



1. **Reversible expansions and compressions that have this property constitute two stages of the Carnot cycle. In this type of reversible expansion, the work done equals  $RT$  times the log of the ratio of the volumes. For ideal gases undergoing this type of process, work is equal to the negative of (\*) heat, as these processes proceed with no change in internal energy or enthalpy, and pressure times volume is constant. For 10 points, name this property possessed by phase transitions, which occur with no change in temperature.**

ANSWER: **isothermal** processes [or **constant-temperature** processes until "temperature" is read; prompt on **phase transitions**; do not accept "adiabatic processes"]

190-14-102-01101

BONUS: What centrist candidate defeated Mohammad Bagher Ghalibaf (GAH-lee-boff) to win Iran's 2013 presidential election?

ANSWER: Hasan **Rouhani**

015-14-102-0110-11

2. **A king of this name reigned for forty-five days before being killed by one of his father's concubines in a drunken stupor. Another king of this name attempted to build the Hall of a Hundred Columns and ordered the construction of the Gate of All Nations, and was ultimately betrayed by his minister (\*) Artabanus (art-uh-BAA-nus). That king of this name led his forces to defeat in the Battle of Plataea (pluh-TAY-uh) after building a pontoon bridge. For 10 points, give this name of a Persian emperor who led his troops at Thermopylae (thur-MAH-puh-lye).**

ANSWER: **Xerxes** (ZERK-seez)

030-14-102-01102

BONUS: What term is used to describe the relative liquidity and mobility of the constituents of the lipid bilayer of the plasma membrane?

ANSWER: **fluid mosaic**

014-14-102-0110-11

3. **Apomixis (EY-poh-MIKE-sis), also known as a clonal version of this process, can occur in species that utilize the ZW sex-determination system. Automixis (AWE-toh-MIKE-sis) occurs when the eggs in this process do undergo meiosis. This process occurs naturally in invertebrates such as (\*) aphids, rotifers and nematodes (NEE-muh-tohdz). This form of reproduction has been observed in vertebrate species such as hammerhead sharks and Komodo dragons. For 10 points, identify this form of asexual reproduction, named from the Greek for "virgin birth," in which an unfertilized egg becomes a new organism.**

ANSWER: **parthenogenesis** [prompt on asexual **reproduction**]

084-14-102-01103

BONUS: Simon Cameron and Edwin Stanton held what Cabinet post, which was in charge of the U.S. military until being folded into the newly created Secretary of Defense in 1947?

ANSWER: secretary of **War** [do not accept "Secretary of Defense"]

121-14-102-0110-11

4. **This actor played obnoxious jock Chris in the film *Whatever It Takes*. He originated the role of a psychotic performance artist in a series of *General Hospital* guest roles. In a 2013 film, he played a magician who idolizes Thomas Edison and becomes involved with the (\*) witches Theodora, Evanora, and Glinda upon arriving at the Emerald City. For 10 points, name this actor who played the lead roles in *Oz the Great and Powerful* and *Rise of the Planet of the Apes*.**

ANSWER: James **Franco**

052-14-102-01104

BONUS: Identify the weak intermolecular forces formed between instantaneous induced dipoles, which are named for a German scientist.

ANSWER: **London** dispersion **forces** [or **van der Waals forces** until "gases" is read; prompt on **dispersion forces**; prompt on **LDFs**]

226-14-102-0110-11

5. **The Grandfather geyser field is located in this region. The Very Large Telescope is located in the Paranal (pah-rah-NAHL) Observatory in this region. The few mammal species native to this area include a variety of grey fox, Darwin's leaf-eared mice, and the (\*) viscacha (vees-CAH-chuh). Owing to El Nino, the southern portion of this desert annually flowers between September and November. This desert is rich in copper and nitrate deposits, the latter of which sparked the War of the Pacific. For 10 points, name this driest hot desert in the world, located to the west of the Andes.**

ANSWER: **Atacama** Desert

020-14-102-01105

BONUS: The title character offers his sole possession, a crutch, to King Melchior and has his lame leg healed as a reward in what Christmas-themed opera by Gian Carlo Menotti, the first to be composed for American television?

ANSWER: **Amahl and the Night Visitors**

088-14-102-0110-11

6. **Brenda Patinkin features in a collection by this author that includes the short stories "Defender of the Faith" and "Esptein." In a novel by this author, Amy Willette is confused with Anne Frank. This author of (\*) *Goodbye, Columbus* and *The Ghost Writer* wrote a novel in which Coleman Silk is black but pretends to be white and Jewish. Another of his novels is a monologue by a sex-obsessed neurotic. For 10 points, name this author of *The Human Stain* and *Portnoy's Complaint*.**

ANSWER: Philip **Roth**

127-14-102-01106

BONUS: What Roman emperor created the tetrarchy (TETCH-rahr-kee) by appointing Maximian, Galerius, and Constantius co-emperors?

ANSWER: **Diocletian**

015-14-102-0110-11

7. **Symbols in this writing system that have developed native meanings are known as "Kokku" (COH-koo) The two ways to read this system's normal symbols are called "on-yomi" (AHN-yoh-mee) and "kun-yomi" (KUN-yoh-mee). This system is ideogrammatic, rather than representing words or syllables, and its name literally means (\*) "Han characters," reflecting its origin. This one of at least three writing systems for Japanese consists of symbols based on Chinese characters. For 10 points, identify this writing system that is not hiragana (HEER-uh-gah-nuh) or katakana (KAH-tuh-kah-nuh).**

ANSWER: **Kanji** [prompt on **Japanese** until "on-yomi" is read]

147-14-102-01107

BONUS: What American general developed the Union's "anaconda plan" during the Civil War after leading troops in the War of 1812 and the Mexican-American War?

ANSWER: Winfield **Scott**

015-14-102-0110-11

8. **Julius Caesar described seeing men dyed with woad while twice doing this action. The last successful instance of this feat was followed by the Harrying of the North and included a battle that featured the death of several housecarls. Napoleon envisioned accomplishing this feat with balloons and a massive tunnel, and Operation (\*) Sea Lion was a failed German attempt to do this action. It was most recently performed by the king who ordered the creation of the Domesday Book. For 10 points, identify this kind of military conquest which gave William the Conqueror his name.**

ANSWER: **invading Britain** [or **invading England** or other equivalents]

141-14-102-01108

BONUS: What Arab nationalist ideology names the party that controlled Iraq under Saddam Hussein and Syria since the rise of the Assad family?

ANSWER: **Ba'athism** [or **Ba'ath** Party]

019-14-102-0110-11



**SET A:**

1. BONUS: This is a 30-second calculation question. A quadratic polynomial  $P$  with real coefficients has the root  $1 + i$ . If the value of  $P$  at  $1$  is  $3$ , what is the value of  $P$  at  $0$ ?

ANSWER: **6**

233-14-102-0110-12

2. BONUS: Oedipa Maas is the protagonist of what short novel by Thomas Pynchon?

ANSWER: *The Crying of Lot 49*

014-14-102-0110-12

3. BONUS: What title character of a Voltaire novel is mentored by Dr. Pangloss?

ANSWER: **Candide**

014-14-102-0110-12

4. BONUS: What kind of computer program transforms source code into object code, to make it executable?

ANSWER: **compiler**

014-14-102-0110-12

**SET B:**

1. BONUS: In statistics, the standard deviation is the square root of what quantity?

ANSWER: **variance**

014-14-102-0110-12

2. BONUS: What Shakespeare play begins with the line, "If music be the food of love, play on?"

ANSWER: *Twelfth Night*

014-14-102-0110-12

3. BONUS: This is a 30-second calculation question. Tommy walks a certain distance around a circular track. Evan walks, at the same speed, from the same starting point to the center of the track and then to a different point on the edge of the track. If Evan exactly meets up with Tommy again, then at what angle, in degrees, must Evan turn when he reaches the center? Express your answer in terms of  $\pi$ .

ANSWER:  **$360/\pi$**  degrees

003-14-102-0110-12

4. BONUS: What American architect built the Imperial Hotel in Japan and created a house called Fallingwater in Pennsylvania?

ANSWER: Frank Lloyd **Wright**

015-14-102-0110-12



9. This philosopher discussed the painting "A Pair of Shoes" by van Gogh in his article *The Origin of the Work of Art*. He examined another German philosopher in *Kant and the Problem of Metaphysics*. In another book, he introduces the idea of a "hermeneutic circle" and discusses the relationship that human perception creates with the (\*) world, composed of the words for "to be" and "there." For 10 points, name this German philosopher who explained "dasein" (DAH-sine) in *Being and Time* and attracted controversy for his Nazi sympathies.

ANSWER: Martin Heidegger

127-14-102-01109

BONUS: What American humorist wrote such novels as *Pudd'nhead Wilson* and *A Connecticut Yankee in King Arthur's Court*?

ANSWER: Mark Twain [or Samuel Langhorne Clemens]

014-14-102-0110-11

10. The main character in this novel thinks that his infatuation with Luba Luft might be mistaken for his love of *The Magic Flute*. This novel ends with Iran, the protagonist's wife, ordering mechanical flies for a synthetic toad that the protagonist found during his sojourn into the Oregon desert to meditate. The protagonist of this novel is disappointed that (\*) Iran misuses her mood organ, and he lusts after Rachel Rosen. For 10 points, name this novel about bounty hunter Rick Deckard, loosely adapted into the film *Blade Runner* and written by Philip K. Dick.

ANSWER: Do Androids Dream of Electric Sheep? [prompt on Blade Runner until it is read]

020-14-102-01110

BONUS: What ABC thriller created by Shonda Rhimes stars Kerry Washington as political fixer Olivia Pope?

ANSWER: Scandal

015-14-102-0110-11

11. A composer for this instrument collected fifty-six pieces in *The Rhetoric of the Gods*. A famous piece for this instrument was accompanied by the lyrics "Happy, happy, they that in hell, Know not the world's despite." This instrument developed out of an Arab instrument called the "Ud" introduced in the conquest of Spain. An English composer for this instrument wrote the song (\*) "Flow My Tears" and had music described as "Semper Dolens," a pun on his name, John Dowland. For 10 points, name this popular Renaissance instrument that was replaced by the guitar.

ANSWER: lutes

080-14-102-01111

BONUS: What English king was forced to sign the Magna Carta by his barons in 1215?

ANSWER: King John Lackland

015-14-102-0110-11

12. **Father Fish and Hobe Gilium appear in this author's novel *The Morning Watch*. He wrote a prose poem set to music by Samuel Barber entitled *Knoxville: Summer of 1915*. In his most famous autobiographical novel, Rufus Follet deals with his father's death in a car crash. This author collaborated with the (\*) photographer Walker Evans to document the lives of sharecroppers in *Let Us Now Praise Famous Men*. For 10 points, name this author of *A Death in the Family*.**

ANSWER: James Agee

127-14-102-01112

BONUS: What company made a leap as a content provider by distributing the original series *House of Cards* and airing the fourth season of *Arrested Development*?

ANSWER: Netflix

015-14-102-0110-11

13. **In this play, the maid rebukes Valere (VAL-air) and his fiancée for arguing over whether they truly love one another. Damis (dah-MEE) is thrown out for refusing to apologize to the title character of this play, who is admired by the unfriendly Madame Pernelle. Cleante (CLEE-ont) serves as the voice of reason in this play, in which (\*) Elmire (IL-meer) stations her husband under a table in order to prove to him that the title character desires her. At the end of this play, the king saves Orgon from his mistake. For 10 points, name this Moliere play about the title religious hypocrite.**

ANSWER: Tartuffe

105-14-102-01113

BONUS: What American river runs past the city of Lake Havasu and through the Grand Canyon?

ANSWER: Colorado River

015-14-102-0110-11

14. **A type of silicon prefixed by this term is a common gate material for MOSFETs (MOSS-fets). Materials whose name contains this prefix can be connected with cross-linking, and their size can be described by their "molecular weight," which is proportional to the amount of repeating subunits. The "tail" of (\*) adenine (AA-deh-noon) nucleotides added to mRNA is prefixed by this term. In math, a term with this prefix denotes linear combinations of variables raised to non-negative integer powers, examples of which include cubic and quartic ones. For 10 points, what is this Greek prefix meaning "many?"**

ANSWER: poly

233-14-102-01114

BONUS: This is a 20-second calculation question. If I draw two letters at random from the alphabet with replacement, what is the probability that I draw the same letter twice?

ANSWER: 1/26

003-14-102-0110-11

15. **This economist co-authored the paper "What Makes Advertising Profitable?" with William Adams and addressed the efficiency wage hypothesis in several papers written with George Akerlof. In November 2013, this person told Bob Corker that she would have the courage to "prick bubbles." She accumulated support for her current position after (\*) Lawrence Summers withdrew from consideration. This former chair of Bill Clinton's Council of Economic Advisers was confirmed in January 2014 to succeed Ben Bernanke. For 10 points, name this woman who became the new Chairman of the Federal Reserve Board.**

ANSWER: Janet Yellen

052-14-102-01115

BONUS: What animal phylum is comprised of flatworms?

ANSWER: **Platyhelminthes**

014-14-102-0110-11

16. **At the start of his political career, this future President joined the KKK and worked in the political machine of boss Thomas Pendergast. This president called the "Turnip Day Session" of Congress and used an executive order to desegregate the (\*) Army. He went on the "Whistle Stop Tour of America" to win the last Presidential election in which four candidates each exceeded two percent of the vote. The *Chicago Tribune* claimed that this "Fair Deal" proponent lost to Dewey in the election of 1948. For 10 points, name this successor to FDR, who chose to bomb Nagasaki and Hiroshima.**

ANSWER: Harry S. **Truman**

149-14-102-01116

BONUS: What reclusive American poet wrote "My Life had stood - a Loaded Gun" and "Safe in their Alabaster Chambers?"

ANSWER: Emily **Dickinson**

014-14-102-0110-11



17. **Crossdating these things is commonly done with a skeleton plot. Portions of these structures that occur early in a season are typically lighter than portions later in a season, allowing for visual identification of their boundaries. These things are the primary object of interest in the field of (\*) dendrochronology.** Because the width of these things varies mostly as a result of precipitation, they can be used to construct past precipitation records. For 10 points, identify these patterns visible in a cross-section of a tree trunk.

ANSWER: tree growth **rings**

066-14-102-01117

BONUS: What son of Odysseus sought help from Menelaus (MEN-uh-LAY-us) and helped his father massacre Penelope's suitors?

ANSWER: **Telemachus**

014-14-102-0110-11