups

1. Carl von Linde patented the application of this unit operation to air. Industrially, this process can be modeled using the McCabe-Thiele method and involves the use of towers filled with perforated trays or packed beds. Common applications of this process include refining crude oil, separating air into its components, and isolating ethanol from fermented food products. It is ineffective when the components are azeotropes. For 10 points, name this process that separates two liquids based on their boiling points, and which has a “fractional” variant.

ANSWER: distillation [or fractional distillation]

2. Off the southern tip of this country is Stewart Island. The Bay of Plenty indents the northern end of this country, which is also surrounded by the Kermadec Islands and the Chatham Islands. Its highest point, Aoraki, is located in the Southern Alps. This country, whose native name is Aotearoa, houses three-fourths of its population on its North Island, which is separated from the South Island by the Cook Strait. Its native people are known as the Maori. For 10 points, name this island nation that contains the cities of Wellington and Auckland.

ANSWER: New Zealand

3. This man responded to the threat of multiparty elections in Hungary by ordering the deposition of Imre Nagy. One story about this man involves his response to Lorenzo Sumulong's indictment of his country's foreign policy. He denounced his predecessor in the “Secret Speech,” which precipitated a “thaw” named for him. Under this man, the Partial Test Ban Treaty was signed in the wake of his unsuccessful attempt to put nuclear missiles in Cuba. For 10 points, name this Soviet politician who de-Stalinized the Communist Party as Premier in the 1950s and '60s.

ANSWER: Nikita [Sergeyevich] Khrushchev

4. This figure touches the open wound of a shirtless patient in an Antoine-Jean Gros canvas. A massive canvas showing this figure in lavish red and white garb was criticized at the 1806 Salon. In addition to being depicted “in the Plaguehouse at Jaffa” and being the subject of an Ingres painting showing his coronation, he was the subject of a work in which he appears upon his mount at the St. Bernard Pass. For 10 points, name this French leader who was depicted “Crossing the Alps” by Jacques-Louis David.

ANSWER: Napoleon I Bonaparte [accept either underlined part]

5. The framing narrative in this work consists of an elaboration of a definition of justice as “what is advantageous to the stronger.” It tells the legend of Gyges, who takes over a kingdom after finding a ring that grants its wearer invisibility. Totalitarian aspects of this book include its advocacy of holding women and children in common, censorship of the arts and literature, and rule by Philosopher Kings. It clarifies its author's theory of the forms using the Allegory of the Cave. For 10 points, name this work by Plato that attempts to describe the ideal city.

ANSWER: *The* Republic [or Plato's Republic; or Politeia]

6. This work opens with a G, F, B-flat, C, F, D motif that returns in several of the interludes between the movements. Its first full movement opens by depicting a gnome running on crooked legs, while another movement evinces the feelings arising from exploring the Paris catacombs by lamplight. This piece, originally composed for solo piano, was orchestrated by Maurice Ravel. It includes the movements “The Old Castle” and “The Great Gate of Kiev.” For 10 points, a series of Victor Hartmann paintings inspired what work by Modest Mussorgsky?

ANSWER: *Pictures at an Exhibition* [or *Kartinki s vystavki*; or *Pictures from an Exhibition*]

7. The transport protein AE1 makes up a quarter of the surface of these cells, which may contain nuclear remnants called Howell-Jolly bodies. These cells develop in reticulocytes. The spleen sequesters these cells, whose production is stimulated by EPO in bone marrow. Vertebrate examples of these cells lack a nucleus. They are normally shaped like biconcave disks, but they are deformed in people with sickle-cell anemia. For 10 points each, name these cells that carry hemoglobin and transport oxygen.

ANSWER: red blood cells/corpuscles [or erythrocytes; or RBCs; prompt on blood cells]

8. One author of this name wrote a love story about Armand and tubercular courtesan Marguerite. That author of *The Lady of the Camellias* shares this name with a man who created Villefort and Madame Danglars, whose husband sends a character to the Chateau d'If. That author of this name created a character who appears in *The Viscount of Bragelonne* and executes Milady de Winter with the help of Athos, Porthos, and Aramis. For 10 points, give this name of a father/son author pair, the older of whom wrote *The Count of Monte Cristo* and *The Three Musketeers*.

ANSWER: Alexandre Dumas [pere or fils]

9. This man had Robert Mosher supervise the use of reinforced concrete in a cantilevered structure. He designed the Gardenwall house for Malcolm Willey in the Prospect Park neighborhood of Minneapolis. He was fired after he designed a “bootleg” house for Allison Harlan. Los Angeles is home to the Hollyhock House of this architect, who exemplified both the Usonian style and the Prairie style and named his own homes Taliesin and Taliesin West. For 10 points, name this American architect who designed a house that overlooks a Pennsylvania creek, Fallingwater.

ANSWER: Frank Lloyd Wright

10. One novel from this country begins with the protagonist receiving a letter, which is a bad omen. In another work from this country, Bamford's shotgun is stolen and Maureen tries to convince the title character to get it back after they travel to his home village. In a novel from this country, James Jarvis helps improve the village of Ixopo after learning about the murder of his son, Arthur, which leads to the execution of Absalom Kumalo. For 10 points, name this home country of the authors of *July's People* and *Cry, the Beloved Country*, Nadine Gordimer and Alan Paton.

ANSWER: Republic of South Africa [or RSA]

11. In one role, this man protects two children from a Siphon. Joe Don Baker originated a role, based on a real sheriff, that this man played in a movie in which he walks around beating up Jay Hamilton's henchmen with a board alongside Johnny Knoxville. He played Mathyus, who defeats Memnon to become king of Egypt, in a spinoff to a film in which he opposes the Brendan Fraser-played Rick O'Connell. For 10 points, name this star of *Race to Witch Mountain* and *Walking Tall* who played the Scorpion King in *The Mummy Returns*, a former WWE star.

ANSWER: Dwayne [Douglas] Johnson [or The Rock]

12. This man's younger brother, Arigboge, tried to replace him when their older brother, Mongke, died. His reforms included making paper money the only form of exchange in his empire and dividing the people into four social classes. This man moved his capital from Karakorum to Ta-tu, which is now Beijing. Many of his ships were destroyed by a typhoon on a failed naval expedition to Japan. He defeated the Song dynasty to unite China and establish the Yuan dynasty. For 10 points, name this man who was visited by Marco Polo, the grandson of Genghis. ANSWER: **Kublai** Khan [or **Xubilai** Xaan; or King **Kubilai**; or **Qubilai** Qayan; or **Shizu** Yuan]

13. In this novel, a character repeatedly claims "I will work harder" as he is constructing a windmill. In this work, there is only one casualty when Mr. Pilkington's and Mr. Frederick's men are led by Mr. Jones in the Battle of the Cowshed. Minimus writes the national anthem of this novel's title location to replace the song taught by Old Major. Among Squealer's rules in this novel is "whatever goes upon two legs is an enemy." For 10 points, Napoleon and Snowball sell Boxer to a glue factory in what George Orwell novel, many characters in which are pigs and horses? ANSWER: **Animal Farm**

14. By one account, one leader in this conflict killed his own horse to inspire his men not to retreat at the Battle of Towton. The likely murder of the Princes in the Tower occurred during this conflict, during which Edward IV reigned after the Battle of Tewkesbury. A king during this conflict was betrayed by the Stanleys and defeated at the Battle of Bosworth Field. Richard III was succeeded by Henry VII, the first Tudor king, during this conflict. For 10 points, name this civil war between the Houses of Lancaster and York, named for a certain flower. ANSWER: Wars of the **Roses** [or **War of the Roses**]

15. In one story, this god takes the guise of Bolverk and causes nine fieldworkers to kill themselves over a magical whetstone. Because this figure drinks nothing but wine and eats nothing, he gives all of his food to two wolves. This son of Bor has a ring that multiplies every nine nights, Draupnir. A pair of ravens helps him to see everything from his throne, Hlidskjalf. He hung himself by his spear from the World Tree to learn the runes and he gave one of his eyes to drink from Mimir's Well. For 10 points, name this "All-Father," the chief god of the Norse pantheon. ANSWER: **Odin** [or **Woden**; or **Wotan**; or **Othinn**; or **All-Father** before mentioned]

16. Though not pendulums, a dynamical system of two of these machines, in which one mass is free to swing in a plane and a larger mass moves only up or down, exhibits chaotic or complex harmonic motion. In a system of two of these machines, for two masses x and y , the acceleration experienced by both masses is x minus y over x plus y , all times little- g . An Atwood machine has two ideal, frictionless examples of these machines, which are connected in a block and tackle. For 10 points, name these machines, exemplified by a wheel around which a rope moves. ANSWER: **pulleys** [accept **Atwood**'s machines before mentioned]

17. One explanation for the existence of this phenomenon is the efficiency wage hypothesis, which explains the "involuntary" type of it. The "structural" variety of this phenomenon is often created by technological change. The "frictional" variety of this phenomenon might be reduced by advances in information technology. The Phillips curve shows an inverse relationship between inflation and this phenomenon. Its natural rate has been estimated at about four percent. For 10 points, name this economic quantity, the rate of jobless individuals in an economy. ANSWER: **unemployment**

18. The name's the same. In particle physics, it names a device invented by Charles Thomson Rees Wilson that was used to discover the positron and kaon. In computing, this word refers to hardware and software delivered as a service over a network. In astronomy, it names Large and Small Magellanic objects that are irregular dwarf galaxies in the Local Group. For 10 points, cirriform, cumuliform, and stratiform are three categories of what meteorologic mass of liquid droplets suspended in the atmosphere?

ANSWER: **clouds** [accept **cloud chamber**; or **cloud computing**; or **Magellanic Clouds**]

19. One participant in this event visited the boardinghouse of Mary Surratt, the first American woman executed. A man was saved by his jaw splint from being stabbed to death by Lewis Powell while this event occurred. One of its perpetrators uttered "useless, useless" before he was shot in a burning barn at Garrett's Farm. That man shouted "Sic semper tyrannis" while carrying out this action during a performance of *Our American Cousin* at Ford's Theatre. For 10 points, what event carried out by John Wilkes Booth led to the death of the sixteenth U.S. president?

ANSWER: the **assassination** of Abraham **Lincoln** [accept equivalents involving **killing Lincoln**; prompt on **assassinating the president** or other more general answers]

20. A man attempts to retrieve a pair of tennis shoes from this character's home following his death. He learns that the love of his life got married while studying at Trinity College in Oxford, where he enrolled after dropping out of St. Olaf's. He is found dead in his pool the afternoon he tells his gardener not to drain it. Owl Eyes is the only person to read the books in this man's library. He promises to take the fall for the death of Myrtle Wilson to protect his love, Daisy Buchanan. For 10 points, name this "Great" title character created by F. Scott Fitzgerald.

ANSWER: **Jay Gatsby** [accept either; or **James Gatz** (accept either); accept *The **Great Gatsby***]

TB-21. This island fell completely to foreign control in the so-called "Flight of the Earls" following the failed rebellion of "Silken" Thomas. One early ruler on this island won the Battle of Clontarf and was named Brian Boru. A rebellion on this island was headquartered at its capital's General Post Office and began on Easter Sunday. Political strife on this island between its natives and Great Britain was called "The Troubles," which were largely settled in the Good Friday Agreement. For 10 points, name this island that contains the city of Dublin.

ANSWER: **Ireland** [or **Eire**]

TB-22. This religious movement's "Father" was Conrad Grebel. The Swiss Brethren was one early branch of this movement, which arose after the teachings of the Zwickau Prophets. This movement's early leader, Thomas Muentzer, was defeated at the Battle of Frankenhausen during the Peasants' War. The Mennonites and the Amish are two offshoots of this sect. For 10 points, name this sect of sixteenth-century radical Protestants that got its name from their practice of "re-baptizing" their converts.

ANSWER: **Anabaptists**

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Bonuses

1. One animal of this type wrapped itself around the staff of Asclepius. For 10 points each:

[10] Name this type of creature, a large one of which Apollo slew at the site of the Delphic oracle.

ANSWER: **snake** [or **serpents**; accept **Python**; accept **dragon**s]

[10] Snakes formed the hair of this legendary female, the only mortal Gorgon, who could turn men to stone with her looks.

ANSWER: **Medusa**

[10] This staff of Apollo, later gifted to Hermes, had two intertwined snakes running up it.

ANSWER: the **caduceus**

2. This song's title provides the name of the male protagonist of *Across the Universe*. For 10 points each:

[10] Name this song dedicated to the son of John Lennon, whose title character is told "don't make it bad" and to "take a sad song and make it better."

ANSWER: "**Hey Jude**"

[10] "Hey Jude" is a song by this group, whose hits include "I Want to Hold Your Hand" and "Yesterday."

ANSWER: The **Beatles**

[10] "You Never Give Me Your Money" is the first of the nine songs, including "Mean Mr. Mustard" and "Carry That Weight," which makes up the sixteen-minute medley that closes this Beatles album.

ANSWER: **Abbey Road**

3. This couple expelled the groups in their kingdom that refused to convert to Catholicism. For 10 points each:

[10] Name this married pair of rulers who oversaw the completion of the recapturing of the Iberian Peninsula from Muslim control and the beginning of the Inquisition.

ANSWER: **Ferdinand** II of Aragon and **Isabella** I [or the **Catholic Monarchs**; or **Reyes Catolicos**]

[10] The marriage of Ferdinand and Isabella marked a union of Aragon and this other Spanish kingdom.

ANSWER: **Castile** [or **Castilla**]

[10] This daughter of Ferdinand and Isabella and wife of Phillip the Handsome was a Queen of Spain who suffered from mental illness and was forced to live in a nunnery for much of her reign.

ANSWER: **Joanna** the Mad [or **Juana** la Loca; or **Joanna** of Castile; or **Juana** de Castilla]

4. The Works Progress Administration collected over 2,300 nonfiction works of this type. For 10 points each:

[10] Name this type of work in American literature, exemplified by the one of Olaudah Equiano, in which African Americans describe their life of servitude.

ANSWER: **slave narratives** [this is the only acceptable answer]

[10] The slave narrative *Incidents in the Life of a Slave Girl* was written by this woman under the name "Linda Brent."

ANSWER: Harriet [Ann] **Jacobs**

[10] This man wrote a narrative describing his escape from slavery in Maryland, published the anti-slavery newspaper *The North Star*, and gave the speeches "Self-Made Men" and "What, to the slave, is the Fourth of July?"

ANSWER: Frederick **Douglass** [or Frederick Augustus Washington **Bailey**]

5. Klenow fragments are produced when subtilisin cleaves one variety of this molecule, and another variety synthesizes Okazaki fragments and reverse proofreads newly synthesized DNA. For 10 points each:

[10] Name this enzyme that uses a DNA strand as a template for creating its complement.

ANSWER: DNA **polymerase** [or deoxyribonucleic acid **polymerase**]

[10] The “taq” variant of DNA polymerase is used in this process, which amplifies sections of DNA through the steps of denaturing, annealing, and extension.

ANSWER: **polymerase chain reaction** [or **PCR**]

[10] *Taq* polymerase is used for its ability to withstand changes in this quantity, differences in which distinguish the three stages of PCR, and which decreases during the annealing stage of touchdown PCR.

ANSWER: **heat** [or **temperature**]

6. This colony, which was aided by Squanto, met with the Wampanoag chief Massasoit. For 10 points each:

[10] Name this colony founded by a group of English Dissenters who travelled on the Mayflower. It was later merged into the Massachusetts Bay Colony.

ANSWER: **Plymouth** [Bay] Colony

[10] This man succeeded John Carver to be the second leader of the Plymouth Colony. He recorded the colony’s history in his journal, *Of Plymouth Plantation*.

ANSWER: William **Bradford**

[10] John Winthrop, a leader of the Massachusetts Bay Colony, gave the sermon “A Model of Christian Charity” in which he used this phrase from Matthew 5:14 to refer to the settlement they would found, Boston.

ANSWER: a **city upon a hill** [or **city on a hill**; prompt on partial answer]

7. This painting’s foreground features a young boy brandishing two pistols. For 10 points each:

[10] Name this painting of the July Revolution whose central figure rallies a group of revolutionaries.

ANSWER: **Liberty Leading the People** [or *La Liberté guidant le peuple*]

[10] This French Romantic artist painted *Liberty Leading the People*. A turbaned man riding a horse looks upon a group of suffering people in his *The Massacre at Chios*.

ANSWER: [Ferdinand Victor] Eugène **Delacroix**

[10] The central figure of *Liberty Leading the People* holds a musket in one hand and a French one of these items in the other. Jasper Johns painted three concentric versions of an American type of this item.

ANSWER: **flags** [accept **French** Revolutionary **flag** or **American flag**; do not accept “tricolore”]

8. We can’t give you a Large Hadron Collider, but we can make you name these things about the fundamental forces that act on particles. For 10 points each:

[10] The LHC smashes together protons, which are typically held together with neutrons in the nuclei by this fundamental force.

ANSWER: **strong** nuclear force [or **strong** interaction; or **color** force]

[10] The strong force is mediated by these force carriers. Unlike photons, which do not carry the charge involved in electromagnetism, these gauge bosons carry color charge.

ANSWER: **gluons**

[10] This weakest of the fundamental forces was first postulated in Newton’s universal law.

ANSWER: **gravity** [or **gravitation**]

9. Emiliano Zapata and his Zapatistas fought for agricultural reform in this country. For 10 points each:

[10] Name this country in which a revolution against dictator Porfirio Diaz lasted from 1910 to '20.

ANSWER: **Mexico** [or United **Mexican** States; or Estados Unidos **Mexicanos**]

[10] This general in the Mexican Revolution served as governor of Chihuahua and conducted several border raids on the U.S., after which Black Jack Pershing pursued him unsuccessfully for several months.

ANSWER: Pancho **Villa** [or Francisco **Villa**; or José Doroteo **Arango** Arámbula]

[10] This man was President of Mexico from 1911 to '13 and opposed Porfirio Diaz. He was executed during the Ten Tragic Days and succeeded by Victoriano Huerta.

ANSWER: Francisco I. **Madero** [or Francisco Indalecio **Madero** González]

10. The title event of this work occurs after the protagonist eats overripe strawberries. For 10 points each:

[10] Name this novella in which Gustav von Aschenbach becomes obsessed with the beautiful boy Tadzio while vacationing in the title Italian city.

ANSWER: ***Death in Venice*** [or *Der Tod in Venedig*]

[10] This German author of *Death in Venice* chronicled Hans Castorp's time in a Swiss sanatorium in *The Magic Mountain*.

ANSWER: [Paul] Thomas **Mann**

[10] In *Death in Venice*, Von Aschenbach practices this profession, whose theoretical "death" is central to Roland Barthes's literary criticism.

ANSWER: **author** [or **writer** or **poet**; prompt on **artist**; accept *The **Death of the Author***, or **auteur**]

11. Water undergoing this process becomes less dense, unlike most other liquids. For 10 points each:

[10] Name this transition under which a liquid turns to a solid.

ANSWER: **freezing** [accept word forms; prompt on **solidification** or word forms]

[10] Freezing-point depression, boiling-point elevation, and osmotic pressure are examples of these properties of solutions that depend only on the ratio of solute molecules to solvent molecules in solution.

ANSWER: **colligative** properties

[10] A factor named for this Dutch chemist, denoted "i," is often used in colligative property calculations. When i equals one, particles neither associate nor disassociate in solution.

ANSWER: Jacobius Henricus **van't Hoff** [accept **van't Hoff factor**]

12. In a 1954 film, this number of ronin are tasked with protecting crops. For 10 points each:

[10] Name this number, also the number of the seal in a 1957 Ingmar Bergman film.

ANSWER: **seven** [accept ***Seven Samurai***; or *The **Seventh Seal***; or ***Shichinin no Samurai***; or *Det **sjunde inseget***]

[10] *The Seven Samurai* was directed by this prolific Japanese filmmaker who also directed *Rashomon*.

ANSWER: Akira **Kurosawa** [or **Kurosawa** Akira]

[10] In Ingmar Bergman's *The Seventh Seal*, the protagonist competes against Death in this board game, which is also played by the protagonist of the 1993 film *Searching for Bobby Fischer*.

ANSWER: **chess**

13. Name the following about literary trilogies, for 10 points each.

[10] This author used sections called “newsreels” and “the camera eye” in his works *The 42nd Parallel, 1919*, and *The Big Money*, which make up his *U.S.A. Trilogy*.

ANSWER: John [Roderigo] **Dos Passos**

[10] *The Wreath, The Wife, and The Cross* make up the *Kristin Lavransdatter* trilogy of Sigrid Undset, a Nobel laureate from this Scandinavian country that also produced Knut Hamsun.

ANSWER: Kingdom of **Norway** [or Kongeriket **Noreg**]

[10] Robertson Davies, an author from this country, wrote the *Deptford Trilogy*. This country’s literary tradition includes Carol Shields, Alice Munro, and Robert Service, the so-called “Bard of the Yukon.”

ANSWER: **Canada**

14. This is a bonus about probability. For 10 points each:

[10] This Swiss family produced Jacob, who came up with the principle that relates the speed of a fluid to its pressure, and Daniel, who came up with a namesake discrete probability distribution.

ANSWER: **Bernoulli** [Daniel or Jacob]

[10] A classic example of the discrete Bernoulli distribution is this trial occurrence, which is deemed “fair” if the probability of “heads” occurring is the same as the probability of “tails” occurring.

ANSWER: **flipping a coin** [accept equivalents]

[10] According to the central limit theorem, as the sample size gets larger, a binomial distribution will tend toward this distribution.

ANSWER: **normal** distribution [or **Gaussian** distribution; prompt on **bell curve**]

15. The number of years that a person engages in this process is a commonly used proxy for human capital. For 10 points each:

[10] Name this process, theorists of which include Paolo Freire and Maria Montessori.

ANSWER: **education** [accept equivalents such as **pedagogy**]

[10] This American philosopher advocated progressive education in his work *Democracy and Education*, in addition to penning *Art as Experience* and *The Quest for Certainty*.

ANSWER: John **Dewey**

[10] *Democracy and Education* is partly a response to this French author who outlined his views of education in *Émile*.

ANSWER: Jean-Jacques **Rousseau**

16. For 10 points each, name the following about Germany between the World Wars.

[10] A Republican German government in the between-the-wars era was based in this central German city.

ANSWER: **Weimar** [accept **Weimar Republic**]

[10] This man served as President of the Weimar Republic until the office was disbanded by Adolf Hitler in 1934, allowing Hitler to take power.

ANSWER: Paul [Ludwig Hans Anton von Beneckendorff und] von **Hindenburg**

[10] Hitler had previously tried to seize power in November 1923, during this event named for the fact that it took place during a speech at a Munich locale where brews were served.

ANSWER: **Beer Hall Putsch**

17. This play centers on Henry Higgins's bet with Colonel Pickering. For 10 points each:

[10] Name this play in which Higgins transforms a flower girl into a well-spoken and well-behaved woman.

ANSWER: **Pygmalion**

[10] The focal point of *Pygmalion* is this young girl, the daughter of Alfred, who is presented at Nepommuck's Ball.

ANSWER: **Eliza Doolittle** [accept either]

[10] *Pygmalion* was written by this Irish playwright who also penned *Mrs. Warren's Profession* and *Major Barbara*.

ANSWER: George Bernard **Shaw**

18. The *Book of Genesis* tells the story of this man who fled a burning city. For 10 points each:

[10] Name this man, whose wife turned into a pillar of salt when she looked back at the city that they had fled.

ANSWER: **Lot**

[10] Lot and his wife were fleeing this city, which along with Gomorrah, was burned when God could not find one righteous man.

ANSWER: **Sodom**

[10] This uncle of Lot impregnated his wife Sarah when he was 100 years old and also fathered Ishmael with Hagar.

ANSWER: **Abraham** [or **Abram**; or **Avram**; or **Avrohom**; or **Avraham**]

19. In the twentieth century, Talcott Parsons and Anthony Giddens practiced this discipline. For 10 points each:

[10] Name this discipline whose early German practitioners include Georg Simmel and Ferdinand Tönnies.

ANSWER: **sociology**

[10] This French thinker is credited as being the founder of sociology as a discipline. He postulated that societies go through three stages.

ANSWER: Auguste **Comte** [or Isidore Auguste Marie François Xavier **Comte**]

[10] Comte was a proponent of this philosophy, which states that knowledge is gained exclusively through empirical investigation.

ANSWER: **positivism** [accept word forms]

20. This Austrian composer managed to escape the "curse of the Ninth" by not labeling his *Das Lied von der Erde* as a symphony. For 10 points each:

[10] Name this Romantic composer of *Kindertotenlieder*.

ANSWER: Gustav **Mahler**

[10] Mahler's works named *Resurrection*, *Tragic*, and "of a Thousand" are all this type of composition for large orchestra.

ANSWER: **symphony** [accept word forms; or **sinfonie**]

[10] Mahler's symphony of this number is dubbed the *Tragic*. Beethoven's *Pastoral* symphony is also of this number.

ANSWER: *Symphony No. 6* [or **Sixth Symphony**]

Extra. This word describes the outermost shell of an atom. For 10 points each:

[10] Name this word that specifies the electrons that form chemical bonds with other atoms. The carbon group, or Group 14, has four electrons of this type.

ANSWER: **valence**

[10] Except helium, all of the noble gases have this many valence electrons.

ANSWER: **eight**

[10] Using valence electrons is somewhat trickier when considering transition metals. Valence electrons for transition metals are primarily found in these orbitals, whose splitting is important to crystal field theory.

ANSWER: **d** orbitals [prompt on **atomic orbitals**]