

2015 Virginia Tech Academic Competition Occasion (VTACO)

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Packet 10: Tossups

1. This man depicted a Christian knight as well as the Adoration of the Shepherds in his *Modena Triptych*. The left foreground of another painting by this artist sees the three Marys look on in distress at the title figure, who is dressed in bright red. This artist of *The Disrobing of Christ* depicted nudes receiving white robes of salvation in a painting whose foreground is dominated by St. John. In addition to creating the *Opening of the Fifth Seal*, this man's most famous work depicts St. Stephen and St. Augustine descending on the funeral of Don Gonzalo Ruiz. For 10 points, name this painter of *The Burial of the Count of Orgaz* who was originally from Crete.

ANSWER: El Greco [or Doménikos Theotokópoulos]

2. One episode of this show sees the wife of Maseo abducted by Chien Na Wei. One character on this show has defeated Edward Fyers and Anthony Ivo, the latter of whom killed Shado. This show's protagonist has frequently come into conflict with dealers of the drug Vertigo. That same protagonist of this show failed to prevent the Undertaking, but he did defeat an army of *mirakuru*-injected soldiers assembled by Slade Wilson. Supporting characters in this show include Roy Harper, John Diggle, and Felicity Smoak, and its central character's real name is Oliver Queen. For 10 points, name this CW about a DC Comics super-archer.

ANSWER: Arrow

3. This event precipitated from Edward Garrick's insulting of Hugh White and his harassment of John Goldfinch over an unpaid bill. This event saw the deaths of Samuel Gray and James Caldwell, and Hugh Montgomery and Matthew Kilroy were the only participants found guilty after this event. In the trial after this event, prosecutor Robert Paine faced a defense including Josiah Quincy and John Adams, and that trial resulted in the acquittal of Thomas Preston. For 10 points, name this 1770 event occurring in response to the Townshend Acts in which British Troops opened fire on men like Crispus Attucks.

ANSWER: Boston Massacre [or The Bloody Massacre in King Street; or The State Street Massacre]

4. This man wrote an essay exploring various myth systems entitled "Myth in Primitive Psychology." This man wrote an essay on "Baloma" spirits, and he disproved the universality of the Oedipus complex in one work. In addition to *Magic, Science, and Religion*, this man wrote that cultural institutions fill seven basic human needs in another of his works. This author of *Sex and Repression in Savage Society* studied the exchange system known as the Kula Ring among the Trobriand islanders in his most famous work. For 10 points, identify this Polish anthropologist behind *Argonauts of the Western Pacific*.

ANSWER: Bronislaw Malinowski

5. The Precambrian Arkarua is tentatively classified in this taxon. Members of this taxon contain a network of calcite crystals along their skeletons known as ossicles, which collectively form the stereom. The madreporite is a perforated plate connected to the stone canal in these organisms, which usually move using five rows of tube feet. Some organisms in this phylum have a mouthparts known as Aristotle's Lantern. Along with Chordata, members of this phylum are deuterostomes, and all members have radial symmetry. For 10 points, name this phylum that includes animals like sea cucumbers and starfish.

ANSWER: Echinodermata [or Echinoderms]

6. This leader's general Pyotr Rumyantsev signed the Treaty of Kuchuk Kainarji after forces loyal to this leader defeated the Ottomans at the Battle of Chesma. This monarch put Stanislaw Poniatowski on a neighboring throne, and this ruler's reign also saw the construction of fake villages by Gregory Potemkin. This ruler's administration saw a rebellion of Yaik Cossacks led by Pugachev and three partitions of Poland. Gregory Orlov, helped this leader come to power by killing Peter III. For 10 points, name this patron of Diderot and Voltaire, an "enlightened" empress of Russia.

ANSWER: Catherine the Great [or Catherine II]

7. This man included a speech quartet utilizing the text of Gertrude Stein's poem "The World Is Round" in the second movement of his *Living Room Music*. This man utilized radios in his *Imaginary Landscapes*, and his *Sonatas and Interludes* are written for a prepared piano. A performance of one of this man's pieces set to end in 2640 is currently ongoing in Halberstadt, Germany. In addition to *As Slowly as Possible*, the most famous work of this lover of Merce Cunningham instructs the performer to do nothing for the title amount of time. For 10 points, name this avant-garde composer of 4'33" ("Four Minutes, Thirty-Three Seconds").

ANSWER: John Cage

8. The invertebrate rudists and belemnites first proliferated during this geologic period, and the Morrison formation was created during this period following the retreat of the Sundance Sea. The rise of batholiths in American Cordillera marked the Nevadan Orogeny during this period, and Gondwana and Laurasia were formed upon the breaking up of Pangaea during this geologic period. This period saw the formation of the Solnhofen limestone, which preserved many *Archaeopteryx* fossils. For 10 points, name this second period of the Mesozoic era that occurred between the Triassic and Cretaceous periods, noted for its dinosaurs.

ANSWER: Jurassic Period

9. One nickname for this body of water is the "Older sister of the Sister Lakes," with the sister lake being Lake Khövsgöl ("HOOVS-gool"). In historical Chinese texts, this lake was also known as the "North Sea." The Small Sea Strait is on the western portion of this lake, and it forms a passage to the island of Olkhon. The rivers of Sarma, Barguzin, and Selenga flow into this lake, while the only river that flows out of it is a tributary of the Yenisei. This lake is the origin of the Angara. For 10 points, name this crescent-shaped lake in eastern Russia, the oldest and deepest lake in the world.

ANSWER: Lake Baikal

10. This battle saw fighting at Mamayev Kurgan Hill, and a heavily fortified location during this battle was known as "Pavlov's House." This battle was preceded by the Case Blue offensive, which sought to capture important oil fields. During this battle, Major Erwin König was allegedly killed by Vasily Zaytsev, a sniper who killed 225 enemies over the course of this battle. During this battle, Friedrich Paulus was forced to surrender after his army was encircled during Operation Uranus, which was partially orchestrated by Georgy Zhukov. For 10 points, name this World War II battle fought near the Volga.

ANSWER: Battle of **Stalingrad**

11. One character in this work dies in Bangkok in the presence of his wife Marie-Claude after marching to the Cambodian border. Another character in this work wears her grandfather's bowler hat during her sexual encounters. The protagonist of this work has a son named Šimon from a previous marriage, and this novel sees the pig Mefisto befriend the dog Karenin, who dies of cancer. In this novel, Franz's lover, Sabina, has an affair with the protagonist, whose wife is Tereza. For 10 points, name this novel depicting the exploits of Tomáš during events like Prague Spring, written by Milan Kundera.

ANSWER: *The **Unbearable Lightness of Being*** [or ***Nesnesitelná lehkost bytí***; or ***L'Insoutenable légèreté de l'être***]

12. A spinning entity exhibiting this phenomenon generates a magnetic field aligned with its axis, an effect known as the London moment. One theory describing this phenomenon is the Ginzburg-Landau Theory. The yttrium-based compound YBCO exhibits this phenomenon, and substances experiencing this phenomenon often form Cooper Pairs due to the electron-phonon interaction. Materials exhibiting this phenomenon completely eject magnetic field lines from their interiors, a phenomenon known as the Meissner Effect. For 10 points, name this phenomenon governed by BCS Theory and exhibited by materials with zero resistance to electrical flow.

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

13. This modern-day country was the home of the Zagwe and Mudaito dynasties. Robert Napier defeated this nation's emperor Tewodros II at the Battle of Magdala, and General Mengistu established a council known as the Derg in this country. This country achieved victory over Italy at the 1896 Battle of Adowa under the leadership of its Emperor Menelik II. This nation was the home of the Christian Kingdom of Axum, and one of its emperors is revered by Rastafarians. For 10 points, name this eastern African nation whose Emperor Haile Selassie ruled from its capital at Addis Ababa.

ANSWER: Federal Democratic Republic of **Ethiopia**

14. In Judaism, these events are divided into *kiddushin* and *nissuin*, and they see the reading of the *Sheva Brachot*. In Islam, these events are preceded by the paying of a *mahr* and are themselves known as *Nikah*. In Hinduism, these events involve walking around a fire seven times. During these events, Jews are made to sign a *ketubah* and stand under a *chuppah*, after which a glass is broken. Jesus turned water into wine at one of these events at Cana, leading them to become one of the seven Catholic sacraments. For 10 points, name these events that usually involve the exchanging of rings.

ANSWER: **Weddings** [or **Marriages**; accept clear-knowledge equivalents]

15. One book in this work attributes the construction of the Tower of Babel to Nimrod's invention of kings. One character in this work transforms into a toad after deceiving Uriel into giving him directions. In this work, Michael shows another character everything that will happen to mankind up to the Great Flood, and Moloch, Mammon, and Belial debate in Pandemonium. In this epic, Beelzebub subordinates to the central character, who travels through the Abyss into the material world after having proclaimed that it is "better to reign in Hell than serve in Heaven." For 10 points, name this epic that sees Satan trick Adam and Eve, a work of John Milton.

ANSWER: Paradise Lost

16. One variant of this laboratory technique used for compounds unstable at high temperatures uses a Kugelrohr apparatus, while another variant uses a Perkin Triangle. Those types are the "short path" and "vacuum" types. This technique fails for solutions that deviate from Raoult's Law, azeotropes. A type of this technique separates liquids with similar boiling points and was developed by Fritz Haber; that is the "fractional" variety. For 10 points, name this technique of separating mixtures based on the volatility differences of their constituents.

ANSWER: Distillation

17. This architect collaborated with James Freed to design the Javits Center. This architect utilized a large reflecting pool in his Christian Science Center, and he worked with Henry Cobb to design the Hancock Tower. This architect used five steel columns meant to resemble bamboo shoots for his Bank of China Tower. Some of this man's better-known works include the JFK Presidential Library and the east wing of the National Gallery. For 10 points, name this designer of the Rock and Roll Hall of Fame who designed the glass pyramid outside of the Louvre.

ANSWER: Ieoh Ming Pei

18. This figure had a son named Larynx, and this figure's nephew invented the saw. This figure threw that nephew, Perdix, off the Acropolis, after which this man was exiled to the island of Crete to serve King Minos. This figure built a wooden cow costume so that Minos' wife, Pasiphae, could mate with a bull given to Minos by Poseidon, which resulted in the birth of the Minotaur. This man then imprisoned the Minotaur in another of his creations, the Labyrinth. For 10 points, name this master craftsman of Greek myth whose son Icarus fell to his death after flying too close to the sun.

ANSWER: Daedalus

19. One of this author's poems begins "It so happens I am sick of being a man." This author of "Walking Around" addressed poems "to a naked beauty" and "to a large tuna in the market" in one collection. One of this author's poems ends with the line "It is the hour of departure. Oh, abandoned one!" and contains the line "in you everything sank!" This author of *Elemental Odes* addressed a "mason high on your treacherous scaffolding" and a "potter wasted among his clays" in "The Heights of Machu Picchu," which appears in his *Canto General*. For 10 points, name this Chilean poet of *Twenty Love Poems and a Song of Despair*.

ANSWER: Pablo Neruda [or Ricardo Eliécer Neftalí Reyes Basoalto]

20. This author wrote about Jig and "The American" drinking Anis del Toro in a Madrid train station in a short story that appears in his collection *Men Without Women*. In one of his novels, Lady Brett Ashley's affair with Robert Cohn angers Jake Barnes. In another of his novels, Pilar is the wife of Pablo, the leader of a guerrilla group with which Robert Jordan is working. Another of his novels is set during World War I and depicts the relationship between Catherine Barkley and Frederic Henry. For 10 points, name this American author of the short story "Hills Like White Elephants" who also wrote novels like *The Sun Also Rises*, *For Whom the Bell Tolls*, and *A Farewell to Arms*.

ANSWER: Ernest Hemingway

TB. Instead of Argon, this element is used as a shielding gas in gas tungsten arc welding for substances with high heat conductivity. One spectral series associated with this element is the Pickering series, but its primary yellow spectral lines were first observed by Jules Janssen. Runaway fusion of this element in the core of low mass stars results in a namesake "flash." One of this element's isotopes constitutes a Rollin film, which are known to "creep" along surfaces as a superfluid. An alpha particle is identical to a nucleus of this atom. For 10 points, name this lightest noble gas with atomic number two.

ANSWER: Helium

Packet 10: Bonuses

1. They are oftentimes represented by a single-column matrix, and they are added using the parallelogram rule.

For 10 points each:

[10] Name these objects that have both a magnitude and direction, contrasted with scalars.

ANSWER: Vectors

[10] This vector operation is defined geometrically by multiplying the magnitudes of the vectors and the cosine of the angle in-between them. However, in matrix form, one can simply add the products of their components.

ANSWER: Dot Product

[10] In a scalar triple product, the cross product of two vectors is dotted with a third to calculate the volume of one of these geometric figures.

ANSWER: Parallelepiped

2. Answer the following about Islamic dynasties, for 10 points each.

[10] The Umayyad caliphate consisted of members of this sect of Islam, which did not consider Ali and his descendants rightful successors to Muhammad. It is contrasted with Shia Islam.

ANSWER: Sunni Islam [or Sunnites]

[10] This dynasty rose to power after its founder defeated the Umayyad Marwan II at the Battle of the Zab. Its ruler Al-Mansur relocated its capital to Baghdad.

ANSWER: Abbasid caliphate/dynasty

[10] This later dynasty ruled a Persian Empire from 1501 to 1736. It was founded by Shah Ismail I, and it established the Twelver school of Shi'a Islam.

ANSWER: Safavid dynasty

3. NOTE TO MODERATOR: DO NOT REVEAL THE LATTER PORTION OF THE ANSWER TO THE FIRST PART OF THIS BONUS.

The last person to hold this title was Ludovico Manin. For 10 points each:

[10] Name this position once held by both Marco and Agostino Barbarigo, a title given to the leader of a "Most Serene Republic."

ANSWER: Doge of Venice

[10] The doge was the ruler of this northern Italian city famed for its canals. Its fleet would constitute a significant portion of the Holy League that defeated the Ottomans at the Battle of Lepanto.

ANSWER: Venice [or Venezia; or Venexia; or Vinegia]

[10] This blind Doge took part in the Sack of Constantinople during the Fourth Crusade, but he and the forces of Baldwin I would later be defeated at the Battle of Adrianople.

ANSWER: Enrico Dandolo [or Henry Dandolo; or Henricus Dandolo]

4. When humans came to his realm, he weighed their hearts on the Scales of Justice against the Feather of Truth. For 10 points each:

[10] Name this Egyptian jackal headed god of embalming and the underworld.

ANSWER: **Anubis**

[10] If a person's heart was heavier than the feather, it was fed to this creature. It was a mixture of a crocodile, hippopotamus, and lion.

ANSWER: **Ammit**

[10] The descriptions of these practices comes from this Egyptian text. It also contained a list of spells useful for travelling through the afterlife.

ANSWER: **Book of the Dead**

5. The policy "He who does not work, does not eat" was instituted during the "starving time" of this colony. For 10 points each:

[10] Name this first permanent English settlement of the New World.

ANSWER: **Jamestown**

[10] Jamestown was torched by a rebellion started by this frontiersman, who was angered by frequent Native American attacks and a Virginia Governor's "incorrigibly corrupt, inhumanely oppressive" policies.

ANSWER: Nathaniel **Bacon**

[10] This Virginia Governor's policies incited Bacon's Rebellion. This man was appointed by Charles I and replaced Sir Francis Wyatt.

ANSWER: William **Berkeley**

6. A renewed interest in this school of thought came about through positivist critics Wilfrid Sellars and W. V. O. Quine. For 10 points each:

[10] Name this school of philosophy espoused by John Dewey, dubbed "a new name for some old ways of thinking" in the seminal work of another of its proponents.

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

[10] This author of *The Varieties of Religious Experience* and *Essays in Radical Empiricism* gave the aforementioned description of the philosophy in his book *Pragmatism*.

ANSWER: William **James**

[10] This other thinker advocated for pragmatism in works like "The Fixation of Belief" and "How to Make our Ideas Clear," both of which appeared in *Popular Science Monthly*.

ANSWER: Charles Sanders **Peirce** ("PURSE" but be lenient)

7. NOTE TO MODERATOR: DO NOT READ THE ALTERNATE ANSWER TO THE FIRST PART OF THIS BONUS ALOUD.

Details of this ruler's life are collected in the works of the Welsh scholar Asser. For 10 points each:

[10] Name this ruler, whose defense of his kingdom against the Vikings led him to become the only English king with the epithet "the Great."

ANSWER: **Alfred** the Great [or **Alfred** of Wessex]

[10] Alfred codified his laws in this manuscript. It also included laws passed by the earlier King Ine, and William the Conqueror would later create a similar-sounding code.

ANSWER: **Doom Book** [or **Domboc**]

[10] While Alfred styled himself as "King of the Anglo-Saxons," he truly only ruled this southern English kingdom.

ANSWER: **Wessex**

8. Answer the following about early American poetry, for 10 points each.

[10] This female poet wrote that “my hope and treasure lies above” in her “Verses upon the Burning of our House.” She also penned the poetry collection *The Tenth Muse Lately Sprung Up in America*.

ANSWER: Anne **Bradstreet**

[10] This African-American woman composed the poem “To His Excellency General Washington” as well as the collection *Poems on Various Subjects, Religious and Moral*.

ANSWER: Phyllis **Wheatley**

[10] This “poet of the American Revolution” created such poems as “The Indian Burying Ground” and “The Wild Honeysuckle.”

ANSWER: Philip **Freneau**

9. It comes after the G2 phase. For 10 points each:

[10] Name this form of cell division that produces two daughter cells, each genetically identical to the parent cell.

ANSWER: **Mitosis**

[10] This phase in mitosis sees the condensed chromosomes line up their centromeres at the center of the cell. It is the phase during which karyotyping is typically performed.

ANSWER: **Metaphase**

[10] This is the protein structure to which microtubules constituting the spindle apparatus attach during metaphase, allowing them to pull sister chromatids apart.

ANSWER: **Kinetochores**

10. The protagonist of this novel saves Weena from drowning. For 10 points each:

[10] Name this novel, taking place primarily in the year A.D. 802,701, focusing on the conflict between the flesh-eating Morlocks and the peaceful Eloi.

ANSWER: *The* **Time Machine**

[10] This British author, who wrote about the scientist Griffin in *The Invisible Man* and about a Martian invasion in *The War of the Worlds*, wrote *The Time Machine*.

ANSWER: Herbert George **Wells**

[10] This other Wells novel, which is narrated by Edward Prendick, features Montgomery as the assistant to the title scientist, who creates human-like creatures via the vivisection of various animals.

ANSWER: *The* **Island of Doctor Moreau**

11. Name some Venetian painters, for 10 points each.

[10] This painter depicted a dressed Aphrodite Pandemos opposite the nude Aphrodite Urania in his *Sacred and Profane Love*. He also depicted a dog sleeping on a bed next to the title character of his *Venus of Urbino*.

ANSWER: **Titian** [or **Tiziano** Vecelli; or **Tiziano** Vecellio]

[10] This painter depicted Saint Mark preventing the execution of the title character in his *The Miracle of the Slave*. He also created a work centering on a woman reaching into a basket that depicts the title scene on a diagonal on the left, his version of *The Last Supper*.

ANSWER: **Tintoretto** [or Jacopo **Comin**; or Jacopo **Robusti**; prompt on “Il Furioso”]

[10] This teacher of Titian depicted a breastfeeding woman amid a storm in his *The Tempest* and the title characters in thought in his *The Three Philosophers*. Titian would complete this man's *Sleeping Venus*.

ANSWER: **Giorgione** [or Giorgio **Barbarelli** da Castelfranco]

12. The Elephant Butte Dam lies on it, and the largest tributary of this body of water is the Rio Conchos. For 10 points each:

[10] Name this river that forms the border between Mexico and Texas.

ANSWER: **Rio Grande** [or **Rio Bravo** del Norte]

[10] This Southwestern city sits on the Rio Grande across from Ciudad Juarez and is the home of the annual Sun Bowl.

ANSWER: **El Paso**

[10] This national park near the city of Alpine contains 118 miles of the Texas-Mexico border. It is the largest protected area of the Chihuahuan Desert in terms of ecology and topography.

ANSWER: **Big Bend** National Park

13. He included the movement "Alla Marcia" in his *Karelia Suite*. For 10 points each:

[10] Name this composer who originally intended his *Kalevala*-inspired *Lemminkäinen Suite* to be the mythical opera *Veneen Luominen*.

ANSWER: Jean **Sibelius**

[10] This is perhaps the most important work of Sibelius. This nationalistic symphonic poem, which was reworked into the hymn *Be Still, My Soul*, was frequently renamed to avoid Russian censorship.

ANSWER: **Finlandia**

[10] This most-famous movement of Sibelius' *Lemminkäinen Suite* sees the cor anglais represent the title animal swimming around the island of the dead.

ANSWER: *The* **Swan of Tuonela**

14. One song off this album samples the song "Life's Been Good," by Joe Walsh, and another features Nate Ruess and is an apology to the artist's mother. For 10 points each:

[10] Name this album which includes the tracks "So Far..." and "Headlights."

ANSWER: *The* **Marshall Mathers LP 2**

[10] In the chorus of this track off *The Marshall Mathers LP 2*, the artist calls himself "Dale Earnhardt of the trailer park" and asks "whose arms are long enough to slap-box" before proclaiming that he's "beginning to feel like" the title entity.

ANSWER: "**Rap God**"

[10] Marshall Mathers goes by this stage name, which he used on *The Marshall Mathers LP 2*, as well as his other work, such as his song "Lose Yourself" and movie *8 Mile*.

ANSWER: **Eminem** [accept The Real **Slim Shady**]

15. This man designed the TWA Terminal at the John F. Kennedy International airport. For 10 points each:

[10] Name this man, who also designed the Kresge Auditorium at MIT and the main terminal for the Dulles International Airport.

ANSWER: Eero **Saarin**

[10] This is perhaps Saarinen's most famous design. It is contained in the Jefferson National Expansion Museum in Missouri, and it stands 630 feet tall overlooking the Mississippi River.

ANSWER: St. Louis **Gateway Arch** [accept **St. Louis Arch**]

[10] Saarinen also developed a chair that was used in the original Star Trek television series named after this flower.

ANSWER: **Tulip** Chair

16. Macbeth exclaims "Out, out" to a "brief" one of these entities. For 10 points each:

[10] Name these entities. The poem "First Fig" describes one that "burns at both ends" that "will not last the night" but does give "a lovely light!"

ANSWER: Candles

[10] This winner of the 1943 Robert Frost Medal began one of her sonnets "Euclid alone has looked on Beauty bare" in addition to including "First Fig" in her *A Few Figs from Thistles*.

ANSWER: Edna St. Vincent Millay

[10] The 1989 Robert Frost Medal winner, Gwendolyn Brooks, penned this poem about a group of people who "Lurk late," "Jazz June," and "Die soon."

ANSWER: "We Real Cool"

17. The simplest of example of this electrical component consists of two parallel plates. For 10 points each:

[10] Name these electrical components that work by storing energy in an electrostatic field. Their characteristic quantity is measured in Farads.

ANSWER: Capacitors

[10] These materials can be used between the plates of capacitor to increase the strength of the electrostatic field. A perfect vacuum has a value of one for their namesake constant, also known as permittivity.

ANSWER: Dielectrics

[10] Capacitors can be used to create the passive variety of these devices. In audio setups, these devices can be used to direct only appropriate frequency signals to either the tweeter or subwoofer.

ANSWER: Filters

18. He compared love to a chemical reaction in his novel *Elective Affinities*. For 10 points each:

[10] Name this German author who wrote a play in which the title character loves Gretchen and makes a deal with Mephistopheles, his *Faust*.

ANSWER: Johann Wolfgang von Goethe ("GURT-uh" but be lenient and tell them for future reference)

[10] The title character of this Goethe novel kills himself to resolve the love triangle among himself and the married couple of Albert and Lotte.

ANSWER: *The Sorrows of Young Werther* ("VARE-tare")

[10] Goethe also wrote about this character's *Apprenticeship* and *Journeyman Years* in two of his novels. Both names are required.

ANSWER: Wilhelm Meister

19. A court case ruled that the states could not be forced to participate in its Medicaid expansion under penalty of losing current Medicaid funding. For 10 points each:

[10] Name this act, commonly referred to as "Obamacare." Its aims include increasing the quality and affordability of insurance as well as lowering the number of uninsured.

ANSWER: Patient Protection and Affordable Care Act

[10] The aforementioned court case regarding the Affordable Care Act was *National Federation of Independent Business v. [this woman]*. This former Secretary of Health and Human Services was replaced by Sylvia Mathews Burwell in 2014.

ANSWER: Kathleen Sebelius

[10] Sebelius had earlier served as the governor of this state from 2003 to 2009. This state's current governor is the Republican Sam Brownback.

ANSWER: Kansas

20. His discoveries provided support for the germ theory of disease, and he developed a vaccine for anthrax. For 10 points each:

[10] Name this French chemist and microbiologist who also lends his name to a technique of treating milk and wine in order to prevent bacterial contamination.

ANSWER: Louis **Pasteur**

[10] Pasteur also developed a vaccine against this disease with Emile Roux, which he first administered on the nine-year-old Joseph Meister.

ANSWER: **Rabies**

[10] Pasteur is considered a founder of bacteriology along with Ferdinand Cohn and this German physician, who names a series of four postulates for establishing a causative relationship between a microbe and a disease.

ANSWER: Robert **Koch**

TB. It was independently derived from kinetic theory by August Krönig and Rudolf Clausius, and it was first formulated as a combination of Boyle's Law and Charles' Law. For 10 points each:

[10] Name this equation most commonly stated as " $P V$ equals $n R T$."

ANSWER: **Ideal Gas** Law

[10] A more accurate model of gas interaction is an equation named for this Dutch scientist. That equation formulated by this scientist accounts for his namesake attractive or repulsive forces between molecules.

ANSWER: Johannes Diderik **van der Waals**

[10] Beyond the critical temperature, this doubly-eponymous modification of the van der Waals equation proves to be a more accurate model. This equation was modified by Soave to model vapor-liquid equilibria.

ANSWER: **Redlich-Kwong** Equation