

Toss-ups

1. The CCC of these systems is proportional to the inverse sixth power of the counterion charge by the Schulze-Hardy rule, which can be derived from DLVO theory. That theory is typically used to study the stability of these systems. The electric potential at the interfacial double layer of these systems gives its zeta potential. They are destabilized through the process of flocculation, and they have continuous and dispersed phases. For 10 points, name these substances that scatter light in the Tyndall effect, which consist of particles of one substance dispersed in another.

ANSWER: **colloids**

2. This composer's collection "Fourteen Songs" ends with *Vocalise*, which is sung by soprano or tenor with no words but the vocalist's vowel of choice. Another of this composer's works begins with octaves of an A, G-sharp, C-sharp motif. That piece, featured in *Morceaux de Fantaisie*, later breaks into four staves and is his *Prelude in C-sharp Minor* or "The Bells of Moscow". This composer wrote 24 variations based on the last *Caprice* of an Italian violin virtuoso. For 10 points, name this Russian composer of *Rhapsody on a Theme of Paganini*.

ANSWER: Sergei Vassilievich **Rachmaninoff**

3. The physical phenomenon of hysteresis is applied to this economic quantity, and the NAIRU model of it was promoted by Milton Friedman. Okun's law states that a 1 percent increase in this quantity leads to a 2 percent decrease in a country's GDP. The Beveridge curve is often used when studying the frictional variety of this phenomenon. This quantity is plotted against inflation on the Phillips curve. For 10 points, name this phenomenon that occurs when an individual is searching for a job but can't find one.

ANSWER: **unemployment** rate

4. After this ship was lost, Operation Cerberus conducted its former partner through the Channel Dash. The Rhine Exercise was the sortie of *Prinz Eugen* and this ship, which fought the Battle of the Denmark Strait with a fleet that departed from Scapa Flow. A shell from this ship penetrated the magazines of *HMS Hood*, prompting *Prince of Wales* and *King George V* to pursue this ship along with a flight of Fairey Swordfish from *HMS Ark Royal*. This sister ship of *Tirpitz* was soon sunk off the coast of occupied France. For 10 points, name this object of a famous hunt, a battleship named for a German chancellor.

ANSWER: **Bismarck**

5. This poem's title figure builds a structure with "caves of ice" so that those who "should see them" cry in response "Beware! Beware! His flashing eyes, his floating hair." "Gardens bright with sinuous rills" are described by this poem's narrator, who tells of an "Abyssinian maid" he saw in a vision playing a dulcimer. "Caverns measureless to man" going "down to a sunless sea" through which "Alph, the sacred river ran" feature in this poem. For 10 points, identify this poem, written after an opium-addled dream, that describes "a stately pleasure dome" decreed by the title ruler in Xanadu, a work of Samuel Taylor Coleridge.

ANSWER: **"Kubla Khan"** [do not accept or prompt on "Kublai Khan"]

6. Rapid changes in atmospheric pressure can create seiches, which cause sudden changes in these phenomena. These phenomena don't occur at amphidromic points, and predictions about them can be made using the six Doodson numbers. Weak versions of these phenomena are called neaps. Friction caused by them slows the Earth's rotation, and the largest variation in them is seen in the Bay of Fundy. For 10 points, name these periodic risings and lowerings of sea level caused by gravitational attraction from the Sun and Moon.

ANSWER: tides

7. Amused by their jokes, this figure released the monkey-like Cercopes, who had robbed him of his weapons, and his murder of Iphitus resulted in his serving at the court of Omphale. This figure later defeated an Aetolian river god in a wrestling match to win the hand of Deianeira in marriage. This hero used noisemakers made by Hephaestus to drive away the Stymphalian birds. As punishment for killing his wife Megara, this man had to obtain the girdle of Hippolyta, the queen of the Amazons. For 10 points, name this Greek hero, the demigod son of Zeus and Alcmena, who slew the Hydra and the Nemean Lion in his Twelve Labors.

ANSWER: Heracles [accept "Hercules"]

8. One character in a work by this author exclaims, "Malebranche was right! We are not our own light" and assumes she has seduced the bible-salesman Manley Pointer until he steals her leg. Enoch Emery steals a mummy in a novel by this author, in which Hazel Motes establishes the Church without Christ. While at The Tower, one character of this author agrees with Red Sammy on the title statement and is later killed along with her family by the Misfit. For 10 points, name this author of "Good Country People", *Wise Blood*, and a story about the Grandmother, "A Good Man is Hard to Find".

ANSWER: Flannery O'Connor

9. This dynasty began when Wu Sanhui unwisely opened Shanhai Pass after the publication of the Seven Grievances. The execution of Prince Gui ended the Zhu family's opposition to this dynasty, which was ruled by the regent Dorgon during the minority of the Shunzhi Emperor. His successor, Kangxi, was the first of the Three Good Emperors, the last of whom was Qianlong. This dynasty's Daoguang Emperor was forced to sign the "unequal treaties" after the Opium Wars, and this dynasty ended when Longyu abdicated on behalf of Puyi. For 10 points, name this last Chinese dynasty, composed of Manchus.

ANSWER: Great Qing Dynasty [accept "Manchu Dynasty" before mention]

10. In this film, the disappearance of a set of drapes requires that a new one be ordered. Max Dettweiler comments on pink lemonade in this film, whose protagonist is "a flibbertigibbet, a will-'o-the-wisp, a clown", according to her superiors at the Nonnberg Abbey. This film's protagonist "has confidence in sunshine" and loves "bright copper kettles" and "whiskers on kittens". After teaching her charges solfège with "Do-Re-Mi", this film's protagonist sings "Edelweiss" at the Salzburg festival with Captain von Trapp. For 10 points, name this film adapted from a musical in which the hills are alive with the title concept.

ANSWER: *The* Sound of Music

11. The protagonist of one work by this author meets a madman trying to make nosegays for his imaginary lover even though no flowers are blooming. Another of this author's protagonists visits Auerbach's Cellar and loves a girl who sings of the "King in Thule". This author wrote a novel whose title character recites Ossian and is buried under a linden tree after his highly-imitatable suicide, and a tragedy whose title doctor is served by Wagner and meets an apparition of Helen of Troy as part of a deal with Mephistopheles. For 10 points, name this *Sturm und Drang* German poet and author of *The Sorrows of Young Werther* and *Faust*.

ANSWER: Johann Wolfgang von Goethe

12. When it was first formed, this team took 14 attempts to end a calendar year with a positive record, but now ties Brazil's goal differential record at a +14 and has the highest Elo rating. This team has qualified for every World Cup except for 1950, when it was banned. One player on this team, Miroslav Klose, retired from international soccer after breaking Ronaldo's record for goals scored in the World Cup. This team's winning goal in their last FIFA match was scored by Mario Götze's volley kick. For 10 points, name this soccer team, the winners of the 2014 FIFA World Cup Brazil.

ANSWER: Germany [accept "German national football team", "German national soccer team", or "Deutsche Fußballnationalmannschaft"]

13. The Kikuchi lines that result from one form of this phenomenon are useful for orientation in transmission electron microscopy. Babinet's Principle states that two different forms of this phenomenon have the same result, and for x-rays this phenomenon is described by the Scherrer equation and Bragg's Law. Airy disks can result from light undergoing this process, and it can be described in terms of Huygen's principle. For 10 points, name this phenomenon, which comes in near field and far field varieties, the bending of light around an obstacle.

ANSWER: diffraction

14. Union assaults around the Sunken Road cut through to the Confederate center in this battle. Arriving Confederate reinforcements under A.P. Hill forced General Burnside to call off his assault, though he had earlier captured a bridge that allowed Union troops to cross a creek. The discovery of Special Order 191 by Union troops failed to cure McClellan's indecision, which allowed Lee's Army of Northern Virginia to escape from Maryland after this battle. For 10 points, name this bloodiest single-day battle of the Civil War, after which Abraham Lincoln promulgated the Emancipation Proclamation.

ANSWER: Battle of Antietam [accept "Battle of Sharpsburg"]

15. A man on horseback plunges a spear towards a large feline in this artist's *Tiger Hunt*. Another work by this artist depicts townspeople pleading for mercy as warriors storm through their city. One work by this artist of *Entry of the Crusaders in Constantinople* shows two men encircled by floating corpses; that work is *The Barque of Dante*. In one painting by this artist, an infant lies atop its lifeless mother and another painting depicts a boy wielding two pistols while the title figure, a bare-breasted woman, holds the French tricolor flag. For 10 points, name this French painter of *The Massacre at Chios* and *Liberty Leading the People*.

ANSWER: Ferdinand Victor Eugène Delacroix

16. This faith's last calendar month translates to "loftiness" and requires fasting from sunrise to sunset. Ridván, a festival during which no work may be done, takes place during the months of Jalál and Jamál. Mírzá 'Ali-Muhammad, nicknamed "The Gate", foresaw the coming of this religion's major prophet. New Delhi's Lotus Temple belongs to this faith, whose calendar has 19 months of 19 days each. The Persian founder of this religion wrote *The Seven Valleys and the Four Valleys* and *The Book of Certitude*. For ten points, name this faith commonly represented by a nine-pointed star.

ANSWER: **Bahá'í**

17. Enteropeptidase is released in this organ from the crypts of Lieberkühn. In this organ, the zymogen chymotrypsinogen is cleaved by trypsin. Here, cholesterol and apoprotein help form chylomicrons. In humans, the Brunner's glands of this organ release class III mucin glycoproteins mixed with small amounts of bicarbonate. In this organ, lymphatic capillaries known as lacteals make up the core of villi, which line this organ's mucosa layer. The pyloric sphincter opens to the duodenum at the entrance of this organ, which contains the jejunum and ileum. For 10 points, name this digestive organ that is thinner than the colon.

ANSWER: **small intestine**

18. This man, who captured Artavasdes II of Armenia, sent Ventidius Bassus to fight against King Pacorus I and Quintus Labienus in Cilicia and Syria respectively. This man's wife Fulvia led a conspiracy with his brother Lucius that was eventually suppressed at Perusia. This man, who made the Donations of Alexandria, was defeated by Agrippa at the Battle of Actium, and famously divorced Octavian's sister for Cleopatra VII. For 10 points, name this general who made up the Second Triumvirate along with Lepidus and Octavian.

ANSWER: Marcus **Antonius** [accept "Mark **Antony**"]

19. In one play by this man, Talthybius carries young Astyanax's body on the brass shield of Hector. That same play ends with one of the main characters attempting to jump into a fire before being restrained by the enemy soldiers. In another work by this man, Heracles wrestles Death at the tomb of the title figure as repayment for his drunken behavior in Admetus' household. This author of *Alcestis* wrote a play in which Jason betrays his sorceress wife by marrying the daughter of Creon, resulting in the death of his children and new wife. For 10 points name this Greek tragedian who wrote plays like the *Trojan Women* and *Medea*.

ANSWER: **Euripides**

20. This incident was partially documented by an audio recording that was made with the Glide smartphone app. Local alderman Antonio French was arrested following this event, and an Al Jazeera news crew covering the aftermath of this incident was exposed to tear gas. Governor Jay Nixon criticized the release of security video footage depicting the subject of this event, and declared a state of emergency following civil unrest. Officer Darren Wilson was not indicted for his role in this event. For 10 points, identify this incident which occurred in August 2014 that resulted in the death of a resident of Ferguson, Missouri.

ANSWER: **shooting** of Michael **Brown** [accept clear equivalents; prompt on "**Ferguson** riots" or similar answers until Ferguson is mentioned]

TB. Haldane's rule pertains to one form of this process, and the Dobzhansky-Muller model shows how this process can occur without peak shifts. It can happen for plants when they become polyploid, and one theory, which opposes phyletic gradualism, states that this process occurs in short time intervals; that theory is called punctuated equilibrium. When some organisms become geographically isolated from others the allopatric form of this process occurs. For 10 points, name this process in which a population splits into new taxa that can't interbreed, thus forming new species.

ANSWER: **speciation**

Bonuses

1. In this painting, wall tiles depicting both Cupid and a man with a pole appear behind a wooden foot warmer on the floor. For 10 points each:

[10] Identify this painting depicting a woman in yellow standing before a table filled with bread as she pours the title drink into a bowl.

ANSWER: *The Milkmaid*

[10] This artist of *The Milkmaid* also painted a portrait of a woman wearing a blue and yellow headdress and the title piece of jewelry in his *Girl with a Pearl Earring*.

ANSWER: Johannes Vermeer

[10] Dark clouds loom overhead as men and women gather near a boat on the riverbank in Vermeer's "View" of this Dutch city, his hometown.

ANSWER: Delft

2. This author of the *Georgics* is most famous for an epic poem about the son of Anchises. For 10 points each,

[10] Name this Roman poet who wrote about a Trojan who flees first to Carthage, then to Italy.

ANSWER: Publius Vergilius Maro

[10] That epic poem by Vergil has this title. In this work, Dido commits suicide after the title hero abandons her to fulfil a prophecy that he would establish Alba Longa.

ANSWER: Aeneid [accept "Aeneis"]

[10] This rustic series by Vergil, inspired by Theocritus's *Idylls*, concerns the work of shepherds. The fourth one is sometimes called "Messianic" for supposedly prefiguring the birth of Jesus.

ANSWER: Eclogues [accept "Eclogae", "Bucolics", or "Bucolica"]

3. These storms require warm water temperature and form around a low pressure system called the eye. For 10 points each:

[10] Name these large storms that are stronger than tropical storms and often hit North America in the summer and early fall.

ANSWER: hurricanes

[10] The strength of a hurricane is typically measured on this scale, which classifies them by a number 1 through 5 based on their wind speed.

ANSWER: Saffir-Simpson scale

[10] The most dangerous and damaging part of a hurricane is this region outside of the eye. The strongest winds and heaviest rains are found here.

ANSWER: eyewall

4. At the beginning of this film, the protagonist is notified that the Nazis are searching for Abner Ravenwood, in order to find the Well of Souls. For 10 points each:

[10] Name this film in which Indiana Jones travels to Cairo and aims to find the title object before the Nazis and René Belloq do, to prevent them from becoming invincible.

ANSWER: *Indiana Jones and the Raiders of the Lost Ark*

[10] This man plays Indiana Jones in that series, and Han Solo in the Star Wars films.

ANSWER: Harrison Ford

[10] This Egyptian friend of Indy hosts him in Cairo and helps him excavate the Well of Souls. In *The Last Crusade*, he loses Marcus Brody.

ANSWER: Sallah Mohammed Faisel el-Kahir

5. Arthur Evans restored a ruined palace at this location, which contains frescoes of bull-leapers. For 10 points each:

[10] Name this labyrinthine city, the ancient capital of the Minoan civilization.

ANSWER: **Knossos**

[10] The Minoans ruled this largest Greek island, whose agriculture was destroyed by a volcanic eruption in nearby Thera.

ANSWER: **Crete**

[10] The palace at Knossos contained tablets that use this syllabic script, the writing system of Mycenaean Greek. Its “A” relative remains undeciphered.

ANSWER: **Linear B**

6. Name some American rivers, for 10 points each:

[10] Major tributaries of this river include the Kaskaskia and Rock Rivers. This river, the longest in North America, empties into the Gulf of Mexico after joining the Missouri.

ANSWER: **Mississippi** River

[10] The J. Edward Roush Lake is a reservoir on this river. This state river of Indiana drains into the Ohio River after passing through the city of Lafayette.

ANSWER: **Wabash** River

[10] The Portage Division in Manitoba prevents a northern river of this name from flooding Winnipeg. A southern river of this name flows past Shreveport on its way to the Mississippi.

ANSWER: **Red** River

7. This law sometimes uses the absorption coefficient, and it relates the absorbance and concentration of a sample. For 10 points each:

[10] Name this law often stated as $A=ebc$, where b represents the path length that light travels.

ANSWER: **Beer-Lambert-Bouguer** Law

[10] The “ c ” in the equation $A=ebc$ represents concentration, which is often given in terms of this quantity. This quantity is equal to moles of solute divided by liters of solution.

ANSWER: **molarity** [accept “**molar concentration**”]

[10] Beer’s Law is the fundamental law of this branch of chemistry that attempts to find the reflective and transmissive properties of materials as a function of wavelength.

ANSWER: **spectrophotometry**

8. This country’s Cry of Ipiranga was its declaration of independence. For 10 points each:

[10] Name this country, whose western border was technically limited by the Treaty of Tordesillas. This Portuguese-speaking country was once ruled from Rio de Janeiro.

ANSWER: **Brazil**

[10] Under this emperor, the Golden Law freed slaves in Brazil. He also led the Brazilians to victory in the Platine War against the Argentine Confederation.

ANSWER: **Pedro II**

[10] Pedro II ruled when Brazil won a war named for this country. Brazil entered that war after civil war broke out between two parties in this country, the Blanco and Colorado parties.

ANSWER: **Uruguay**

9. This poem asks “What the hand dare seize the fire?” and “What immortal hand or eye / Could frame thy fearful symmetry?” For 10 points each:

[10] Name this poem about a certain animal “burning bright in the forests of the night.”

ANSWER: “The **Tyger**”

[10] This poet included “The Tyger” in his collection *Songs of Experience*, which also included such poems by him as “The Sick Rose” and “London.”

ANSWER: William **Blake**

[10] *Songs of Experience* includes this poem, in which the narrator’s wrath for his foe continues to grow until he kills him. It ends with the narrator being glad to see his dead foe in the morning.

ANSWER: “A **Poison Tree**”

10. She and her brother Apollo shot the Niobids because their mother boasted of having more children than Leto. For 10 points each,

[10] Name this Greek goddess of the hunt.

ANSWER: **Artemis**

[10] Artemis transformed this unfortunate hunter into a stag for seeing her naked. He was torn apart by his dogs.

ANSWER: **Actaeon**

[10] This companion of Artemis was transformed into a bear for breaking her vow of maidenhood by sleeping with Zeus. She was thrown into the stars to become Ursa Major.

ANSWER: **Callisto**

11. This statue is the centerpiece of the tomb of Pope Julius II. For 10 points each:

[10] Name this statue that mistakenly depicts the title biblical figure with horns.

ANSWER: **Moses**

[10] *Moses* is a sculpture by this artist who painted the ceiling of the Sistine Chapel.

ANSWER: **Michelangelo** Buonarroti

[10] Michelangelo also sculpted this statue, which depicts a disproportionately large Mary cradling the post-Crucifixion Jesus in her lap.

ANSWER: **Pietà**

12. Humans have forty-four autosomal types of these biological structures and two sex ones. For 10 points each:

[10] Name these biological structures that are seen in karyotypes and are made of chromatin.

ANSWER: **chromosomes**

[10] In this process that occurs during prophase I, homologous chromosomes exchange genetic information by physically touching.

ANSWER: chromosomal **crossover** [accept “**crossing over**” and other word forms]

[10] This is the location at which homologous chromosomes meet during crossover.

ANSWER: **chiasmata**

13. This work argues that no analysis of a subject will produce the predicate and that statements found in geometry and Newtonian physics are synthetic judgments. For 10 points each:

[10] Name this work that analyzed " $7 + 5 = 12$ " and validates the possibility of *a priori* truths.

ANSWER: **Critique of Pure Reason** [accept "**Kritik der reinen Vernunft**"]

[10] *Critique of Pure Reason* was written by this German philosopher who also wrote the *Metaphysics of Morals*.

ANSWER: Immanuel **Kant**

[10] Kant introduced this concept in deontological moral philosophy that evaluates motivations for actions and argues that one should behave as if his actions were universal law.

ANSWER: **categorical imperative**

14. After a stolen car he was riding in hits a young child, this novel's protagonist ends up in Lycurgus to work for his uncle's collar factory, where he meets Roberta. For 10 points each:

[10] Name this novel whose protagonist, Clyde Griffiths, is put on trial for killing the pregnant Roberta so that he can marry Sondra Finchley.

ANSWER: *An* **American Tragedy**

[10] *An American Tragedy* is a novel by this author, who wrote about the title character's affair with the affluent Lester Kane in *Jennie Gerhardt*.

ANSWER: Theodore Herman Albert **Dreiser**

[10] Clyde Griffiths takes Roberta on a canoeing trip where she suffers this fate, causing her death. This fate befell Edna Pontellier after walking into the Gulf of Mexico in *The Awakening*.

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

15. The Frankish victory at this battle stopped the advance of the Moors. For 10 points each,

[10] Name this battle at which Charles Martel vanquished the Governor of Andalusia.

ANSWER: Battle of **Tours** [accept "Battle of **Poitiers**"]

[10] The defeated army had been sent by this second Islamic caliphate, which ruled from Damascus and fell to the Abbasids. It failed to capture France, but controlled Spain until its fall.

ANSWER: **Umayyad** Caliphate

[10] An Umayyad prince fled to Andalusia upon the dynasty's fall and established a namesake emirate, later caliphate, in this city, which is home to a Mezquita with a famous hypostyle hall.

ANSWER: **Córdoba**

16. This work contains duple sixteenths set against its 6-8 meter to evoke the title phenomenon. For 10 points each:

[10] Name this nocturnally-titled work in D-flat Major, the third movement of *Suite Bergamasque*.

ANSWER: "**Clair de lune**" [accept "**Moonlight**"]

[10] *Suite bergamasque* is a work for solo piano by this French Impressionist composer, who also wrote *Prelude to the Afternoon of a Faun*.

ANSWER: Achille-Claude **Debussy**

[10] One of Debussy's *Preludes* evokes a "Sunken", or *engloutie*, one of these religious buildings. Smetana's *Ma Vlast* portrays a festive installation ceremony outside one of them.

ANSWER: **cathedral** [accept "**cathédrale**"]

17. This character comes into possession of a casket filled with the letters of Argas and uses it to blackmail the family of Madame Parnelle. For 10 points each:

[10] Name this character who, in the end of his namesake play, gets arrested after the king hears about his deception of Orgon, who banished his son because of him.

ANSWER: **Tartuffe**

[10] *Tartuffe* is a play by this French playwright, who wrote of Angelique's love for Cleante despite her father's attempts to marry her to the doctor, Thomas, in *The Imaginary Invalid*.

ANSWER: **Molière** [accept "Jean-Baptiste **Poquelin**"]

[10] This other French dramatist wrote how the title character poisons herself after revealing to Theseus that she had falsely accused Hippolytus of rape since he had spurned her in *Phèdre*.

ANSWER: Jean **Racine**

18. Catholics usually perform this act towards the altar at the end of Mass. For 10 points each:

[10] Name this action that constitutes bending at least one knee as a sign of respect.

ANSWER: **genuflection** [prompt on "**kneeling**"]

[10] Genuflection is sometimes performed in front of this object, usually a decorated vessel used to house the bread and wine.

ANSWER: **tabernacle**

[10] Christians debate whether the body and blood of Christ are consubstantiated or transubstantiated during this rite, in which parishioners receive bread and wine.

ANSWER: Holy **Eucharist** [accept "holy **communion**" or "the **Lord's Supper**"]

19. These entities were shut down temporarily by FDR in order to stabilize the economy and Alexander Hamilton created a national one of these in his financial plan. For 10 points each:

[10] Name these financial institutions which invest deposits and lend money.

ANSWER: **banks**

[10] In this case, the Supreme Court decided that the power to tax was the power to destroy and that a state could not tax the federally-created Bank of the United States.

ANSWER: John James **McCulloch v. The State of Maryland** [accept "**Maryland v. McCulloch**"]

[10] This Financier of the Revolution served as Superintendent of Finance and declined George Washington's offer to be Secretary of the Treasury, suggesting Hamilton take the post instead.

ANSWER: Robert **Morris**

20. The equation of motion for these systems is found by equating Newton's second law and Hooke's law. For 10 points each:

[10] Name these entities that experience a restoring force. A mass on a spring is an example.

ANSWER: **simple harmonic oscillators**

[10] This phenomenon of SHOs, often caused by friction, involves a decrease in the velocity of a system. It comes in "critical" and "under" varieties.

ANSWER: **damping**

[10] This type of circuit acts as a simple harmonic oscillator. They consist of a resistor, an inductor, and a capacitor.

ANSWER: **RLC** circuit [accept **R** **L** and **C** in any order]

21. An Austrian bill proposed in November of 2014 limits foreign funding of these people's activities. For 10 points each:

[10] Name these people who lead formal prayer in Sunni Islam.

ANSWER: **imam**

[10] The largest branch of Shi'a Islam, Imamiyyah, believes that this many imams were chosen by God as models to lead humanity. It contrasts the Seveners and Fivers.

ANSWER: **Twelve**

[10] Imam Al-Shafi'i developed this Islamic jurisprudential system, the human interpretation of divine law. Schools of this concept include Shafi'i, Hanafi, and Maliki.

ANSWER: **fiqh**