

NEW TRIER SCOBOL SOLO 2012

ROUND 5

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1. The meson was originally proposed as a particle that mediates interactions between two of these particles. An attempt to study the decay of these particles has taken place as part of the neutrino detection experiment at Super-Kamiokande [kam-ee-oh-KAN-day], and beams of these particles are collided in the Large Hadron [HAY-drahn] Collider in the search for new particles. These are the main component of cosmic rays, and, like the nucleus, their discovery is credited to Ernest Rutherford, who bombarded nitrogen with alpha particles. These baryons [BAIR-ee-ahnz] that consist of two up and one down quarks exhibit electric charge. Name these particles equivalent to hydrogen-1 nuclei that combine with neutrons in the strong nuclear force and whose charge is the opposite of an electron's.

ANSWER: protons [accept hydrogen ion or hydrogen-1 nucleus until "hydrogen-1"; prompt on hydrogen]

2. This book begins with a dream in which somebody reads from a book, cries, and asks "What shall I do?". That dream follows an apology from the author stating that he had planned to write another book. One of the places visited is Palace Beautiful, which houses the mistresses Discretion, Piety, Prudence, and Charity. One character from this work, Gaius, kills Giant Good-Slay and owns an inn between the Valley of the Shadow of Death and Vanity Fair. The protagonist Christian, and later his wife Christiana, leave the City of Destruction to visit the Celestial City. Name this 17th-century allegory written by John Bunyan.

ANSWER: *The Pilgrim's Progress*

3. This person was opposed by Arnulf of Lisieux [lis-yoo], and one of the controversial decisions he made was that the king could not put voluntary offerings from sheriffs into the royal treasury. Serving between Theobald of Bec and Roger de Bailleul [by-loo], he opposed the Constitutions of Clarendon. Edward Grim witnessed this person's murder, which was committed by Reginald FitzUrse and three other knights when this person refused to leave his church. Now considered a saint, name this close friend and then major enemy of Henry II who was the Archbishop of Canterbury.

ANSWER: (Saint) Thomas à Becket [prompt on (Saint) Thomas of Canterbury or Thomas of London]

4. The companion type of these objects is sometimes used to simplify differential equations. The Gram-Schmidt orthonormalization process is used for the QR decomposition of these objects. The exponential function is defined by a finite series for these objects only if they are nilpotent. These objects that have four fundamental subspaces can be used to represent linear transformations. Finding their eigenvalues allows them to be diagonalized. If \mathbf{x} and \mathbf{b} are vectors and A is one of these, then $A\mathbf{x} = \mathbf{b}$ represents a system of linear equations. These objects have a nonzero determinant if they are invertible and square. Identify these objects whose multiplication is not commutative, rectangular grids of numbers arranged in rows and columns.

ANSWER: (square) matrices [or matrix]

5. This writer built upon work by John Grote and William James in distinguishing between “knowledge by acquaintance” and “knowledge by description”. He also developed James’ idea that the basic building block of everything was neither mind nor matter, his theory of neutral monism. In one of his works, he explained why he did not believe in God and immortality and did not believe Christ was the the best and wisest of men, and he also compared belief in God to belief in a celestial teapot. This thinker developed type theory to resolve a problem with Gottlob Frege’s set theory, which he found to allow his paradox of the set of all sets that are not members of themselves. Name this author of *Why I Am Not a Christian* who worked with Alfred North Whitehead on *Principia Mathematica*.

ANSWER: Bertrand (Arthur William) **Russell**

6. In one novel by this author, the protagonist meets the Elder Brother and Father Jacobus [yah-KOH-bus] in his travels from Waldzell [VALD-tsell] School in Castalia. In another novel by this author, Mozart explains how to approach life to the main character. That protagonist has a girlfriend Erika he rarely sees and is introduced to Maria by Hermine; the work by this author in which he appears involves a book-within-a-book subtitled *For Madmen Only* and a magical theatre. In another work, the title character has a child with Kamala before she is bitten by a snake and is followed by Govinda. Name this German author who wrote about Joseph Knecht [“connect”] in *The Glass Bead Game* and about Harry Haller in *Steppenwolf* who also wrote *Siddhartha*.

ANSWER: Hermann **Hesse**

7. One example of these substances’ existence is through the autocatalytic transformation of the element tin, often called tin pest. Other metal examples include austenite and ferrite, but they are more common among non-metals due to varied crystalline structures. One subset of these reverts to the P₄ form upon melting and is classified as red or white, while many are given the prefix di-. The ones classified as S₈ are named by Greek letters, and other sulfur examples have different numbers of atoms in their rings. Carbon’s examples include fullerene, graphite, and diamond. Identify these variants of elements based on molecular structure sometimes contrasted with isotopes.

ANSWER: **allotropes** [accept word forms]

8. The area around this river has been home to the Slavey people, a group of Dené, and it goes past the Norman Wells oil fields. Its longest feeder is the Liard River, which meets it at Fort Simpson in the Dehcho Region. It is fed near its end by the Peel and Arctic Red Rivers. The first European to travel its length wanted to name it Disappointment River because it does not reach the Pacific Ocean, but it is named after him instead. It is fed by the Great Bear River, empties into the Beaufort Sea, and begins at Great Slave Lake. Name this longest river of Canada.

ANSWER: **Mackenzie** River

9. The death sentence of anarchist Salvador Puig Antich inspired this artist’s triptych with one thick line and one blotch of bright color on each canvas along with paint spatters, entitled *The Hope of a Condemned Man*. One work shows a yellow and white ladder with red rungs, while another shows several characters in a room, including one with a face that is half red and half purple. Many of his works were influenced by his ethnicity, such as his *Barcelona Series* that was influenced by the Spanish Civil War and his *Head of a Catalan Peasant*. Name this artist of *Dog Barking at the Moon* and *Harlequin’s Carnival*, who created a mural originally called *The Sun, the Moon and One Star*.

ANSWER: Joan [zhoo-AHN] **Miró** (i Ferrà)

10. This event led Cotton Exchange secretary Myron Colony to secretly work for the Treasury Secretary. Some of its central figures were revenue agent John Joyce and Supervisor of Internal Revenue John McDonald, who eventually served jail time after being prosecuted by James Broadhead. Broadhead replaced John Brooks Henderson as the special prosecutor for this scandal. Centered in St. Louis, it pitted Treasury Secretary Benjamin Bristow against the President's private secretary Orville Babcock. Name this scandal in the Grant administration, uncovered by comparing shipping and tax records to the records of rectifiers and distillers of a certain alcoholic beverage.

ANSWER: Whiskey Ring

11. This adjective describes a type of division that adds two points, one on a segment and one on the extension of that segment, in a way that creates two proportions. It also describes functions f that satisfy $\Delta^2 f$ equals zero. This word names a diverging series equivalent to the quantity one minus x to the n^{th} power divided by the quantity one minus x . That series adds the reciprocals of the positive integers. To find the type of mean described by this term, one takes the sum of the number's reciprocals and divides the number of data points by that value. Give this adjective often used with mathematics concerning the study of sound waves because of its connection to music.

ANSWER: harmonic [accept harmonic division or harmonic functions or harmonic series or harmonic sequence or harmonic mean]

12. Rumors are started about one of this author's protagonists when she asks Gus Trenor to invest her money in the stock market. In another novel by this author, a character invites Sillerton Jackson to dinner to find out what is going on in her friends' lives. That woman and her daughter Janey are concerned that her son will fall in love with Countess Olenska instead of May Welland. This author also wrote about a man who falls in love with his wife's cousin Mattie in Starkfield, Massachusetts. Name this author who wrote *The House of Mirth*, *The Age of Innocence*, and *Ethan Frome*.

ANSWER: Edith (Newbold Jones) Wharton [accept either underlined name]

13. This general was trapped under his dead horse during his victory over Antonio Zabala at the Battle of San Lorenzo. When one of his allies attacked prematurely in another battle, this general ordered Miguel Estanislao Soler into battle, leading to his victory over Rafael Maroto. That victory occurred after he replaced Manuel Belgrano and crossed the Andes to join forces with Bernardo O'Higgins, with whom he won the Battles of Maipú and Chacabuco [chah-kah-BOO-koh]. Name this first president of Peru, who after the Guayaquil Conference worked closely with Simon Bolívar.

ANSWER: José de San Martín [prompt on Martín]

14. This organelle contains ferredoxin-thioredoxin reductase, an iron-sulfur enzyme that increases electron transfer. Though it does not take part in oxidative phosphorylation, it uses ATPase to separate a phosphate from ATP. The fluid inside of it, which contains enzymes such as RuBisCO, is the stroma. The enzyme cytochrome b6f complex is located in its thylakoids, disks which are stacked to form grana. The stroma within this organelle is the location of the Calvin cycle, which is also known as the dark reactions, and these organelles are often contrasted with mitochondria because both convert energy. Name these organelles evolved from cyanobacteria that conduct photosynthesis and are green.

ANSWER: chloroplasts

15. The sacristy of one church built by this man features a wooden crucifix sculpted by Michelangelo, who designed the sacristy for another of this man's commissions in the same city. This architect of the Santo Spirito and the Basilica of San Lorenzo designed an intricate loggia [LOJ-yah] for an orphanage called the Hospital of the Innocents. He engineered a double-shelled cupola as part of his most famous commission, which arose decades after he lost a competition to design the doors of the Florence Baptistery to Lorenzo Ghiberti [gih-BAIR-tee]. Name this architect from Florence who designed the dome of the Florence Cathedral.

ANSWER: Filippo **Brunelleschi** [broo-nehl-LES-kee]

16. In one poem by this writer, wind from the pine-trees trickles on his bare head after he takes his cap off. This poet wrote that his joy is great at the moment when he forgets that he exists at all. In the same work, he asked who can bear to grieve alone, and he referred to his shadow as his slave and the moon as his friend. That work proclaims that Heaven and Earth both love wine. In another poem, he writes about sitting alone with the Jingting Mountains. His works include "In the Mountains on a Summer Day" and "Drinking Alone by Moonlight". Name this writer who lived during the eighth century, during the Tang Dynasty.

ANSWER: **Li** (Tai) Bai [or **Li** (Tai) Po or **Li** (Tai) Pai or **Li** (Tai) Bo]

17. A deficiency in this vitamin can cause lower neck lesions, and people born with Hartnup disease typically get deficiencies of it because of an inability of the body to break down tryptophan. Too much of it can increase gout or cause a flushing sensation under your skin, and it is sometimes combined with statins to treat high cholesterol. It includes a pyridine [PEER-uh-deen] ring and can be converted in the body into NADH. A deficiency of this can be caused by alcoholism or a diet in which the only grains are barley and corn. Name this nutrient necessary to avoid pellagra that can be called vitamin B3.

ANSWER: **niacin** [accept **nicotinic acid**; accept vitamin **B3** before the end]

18. This country's second president, Ali Hassan Mwinyi, moved it away from a socialist plan which was based on the concept of Ujamaa, or family. Its move to socialism was outlined in 1967 in the Arusha Declaration, which led to people being forced to move to collective farms and to commodity shortages. Kenya and this country were the site of simultaneous 1998 bombings, linked to al Qaeda, of U.S. embassies. Its first president, who founded its Chama cha Mapinduzi party and tried to overthrow neighboring Uganda's Idi Amin [EE-dee ah-MEEN], was Julius Nyerere [nyeh-RAIR-eh]. Name this East African country formed in 1964 by the merger of an island nation with a mainland nation.

ANSWER: United Republic of **Tanzania** [or Jamhuri ya Muungano wa **Tanzania**]

19. One work by this composer, which is nicknamed *Overture in Handel's Style* and built on the success of his work on *The Ruins of Athens*, is his overture to *The Consecration of the House*. In 1819, a composer wrote a brief waltz and sent it out to every major Austrian composer hoping each one would write a variation; this composer got carried away with the project and ended up composing 33 *Diabelli Variations*, postponing work on his D Major *Missa Solemnis*. He wrote very brief notes for his sixth symphony, including the description "Awakening of cheerful feelings upon arrival in the country" for the first movement of that work which became known as his *Pastoral* Symphony. Name this composer who included a chorus based on Friedrich Schiller's "Ode to Joy" in his ninth and final symphony.

ANSWER: Ludwig van **Beethoven**

20. This figure was once dragged through the chasm of Hermion. Hesiod noted that he had a brass voice, and Apollodorus described him as having the tail of a dragon and snakes on his back. One hero, on his way to this beast, arranged a marriage with Meleager's sister, broke Menoetes' rib cage in a wrestling match, and freed Theseus from the Chair of Forgetfulness. This beast was lulled to sleep by Orpheus on his way to rescue Eurydice [yoo-RID-uh-see], and Heracles strangled this beast and bound him with chains because Hades did not allow him to use weapons on his dog. Identify this guardian of the underworld who in most depictions was a three-headed dog.

ANSWER: Cerberus [or Kerberos]

TB1. Victor Veselago demonstrated that the negative type of this phenomenon can happen in materials where the permittivity and permeability are both negative. In general, the value associated with this phenomenon in a material is equal to the square root of the product of permittivity and permeability, though the opposite of the square root is used in metamaterials. The double type of this—known as birefringence—takes place when this phenomenon depends on the polarization of light. It does not take place beyond the critical angle; instead, total internal reflection occurs. Name this phenomenon, quantified by Snell's Law, in which light passing from one medium to another bends.

ANSWER: refraction [accept word forms; do not accept "diffraction"]

TB2. This composer's only completed string trio is his *Divertimento in E flat*, and three of his small symphonies are also classified as Divertimenti. His *Paris* Symphony starts with several octave D chords and contains a swiftly ascending Mannheim Rocket, as does his *Great G Minor* Symphony. It is believed that Johann André completed parts of his 26th piano concerto, which was played at the coronation of Leopold II. "Antretter" and "Gran Partita" are some of the nicknames of his serenades, the last and most famous of which is *Eine Kleine Nachtmusik* ["EYE"-nuh KLY-nuh NAKHT-moo-zik]. Name this composer whose music was organized by Ludwig von Köchel and who wrote 41 numbered symphonies, the last of which is nicknamed *Jupiter*, in addition to operas such as *Don Giovanni* and *The Magic Flute*.

ANSWER: Wolfgang Amadeus Mozart [or Johannes Chrysostomus Wolfgangus Theophilus Mozart]

TB3. This is the birth month of Amelia Earhart, Kevin Bacon, Mick Jagger, and George Walker Bush. Name this month featuring Parent's Day and Independence Day that follows June.

ANSWER: July