1. The r-process refers to rapid neutron capture during these phenomena. One type of these phenomena is useful for measuring distances in excess of one thousand megaparsecs. Another type of these phenomena lack hydrogen lines and generally occur above the Chandrasekhar limit. The abundance of the heavy elements can be explained by their nuclear synthesis during these phenomena, and the Crab Nebula was formed by one of these phenomena. In white dwarfs above 1.44 solar masses, this event leads to the formation of a black hole. For 10 points, name these extremely energetic explosions of stars.
ANSWER: **supernova**

066-11-25-07101

2. This sculptor was commissioned to create a sanctuary for the Maharaja of Indore [in-DOR-uh], resulting in the *Temple of Meditation* that included the piece *King of Kings*. In one piece, this man set twelve seats around a large, circular stone. Another work by this man has seventeen rhombus-shaped pieces stretch vertically nearly 100 feet. Both those works, *Table of Silence* and *Endless Column*, are located in Targu Jiu (TAR-goo ZHEE-oo). For 10 points, name this sculptor of a piece considered by customs officials to be an industrial part called *Bird in Space*, who was born in Romania.
ANSWER: Constantin **Brancusi**

023-11-25-07102

3. A cupbearer in this work inspired the pen name of British author Saki. This collection's opening poems take place on the vernal equinox; it goes on to describe a rejection of "doctor and saint" in favor of "the wine of life." It uses a namesake stanza of four iambic pentameter lines arranged into a quatrain. It is most known in English through a liberal translation by Edward FitzGerald, who penned the lines "A Book of Verses underneath the Bough, A Jug of Wine, a Loaf of Bread and Thou." For 10 points, identify this collection of hedonistic Persian love poetry by Omar Khayyam.
ANSWER: the **Rubaiyat**

019-11-25-07103

4. Kennedy and Illingworth attempted to carry out this experiment with a half-wave step. One of its conductors later worked with Dayton Miller to resolve the problem that this experiment raised. The setup of this experiment was constructed atop a slab of marble floating in a pool of mercury. One of this experiment's conductors created a namesake interferometer to split a single light source into two beams of light. For 10 points, name this experiment, the null result of which discredited the existence of luminiferous [loo-mih-NIH-fer-us] ether.
ANSWER: **Michelson-Morley** experiment

026-11-25-07104

5. In one work by this playwright, Ann Deever plans to run off with and marry Chris, the son of the main character. That play by this man ends with the suicide of Joe Keller after it becomes clear to the other characters that he allowed cracked cylinder heads to be sold to the Air Force, resulting in 21 pilots dying. This writer of *All My Sons* also wrote a play in which Abigail Williams ruins the life of John Proctor and a car-driving suicide is enacted by the father of Biff and Happy. For 10 points, name this American playwright of *The Crucible* and *Death of a Salesman*.
ANSWER: Arthur Asher **Miller**

023-11-25-07105

6. One experiment that studied this concept involved a cat trapped in a box that would open when a certain region was pressed. This can diminish over time until it disappears in a process called "extinction." In a famous study of this, dogs began to salivate at the sound of a bell. This concept has "operant" and "classical" varieties, the latter of which was studied in dogs by Ivan Pavlov. For 10 points, name this concept in psychology, the pairing of a stimulus with a response.
ANSWER: **conditioning** [prompt on **classical** or **operant** conditioning before they are read]

7. This hero delivered Thebes from the tyranny of the Minyans by slaying the Minyan king, Erginus. This man killed the monstrous Cacus in Italy to recover his stolen oxen. He bore the indignity of dressing in women's clothing while serving Queen Omphale (om-FAH-lee). In a fit of madness, this man killed his wife Megara and his eight children. He diverted the rivers Alpheius (al-FEE-us) and Peneius (peh-NEE-us) to cleanse the stables of King Augeus. For 10 points, name this Greek hero, who notably completed twelve labors.
ANSWER: **Heracles** [or **Hercules**]

8. Dimercaprol [DYE-mer-kah-prawl] reacts with Lewisite in one type of this reaction, used to treat mustard gas poisoning in World War I. "Agents" that promote this kind of reaction include siderophores [SID-er-uh-forz], porphyrins, and EDTA. This kind of reaction is almost always more thermodynamically stable than adding an equivalent number of monodentate ligands. For 10 points, name this reaction in which a single ligand forms several bonds with a metal ion to form a certain type of coordination complex.
ANSWER: **chelation** [KEE-lay-shun] [or word forms, such as **chelate**]

9. This ballet's *pas de deux* includes a section that uses the celesta [see-LES-tuh], which comes later than the "Dance of the Reed Pipes." This ballet opens at a party where one of the guests is Drosselmeyer. This ballet includes a "trepak," and other sections of this ballet represent chocolate, tea, and coffee. The Mouse King is defeated before the "Waltz of the Snowflakes" in this ballet. This ballet includes the "Waltz of the Flowers" and the "Dance of the Sugar Plum Fairy." For 10 points, name this ballet by Peter Tchaikovsky about Clara's Christmas gift coming to life.
ANSWER: *The **Nutcracker*** [or ***Schelkunchik***]

10. One character in this novel, Cy Bogart, earns the respect of his fellow townspeople by beating up the son of a local German-American farmer during wartime, though he later causes the teacher Fern Mullins to lose his job. Vida Sherman marries Raymond Wutherspoon in this novel, and the protagonist's maid, Bea Sorenson, marries Miles Bjornstam; Bea and her child later die of an illness. The protagonist decides to marry Will, a doctor, though she finds that his descriptions of Gopher Prairie fall short of her expectations. For 10 points, name this novel by Sinclair Lewis.
ANSWER: ***Main Street***

11. This thinker referred to symbols meaningful to a specific group or class as "collective representations." He argued that in modern society, people's work is so specialized that they are naturally dependent on one another, experiencing "organic solidarity." This author of the *Division of Labor in Society* also examined how Protestants are more likely to perform the title action than Catholics in a work that popularized the term "anomie." For 10 points, name this French sociologist, who wrote *Suicide*.
ANSWER: David Emile **Durkheim**

12. This was the book John Wesley was reading when he felt his heart "strangely warmed." The writer of this book states that "neither death, nor life, nor angels, nor rulers, nor things present, nor things to come" can separate us from the love of God. This book questions "if God is for us, who is against us?" and states that "the wages of sin is death." This book is found after *Acts* and is the first and longest of the Pauline Epistles. For 10 points, name this letter written to the church of a large Italian city.
ANSWER: Epistle of Paul to the **Romans**

13. In one story by this man, Johannes Dahlmann reads his copy of the *Arabian Nights* and gets into a knife fight after almost dying in a hospital. This author wrote a story about the struggles of a man with a limitless memory. This author of "The South" and "Funes, the Memorious" wrote about the German spy Yu Tsun leaving a message through murder in another story. His story about a building with endless hexagonal rooms was collected in *Ficciones* [feek-see-OH-nays]. For 10 points, name this author of "The Garden of Forking Paths" and "The Library of Babel."
ANSWER: Jorge Luis **Borges**

14. These works were premiered at the Bayreuth Festival with the funding of Mad King Ludwig. The title object of these works is stolen by the dwarf Mime and is forged by Alberich. The main character of these works kills the dragon Fafner and loves Brünnhilde. It includes *Götterdämmerung* [goh-ter-DEM-mer-runk], *The Rheingold*, *The Valkyrie*, and an opera named for its main character, *Siegfried*. For 10 points, name this series of four operas by Richard Wagner.
ANSWER: The **Ring** Cycle [or *The **Ring** of the Nibelungs*; or Der **Ring** des Nibelungen]

15. This party ran Norman Thomas as its presidential candidate in six consecutive elections starting in 1928. Daniel De Leon and Big Bill Haywood were members in the Industrial Workers of the World, who supported this party. This party's presidential candidate in the 1920 election was held in prison during the election. That man was Eugene V. Debs. For 10 points, name this party that espoused a philosophy to which Barack Obama is sometimes accused of adhering.
ANSWER: **Socialist** Party of America

1A. What poet wrote a series of works about Maud Gonne and discussed a "lonely impulse of delight" in his poem "An Irish Airman Foresees His Death"?
ANSWER: William Butler **Yeats**

1B. What Italian mathematician wrote the *Book of the Abacus* and is known for his sequence in which each number is the sum of the two previous numbers?
ANSWER: Leonardo **Fibonacci** [or **Leonardo Pisano**; or **Leonardo of Pisa**]

2A. What early feminist and author of *Woman in the Nineteenth Century* was a transcendentalist who served as the first editor of *The Dial*?
ANSWER: Margaret **Fuller**

2B. What Russian wrote *Uncle Vanya* as well as a play about the destruction of Madame Ranevsky's estate, *The Cherry Orchard*?
ANSWER: Anton **Chekhov**

3A. This is a 10-second calculation question. In simplest terms, what is the area of a square whose diagonal measures 6 times the square root of 2?
ANSWER: **36**

3B. This is a 10-second calculation question. In simplest terms, what is the expression a to the quantity b plus 3 end quantity equal to if a is 7 and b is -1.
ANSWER: **49**

4A. What American political party grew out of the Farmers' Alliances, advocated a graduated income tax, and ran James Weaver in the 1892 presidential election before endorsing Democrat William Jennings Bryan in the 1896 election?
ANSWER: **Populist** Party [or **People's** Party]

4B. What equation of chemical kinetics involves a "pre-exponential factor" and can be used to calculate reaction rate, given temperature and activation energy?
ANSWER: **Arrhenius** Equation

5A. This is a 20-second calculation question. Find the tangent of the arccosine of -7/25.
ANSWER: **-24/7** [do not accept "24/7," as the range of arccosine does not include Quadrant III angles]

5B. This is a 20-second calculation question. What is the probability than an 80-percent free throw shooter makes three consecutive free throws?
ANSWER: **51.2 percent** [or 0**.512**; or **64/125**; do not accept "51.2" by itself]

6A. Osmosis is a special case of what process, which can also be described by Fick's Laws?
ANSWER: **diffusion**

6B. What country music trio composed of Charles Kelley, Dave Haywood, and Hillary Scott found success with the songs "I Run to You," "Our Kind of Love," and "Need You Now"?
ANSWER: **Lady Antebellum**

7A. This is a 30-second calculation question. Find the quadratic equation of the parabola that passes through the points (3, 3), (0, 6), and (-1, 15).
ANSWER: $y = \underline{\mathbf{2x^2 - 7x + 6}}$

7B. This is a 30-second calculation question. In simplest terms, what is the difference between the arithmetic mean and the geometric mean of the set {1, 8, 9, 18}?
ANSWER: **3**

8A. What American painter depicted a fire hydrant in *Early Sunday Morning* and painted a diner that is apparently without a door in *Nighthawks*?
ANSWER: Edward **Hopper**

8B. What British philosopher formulated an early version of the scientific method in his *Novum Organum*?
ANSWER: Francis **Bacon**

9A. What material was created from pressing together perpendicular strips of a grasslike plant to create a surface fit for writing on, which was originally developed in Egypt?
ANSWER: **papyrus**

9B. What phylum, whose body consists of two layers of cells around a structure called mesohyl [meh-ZOH-hill], contains sponges?
ANSWER: **Porifera**

10A. Name the poetic form which consists of one character talking about themselves or their situation in a revealing way, an example of which is Robert Browning's "My Last Duchess."
ANSWER: **dramatic monologue**

10B. What 2010 film featured Mickey Rourke as Ivan Vanko, the son of a scientist who worked with the main character's father and who destroys some cars at the Grand Prix de Monaco?
ANSWER: ***Iron Man 2***

1. One scale for measuring the intensity of these phenomena sets T equal to B over two minus four, and is called the TORRO scale. This object's formation can sometimes be seen on Doppler radar intensity images as hook echoes. The damage that these entities cause is ranked on the Enhanced Fujita scale. One of them that forms over water is called a waterspout, and they typically form from wall or funnel clouds. For 10 points, name these rotating columns of air that are ranked on a scale from EF1 to EF5.
ANSWER: **tornado**es [or **twister**; do not accept "cyclone"]

026-11-25-07117

2. This man was charged with giving a $600,000 bribe to David Mills in a case which is currently suspended, and has been accused of embezzling money from a company he controls. That company, Mediaset, owns five television stations, three in his native country. This founder of the People Of Freedom movement has been criticized for his "bunga-bunga" parties, which included the services of the underage prostitute Karima el-Mahroug, known as "Ruby". For 10 points, name this Prime Minister of Italy.
ANSWER: Silvio **Berlusconi**

082-11-25-07118

3. The lead-up to this legislation saw the formation of a Committee of Thirteen and the Nashville Convention. It organized the territories of Utah and New Mexico under popular sovereignty and established the borders of Texas, which was also given money to pay off its debts. This piece of legislation ended the slave trading market in Washington, D.C., but did not outlaw slavery there. Other provisions of this legislation admitted California as a free state and provided for a harsh Fugitive Slave Act. For 10 points, name this compromise passed during the middle of the nineteenth century.
ANSWER: **Compromise of 1850**

040-11-25-07119

4. One character in this novel is allowed to spend a summer at Brighton under the care of Colonel Forster. While touring an estate with the Gardiners, this novel's protagonist is informed by the housekeeper, Mrs. Reynolds, of the outstanding character of her master, who unexpectedly returns to his estate during the visit. That man, the nephew of Lady Catherine, is revealed to be the one who paid off Wickham to marry Lydia, probably because of his love for Lydia's sister Elizabeth. For 10 points, Mr. Darcy and the Bennet family appear in which Jane Austen novel?
ANSWER: *Pride and Prejudice*

040-11-25-07120

5. This city saw factions of its demes supporting different charioteers, which were called Blues and Greens. A council held in this city promulgated the modern version of the Nicene Creed. During the Nika riots, Belisarius tricked a mob into being massacred in its Hippodrome. Michael Palaeologus recaptured this city after it was sacked by Venetians during the Fourth Crusade. This city was captured in 1453 by Mehmed II's Ottoman forces. For 10 points, name this capital of the Byzantine Empire.
ANSWER: **Constantinople** [or **Istanbul**; or **Byzantium**]

027-11-25-07121

6. This event was anticipated by the Flour Riot and its aftermath led to the establishment of the sub-treasury system. One cause of this event, an inflationary bubble of the "pet banks", was countered by this event's immediate cause, an executive order demanding payment for public land in gold or silver. This event caused by Andrew Jackson's Specie Circular led to a six-year-long depression and record unemployment. For 10 points, name this financial crash which occurred during the first year of Martin Van Buren's presidency.
ANSWER: **Panic of 1837** [or **1837 Panic**]

7. The narrator of this story describes committing an action because he knows that only that action may put him beyond the reach of the mercy of God. That narrator describes how he was renowned for his tenderness and docility when he was a youth, though, after finding a wife with a similar character, he begins to become less cordial under the influence of alcohol. At its end, the narrator is apprehended for the murder of his wife after the hiding place of her body is revealed to the police by the cries of an animal, which is named Pluto. For 10 points, name this short story by Edgar Allan Poe.
ANSWER: "The **Black Cat**"

8. A song that was used in support of this event was Thomas Wharton's "Lilli Burlero." Among the actions that prompted this event was an order to read the Declaration of Indulgence from pulpits, which was resisted by Archbishop of Canterbury William Sancroft. John Churchill's desertion was a key action in this event's success. It led to a document that prohibited a standing army in peacetime and gave the right of succession to Anne. That document accompanying this event was the Bill of Rights. For 10 points, name this 1688 bloodless revolution in which James II was replaced by William and Mary.
ANSWER: **Glorious Revolution** [or **Revolution of 1688** before mentioned; or **Bloodless Revolution** before mentioned]

9. This is the only construction in French which does not use a subject pronoun, and the only one which puts pronouns after the verb with a connecting hyphen. When forming this construct in German, the "sie" form keeps the pronoun but the "du" and "ihr" forms drop the pronoun. In Latin, the plural form of this mood adds the letters "t e" to the singular construction, which is formed by removing "r e" from the present infinitive. In most languages which use this mood, it has a "negative" form, which is used for prohibitions. For 10 points, name this verb mood, which is used to give a command.
ANSWER: **imperative** mood

10. The programming used in this unit is forecasted to be able to be used in the analysis of medical records and in helping to develop diagnoses. It consists of ninety Power 750 servers and over 2000 POWER7 processors. Early versions had an accuracy rate of as low as fifteen percent, though after the expansion of its databases to include more primary sources and definitions, it could defeat most human opponents. This was put into practice when it handily beat Brad Rutter and Ken Jennings in two recently televised matches. For 10 points, name this IBM computer designed to play Jeopardy!
ANSWER: **Watson**

11. In one of this man's novels, Sharik transforms into a man after an operation is performed by the doctor Philip Philipovich Preobrezhansky [pray-oh-breh-ZHAN-skee]. In another novel by this writer, one of the title characters writes a manuscript about the relationship between Jesus and Pontius Pilate. One character in that work by this author of *The Heart of a Dog* is always attended by his black cat Behemoth and is named Woland. For 10 points, name the Soviet author of a work which ends with the two title characters together in a sort of limbo, *The Master and Margarita*.
ANSWER: Mikhail Afanasyevich **Bulgakov**

12. The Wolfe Creek Meteor Crater is located in this nation that is home to the Gibson and Tanami Deserts. The so-called Tea and Sugar Train brought supplies to towns in its region known as the Nullarbor [null-uh-BOR] Plain, which also contains part of the span of its transcontinental railroad that runs from Port Augusta to Kalgoorlie. Its largest lake, whose two halves are connected by the Goyder Channel is notable for its shrinking and growing during the rainy season; that body of water is Lake Eyre. Its states include Queensland, Victoria, and New South Wales. For 10 points, name this nation whose capital is Canberra [KAN-ber-uh].
ANSWER: **Australia**

13. This city's Stage Center was once called the Mummers Theater. I.M. Pei designed a namesake plan for this city's downtown that resulted in the Myriad Botanical gardens. This city was founded during the Land Run of 1889. Each quadrant of this city contains a park, the largest of which is named for Will Rogers. This city's only pro sports team plays at the Ford Center. A tragedy in this city is commemorated by a memorial that shows a field of empty chairs and was perpetrated by Timothy McVeigh. For 10 points, name this capital city of a state that also contains Tulsa and the home of the NBA's Thunder.
ANSWER: **Oklahoma City**

14. William Porcelet was spared during this event due to his reputation, but he used his influence to help many of its targets escape death. One of its leaders was Bartholomaeus [bar-toh-loh-MAY-us] of Neocastro. Similar actions had been planned by John of Procida, who acted as an advisor to Constance, the wife of Peter of Aragon who eventually inherited the territory in which it occurred. The belligerents were unhappy with the rule of Charles of Anjou, an Angevin monarch, and they rose up on Easter Monday following a scuffle with a French officer. For 10 points, name this 1282 rebellion on a Mediterranean island.
ANSWER: **Sicilian Vespers**

15. The anti-EMR1 monoclonal antibody binds specifically to these cells, and they also express CD68 and CD14. So-called "Heart Failure Cells" are created when these cells become laden with hemosiderin, and in atherosclerotic [ah-thuh-ROH-skleh-RAW-tik] plaques they become foam cells. One variant of these cells line the walls of liver sinusoids and are called Kupffer cells, and these cells' main function is triggered by activation of toll-like receptors, followed by actin polymerization. These cells differentiate from monocytes. They express MHC class II, which with they present antigens to helper T cells. For 10 points, name these immune cells which phagocytize [FAG-uh-seye-tize] debris and pathogens, whose name is Greek for "big eaters".
ANSWER: **macrophage**s

1. This man managed to pass the Symplegades after he allowed a dove to fly through them, and, seeing it emerge alive on the other side, knew that he could pass through safely. This man's son Thessalus became king of Corinth after he defeated Acastus with the aid of Peleus, while his marriage to Creusa caused enmity between himself and his lover, who killed Creusa as well as her children by this man. That woman, Medea, had earlier helped this man achieve his most notable task in Colchis. For 10 points, name this leader of the Argonauts who acquired the Golden Fleece.
ANSWER: **Jason**

040-11-25-07132

2. The off-by-one error is commonly encountered when writing to these entities. Character strings can be represented as these entities with a trailing null byte, and the lack of bound checking on these structures can result in the overwriting of memory addresses. In C and C++, these entities are defined using square brackets, and in most languages, their indices start at zero. For 10 points, name these data structures that contain elements of the same data type, which can be two-dimensional and are thus analogous to matrices.
ANSWER: **array**s

066-11-25-07133

3. On *Mad Men*, a wealthy heir hires Sterling Cooper Draper Pryce to bring this sport to national prominence. This sport was banned for thirteen years in the Philippines after a game-fixing scheme was discovered in 1988. This sport is played in a three-walled court called the cancha. It uses a ball called a pelota which must be caught and thrown with the basket-like "cesta." For 10 points, name this fast-paced sport somewhat popular in Spain and Florida.
ANSWER: **jai alai** (HI-ah-LIE)

015-11-25-07134

4. For an ideal gas, this quantity can be derived from temperature using Sutherland's formula. This quantity can be mathematically represented by tensors of fourth or higher orders. Bingham plastics can experience a dramatic increase in this property at high stresses, though at low stresses it instead is characterized by an amalgamation of this term and "elastic." Thixotropic and rheopectic materials respectively decrease and increase this property over time, much like the processes of shear thinning and shear thickening. This value is non-constant for non-Newtonian fluids, such as blood and ketchup. Analogous to friction, for 10 points, identify this term for a fluid's resistance to flow.
ANSWER: **viscosity**

020-11-25-07135

5. Like Hirschsprung's disease, mutations in the RET proto-oncogene are associated with a particular cancer in this organ, which is also the site of Hurthle cell neoplasm. Anaplastic, medullary, and neoplasms comprise most malignancies of this organ. The main product of this gland is overproduced in Graves disease and under-produced in Hashimoto's disease. This organ, which contains two lobes and an isthmus, has C-cells which secrete a hormone that reduces blood calcium, known as calcitonin. The main product of this gland is produced in colloidal form, and is produced in T3 and T4 forms. For 10 points, name this organ which is the site of goiters, a gland in the neck that needs iodine to function.
ANSWER: **thyroid**

048-11-25-07136

This is a calculation question. In simplest terms, what is the measure of the interior angle of a regular dodecagon?
ANSWER: **150** degrees [or **5pi/6** radians]

What type of enzyme transfers phosphates to other proteins?
ANSWER: **kinase**s