

Scobol Solo 2020

Packet 5 (Round 5)



1. Arnold Sommerfeld provided a model of this object that extended a previous model by allowing for ellipses. Another model of this object explained the Rydberg [RID-berg] formula but gave incorrect predictions for the angular momentum of the ground state. That model was based on the quantization of angular momentum. In this object, the azimuthal [az-uh-MOO-thul] and magnetic quantum numbers in the ground state are always zero. This is the only neutral atom for which the Schrödinger [SHRAY-din-gur] equation can be solved. Name this atom, modeled by Niels Bohr, that is the simplest because it has only one electron and one proton.

Answer: hydrogen atom [prompt on atom; prompt on atomic orbitals; prompt on electron orbitals]

2. The pecuniary [pek-YOO-nee-air-ee] and technical types of these phenomena are often contrasted; the pecuniary type affects profit but not the ability to produce. The Coase [kohss] theorem states that the effects of these phenomena can be addressed when there are low transaction costs. One attempt to put a tax on the negative examples of these phenomena is a Pigovian [pih-GOH-vee-un] tax. The positive examples of these phenomena generally benefit society, while pollution is an example of a negative one. Name this type of economic phenomenon in which a transaction affects people who are not part of it.

Answer: externality or externalities

3. In one book by this author, the people in Pie Tavern mock and jeer mourners who invoke God. This author had H. F. narrate that story, which starts with scary news reports from Holland and St. Giles's Parish. In another novel by this author, the title character learns that her third husband is her half-brother after traveling with him to Virginia Colony. This author wrote that novel about a woman who was born in Newgate Prison in London. In this author's best-known novel, the title character names his companion "Friday" while living on an island. Name this author of *A Journal of the Plague Year*, *Moll Flanders*, and *Robinson Crusoe*.

Answer: Daniel Defoe

4. The Red Chapel at Karnak is sometimes named for this pharaoh, who oversaw its construction. The central and best-preserved terrace at the Temple of Deir el-Bahri was dedicated to this pharaoh. That temple is the location where myrrh trees were transplanted after this pharaoh organized a trade mission to Punt. A 2007 discovery suggested that this pharaoh died from bone cancer. This pharaoh ruled for about 21 years, sharing power with Thutmose [THUT-mohss] III, who was her husband's son, for part of that time. Name this successor of her husband Thutmose II.

Answer: Hatshepsut

5. A possible visit to this moon is the goal of the NASA *Trident* program, which is investigating why this moon’s atmosphere has many charged particles and why there are active plumes coming from this moon’s surface. There is speculation that this moon has a sub-surface ocean. Of the moons in our Solar System with a retrograde motion, this one is by far the largest. This moon has over 400 times the mass of its planet’s second-largest moon, which is Proteus. Name this moon that might be a captured object from the Kuiper [KY-pur] Belt and which orbits Neptune.

Answer: Triton

Check the score.

6. One time named for this god is an hour and 36 minutes before sunrise, which is a good time to meditate. One day for this god is equal to a *kalpa*, which for us is 4.32 billion years. This god lived with the goddesses Saraswati and Gayatri [“GUY-uh-tree”], who represent faithfulness and music. This god had four faces, and each of his mouths is responsible for creating one of the Vedas [VAY-duhz]. After this god was born from either a golden egg or a lotus coming from Vishnu’s navel, he created the objects in the universe. Name this Hindu god who joins Vishnu and Shiva in the *tri-murti* [trih-MUR-tee].

Answer: Brahma

7. In one novel by this author, Leora dies of the plague after traveling with her husband to the island of St. Hubert. This author wrote that novel about a title character who studies under Max Gottlieb to become a research doctor. Like several novels by this author, that one is set partially in the fictional U.S. state of Winnemac [WIN-uh-mak], which is the location of the city of Zenith. Another of this author’s title characters is a realtor who has an affair with Tanis Judique [tah-NEESS zhoo-DEEK]. Name this author from Minnesota who wrote *Arrowsmith* and *Babbitt*.

Answer: (Harry) Sinclair Lewis [do not accept or prompt on “Sinclair”]

8. The lead female in this opera sings that her true name is Lucia [LOO-chah], though she is called another name. Later in this opera, another woman sends a man to a shoemaker after singing “Quando me’n vo”, which is also known as “Musetta’s Waltz”. By singing that song in Act II of this opera, Musetta is able to win back the love of Marcello [mar-CHEL-loh] while they are at Cafe Momus. In Act I of this opera, the aria “Che gelida manina” [kay JAY-lee-dah mah-NEE-nah]—whose name means “What a frozen little hand”—is sung by Rodolfo to Mimì. Name this Giacomo Puccini [JAH-koh-moh poot-CHEE-nee] opera set in Paris that ends with Mimì dying, probably from tuberculosis.

Answer: *La bohème*

9. Suspicion of this ruler grew after the books of the Elder Dempster shipping firm were viewed by E. D. Morel, who became a journalist and enlisted Arthur Conan Doyle and Mark Twain in a publicity campaign against this ruler. Morel also befriended Roger Casement, whose report pressured this leader to give large private holdings to the government. After Henry Stanley found David Livingstone, Stanley became an agent for this leader. Adam Hochschild estimated that this leader is responsible for 10 million deaths. Name this person who established a personal colony at the Congo Free State and was the king of Belgium.

Answer: Leopold II of Belgium [prompt on Leopold]

10. In a Bernoulli [bur-NOO-lee] distribution this property equals the probability of a success, while in a chi-squared [ky “squared”] distribution this property equals the number of degrees of freedom. The standard deviation divided by the square root of the sample size equals the “standard error of” this property. The deviations from this number add to 0, and the sum of the squares of the deviations from this number are smaller than they are from any other number. In a normal distribution, this property equals both the median and the mode. Name this property that can be calculated for a finite data set by adding the numbers and dividing by how many numbers there are.

Answer: arithmetic mean [prompt on average or expected value or expectation]

Check the score.

11. In November 2020, this country’s Astravets Nuclear Power Plant went into operation despite strong complaints from neighboring countries. At the beginning of November 2020, the European Union blacklisted 15 leaders of this country, including its president. Later in November, Russian Foreign Minister Sergey Lavrov urged this country’s president to consider a new constitution. That action was taken after this country’s August election, in which the incumbent claimed to win 80% of the vote, leading to massive protests. Name this country where Sviatlana Tsikhanouskaya [svyaht-LAH-nuh tsee-kah-NOH-skah-yah] challenged Alexander Lukashenko [loo-kuh-SHAYN-koh], leading to protests in Minsk.

Answer: (Republic of) Belarus [or (Respublika) Byelarus]

12. One poem by this writer ends with the line “Gazing towards the west in admiration, one can only sigh.” In that poem, this writer compares the title object to “climbing to the great blue sky”, and he says of that object, “How dangerous, how high”. Another poem by this writer ends with the line “When my song was over, all my senses had gone.” In that poem, this writer describes lying by his front porch all day. Another poem by this writer begins “Moonlight before my bed, perhaps frost on the ground”. Name this Chinese poet who wrote “The Hard Road to Shu”, “Waking from Drunkenness on a Spring Day”, and “Quiet Night Thought”.

Answer: Li Bai [or Li Bo or Taibai; prompt on Bai or Bo]

13. The two paintings by this artist commissioned by Dr. Fastlicht are a still life showing fruit placed around a ceramic dog and a self-portrait showing this artist's face surrounded by a white collar and above a medallion. Another painting by this artist depicts a woman lying on a bed with red lines connecting her to six objects, including a snail. That painting is named for Henry Ford Hospital. Another painting by this painter depicts a deer with nine arrows sticking out of it and has a woman's face. Many paintings by this artist are self-portraits, including a double portrait showing two versions of this person connected by an artery. Name this Mexican artist of *The Two Fridas*.

Answer: (Magdalena Carmen) Frida Kahlo (y Calderón) (de Rivera)

14. This organelle takes up almost the entirety of the largest discovered bacteria. The membrane around this organelle is the tonoplast ["**TONE**"-oh-plast]. Most plant cells contain one large example of these organelles, which contains water to help those cells maintain turgor pressure. These organelles are larger versions of vesicles, and they perform the same purposes of storage, digestion, and the expulsion of excess water. Name these organelles that in single-cell animals have a type used in osmoregulation, called the "contractile" type.

Answer: vacuoles [**VAK**-yoo-ohlz]

15. This lake is just south of Lake Nipigon [**NIP**-ih-gawn], and the northeast shore of this lake contains Pukaskwa [**puh**-KASK-wuh] National Park. The Keweenaw [**KEE**-wuh-naw] Peninsula, which juts into this lake, contains the town of Copper Harbor. The southeast corner of this lake contains the Soo Locks, through which its water flows into the St. Marys River. The northwest part of this lake contains Isle Royale ["**royal**"], which is near the town of Thunder Bay. Name this lake that borders Ontario, Minnesota, Wisconsin, and Michigan, and which is the largest, northernmost, and westernmost of the Great Lakes.

Answer: Lake Superior

Check the score.

16. This king allowed Jacob De la Gardie to conduct the unsuccessful Siege of Tikhvin [**TEEK**-vin] but did not allow him to press to make this king's brother Charles Philip the Tsar of Russia. De la Gardie gained land for this king through the Treaty of Stolbovo [**stole**-BOH-voh] at the end of the Ingrian War. This king was injured at the Battle of Dirschau [**DEER**-shao], which was against the Polish-Lithuanian Commonwealth. This king died while fighting against Albrecht von Wallenstein [**VAWL**-en-shtyn] at the Battle of Lützen [**LOOT**-zen], which was fought one year after this king's victory at the Battle of Breitenfeld ["**BRIGHT**"-en-feld]. Name this king of Sweden who led troops during the Thirty Years' War.

Answer: Gustavus Adolphus [or Gustav II Adolf; accept any underlined portion]

17. Alexander Glazunov said of this composer “He wants to study orchestration? He hasn’t the slightest knowledge of counterpoint.” This composer responded by writing his *Concerto in F* with the support of Walter Damrosch. This composer got help from Ferde Grofé [“feared” groh-fay] for an earlier composition that premiered with this composer playing the piano part before it had been written down. That work, which is called a “jazz concerto”, was written by this person for the concert *An Experiment in Modern Music*. Name this composer who put a clarinet glissando at the beginning of his *Rhapsody in Blue*.

Answer: George Gershwin [or Jacob Bruskin Gershowitz]

18. In a play by this 20th-century writer, the title character states “Then there must be two kinds of happiness, and I’ve chosen the murderous kind.” This writer had that character go on to say “Even grief is vanity” in a play whose title character deals with the death of Drusilla. This author’s play *Caligula* is often paired with his essay “The Myth of Sisyphus”. A novel by this author is set in the city of Oran [aw-rahm], where Dr. Bernard Rieux [ryoo] is trying to control an epidemic. Name this author born in French Algeria who wrote *The Plague*.

Answer: Albert Camus [al-bair kah-moo]

19. The radii named after this person are typically measured in hundreds of pico-meters [PEE-koh-“meters”] and are contrasted with the covalent radius by the fact that his radius applies to atoms that are not bonded. The magnitude of the force named for this person equals the Hamaker [HAM-uh-kur] constant times the product of two radii divided by the sum of two radii times 6 times distance squared. The equation named for this person has a parameter that adjusts for volume and another parameter that adjusts for pressure caused by inter-molecular attraction and repulsion. Name this Dutch scientist whose equation is an improvement over the ideal gas law.

Answer: Johannes Diderik van der Waals

20. This U.S. president’s Secretary of the Treasury designed the Department of the Interior, oversaw the creation of the Independent Treasury, and increased trade by replacing the Black tariff with a reduced system named after that secretary, the Walker tariff. This president eventually talked his own Secretary of State—James Buchanan—out of this president’s earlier promise that was exemplified by the slogan “Fifty-four forty or fight”, leading to a settlement over the Oregon Territory. Name this president of the United States during the Mexican-American War who was considered a “dark horse”.

Answer: James K(nox) Polk

This is the end of regulation. Check the score. If it is tied, proceed to overtime tossups. If it is not tied, the game is over.

^{TB}21. This major key signature is used for “Autumn” in Antonio Vivaldi’s *The Four Seasons*, though that piece also switches into this key’s relative minor. Some composers believe that this key represents the outdoors well, and it is the key of Beethoven’s *Pastoral Symphony*. C major, G major, and this key are the only major keys whose tonic chords can be played using only white keys on the piano. This key is the home key of the English horn, which makes that instrument a perfect fifth lower than instruments that are keyed in C major. Name this major key whose relative minor is D minor and whose only flat is B flat.

Answer: F major [do not accept or prompt on “F minor”, “F sharp”, or “F flat”]

If the score is still tied, continue. If it is not tied, the game is over.

^{TB}22. A city near this state’s border with Kentucky is the location of Austin Peay [pee] State University. Another city in this state is the location of the Sunsphere that was built for its 1982 World’s Fair. That city, which is the site of this state’s flagship state university, is near Oak Ridge National Laboratory. Another city in this state has many blues clubs along Beale Street and is the location of Graceland, the estate of Elvis Presley. Another city in this state houses the Grand Ole Opry House and the Country Music Hall of Fame. Name this state that contains Clarksville, Knoxville, Memphis, and Nashville.

Answer: Tennessee

If the score is still tied, continue. If it is not tied, the game is over.

^{TB}23. During this month in 2011, the United States killed Osama bin Laden. During this month in 1970, four students were killed at Kent State University. Mexico celebrates its victory over the French Empire during this month. Mother’s Day and Memorial Day are celebrated during this month. Name this fifth month of the year.

Answer: May

There are no more overtime questions available. If the score is still tied, contact the control room for further instructions. If it is not tied, the game is over.