Scobol Solo 2019
Championship I (Phase I: Questions 1-20)

1. By simplifying an expression with the wave·vector and planes, the Laue [LAO-uh] equations can be reduced to this law when the planes exist. This law gives a condition when interference will be constructive during Rayleigh scattering. This law uses a distance d that equals the distance between planes of a crystal. This law also uses the wavelength of an incident wave or the de Broglie [duh BROY-lee] wavelength of an incident particle. This law is expressed by the equation $2d\sin\theta = n\lambda$ ["two D sine theta equals n lambda"]. Name this law used to predict scattering caused by a crystal.

   Answer: <u>Bragg</u>'s law [or <u>Wulff-Bragg</u>'s condition]

2. In this novel, a superintendent and teacher follow a girl into a public-house, or bar, called Pegasus's Arms. While in the bar, the teachers meet Mr. Sleary, who runs a circus. The student they follow in this novel has the real name Cecilia, but she is commonly called Sissy. Part of this novel is set at Bounderby's bank in Coketown. This novel opens with the superintendent saying "Now, what I want is, Facts. Teach these boys and girls nothing but Facts." That superintendent is Mr. Thomas Gradgrind. Name this short novel by Charles Dickens.

   Answer: <u>*Hard Times*</u>

3. This creature drank the milk of Audumla [aw-DM-lah], the primordial cow who licked away salt to reveal Búri. This creature was formed when fire from Muspelheim [MOOSS-pul-hym] mixed with ice from Niflheim [NIFF-ul-hym]. This creature's eyebrows were used to protect humanity by forming a fence around Midgard. The Poetic Edda states that this creature lived when there was no sea or waves or heaven. The frost giants descend from this primordial creature. Name this hermaphroditic [hur-maf-roh-DIT-ik] giant from Norse mythology whose body was used to fashion the Earth after he was killed by the brothers Odin, Vili and Vé.

   Answer: <u>Ymir</u> [EE-mir] [or <u>Aurgelmir</u> or <u>Brimir</u> or <u>Blain</u>; prompt on frost <u>giant</u> or <u>jötunn</u>]

4. This battle reversed a successful defense by Basil Apocapes [ah-poh-KAH-peess] that occurred 17 years earlier in the same location. The losing side in this battle trusted Andronikos Doukas [ahn-droh-NEE-kohss DOO-kahss], who fled with his troops after starting a rumor that the emperor had died. Just before this battle, the losing side sent half their forces under General Joseph Tarchaneiotes [tar-kan-ay-OH-teess] to Lake Van. This battle took place near the Murat River, which is a branch of the Euphrates [yoo-FRAY-teez]. Emperor Romanos IV was captured during this battle, which was a major blow against the Byzantine Empire in Anatolia. Name this 1071 victory for Alp Arslan, the great-grandson of Seljuk.

   Answer: Battle of <u>Manzikert</u>

5. A painting whose nickname states that Madonna is shown with this type of flower [pause] was originally credited to Albrecht Dürer but was probably painted by his assistants. These flowers, which are not water lilies, lined several paths at Giverny [zhiv-air-nee], and Claude Monet painted a field of yellow ones of them. Vincent van Gogh's painting of these flowers sold for more than his sunflower painting and uses several shades of purple. Georgia O'Keeffe painted a series of these flowers and denied that they represent female genitalia. Name this type of flower, of which O'Keeffe painted three black ones.

Answer: irises

6. Experiments with the ATLAS detector have attempted to find the lightest particle predicted by a property with this name, which could explain dark matter. That particle, the [pronounce carefully with the 'S'] top squark, is predicted by a property with this name and could explain the mass of the Higgs boson [BOH-zahn]. That property with this name provides a way to pair up all fundamental fermions ["FAIR"-mee-ahnz] with a fundamental boson. Another property with this name describes the combination of charge, parity, and time reversal, or "CPT", in physical laws. Properties with this name correspond to conservation laws, according to Noether's [NOY-tur'z] theorem. Give this term that can also be used for the property of an object matching its own mirror image.

Answer: symmetry or being symmetric(al) [accept supersymmetry before "parity"]

7. All of this country's Muslim ministers, including four cabinet ministers and five state ministers, resigned their positions in June 2019 following demands made by Buddhist monks. This country held its first-ever presidential debate in October 2019 after President Maithripala Sirisena ["my-three"-PAH-lah sir-ee-SAY-nuh] was unable to move the elections back to 2020. The National Thowheeth Jama'ath [THOH-heeth juh-MAHTH] carried out a series of attacks in this country in 2019, targeting Christians. Those attacks killed 259 people during Easter. Name this former home of the Tamil Tigers whose capital is Colombo.

Answer: (Democratic Socialist Republic of) Sri Lanka [or Sri Lanka (Prajatantrika Samajavadi Janarajaya)]

8. One of the items in this novel is a silk box containing 12 gauze flowers. Also in this novel, a character tells his cousin not to throw flowers into water because they will get spoiled, recommending that they should be buried in a bag so they can be returned into earth. In this novel, a normally inanimate object begs a Buddhist priest and Taoist priest to be taken by them to see the world. The main character of this novel has a piece of jade in his mouth. Name this 18th-century work by Cao Xueqin [tsao shway-chyin], one of China's Four Great Classical Novels.

Answer: *Dream of the Red Chamber* [or *The Story of the Stone* or *Hongloumeng* or *Red Chamber Dream* or *A Dream of Red Mansions*; prompt on *Red Chamber*]

9. An opera by this composer ends with a duet whose title means "I gaze at you, I possess you." This composer wrote that duet, "Pur ti miro, pur ti godo", for the protagonist and her lover, Nerone [neh-ROH-nay]. Another opera by this composer, based on a libretto by Alessandro Striggio [STREED-joh], features the love song "Rosa del ciel" [ROH-zah del chee-EL] and the aria "Possente spirto e formidabil nume" [pohss-SEN-tay SPEER-toh eh for-mee-DAH-beel NOO-may]. After that song, this composer's directions tell the title character to play the lyre, which puts Caronte to sleep. Because of that work, this composer is often regarded as the first opera composer. Name this composer of *The Coronation of Poppea* [pohp-PAY-ah] and *L'Orfeo* [lor-FAY-oh].

Answer: Claudio (Giovanni Antonio) Monteverdi

10. This leader's fiscal system is sometimes called "capitatio-jugatio" [kah-pee-TAH-tee-oh yoo-GAH-tee-oh] based on the names of taxes on people and land. This leader issued an Edict on Maximum Prices that became so unpopular that administrators ignored it. This person came to power after accusing Aper of murdering Aper's own son, Numerian. This leader often ruled from Nicomedia [nik-oh-"media"], and he eventually lived in a large building in Split in what is now Croatia. This person gained power after the Battle of the Margus River in 285 and the death of Carinus. Name this Roman Emperor who ruled with Maximian and as part of a tetrarchy [TET-rar-kee] and who tried to eliminate Christianity.

Answer: Diocletian [or Gaius Aurelius Valerius Diocletianus or Diocles]

11. A 2019 study of the "stress" named for this substance showed that it increased yeast longevity. In poly·morpho·nuclear cells, this substance connects the nucleus lobes. This substance and serine proteases [SAIR-een PROH-tee-"aces"] are released by neutro·phils and kill microbes. One of the topics of epi·genetics is the so-called "remodeling" of this substance. This substance is considered active when its proteins are acetyl·ated and its DNA is exposed. This fiber contains nucleo·somes, which in turn contain a histone. Name this fiber made up of protein, RNA, and DNA which is used to make chromosomes.

Answer: chromatin

12. This person wrote a book on socialism, concluding "All efforts to realize Socialism lead only to the destruction of society." That 1922 book stated that people who want society to exist should accept "private ownership in the means of production". This person expanded on those thoughts in a 1949 book that stated "Socialism is not an alternative to capitalism; it is an alternative to any system under which men can live as human beings" and which emphasized praxeology [prak-see-AH-luh-jee]. This person taught Murray Rothbard, Oskar Morgenstern, and Friedrich Hayek. Name this Austrian-school economist who wrote *Human Action*.

Answer: Ludwig (Heinrich Edler) von Mises [vahn MEE-zuss]

13. One poem by this writer begins "Lord: it is time. The summer was immense." In the last stanza of that poem, this writer mentions people who have no house now and are alone now. In addition to that poem, "Autumn Day", this author wrote a poem about an animal that paces in cramped circles and sees "constantly passing bars". A collection of poems by this writer asks "Who, if I cried out, would hear me among the hierarchies of angels?". That collection is named for the castle on the Adriatic Sea where this poet starting writing them. This person also wrote letters of advice to Franz Xaver Kappus, who was a young poet. Name this writer of "The Panther" and *Duino Elegies.*

Answer: Rainer Maria <u>Rilke</u> [RIL-kuh]

14. Control over the most populous city in this ancient region changed hands after Pheles [FEE-leez] was killed by Ethbaal [eth-BAH-ahl]. The language spoken in this ancient region was influenced by Berber languages to become the Punic [PYOO-nik] language and was a descendant of the Canaanite [KAY-nuh-"night"] language. The Biblical Jezebel is described as Sidonian [sih-DOH-nee-un] because she was from one of the cities in this region. The most populous city in this region, which supposedly was the birthplace of Dido ["DIE"-doh] before she went to Carthage, was Tyre. Name this region, famed for its shipping and trading, that was located in what is now Lebanon.

Answer: <u>Phoenicia</u> or <u>Syrophoenicia</u> [prompt on <u>Syria</u> or <u>Lebanon</u> or <u>Canaan</u> or <u>Sidonia</u> or <u>Tyre</u>]

15. A test named for this process is similar to a leak down test and can determine whether engine valves are burned out. A ratio named for this process equals the sum of displacement volume plus clearance volume, all over clearance volume. That ratio measures the strength of a combustion engine. In a diesel engine, this process leads to fuel ignition. When this process is adiabatic [ay-dee-uh-BAT-ik], there is an increase in temperature. This process is due to inward stress. Name this process that increases gas pressure by decreasing volume.

Answer: <u>compression</u> [accept <u>compress</u>ing or being <u>compressed</u>]

16. Some incidental music and a suite by this composer were inspired by Nina's exclamation "How beautiful the new waltz is!" in Mikhail Lermontov's [LER-mun-tawff's] *Masquerade.* This composer used increasing speed in the *Allegro marcatissimo* [ahl-LEG-roh mar-kah-TEESS-see-moh] section of his *Toccata in E-flat minor.* The best-known work by this composer, which became very popular in the United States in 1948, is taken from the last act of his ballet *Gayane* [gah-YAH-neh]. Despite being born in what is now the country of Georgia and living almost his entire life in the Soviet Union, this person is considered an Armenian hero. Name this composer of the "Sabre Dance".

Answer: Aram (Ilyich) <u>Khachaturian</u> ["AIR"-um kah-chuh-TUR-ee-un]

17. This writer and a photographer portrayed the Gudger, Ricketts, and Woods families, whom they met on an assignment to report on Alabama tenant farmers in 1936. The photographer who worked with this writer was Walker Evans. A posthumously published book by this writer has a recent version that begins with the protagonist dragging the decaying body of John the Baptist, while the original version begins with a short joyful section titled "Knoxville: Summer, 1915". That novel is based on the death of this author's father in a car accident. Name this author of *Let Us Now Praise Famous Men* and *A Death in the Family*.

Answer: James <u>Agee</u>

18. This country is the location of the Moremi Game Reserve, which is next to the Okavango Delta, where water from its namesake river evaporates. Gemsbok [GEMZ-bahk] National Park, which is the northeast part of Kgalagadi [kug-lug-AH-dee] Trans·frontier Park, is in this country, though much of it is now used for fracking. This country and Namibia dispute control of Sedudu [sed-oo-doo] Island. This country is south of the Caprivi [kuh-PREE-vee] Strip. Much of this country is taken up by the Kalahari Desert. Name this country that borders Zimbabwe and South Africa and whose capital is Gaborone [gab-uh-ROH-nay].

Answer: (Republic of) <u>Botswana</u> [or (Lefatshe la) <u>Botswana</u>]

19. William Lucas explained why these constructs often do not have stable sets, which are also known as von Neumann-Morgenstern [vawn NOY-mun MOR-gun-stern] solutions. James Friedman wrote about the "super-" types of these constructs, which strengthened the Folk theorem describing them. The Folk theorem states that feasible and enforceable outcomes of these constructs are part of an equilibrium when these constructs are repeated. One of the major goals in studying these constructs is to find a mini·max solution, which is often achieved using a mixed strategy. Name these constructs that, when they are non-cooperative and opposing strategies are known, can be solved by a Nash equilibrium.

Answer: <u>games</u>

20. This project published a journal called *The Harbinger*. The founder of this project eventually stated "I can now understand how a man would feel if he could attend his own funeral." This project lost hope when its un·insured Phalanstery [fuh-LAN-stuh-ree] suddenly burned down while still under construction. A few months earlier, a smallpox outbreak had slowed this project down. This project occurred in what was then a rural area and is now the West Roxbury neighborhood of Boston. Inspired by the writings of Charles Fourier [sharl fur-yay], this endeavor was run by George Ripley. Name this utopian experiment in communal living that was supported by many Transcendentalists.

Answer: <u>Brook Farm</u> (Institute of Agriculture and Education) [or the <u>Brook Farm</u> Association for Industry and Education]

This is the end of the packet.