## early autumn collegiate novice tournament

matt jackson | bryan berend | dallin kelson | ethan hewett | gaurav kandlikar | neil fitzgerald | tony leng | matt hart huma zafar | brice russ | charlie rosenthal | sandy huang | idrees kahloon | tanay kothari | andrew hart

## packet 3 tossups

1. In one story by this author, a peasant stoops to pick up a bit of string, causing his fellow townsmen to accuse him of stealing a purse. He created a title character who sleeps with a Prussian officer so a traveling party can leave Totes. In another of his stories, Monsieur Loisel uses the money he had been saving for a rifle to buy his wife a dress, after which she borrows the title object from Madame Forestier. In that story, the protagonist borrows a piece of jewelry that is made out of paste. For 10 points, name this French author who wrote "The Ball of Fat" and "The Necklace." ANSWER: Guy de Maupassant
2. This man's troops donned surplus slaughterhouse tunics while fighting against Juan Manuel de Rosas. In another campaign, he won at Calatafimi after landing at Marsala. He was ordered not to attack Trentino, but he earlier defeated the Neapolitans at the Volturno River. This leader of the Expedition of the Thousand allied with the prime minister of Sardinia-Piedmont, the Count di Cavour, to install Victor Emmanuel II as king. For 10 points, name this leader of the Red Shirts during the Risorgimento, the military leader behind Italian unification.
ANSWER: Giuseppe Garibaldi
3. This landmark was discovered by a party that nearly starved to death before reaching Kamarata. It is located in the western part of Canaima National Park in the Gran Sabana region, along the Kerep River. This geographical feature begins atop the Auyantepui, a flat top mountain, and ends in the Devil's Canyon. Its current name honors the American aviator who discovered it when he crash-landed his plane nearby, but it was nearly renamed in 2009 by Hugo Chavez. For 10 points, name this waterfall located in Venezuela, the highest in the world.
ANSWER Angel Falls [accept just Angel after "waterfall"]
4. One result of this theory was tested in the 2004 GP-B experiment, which tentatively confirmed the geodetic effect. The equations that govern this theory equate curvature with energy and momentum, represented by the stress-energy tensor. This theory predicts that objects close to a rotating mass undergo precession, a phenomenon known as framedragging. It also predicts a phenomenon whereby light is bent by massive objects, called gravitational lensing. For 10 points, name this theory, which is governed by Einstein's field equations, and has a "special" counterpart. ANSWER: general relativity [prompt on relativity; do not accept "special relativity"]
5. This band sings "Do as I say, not as I do" to open their song "Walking Contradiction," which can be found on their album Insomniac. One of their choruses begins "No time to search the world around." In another song, they sing "summer has come and passed, the innocence can never last." Their songs "Basket Case" and "When I Come Around" are on their album Dookie. More recent hits by this band include "Boulevard of Broken Dreams" and "Know Your Enemy." For 10 points, name this band whose latest albums are $21^{\text {st }}$ Century Breakdown and American Idiot. ANSWER: Green Day
6. This faith uses the Ik Onkar symbol to represent the "one god." This religion's marriage ceremony is called the Anand Karaj. Its three pillars are Kirat, Karni, and Vand Chakko. Its followers have faith in a supreme being called Waheguru. Early leaders of this religion include Ram Das and Arjan Dev. Uncut hair and wooden combs are two of the "five Ks" of this religion, whose sacred texts include the Bani, Chupai, and the Adi Granth. For 10 points, name this religion, which believes that Nanak was the first of ten gurus.
ANSWER: Sikhism
7. In a story by this author, the Handicapper General enforces Amendments 211 to 213, which ensure that all are equal. He wrote a novel in which the protagonist's research for the book The Way the World Ended leads him to realize that Felix Hoenikker has created a substance that can freeze the oceans. This author of "Harrison Bergeron" and creator of ice-nine wrote a novel in which the protagonist is kidnapped by Tralfamadorians after spending time in a POW camp in Dresden. For 10 points, name this creator of Billy Pilgrim, the author of Cat's Cradle and Slaughterhouse-Five. ANSWER: Kurt Vonnegut Jr.
8. Granular bodies in these structures are named for a German whose stain revealed them, Franz Nissl. They contain a tight junction called a hillock. Saltatory conduction is used to transport action potentials across myelinated sheaths called Nodes of Ranvier in these structures. They receive metabolic and structural support from neighboring glial cells. The body of these cells is called the soma, and they possess dendrites and axons. For 10 points, name these specialized cells that connect to each other to form networks in the body's central and peripheral nervous systems. ANSWER: neurons [or nerve cells; or neurones; prompt on soma before read; prompt on axon before "soma"; prompt on dendrite until "hillock"]
9. This author's "Fateful Hoaxing" titles a scathing critique of a work that discusses how youths skirt the traditional taupo system. One of this thinker's works studies how gender roles affected the tendencies of the Arapesh, Mundugumor, and Tchambuli to be warlike or peaceful. Interviews with adolescent girls make up the fieldwork for her work that compares the guarded sexuality of youth in America to the more open sexuality of young girls on the island of Ta'u in the Pacific. For 10 points, name this American anthropologist who wrote Coming of Age in Samoa. ANSWER: Margaret Mead
10. This ruler's third wife, Fastrada, had fought against him with Widukind's Saxons. He ushered in a "Renaissance" that included such scholars as Alcuin of York and this man's biographer, Einhard. Three of his grandsons carved up his empire in the Treaty of Verdun. This ruler defeated the Lombards at Pavia, though his rear guard lost to Basques at Ronceveaux Pass. In 800 CE, this predecessor of Louis the Pious was crowned by Pope Leo III as "King of the Romans." For 10 points, name this son of Pepin the Short, a great Frankish king of the Carolingian dynasty.. ANSWER: Charlemagne [or Charles I; or Charles the Great; or Karl der Grosse from any Germans]
11. This composer was briefly engaged to the Belgian mezzo-soprano Désirée Artôt, to whom he dedicated his Six French Songs. Among his symphonies are his unnumbered Manfred Symphony, one subtitled "Polish," and one whose second movement features a waltz-like melody in five-four time. His Marche Slave shares parts with a composition that is partly scored for cannon fire. He also wrote a ballet that features the "Dance of the Sugarplum Fairy." For 10 points, name this Russian composer of the Pathétique Symphony, the 1812 Overture, and The Nutcracker.
ANSWER: Pyotr Ilyich Tchaikovsky [or Peter Ilich Tchaikovsky]
12. The protonation of nitric acid by this compound creates greater-than-normal amounts of nitronium ions, which are used to nitrate benzene in a textbook electrophilic aromatic substitution reaction. The dehydrating property of this substance is often demonstrated by pouring it over sucrose. The production of this compound was revolutionized by the use of lead-lined chambers. It is now produced using a vanadium(2) oxide catalyst in the contact process. For 10 points, name this compound with chemical formula $\mathrm{H}_{2} \mathrm{SO}_{4}$, a strong acid found in car batteries.
ANSWER: sulfuric acid [or $\underline{\mathbf{H}}_{2} \underline{\mathbf{S O}}_{4}$ before mentioned; do not accept "sulfurous acid"]
13. The Hennings Report questioned this man's campaign and tax reports. Millard Tydings led a committee that investigated the truth of this man's claims. He made one of those claims during a speech at the Republican Women's Club of Wheeling, West Virginia. During hearings held between the army and this man, whose chief counsel was Roy Cohn, Joseph Welch asked this man if he had any "sense of decency." For 10 points, name this Wisconsin senator who in 1950 claimed to have identified fifty-seven communists in the State Department.
ANSWER: Joseph McCarthy
14. This thinker defined property in terms of work done on natural substances in a work that was partly written in response to Robert Filmer. He divided properties of objects into primary and secondary qualities. He claimed that, because man leaves the state of nature to gain the protection of government, monarchs who do not protect their citizens can be overthrown. For 10 points, name this British empiricist who wrote Two Treatises on Government and the Essay Concerning Human Understanding, which proposed a mental blank slate called the "tabula rasa." ANSWER: John Locke
15. This operation is generally equivalent to the wedge product, which is also characterized by anticommutativity and multilinearity. The differential of this operation can be calculated by Jacobi's formula. If it equals zero, its associated object is singular; otherwise, its associated object is invertible. The Wronskian is a special case of this operation, which is sometimes evaluated using Sylvester's theorem. For the two-by-two matrix "a b c d", it is equal to "a times d" minus "b times c." For 10 points, name this operation performed on square matrices, abbreviated "det."
ANSWER: determinant of a matrix [accept det before mentioned]
16. One author from this country wrote a novel in which an entomologist is forced to live with a widow at the bottom of a sandpit. Another author from this country wrote a novel in which Bird copes with his son's mental illness. A third author from this country wrote about an expert in ballet who travels to a spa retreat. Those novelists from this nation wrote the novels The Woman in the Dunes, A Personal Matter, and Snow Country. For 10 points, name this home country of Kobo Abe, Kenzaburo Oe, and Yasunari Kawabata.
ANSWER: Japan [or Nippon-koku; or Nihon-koku]
17. The engraver Raffaello Morghen is best-known for his reproduction of this painting, which is situated across from a piece by Giovanni Donato. Figures on its left side include a bald man raising his hands and a man holding a knife and whispering into another figure's ear. This work, located in the Santa Maria delle Grazie, was painted for its artist's patron Ludovico Sforza. The central figure sits with outstretched palms in this work, in which John is depicted with effeminate features. For 10 points, name this fresco depicting Christ's final meal, painted by Leonardo da Vinci. ANSWER: The Last Supper [or Il Cenacolo; or L'Ultima cena]
18. This man was born in a year in which an elephant owned by the ruler of Saba' refused to enter his hometown. Khosrau II angrily tore up the letter he received from this man. His early military tactics centered on ghazawat raids. His conflicts against the Quraysh tribe culminated at the Battle of Badr, which he won. He dug fortifications to defeat a larger force at the Battle of the Trench. His journey to a town formerly named Yathrib is known as the Hijra. For 10 points, name this man who led a pilgrimage from Mecca to Medina, transcribed the Qur'an, and founded Islam. ANSWER: Muhammad ibn Abdullah
19. When this deity assumes his role as the god of wind, he is depicted with a conical hat and a mask with two protruding tubes. In one story, he immolated himself after being tricked into sleeping with a priestess by a rival deity. In order to begin the fifth world cycle, he traveled into the underworld with his dog-headed psychopomp brother. This nemesis of the jaguar-faced god of the "smoking mirror" is typically depicted as a warrior or a feathered serpent. For 10 points, name this rival of Tezcatlipoca, an Aztec sky god who Montezuma allegedly confused with Hernan Cortes.
ANSWER: Quetzalcoatl [prompt on Ehécatl]
20. Near the opening of the work in which this character appears, he is "underneath the grove of a sycamore" lamenting his unrequited love for a woman with "Dian's wit," Rosaline. He is visited by Balthazar towards the end of the work in which he appears. This target of a speech about Queen Mab laments that he is "fortune's fool" after stabbing Tybalt, for which he is banished from Verona. He had earlier gone to Friar Lawrence to make plans for his wedding. For 10 points, name this star-crossed lover who commits suicide beside a seemingly dead Juliet.
ANSWER: Romeo Montague [prompt on Montague]

## tiebreakers

21. In one opera by this composer, Zerbinetta sings "The high and mighty princess" aria and the title character sings a duet with Bacchus. Another opera by this composer sees Octavian dress up as the chambermaid Mariandel to trick Baron Ochs. This composer of Ariadne auf Naxos often collaborated with the librettist Hugo von Hofmannstahl. He wrote an opera in which the head of Jokanaan is served on a platter after the "Dance of the Seven Veils." For 10 points, name this German composer of the operas Salome and Der Rosenkavalier.
ANSWER: Richard Georg Strauss
22. This conflict included the signing of the Act of Accord. Enmity between the Percy and Neville families was high during this conflict. The Earl of Warwick led forces to victory at the First Battle of St. Albans and later got the epithet "Kingmaker" for successfully crowning Edward IV during this war, which included battles at Northampton and Tewkesbury. During this conflict, Henry VII defeated Richard III at the Battle of Bosworth Field. For 10 points, name this series of British wars that pitted the houses of Lancaster and York against each other.
ANSWER: Wars of the Roses

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## packet 3 bonuses

1. For 10 points each, name the following about the architect Eero Saarinen.
[10] Saarinen designed this part of the Jefferson National Expansion Memorial, a curvy metal landmark of St. Louis, Missouri.
ANSWER: The Gateway Arch [or Gateway to the West; prompt on partial answer]
[10] Saarinen was born in this country, whose other architects include Alvar Aalto and Eero's dad, Eliel. Large cities in it include Espoo and Helsinki.
ANSWER: Republic of Finland
[10] A roof reminiscent of an airfoil supported by two colonnades characterizes Saarinen's design for the main terminal of this airport.
ANSWER: Washington Dulles International Airport
2. This plant tissue consists of tracheids and vessel cells, which may be lignified. For 10 points each:
[10] Name this vascular tissue that passively transports water and soluble minerals throughout the plant.
ANSWER: xylem
[10] Xylem is often contrasted with this other type of vascular plant tissue, which transports nutrients like sucrose.
ANSWER: phloem
[10] Besides root pressure, the main force responsible for bringing water through the xylem is the "pull" of this process, which is the loss of water vapor through the stomata of leaves, analogous to sweating.
ANSWER: transpiration [or transpirational pull]
3. Name these Roman emperors who let power go to their heads, for 10 points each.
[10] It may only be legend that this emperor fiddled during the Great Fire of Rome, but he did force the suicides of his mother Agrippina and his tutor Seneca.
ANSWER: Nero Claudius Caesar Augustus Germanicus
[10] This successor of Tiberius, whose common name means "little boot," allegedly appointed his horse Insitatus as a senator. When his sister Drusilla bore his child, he accidentally disemboweled her in excitement.
ANSWER: Caligula [or Gaius Julius Caesar Augustus Germanicus]
[10] This megalomaniac, who believed he was Hercules, began his reign by sharing power with his father, Marcus Aurelius. He later renamed Rome after himself and took part in large gladiatorial fights in the Coliseum.
ANSWER: Lucius Aurelius Commodus Antoninus
4. Name the following about international relations theory, for 10 points each.
[10] IR theory owes much to Antonio Gramsci, whose theories are largely contained in "notebooks" written in one of these institutions. The study of these places is a subfield of penology.
ANSWER: prisons [or jails; or penitentiary; accept all reasonable equivalents]
[10] Gramsci described the "cultural" type of this concept, which Zelmay Khalilzad believes the U.S. must hold, lest global war occur. This type of dominance was contrasted with "survival" in a recent Chomsky treatise.
ANSWER: hegemony
[10] Central to many IR theories is the belief that the world system exemplifies this kind of situation, which is not necessarily chaotic. Mikhail Bakunin was a proponent of the collective form of this state, which is lawless.
ANSWER: anarchy [accept word forms]
5. This book's title figures include Jephthah and Jair. For 10 points each:
[10] Name this book of the Old Testament, which includes the story of Samson and Delilah.
ANSWER: The Book of Judges [or Sefer Shoftim]
[10] This only female judge accompanied Barak into battle against the troops of Sisera, who was killed by Jael after being defeated in battle by the Israelites.
ANSWER: Deborah [or Dvora; or Debra]
[10] This judge asked God for a sign in the form of a wet sheep skin, then trimmed his army of 32,000 men down to 300 and defeated the Midianite armies of Oreb and Zeeb while smashing jars and blowing horns.
ANSWER: Gideon [or Gedeon; or Jerubbaal]
6. One character in this play tells a story in which a boy swerves to avoid a porcupine and hits a tree. For 10 points each: [10] Name this American play in which Nick and Honey are invited to dine with George and Martha at a dinner party that soon turns into a disaster.

## ANSWER: Who's Afraid of Virginia Woolf?

[10] This American absurdist playwright wrote Who's Afraid of Virginia Woolf, as well as Zoo Story and Seascape. ANSWER: Edward Franklin Albee III
[10] Virginia Woolf herself wrote this modernist novel in which time passes between two vignettes about the Ramsay family, who plan a journey to the title seaside structure.
ANSWER: To the Lighthouse
7. Lord De La Ware's supply ship prevented the complete destruction of this town during its "starving time." For 10 points each:
[10] Name this settlement founded by John Smith, the original site of the Virginia House of Burgesses.
ANSWER: Jamestown
[10] This farmer and early settler of Jamestown married Pocahontas and imported tobacco seeds from the West Indies. ANSWER: John Rolfe
[10] Jamestown was burned during this Virginia rebellion. The namesake planter of this rebellion was angered by Governor William Berkley's lack of response to the claim that the Susquehannock Indians were making trouble.
ANSWER: Bacon's Rebellion
8. Tyurin is a deputy foreman in this work, in which Tsezar shares food packets with the protagonist. For 10 points each: [10] Name this work that details twenty-four hours served in a Soviet labor camp by the title character.
ANSWER: A/One Day in the Life of Ivan Denisovich [or Odin den' Ivana Denisovicha]
[10] This Soviet expatriate author wrote One Day in the Life of Ivan Denisovich.
ANSWER: Aleksandr Isayevich Solzhenitsyn
[10] In this work, titled for the island-like chain of Soviet prisons, Aleksandr Solzhenitsyn details the history of the Soviet forced labor system and describes the course of a typical inmate from arrest and show trial to internment.
ANSWER: The Gulag Archipelago [or Arkhipelag GULAG]
9. These atoms differ in mass number but not atomic number. For 10 points each:
[10] Name these atoms of the same element that have different numbers of neutrons.
ANSWER: isotopes
[10] This hydrogen isotope contains one proton and one neutron. Two of them are found in heavy water.
ANSWER: deuterium [prompt on heavy hydrogen]
[10] The fact that the 40 isotope of this element decays into argon- 40 is the basis of a radiometric dating method. Like sodium and other alkali metals, it reacts violently with water to form hydrogen.
ANSWER: potassium [or $\underline{\mathbf{K}}$ ]
10. This oil rig caused eleven deaths when it exploded on April 20, 2010. For 10 points each:
[10] Identify this offshore oil rig whose explosion has led to the largest offshore oil spill in United States history. ANSWER: Deepwater Horizon
[10] Deepwater Horizon was leased by this oil company.
ANSWER: BP plc [or British Petroleum]
[10] This former Senator from Colorado and current Secretary of the Interior has been harshly criticized due to his poor handling of the Deepwater Horizon oil spill.
ANSWER: Kenneth Lee "Ken" Salazar
11. This tsar established an army of oprichniki and instigated the Livonian War. For 10 points each:
[10] Name this early Russian tsar who accidentally murdered his eldest son, hastening the downfall of the Rurik line.
His nickname refers to his great power, not his cruelty.
ANSWER: Ivan the Terrible [or Ivan IV; or Ivan Grozny; prompt on Ivan]
[10] After the death of Fyodor I, this period of instability began in Russia, ending only with the ascension of Michael Romanov.
ANSWER: the Time of Troubles [or Smutnoye Vremya]
[10] During the Time of Troubles, three different men falsely stepped forward, claiming to be this youngest son of Ivan IV.
ANSWER: Dmitri Ivanovich [or Dmitri of Uglich; or Dmitri of Moscow; or False Dmitris]
12. This set of pieces was originally published along with eight other concertos in the collection The Contest Between Harmony and Invention. For 10 points each:
[10] Name this set of violin concertos by Antonio Vivaldi.
ANSWER: The Four Seasons [or Le quattro stagioni]
[10] The Four Seasons is one piece from this era of music, characterized by musical ornamentation and the popularization of opera. Its name comes from a Portuguese word meaning "misshapen pearl."
ANSWER: Baroque
[10] Another Italian Baroque composer was this man, known for his nine books of madrigals and his pioneering operas, such as The Coronation of Poppea.
ANSWER: Claudio Giovanni Antonio Monteverdi
13. This man came to Iolcus wearing only one sandal, which prompted Pelias to send him on a quest. For 10 points each: [10] Name this hero from Greek mythology who takes his rightful place as king after leading the Argonauts to the land of Colchis.
ANSWER: Jason [or Iason]
[10] In order to take the throne from Pelias, Jason needed to obtain this object, which once belonged to his ancestor Phrixus. Jason had to perform three difficult tasks in order to obtain it.
ANSWER: The Golden Fleece
[10] Jason was only able to complete those tasks with the help of this sorceress, whom Jason later married. After Jason married someone else, this woman went crazy and killed the children she had with Jason.
ANSWER: Medea
14. This empire invented the circling formation known as the "Horns of the Buffalo." For 10 points each:
[10] Name this South African empire that won the Battle of Isandlwana during its 1879 war against colonialists. ANSWER: the Zulu Empire
[10] The Zulu lost their namesake 1879 war against this colonial power, which later fought two wars against the Boers in South Africa.
ANSWER: Great Britain [or England; or United Kingdom; or British Empire]
[10] This great Zulu ruler reorganized the army and led the Mfecane, or "Crushing." He died shortly after the arrival of Europeans in southern Africa.
ANSWER: Shaka
15. A central tenet of this interpretation is that a wavefunction can describe the state of any particle. For 10 points each: [10] Name this interpretation of quantum physics, which is named for a European capital city.
ANSWER: Copenhagen interpretation
[10] This Danish physicist was the formulator of the Copenhagen interpretation of quantum mechanics, and also names an atomic model.
ANSWER: Niels Henrik David Bohr
[10] The Bohr atomic model was only successful in explaining this simplest element that gives off the Balmer and Lyman spectral lines.
ANSWER: hydrogen [or $\underline{\mathbf{H}}$ ]
16. He wrote about finding spouses in Rome in Ars Amatoria. For 10 points each.
[10] Name this Roman poet who told the transformation-heavy stories of Pyramus and Thisbe and Jupiter and Europa before being exiled to the Black Sea region.
ANSWER: Ovid [or Publius Ovidius Naso]
[10] Ovid is perhaps most famous for writing this collection that contains the aforementioned stories about the transformations of figures like Europa.
ANSWER: the Metamorphoses [prompt on Transformations]
[10] This other Roman poet decried the fact that there is "No place in Rome for a Roman" and coined the phrase "bread and circuses" in his sixteen Satires.
ANSWER: Juvenal [or Decimus Iunius Iuvenalis]
17. This work describes "docile bodies" in a system exemplified by a building in which an "unequal gaze" would dominate, called the Panopticon. For 10 points each:
[10] Name this philosophical text by the author of The Birth of the Clinic that describes the "Birth of the Prison."
ANSWER: Discipline and Punish: The Birth of the Prison [or Surveiller et punir: Naissance de la Prison]
[10] This bald Frenchman, an advocate of "discourse," wrote The Birth of the Clinic and Discipline and Punish. ANSWER: Michel Foucault
[10] The Panopticon originated from the work of this British thinker, who formulated the "greatest happiness principle" and founded utilitarianism.
ANSWER: Jeremy Bentham
18. The dynamo theory posits that rotation in this area gives rise to the Earth's magnetic field. For 10 points each: [10] Name this innermost layer of the Earth's interior, which is split into two parts, one solid and one liquid, composed of mostly iron and nickel.
ANSWER: the core
[10] Above the core lies this layer, the largest of the Earth's interior, which borders the crust at the Moho.
ANSWER: the mantle [do not accept "outer mantle" or "inner mantle"]
[10] A portion of the upper mantle is this region. It is also called the "low-velocity zone," and the lithosphere "floats" atop this layer in plate tectonic theory.
ANSWER: the asthenosphere
19. This artist depicted a naked man holding a cross towards four elephants with elongated legs in his painting The Temptation of Saint Anthony. For 10 points each:
[10] Name this Spanish Surrealist whose other bizarre works include Swans Reflecting Elephants and Soft Construction with Boiled Beans.
ANSWER: Salvador Dalí [or Salvador Domingo Felipe Jacinto Dalí i Domènech, Marquis of Púbol] [10] Dalí is best-known for this 1931 painting that depicts ants swarming a pocket watch and several melting clocks. ANSWER: The Persistence of Memory [or La Persistencia de la memoria]
[10] Dalí collaborated with this Spanish film director on the short film Un Chien Andalou, whose opening scene depicts a woman's eye being slit with a straight razor.
ANSWER: Luis Buñuel Portolés
20. In this novel, Thwackum tutors both the title character and Blifil. For 10 points each:
[10] Name this novel in which Squire Allworthy raises the title "foundling," who is in love with Sophia Western. ANSWER: The History of Tom Jones, a Foundling
[10] Tom Jones is by this British author of Amelia, who was a co-founder of London's first police force, the Bow Street Runners. He also wrote a play about Tom Thumb.
ANSWER: Henry Fielding
[10] Henry Fielding's Shamela purports to expose and refute the misrepresentations within Pamela, which is an epistolary novel by this author of the dreadfully long Clarissa.
ANSWER: Samuel Richardson

## extra bonus

21. The Morse equation can be used to measure this phenomenon. For 10 points each:
[10] Name this type of pressure, the result of water passing through a semi-permeable membrane.
ANSWER: osmotic pressure
[10] Osmotic pressure, boiling point elevation, and freezing point depression are all properties of this type, which depend solely on the concentration of a solute.
ANSWER: colligative properties
[10] The Morse equation employs this "factor," denoted $i$ and named for a Dutchman, that is calculated by taking the number of dissociated particles in a solution over the number of unit particles initially dissolved.
ANSWER: van 't Hoff factor
