## HEINRICH BOLL IV at GEORGIA TECH - 1999 <br> TOSSUPS - Broward Community College

1. In 1900, anyone who took a swim off the coast of this city, which produced more than half of the world's oil supply, would emerge with black skin. Recently, the pollution has caused a jump in caviar prices, due to plummeting populations of beluga sturgeon in the Caspian. This city had lost much of its political value by the time Hitler turned his forces toward it instead of Moscow, but today oil companies are investing billions despite the turmoil in the Caucasus. FTP, name this "Pearl of the Caspian," the capital of Azerbaijan.

Answer: Baku
2. By his 5th birthday he could read English, Hebrew, Latin, and Greek, and by 13 he knew various European languages, Sanskrit, Arabic, Malay, Hindi, and Bengali. Appointed Royal Astronomer of Ireland at 21 , he soon did important work in optics and mechanics before producing his greatest mathematical work on matrix theory and quaternions. FTP, name this Irish mathematician, whose name is attached to a function in mathematical physics which represents the total energy of a system.

Answer: William Rowan Hamilton
3. Earthworms and most other annelids use this type of locomotion, since their hydrostatic skeletons allow them to change the shape of each individual segment of their body, using both circular and longitudinal muscles in a rhythmic pattern. The term is most often heard in connection with the human esophagus and intestines, which use rhythmic waves of smooth muscle contraction to push food along the digestive tract. FTP, provide this term which originates from Greek words meaning "to wrap around."

Answer: peristalsis or peristaltic motion (prompt on variants)
4. This philosophical movement views reality as hierarchically ordered; at its apex is a spiritual entity or hypostasis which is unknowable and ineffable and can only be described indirectly. Other hypostases derived by emanation include intellect, then soul, then matter, but these manifestations are of decreasing levels of perfection. The movement formed in the 3rd century AD and borrowed from other schools, and it stood in opposition to Epicureanism. FTP, name this movement initiated by the work of Plotinus.

Answer: Neo-Platonism or Neo-Platonic school
5. He was a leading poet, dramatist, philosopher, and historian of his day, and his works are characterized by strong optimism and moral idealism. Fascinated by the Thirty Years' War, he wrote a history of the war in the early 1790 s, and it provided the setting for his 3 -part verse masterpiece completed in 1799. FTP, name this German thinker whose works include the plays Maria Stuart, The Maid of Orleans, and William Tell, the Wallenstein trilogy and the poems "The Song of the Bell" and "Ode to Joy."

Answer: Johann Christian Friedrich von Schiller
6. Recent DNA studies by Erika Hagelberg seem to support opponents of this man's theory, but he stands by his work. At age 84, he now resides in Tenerife, but it was in the Pacific where he became famous over 50 years ago. From experience, he says that leaky boats are actually best for long travel, such as his 1977 journey in a Tigris reed boat or the Ra expeditions of 1969-70. FTP, name this Norwegian who argues that Polynesia was first settled by South Americans, and who backed up his words in 1947 by sailing for 101 days on the balsa raft Kon-Tiki.

Answer: Thor Heyerdahl
7. So little is known about him that even his name is in doubt. He was the architect of the basilica and shrine honouring Augustus at Fano, and his best-known written work is dedicated to Octavian. He related orders of columns to the bodies of men, women, and maidens; described methods of town planning, building design, and stone construction; and provided methods and advice for transporting water via aqueduct. FTP, name this Roman engineer and architect known for his Ten Books on Architecture.

Answer: Vitruvius
8. One of the sons of King Dasa-Ratha of Ayodhya, he is the 7th avatar of Vishnu. During his 14-year exile, his wife is captured by Ravana, but after many difficult battles he kills Ravana. He then returns to

Ayodhya and rules with his wife Sita for 10,000 years, then alone for another 1,000 , before he and his brothers return to the heavens as Vishnu. FTP, name this hero of an Indian epic generally attributed to the poet Valmiki.

Answer: Rama (prompt on Ramayana)
9. In a coaxial cable, this quantity is determined by the diameter of the center conductor, diameter of the shield, distance from center conductor to shield, and dielectric constant of the material in between. In an alternating current, its square is equal to the square of resistance plus the square of the difference of inductive and capacitive reactance. FTP, identify this aspect of a current, equal to the resistance for an AC current in resonance, symbolized by the letter Z .

Answer: Impedance
10. Its rarely-heard fourth verse begins with part of a line from Twelfth Night, and the third verse is full of sea references. It remains popular over 30 years after its composition and has appeared in many movies, most notably The Commitments and the Scorsese section of New York Stories. The organ part, contrary to rumor, is not taken from Bach, but listeners still struggle to figure out what Keith Reid's lyrics are about -a mermaid, a relationship ending, drunkenness, and betrayal are a few popular guesses. And no one seems sure about the apparent Chaucer reference, what a light fandango may be, or why sixteen Vestal virgins would be leaving for the coast. FTP, name this 1967 song, the best-known work of Procol Harum.

Answer: "A Whiter Shade of Pale"
11. Past winners include Enrico Bombieri, Lars Ahlfors, Gerd Faltings, and Edward Witten, all of whom were under 40 at the time. Its face features the initials RTM and a portrait of Archimedes, with his name in Greek characters; the winner's name is engraved on the rim. Established by a Canadian professor in 1924, it was first awarded in 1936 and has been awarded every four years since 1950. FTP, name this medal which is awarded at every meeting of the International Congress of Mathematicians.

Answer: Fields Medal
12. His raft floated away from Sarasota, past the mouth of the Mississippi, and crashed on Galveston Island in November 1528. After two years as a prisoner of the Karankawa Indians, he began to gain a reputation as a great healer, and by 1535 he was wandering Mexico with a vast group of reverent Pimas and Opatas following him everywhere. FTP, name this Spaniard, whose odd surname is derived from an ancestor who used a bovine skull to mark a route through a'mountain pass.

Answer: Alvar Nuñez Cabeza de Vaca
13. He might have been one of the greats of Victorian literature, were it not for his death in 1833. In 1831, he published the essay "On Some of the Characteristics of Modern Poetry," which helped define a distinction between Romantic and Classical schools of Victorian poetry. At Cambridge, he was the brightest light of a group of young intellectuals called the Apostles, another member of which would become his closest friend -- Alfred, Lord Tennyson. FTP, name this man whose death sent Tennyson into a long depression, and who inspired Tennyson's 1850 poem, "In Memoriam."

Answer: Arthur Henry Hallam (prompt on A.H.H.)
14. These compounds are most frequently used in the synthesis of alcohols. They are obtained by the reaction of chips or granules of magnesium with an alkyl or aryl halide. The reaction is carried out in an ether solvent, most commonly diethyl ether, which is needed to solvate and stabilize the product as it forms. FTP, identify the term for these organomagnesium halides, which are named for the French chemist who shared the 1912 Nobel Prize in Chemistry.

Answer: Grignard reagants (prompt on organometallic compounds, or organomagnesium halides before last sentence)
15. It was visited by Livingstone in 1851-53, and later by Dr. John Kirk in 1858-60. It rises in Northwestern Zambia and flows south through eastern Angola and western Zambia to the Botswana border. Then it turns east and forms the Zambia-Zimbabwe border, and eventually it crosses Mozambique and enters the Mozambique Channel near Chinde. FTP name this river which along its 1700 -mile course has three main navigable stretches, separated by rapids and by Victoria Falls.

Answer: The Zambezi (or Zambesi or Zambeze) River
16. Frank Drummer, who tried to memorize the Encyclopedia Brittanica; Sam Hookey, who was attacked by Brutus the Lion; Benjamin and Mrs. Benjamin Pantier, who hated each other, Reuben Pantier, who was loved by Emily Sparks; Knowlt Hoheimer, who stole Curl Trenary's pigs, avoided jail by running off to the war, and died at Missionary Ridge; and Lydia Puckett, whose rejection of Knowlt was the real reason he ran away to the war. All of these characters are buried on a hill, FTP, in what fictional county created by Edgar Lee Masters?

Answer: Spoon River (accept Spoon River Anthology) (prompt on Masters)
17. In 1800 , he won a lottery and with $\$ 600$ of his winnings bought his freedom and became a carpenter. Years later, he wanted to free others and planned to set what was then the 5th largest city in America on fire and then flee to sanctuary in recently established Haiti. FTP, name this man whose prematurely discovered plan for the largest slave rebellion in US history would have burned Charleston, South Carolina on July 14, 1822.

Answer: Denmark Vesey
18. When he was 8, his family moved to Nebraska, where his father founded the town of Cozad, the last name that he was born with. After several violent confrontations with other homesteaders and cattlemen, his family was forced to flee the state and assume false identities. We know him as the artist of such works as La Neige, Young Woman in Black, and Jesseca Penn in Black. FTP name this writer of The Art Spirit and leader of The Eight.

Answer: Robert Henri
19. It was first observed by American psychologist G. C. Homuns. In studying the effects of increased or decreased lighting on the productivity of workers, Homuns observed that productivity increased regardless of which change was made. This effect refers to the generalization that anything new will bring about a short-term improvement. FTP, identify this effect which was named for the industrial plant where the study was done and not for the author of Mosses from an Old Manse and The Scarlet Letter.

Answer: The Hawthorne Effect
20. It ended when Toghon Temur Khan fled with his Empress and concubines to Xanadu, then to Karakorum. Other members of the dynasty included Asikipa Khan and Temur Khan, but the first ruler is easily the most famous. It was during this dynastic period that Marco Polo visited China and met Kublai Khan. FTP, name this Chinese dynasty suceeded by the Ming dynasty, lasting from 1279-1368.

Answer: Yuan dynasty (prompt on Mongol dynasty)
21. Her life, as recounted as Millicent Dillon's biography A Little Original Sin, was filled with adventures and love affairs. Many of her central characters were odd, eccentric women living in exotic places, not unlike the writer herself. Born in New York, she spent much of her married life in Tangier, which often made her feel "cut off," which is one reason she produced only one novel, one play, and seven short stories. Her husband, the author of The Sheltering Sky, found Morocco stimulating, however. FTP, name this writer whose lone novel was Two Serious Ladies.

Answer: Jane Bowles
22. Born in Kiev in 1890, he became a member of the Ballet Russes under the direction of Sergei Diaghilev. He was its leading male dancer in the premieres of The Spectre of the Rose, Petrushka, and Scheherezade and in 1912 he choreographed the avant garde Afternoon of a Faun, which shocked the audience. FTP who caused a near riot in the following year as choreographer and with his frenetic twists and jerks as lead dancer in The Rite of Spring.

Answer: Vaslav Nijinsky
23. One of these can be built to add any two binary numbers, but one can not be built to multiply any two binary numbers. It is a machine which starts in a certain internal state Q , receives a stimulus S , reacts by changing to an internal state Q-prime and spitting out a response R , and repeats this cycle with a new stimulus or input. FTP, identify this machine, which Richard Feynman describes as a Turing machine
without a tape.
Answer: Finite State Machine or FSM (prompt on early buzz with "Turing machine" prior to "multiply")
24. Born in 1937, she was a textile worker and an amateur parachutist in her youth, until she was recruited by her country in 1961. She drew unusual attention in 1964 when she gave birth to her first child, who was the first human to ever have both parents exposed to the space environment. FTP, name this woman who orbited the earth 48 times in June 1963, the first female cosmonaut.

Answer: Valentina Tereshkova
25. Sometimes called the Battle of Senlac Hill, Harold II rushed south to meet defeat by the Bastard Duke of Normandy. FTP identify this 1066 battle won by the forces of William the Conqueror.

Answer: Battle of _Hastings_
26. Some of her poems include "To Maecenas," "Thoughts on the Works of Providence," "To the University of Cambridge, in New England," and "To His Excellency, George Washington." She was only 19 or 20 when these poems were published in London and her youth and circumstances attracted considerable attention. Only 12 years earlier, she came to Boston and learned to read English. FTP name this woman who came from Western Africa at age 8 and became the first black woman writer in the US.

Answer: Phillis Wheatley
27. Henry II of Saxony; Lothair II of Franconia; Wenceslas and Sigismund of Luxemburg; and Albert II, Charles V, and Leopold I of Habsburg all held this position. It was fairly powerful for its first three centuries, but after 1250 it had little power, then less still after 1648, and virtually none when the post was abolished in 1806 by its last holder, Francis II. FTP, name this post held by Frederick Barbarossa from 1152-1190, the first holder of which was Otto the Great in 962 AD.

Answer: Holy Roman Emperor (prompt on variants)
28. The son of a clockmaker, he was looking for a clockmaking book, but the bookseller sent him to the magic books instead. He soon became the great master of 19 th-century drawing-room magic, combining sleight-of-hand with extraordinary automata which he himself constructed. Some of his most famous illusions were The Mysterious Orange Tree, The Pastry Cook, and The Writing Automaton -- the last of these was asked questions by the audience and somehow gave handwritten answers. FTP, name this French magician, whose name was adopted in altered form by a young magician named Erich Weiss.

Answer: Jean Eugene Robert-Houdin or Houdin (Do not accept "Houdini")

## HEINRICH BOLL IV at GEORGIA TECH - 1999

## BONI - Broward Community College

1. Identify these North American prehistoric lakes, FTP each.
a) This lake covered large portions of Montana until the bursting of an ice dam 15,000 years ago, which caused a flood ten times greater than the combined flow of the world's rivers.

Answer: Lake Missoula
b) This enormous precursor of the Great Lakes is named for an Indian tribe crushed by the Iroquois in the 17th century.

Answer: Lake Algonquin
c) The Great Salt Lake has only a tenth the area of this precursor, which lost a third of its volume in about six weeks through a breach at Red Rock Canyon.

Answer: Lake Bonneville
2. Identify the 20th-century play from a brief (and slightly paraphrased) excerpt from a review of it, for 15 points; if you need the author of the play, you'll get 5 points.
a) (15) Joseph Firebaugh writes: "With the usual serious emphasis on human values, [it] is the funniest of [the author's] plays. Our more venial sins -- those of appetite -- are embodied in Sabina, a character whose blend of selfishness and good-heartedness creates sheer mirth. The technique ... of treating time as relative,
and jumping back and forth in it with gay abandon, is used for both serious and comic purposes."
(5) Thornton Wilder

Answer: The Skin of Our Teeth
b) (15) Harold Clurman called this play "Waiting for Godot rewritten by a university wit. Based on a nice conceit, it is epigrammatically literate, intelligent, theatrically clever. It marks a scintillating debut for its author." However, Robert Brustein called it "a theatrical parasite, feeding off Hamlet, Waiting for Godot, and Six Characters in Search of an Author."
(5) Tom Stoppard

Answer: Rosencrantz and Guildenstern Are Dead
3. FTP each, name these regions of the human brain associated with speech.
a) Located primarily on the left side, in and around the upper rear part of the temporal lobe, this area is concerned with comprehension of language. Damage to the area leaves speech fluent but with little content.

## Answer: Wernicke's Area

b) Named for a 19th century French craniometer and located primarily on the left side, in the lower rear part of the frontal lobe, this area is concerned with the formulation of sentences; damage to it impairs speech but leaves comprehension intact.

Answer: Broca's Area
c) This is the nerve bundle which connects Wernicke's area and Broca's area; damage to this nerve bundle may cause conduction aphasia.

Answer: Arcuate Fasciculus
4. Three 20-century Mexican muralists are often referred to as the "tres grandes" of the Mexican mural. Name them from a brief description, FTP each.
a) In 1933 he began to use bright pyroxylin paints, such as in his 1937 Portrait of the Bourgeoisie; politically, he fought on the Republican side in the Spanish Civil War and later had to leave Mexico after a failed assassination attempt of Trotsky.

Answer: David Siqueiros
b) This muralist's works include The Hour of the Gigolo and The Table of Brotherhood, as well as the mural panels for the Baker Library at Dartmouth College which depict the history of America in the Coming of Quetzalcoatl, the Return of Quetzalcoatl, and Modern Industrial Man.

Answer: Jose Clemente Orozco
c) This muralist was the husband of Frida Kahlo, and his works include Crossing the Barranca and The Offering.

## Answer: Diego Rivera

5. 30-20-10, name this guy.
a) (30) After figuring odds from an old artillery manual in 1942, he ordered his men in the 305th Bomb Group to take no evasive action in bombing runs, which ultimately increased their effectiveness while reducing total losses.
b) (20) As head of the SAC from 1948 to 1957, he was an outspoken cold warrior who advocated running an armored column through the Soviet blockade of Berlin and fire-bombing North Korean villages. His famous perpetual frown was actually a result of Bell's palsy.
c) (10) In 1968, he often drew comparisons to the general in Dr. Strangelove when he was George Wallace's running mate. He was nicknamed the Hedgehog for his tenacity, and in one typical remark, he said that to win in Vietnam, he would "use anything we could dream up, including nuclear weapons."

Answer: Curtis LeMay
6. Many objects in the Messier catalogue are also known by other names. Provide the common names corresponding to the following Messier numbers, for the stated number of points.
a) (5) M1

Answer: The Crab Nebula (accept Crab Pulsar) '
b) (5) M31

Answer: The Andromeda Galaxy (accept Andromeda Nebula)
c) (10) M45

## Answer: The Pleiades

d) (10) M104

Answer: The Sombrero Galaxy
7. FTP each, answer the following conjoined bonus questions. For instance, if I were to ask for the cowinner of the Physics Nobel from the University of Chicago in 1983, and the winner of the 1930 Physics Nobel, you'd say "Subrahmanyan Chandrasekhara Raman."
a) The western epic which won Kevin Costner a Best Director Oscar in 1990; and the German name for the element with the highest melting point.

Answer: Dances with Wolfram (accept variants)
b) The poet laureate of Great Britain from 1968-1972; and a nucleophilic species in an acid-base reaction, which can donate an electron pair.

Answer: Cecil Day-Lew is base
c) The father of Virginia Woolf; and the author of "The Devil and Daniel Webster."

Answer: _Leslie Stephen Vincent Benet_
8. 30-20-10, identify the year in which the following took place.
a) (30) Friedrich Siemens develops a regenerative smelting furnace; the first railroad bridge across the Mississippi, from Davenport to Rock Island, opens; and the Xhosa of South Africa slaughter their cattle on the basis of a prophecy.
b) (20) Whittier publishes _The Panorama_; William Walker sacks Granada; five pro-slavery men are hacked to death at Potawatomie Creek; and a Massachusetts senator insults Andrew P. Butler of South Carolina.
c) (10) Butler's nephew Preston Brooks attacks Charles Sumner with a cane; the Treaty of Paris concludes the Crimean War; and John C. Fremont is defeated as the first Republican candidate for president.

Answer:_1856_
9. FTP each, name the authors of these influential 20th-century works of literary criticism or theory.
a) _Of Grammatology_, and _Writing and Difference_

Answer: Jacques _Derrida_
b) _The Well-Tempered Critic, and _Anatomy of Criticism_

Answer: Northrop _Frye_
c) _On the Way to Language_, and _Being and Time_

Answer: Martin _Heidegger_
10. a) (5) Off the Mediterranean coast of Spain are a group of 11 islets and 4 or 5 main islands, which are collectively a province of Spain. First, for 5 points, name this group of islands, which was taken by James I of Aragon in the 13th century.

Answer: The _Balearic_Islands, or _Balearas_
b) (5) What port city on the largest island is the capital of the Balearics?

## Answer: _Palma

c) (20) Formentera is the fourth-largest island of the group. For 5 points each, with a bonus of 5 for getting all in the right order, name the largest three islands in order from largest to smallest.

Answer: _Mallorca_(Majorca), _Menorca_(Minorca), and _Ibiza_
11. Identify the following members of the Lausanne School of economic theory, FTPE.
a) What author of _Elements of Pure Economics_transformed his father's theories of scarcity into the equivalent of marginal utility?

Answer: Leon_Walras_(not_Auguste Walras_) .
b) This Italian ascended to Walras's chair in 1893. He generally followed Walras's mathematical and general equilibrium approach, but he sought to replace the term "utility" with "ophelimity," meaning "the power to satisfy wants."

Answer: Vilfredo _Pareto_
c) Though he did not teach at Lausanne, his work is in many ways fundamentally closer to Walras than Pareto's work was. In the 1920 s and 30 s, he developed the input-output or interindustry economic model,
which fused general equilibrium economics and modern matrix algebra.
Answer: W. W. _Leontief_
12. 30-20-10, identify this person.
a) (30) Born on June 6, 1901, he first expounded his political ideas in the 1926 article, "Nationalism, Islam, and Marxism."
b) (20) He was arrested by the Dutch in 1929 and again in 1933 for his political activities as a nationalist. Exiled to Bengkulu on Sumatra, he was only released from his second imprisonment by the Japanese invasion of 1942.
c) (10) He became Indonesia's first president in 1945, held the post after the Dutch transferred sovereignty in 1949, and remained president until he was deposed in the mid-1960s.

Answer: _Sukarno_
13. Name the librettists of the following operas, for the stated number of points.
a) (5) _Tannhauser_

Answer: Richard _Wagner_
b) (5) _Cosi Fan Tutte_

Answer: Lorenzo _da Ponte_
c) (10) _Der Rosenkavalier_

Answer: Hugo von_Hofmannsthal_
d) (10) _Les Huguenots_

Answer: A. Eugene _Scribe_
14. Identify the 17 th-century English poets of the following poems, for the stated number of points.
a) (5) "The Flea" and "A Valediction Forbidding Mourning"

Answer: John _Donne_
b) (5) "Upon Appleton House" Answer: Andrew _Marvell_
c) (10) "The Altar" and "Easter Wings" Answer: George _Herbert
d) (10) "Oberon's Feast" and "To the Water Nymphs, Drinking at the Fountain" Answer: Robert_Herrick_
15. Identify the following former NFL Rookies of the Year for 10 points each from the team they played for and the year; you'll get five points if you need the position they played.
a) (10) Detroit Lions, 1980
(5) Running back

Answer: Billy _Sims_
b) (10) Philadelphia Eagles, 1988
(5) Tight end Answer: Keith _Jackson_
c) (10) Pittsburgh Steelers, 1984
(5) Wide Receiver

Answer: Louis _Lipps_
16. Identify the following ancient cultures for the stated number of points.
a) (5) This group of tribesmen successfully invaded Egypt around 1680 BC , aided by sandals and horses. Answer: The _Hyksos_
b) (5) This tribe in Asia Minor is generally considered the first to successfully smelt and use iron tools and weapons, somewhere between 1500 and 1000 BC .

Answer: The _Hittites_
c) (10) This group gained a short-lived empire, from $625-559 \mathrm{BC}$, by conquering Nineveh in 612 BC , then taking Armenia and eastern Iran. Answer: The _Medes_or _Median Empire _
d) (10) This group was the first to issue standardized and stamped gold coinage, beginning in about 613 BC.

Answer: The _Lydians_
17. T.S. Eliot's _Four Quartets_is comprised of, predictably enough, four parts. Name these four sections for 5 points each, with a 5 -point bonus for naming all four, and an additional 5 points for naming all four in order.

Answer: _Burnt Norton_,_East Coker_, _The Dry Salvages_, and _Little Gidding_
18. Provide the terms for the following from biochemistry, for 10 points each.
a) Reactions which replenish metabolites that may be low in concentration; the reaction catalyzed by pyruvate carboxlase in the liver and kidneys is one example.

Answer: _Anaplerotic_reactions
b) A change in conformational structure at one location of a multisubunit protein which causes a conformational change at another location on the protein

Answer: _Allosteric_interaction
c) Named by John Cairns, the site at which incorporation of nucleotides occurs in DNA synthesis.

Answer: _Replication fork_(prompt on _origin).
19. Identify the following characters who appear Virgil's _Aeneid_, for 15 points each.
a) The Greek spy who deceives the Trojans into bringing the horse into Troy, then opens the secret hatch by night.

Answer: _Sinon
b) The son of Achilles who was inside the wooden horse.

Answer: _Neoptolemus_
20. Name the Persian poets of the following works, for the stated number of points.
a) (10) The 11th-century author of the _Ruba'i_, or _Rubaiyat_

Answer: Omar_Khayyam_
b) (20) Identify the writer of The _Masnavi-ye Manavi_OR the writer of _Layla and Majnun_

Answers: _Rumi_OR _Nizami_
21. a) (15) As of 1999 , only 4 British monarchs have reigned for longer than Elizabeth II, since the 9th century. Victoria was the longest-reigning of the four. Name the other 3 for 5 points each.

Answer: _Henry III_,_Edward III_, and _George III_
b) (15) Excluding Elizabeth II and Henry VI, only 3 other monarchs have reigned for as long as 36 years but less than 50 . Name these 3 monarchs, for 5 points each.

Answer: _Aethelred the Unready_(or the 2nd), _Henry VIII_, and _Elizabeth I_
22. Listen to the list of subatomic particles that will be given, and arrange those particles in terms of rest mass from lightest to heaviest. 5 points each, with a bonus of 5 for all correct. The particles are the W+ boson; the Z-naught boson; the bottom quark; the J/psi particle; and the tauon.

Answer: _Tauon_,_J/psi_,_Bottom Quark_,_W+_, and _Z-naught_ (accept _Beauty_in place of Bottom)
23. Identify these insurrectionist theories from a brief description, for 15 points each.
a) Discontented populations, especially under foreign occupation, are a potentially volatile group which can be only set off by some additional action, such as by a trained elite. This theory informed many Allied activities during World War II.

Answer: _Detonator_Theory
b) Going a step beyond detonator theory, this theory often associated with Che Guevara holds that it is not necessary to wait for revolutionary conditions to develop, since a dedicated small group can ignite a revolution, thus creating both the uprising and the conditions which make it possible.

Answer: _Foco_Theory
24. Answer these questions about the Vedas.
a) (5) Provide the term for sages who transmitted the Vedas orally before the texts were written down.

Answer: _rishi_ or _rishis_
b) (25) The Vedas consist primarily of four large collections of hymns and other such things. These four collections together are known as the Samhitas. For 5 points each, with a bonus of 5 for all correct, name these 4 Vedas.

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Answer: _Rg_or_Rig_Veda,_Sama_Veda,_Yajur_Veda, and _Atharva_Veda
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25. Answer the following for ten points each.
a) When Ramanujan visited Hardy in England, he observed that the cab number was the smallest number which was the sum of two perfect cubes in two different ways. What was this number? Answer: _1729
b) In the 1790 s, Gauss proved that a regular heptagon could not be constructed with a ruler and compass, and he gave a new method for producing a regular polygon with a two-digit number of sides. How many sides?

Answer: _17_
c) To 3 significant figures, what is the value of Feigenbaum's period-doubling constant?

Answer: _4.67_(4.669)

