



1. The output of this technique is calculated from three vectors that form Einthoven's triangle. Common versions of this technique have three, five, or twelve leads. Fibrillation is diagnosed using this technique by the absence of distinct P waves. The time between QRS complexes measured using this technique gives the heart rate. For 10 points, name this technique that measures the electrical activity of the heart.

ANSWER: electrocardiography [or electrocardiogram; or ECG; or EKG; do not accept "echocardiogram"]

003-12-71-01101

2. This poet wrote about "great wings beating still above the staggering girl" in his poem "Leda and the Swan." Another poem of his talks about how "a terrible beauty is born." He described how "the ceremony of innocence is drowned" in a poem noting, "things fall apart; the center cannot hold." This poet of "Easter, 1916" wrote about a place that is "no country for old men" in "Sailing to Byzantium." For 10 points, name this Irish poet of "The Second Coming."

ANSWER: William Butler Yeats

186-12-71-01102

3. The movement of one of these shapes along a line generates the solution to the brachistochrone problem. These shapes have an eccentricity of 0, and rotating one of these about an outside axis yields a torus. Chords are line segments within, and secants are lines through, two points on this shape, whose "unit" type is graphed by " $x^2 + y^2 = 1$ ". For 10 points, name this shape whose points are all equidistant from the center, which have a radius and a circumference.

ANSWER: circles

104-12-71-01103

4. During the Democratic primary for this election, Ted Kennedy responded incoherently to Roger Mudd's question, "Why do you want to be president?" The victor in this election asked "Are you better off than you were four years ago?" and was accused of "voodoo economics" by his running mate. In this election, the incumbent lost by 440 electoral votes due to high inflation and not resolving the Iran Hostage Crisis. For 10 points, name this presidential election in which Ronald Reagan defeated Jimmy Carter.

ANSWER: Election of 1980

080-12-71-01104

5. This man's company built the "New Street Works" in Chelmsford, England. At the time of the *Titanic* disaster, this man's company employed David Sarnoff, and Britain's postmaster general said lives were saved through this man and his invention. He shared the Nobel Prize with Karl Ferdinand Braun. This man built a station in Massachusetts that allowed Teddy Roosevelt to congratulate Edward VII in the United Kingdom. For 10 points, name this Italian inventor credited with developing long distance wireless radio transmission.

ANSWER: Guglielmo Marconi

052-12-71-01105

6. This politician humorously claimed in a September radio interview that he ran a Minnesota marathon in under three hours, and defeated Jeffrey Thomas four times in defending his congressional seat. He became the chairman of the House Budget Committee in 2011, and he is a representative from Wisconsin. For 10 points, identify this politician who was chosen as Mitt Romney's running mate in 2012.

ANSWER: Paul Davis **Ryan**

189-12-71-01106

7. This language features a characteristic loss of the intervocalic "l" and "n." Unlike other languages in its family, this language features the future subjunctive mood. In this tongue, five of the days of the week are appended with the word "feira." This language is conflated with Asian languages in Kristang, and with Spanish, Dutch, and English in Papamintento, while it is closely related to Galician. For 10 points, name this language spoken in Mozambique, Angola, Brazil, and its namesake Iberian country.

ANSWER: **Portuguese**

192-12-71-01107

8. One work described this art form's origin from Dionysian raw impulses channeled through ordered Apollonian beauty, and was the first by Friedrich Nietzsche. This form includes *peripeteia*, or reversal, and characters with a *hamartia*, sometimes called this form's namesake "flaw", according to Aristotle's *Poetics*. For 10 points, name this catharsis-inducing type of drama exemplified by Socrates' *Antigone*, identified by the deaths of characters and their unhappy endings.

ANSWER: **tragedy** [prompt **drama** or **theater**]

104-12-71-01108

9. Exposed remnants of this region can be seen at the "Tablelands" region in Canada. Its lower boundary is marked by the "D double-prime" layer, which also contains a seismic velocity discontinuity named for Beno Gutenberg. The upper portion of this layer includes the viscous asthenosphere, and it is separated from the layer above it by the Mohorovicic (mo-ho-ree-vick) discontinuity. Its namesake plumes lead to "hot spot volcanism." For 10 points, name this layer of the earth between the crust and the outer core.

ANSWER: the **mantle** [or **lithosphere** until "lower boundary"]

052-12-71-01109

10. One character in this novel causes Mrs. Phelps to burst into tears when he recites "Dover Beach." The protagonist's wife Mildred wants to buy a fourth wall-sized television. The protagonist of this novel is told he represents a copy of the Book of Ecclesiastes by Granger. Professor Faber helps the protagonist of this novel escape the Mechanical Hound after he kills Captain Beatty. For 10 points, name this Ray Bradbury novel about Guy Montag which is titled for the temperature at which books burn.

ANSWER: **Fahrenheit 451**

186-12-71-01110

11. In one play by this author, the wife of Sam Evans has an affair with the scientist Ned Darrell. This author also wrote a play where the title character, a former Pullman factory worker, clashes with Henry Smithers and is killed by a silver bullet. This author of *Strange Interlude* and *The Emperor Jones* also wrote a play depicting the denizens of Harry Hope's bar and another play focusing on the Tyrone family. For 10 points, name this American playwright of *The Iceman Cometh* and *Long Day's Journey into Night*.

ANSWER: Eugene **O'Neill** [or Eugene Gladstone **O'Neill**]

186-12-71-01111

12. This man was scandalized by his affair with Maria Reynolds. He was the only man from New York to sign the Constitution, and he later authorized the excise tax that led to the Whiskey Rebellion. Under the name "Publius," this author of the *Report on Manufactures* wrote the Federalist Papers with Madison and Jay. This man was killed in Weehawken after he supported Thomas Jefferson as the lesser of two evils. For 10 points, name this first Secretary of the Treasury, a man who was killed by Aaron Burr in a duel.

ANSWER: Alexander **Hamilton**

192-12-71-01112

13. Before the 1965 Southern Cathedrals' Festival, this composer was commissioned to create the choral work *Chichester Psalms*. Dedicating his *Kaddish Symphony* to the assassinated John F. Kennedy, this man was noted for his televised Young People's Concerts. The music director for the New York Philharmonic for almost all of the 1960s, this man composed the music to a work about the street gangs the Jets and the Sharks. For 10 points, name this composer who collaborated with Stephen Sondheim on *West Side Story*.

ANSWER: Leonard **Bernstein**

052-12-71-01113

14. This man's true identity was revealed by his brother David, and he was the subject of a forensic sketch showing him wearing a hoodie and dark sunglasses. This man wrote the essay "Industrial Society and Its Future," which heavily criticized technology and demanded that a newspaper publish the so-called "manifesto." This man was finally captured while in a cabin outside Lincoln, Montana. For 10 points, give the nickname or real name of the terrorist who mailed numerous home-made explosives before his arrest in 1996.

ANSWER: **Unabomber** [or Theodore **Kaczynski**]

052-12-71-01114

15. This structure is the form in which local variables, function parameters and other non-explicitly allocated data are stored in memory. The call one of these structures contains frames that control program flow; a common debugging method "traces" that one. A depth-first search uses this structure, unlike a breadth-first search. The operations push and pop operate on this data structure. For 10 points, identify this last-in first-out data structure.

ANSWER: **stack**

066-12-71-01115



1A. *I and the Village* is housed in which New York museum that focuses mainly on 20th and 21st century works?

ANSWER: Museum of Modern Art [or MoMA]

1B. What 20th-century Spanish playwright wrote *Yerma* and *The House of Bernarda Alba*?

ANSWER: Federico Garcia Lorca [or Federico del Sagrado Corazon de Jesus Garcia Lorca]

2A. Which 90s sitcom starring Tim Allen as Tim "The Toolman" Taylor also included characters such as Al Borland and Wilson?

ANSWER: Home Improvement

2B. Which NFL coach was fined \$50,000 for grabbing a replacement referee's arm after Baltimore defeated his New England Patriots?

ANSWER: William Stephen "Bill" Belichick

3A. At what World War II battle did Anthony McAuliffe respond "Nuts!" to a request to surrender Bastogne?

ANSWER: Battle of the Bulge [or the Battle of the Ardennes]

3B. This is a 20-second calculation question. Find the probability, expressed as a decimal or a fraction, of rolling one six-sided die and getting an even number three times in a row.

ANSWER: 1/8 [or 0.125]

4A. This is a 20-second calculation question. Find the sine of 120 degrees.

ANSWER: square root of three, divided by two [or radical three over two; or root three over two; or radical three divided by two]

4B. Which equation from electrochemistry, which gives the voltage of a galvanic cell, can also be generalized into a form which gives the equilibrium potential for a cell membrane?

ANSWER: Nernst equation

5A. What French existentialist defined the "bad faith" principle in his *Being and Nothingness*?

ANSWER: Jean-Paul Sartre

5B. In what phenomenon from special relativity does an observer find that a moving clock ticks more slowly than a stationary one?

ANSWER: time dilation

6A. What British poet condemned censorship in *Areopagitica* and depicted the fall of man in *Paradise Lost*?

ANSWER: John Milton

6B. What chemical quantity is found by subtracting the product of entropy and temperature from a substance's enthalpy?

ANSWER: Gibbs free energy

7A. This is a 30-second calculation question. How many real solutions does the equation "x cubed plus x squared plus x equals zero" have?

ANSWER: one

7B. This is a 30-second calculation question. A gardener transfers water from a cylindrical vase with a height of ten feet, eight inches and base radius of one foot into a perfectly spherical vase. Assuming none of the water spills and there is no empty space in the vase it sits in, what is the radius of the spherical vase?

ANSWER: **two feet**

8A. What king suffered from porphyria late in his reign, years after leading Britain through the American Revolution?

ANSWER: **George III** of Great Britain [or **Georg Wilhelm Friedrich**; prompt on **George**]

8B. Matrix multiplication does *not* possess what property which, for an operation star, allows that a star b equals b star a?

ANSWER: **commutativity** [or **commutation**; or **commutative** property]

9A. What Egyptian god of storms killed his brother Osiris?

ANSWER: **Set**

9B. Which body of water, which is the largest lake by surface area in Africa, is the source of the White Nile?

ANSWER: Lake **Victoria**

10A. What symphony's dedication was changed to "to the memory of a great man" after its composer Beethoven became disgusted with Napoleon's actions?

ANSWER: **Eroica** *Symphony* [or Beethoven's **Third** *Symphony*]

10B. Name the peninsula which was ruled at different times by the Silla and Choson dynasties.

ANSWER: **Korean** peninsula [or **Hanguk** bando]



1. One architectural landmark in this city has a circular hole in its so-called “Chippendale roof” and was bought by Sony from AT&T. The Circle Line ferry operates in this city, which contains a neighborhood abbreviates the descriptor “south of Houston Street” and two divisions connected by the long Verazzano-Narrows bridge. SoHo and TriBeCa are neighborhoods in this city of 8 million people. For 10 points, name this city made of five boroughs, the home of the Empire State Building.

ANSWER: New York City

104-12-71-01117

2. This phenomenon appears to move via "saltatory conduction" between nodes of Ranvier (RAHN-vee-AY). Its generation is modeled by Hodgkin-Huxley kinetics, which includes overshoot due to permeability of the cell membrane to sodium ions at its peak. Another of them cannot occur during a neuron's absolute refractory period. For 10 points, name this all-or-nothing response of a neuron to a depolarization.

ANSWER: action potential

003-12-71-01118

3. This multinational region is home to the *Cataglyphis* ant, which can zoom in a straight line back to its nest by sensing the sun's angle. Opposite sides of this region are home to the Grand Ergs and the sinkhole-like Qattara depression. The nomadic Tuaregs trade across this region, whose western part is bounded by the Atlas mountains to the north and the grasslands of the Sahel to its south. For 10 points, name this North African desert, the world's largest.

ANSWER: Sahara Desert

104-12-71-01119

4. The inverse of this SI unit is the unit of the Rydberg constant, the wavenumber, and the power of a lens as measured in diopters. From 1960 to 1983 the value of this unit was determined by krypton-86 radiation; since then, it has been defined in terms of the speed of light. Units that are powers of ten of this SI unit include the angstrom and the micron. For 10 points, name this SI unit of length.

ANSWER: meter

003-12-71-01120

5. This character carries a Bible with a romantic message in it for Sophia Grangerford. He travels to Jackson Island after using a dead pig's blood to make his alcoholic Pap think he is dead. This boy is taken in by two conmen who pose as a duke and a dauphin while traveling with the black slave Jim on a raft down the Mississippi River. For 10 points, name this Missourian boy created by Mark Twain, the rascally friend of Tom Sawyer.

ANSWER: Huck Finn [or Huckleberry Finn; or Huckleberry Finn]

104-12-71-01121

6. This figure is told by a man in a field that the people he is seeking have moved to Dothan from Shechem. This man avoided being killed by an intercession by Reuben. While in prison, this man met a baker and a butler, and the butler later helped this man by having him interpret another man's dream of seven lean cows eating seven fat cows. For 10 points, name this powerful servant under the Pharaoh who caused jealousy among his brothers by receiving a coat of many colors.

ANSWER: Joseph

023-12-71-01122

7. In one of this author's works, Mary Pereira becomes a nurse for a wealthy family whose child she switched at birth. In another of his novels, Saladin Chamcha and Gibreel Farishta fall out of a hijacked plane. This man wrote about Saleem Sinai and other magical children born in the hour of India's independence in the novel *Midnight's Children*. Another of his books contains controversial passages about Mohammad and the birth of Islam. For 10 points, name this Indian writer put under a *fatwa* for writing *The Satanic Verses*.

ANSWER: Salman **Rushdie** [or Ahmed Salman **Rushdie**]

080-12-71-01123

8. Einstein found that the coefficient describing this process is equal to Boltzmann's constant times temperature divided by the drag coefficient. That coefficient is proportional to the mean square displacement during Brownian motion, which drives this process. This process is characterized by Fick's First Law, which states that solute flux is proportional to the concentration gradient. For 10 points, name this process by which solute flows from areas of high to low concentration.

ANSWER: **diffusion**

003-12-71-01124

9. Pablo Picasso painted a series of 58 reinterpretations of this work, the basis for John Singer Sargent's *The Daughters of Edward Darley Boit*. In this painting, a mirror on the back wall reflects King Philip IV and his queen, and the artist himself is wearing the red cross of the Order of Santiago while working. Two dwarves, a mastiff, and the title characters surround the Infanta Margarita in this painting. For 10 points, name this Diego Velazquez painting set in the court of Spain.

ANSWER: **Las Meninas** [or *The Maids of Honour*]

080-12-71-01125

10. This man's theories were interpreted by John Hicks's IS/LM model. He argued that employers might not be able to alter "sticky wages" and popularized the "paradox of thrift." He predicted that punishing debts would have bad effects on Germany after Versailles in *The Economic Consequences of the Peace*. For 10 points, name this British economist whose *General Theory of Employment, Interest, and Money* advocated increased government spending to end recessions.

ANSWER: John Maynard **Keynes**, 1st Baron Keynes [or Lord **Keynes**]

104-12-71-01126

11. While serving as Lieutenant Governor of his state, this politician was elected to the Senate to replace the ailing Paul Tsongas (ZONG-as). This man is married to a woman of Portuguese descent who was once married to the heir of the H.J. Heinz Company. This man's presidential campaign was hurt by the activities of "Swift Boat Veterans for Truth," and his running mate in that election was John Edwards. For 10 points, name this senior Senator from Massachusetts who lost the 2004 presidential election to George W. Bush.

ANSWER: John Forbes **Kerry**

052-12-71-01127

12. This phenomenon occurs at high Reynolds numbers and is characterized by pressure drops proportional to the square of the flow rate. Poiseuille's (pwah-SOOL's) Law does not hold for fluids undergoing this phenomenon, which is characterized by a bulk velocity not parallel to "swirls" or "eddies" in the fluid. For 10 points, name this most common type of fluid flow, which is contrasted with laminar flow and responsible for bumpy airplane rides.

ANSWER: **turbulence** [or **turbulent flow**]

003-12-71-01128

13. This poet was inspired by Johann Heinrich Voss's epic *Luise* to write his own epic, *Hermann and Dorothea*. His novels include the bildungsroman *Wilhelm Meister's Apprenticeship* and another mostly consisting of a series of letters written by an artist driven to suicide by his love for Lotte (LAH-tuh). He is most famous for a lengthy drama published in two parts about an ambitious scholar who makes a deal with Mephistopheles. For 10 points, name this German author of *The Sorrows of Young Werther* (VAIR-ter) and *Faust*.

ANSWER: Johann Wolfgang von **Goethe** (GURR-tuh)

014-12-71-01129

14. In one of this band's songs, the singer declares, "I read dead Russian authors volumes at a time" and repeatedly asks, "How'd you like to be alone and drowning?" Another song by this band addresses "the angry boy, a bit too insane, icing over a secret pain." This band recorded "Narcolepsy" as well as a more popular song with a chorus beginning, "I want something else to get me through this." For 10 points, name this alternative rock band prominent in the 1990s whose songs include "Semi-Charmed Life" and "Jumper."

ANSWER: **Third Eye Blind**

014-12-71-01130

15. The current prime minister of this nation asked for "a little breathing room" from Germany in July 2012. A right-wing party in this nation named Golden Dawn is staunchly anti-immigrant. May 2012 Elections in this country saw losses for the Pasok and New Democracy parties and gains for the Syriza Party. In June 2012, a new Parliament rose in this nation led by Antonis Samaras. France and Germany have bailed out this nation in exchange for austerity measures imposed on it. For 10 points, name this European country which has seen protests in this Athens.

ANSWER: **Greece** [or **Hellenic Republic**]

192-12-71-01131





1. This transition metal is found in Fehling's solution, used to test for the presence of monosaccharides. This metal has the unusual valence electron configuration of three d ten four s one. Weathering of this metal produces verdigris. Brass is an alloy of zinc and this metal, while bronze refers to any alloy of this metal, usually involving tin. For 10 points, name this metal whose high conductivity makes it ideal in electrical wires, and which has atomic number 29.

ANSWER: copper [or Cu]

003-12-71-01132

2. This man was accused of violating eighteen of the nineteen rules of literary art in an essay on his "literary offenses" by Mark Twain. He wrote about a failed raid by Tom Hutter and "Hurry Harry" March in *The Deerslayer*, and he included the siege of Fort William Henry in a novel set during the French and Indian War titled for Uncas's father, Chingachgook. For 10 points, name this American whose *Leatherstocking Tales*, all featuring the Indian-raised white man Natty Bumppo, include *The Last of the Mohicans*.

ANSWER: James Fenimore Cooper

104-12-71-01133

3. This ruler was nicknamed "David" by an Englishman at his court who created the first Western European script with spacing and lower-case letters. That Englishman, Alcuin of York, advised this man to restore Pope Leo III, who crowned this man on Christmas Day. Einhard wrote a biography of this son of Pepin the Short. This ruler had his capital at Aachen and ruled both Saxony and Northern Italy in addition to France. For 10 points, name this Carolingian king who was made "Emperor of the Romans" in 800 CE.

ANSWER: Charlemagne [or Charles I; or Charles the Great; or Charles le Grand; or Carolus Magnus; or Karl der Grosse; prompt on Charles]

080-12-71-01134

4. The concentration of a C peptide formed during synthesis of this molecule is often used to estimate the level of this hormone's secretion. Unlike a molecule produced by alpha cells, secretion of this hormone is inhibited by the sympathetic nervous system. It is produced by beta cells in the islets of Langerhans in response to high plasma glucose levels. For 10 points, name this hormone that is at abnormally low levels in individuals with Type I diabetes.

ANSWER: insulin

003-12-71-01135

5.

00--20-01136

Name this color of most aqueous copper solutions, which names a "shift" in which the wavelength decreases via the Doppler effect.

ANSWER: blue

This is a 30-second calculation question. Find the square of the quantity "four x squared plus three z," close quantity.

ANSWER:  $16x^4 + 24x^2z + 9z^2$  [accept equivalents which have the correct terms in a different order]