

Ladue Invitational Spring Tournament IV

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Round 6**Tossups**

1. The bases of some of these structures are home to “tuba” and “mamma” formations, and their own formation is described by the Bergeron process. A notable “arcus” feature in one of these things found near the Gulf of Carpentaria is called Morning Glory, and the addition of silver iodide or dry ice can induce (*) nucleation in these objects. One type of these structures can form from contrails and are given the nickname “mares’ tails,” and the term “nimbus” is used to describe a darker type of these objects that form prior to precipitation. For ten points, identify these atmospheric formations that come in cirrus, stratus, and cumulus varieties.

ANSWER: clouds

<EC>

2. Former councilwoman and head of Success Academy Charter Schools, Eva Moskowitz, intends to run for mayor of this city. An undercover detective was arrested in this city in connection with an attack on an SUV driver by a motorcycle gang. A mayoral candidate in this city who allegedly flipped off a reporter following a primary election marred by a (*) sexting scandal was Anthony Weiner. In March 2013, Justice Milton Tingling invalidated an anti-obesity measure in this city that banned the sale of large containers of soft drinks. For ten points, name this city whose mayor was Michael Bloomberg.

ANSWER: New York City [or NYC]

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3. In one of this writer’s poems, Saturn, who is “quiet as a stone, / Still as the silence round about his lair”, sits in “the shady sadness of a vale”. The speaker asks “Where are the songs of Spring? Ay, where are they?” in another of his poems, which describes a “Season of mists and yellow fruitfulness”. This poet of the unfinished “Hyperion” and “To (*) Autumn” also wrote a poem addressed to a “light-winged Dryad of the trees”. Another one of his poems describes a “foster-child of Silence and slow Time” and concludes by stating that “Beauty is truth, truth Beauty.” For ten points, name this English poet of “Ode to a Nightingale” and “Ode on a Grecian Urn.”

ANSWER: John Keats

<MP>

4. A National Historical Park at this site features the National Memorial Arch and Washington Memorial Chapel. Dutch “pepper pot” tripe soup was allegedly invented at this location, where one general gave a speech responding to accusations made in the Conway Cabal that referenced the earlier success of Horatio Gates at Saratoga. The Revolutionary War Drill Manual was written while (*) Baron von Steuben trained troops at this location, to which the Continental Army had retreated after losing the battles of Germantown and Brandywine. For ten points, name this Pennsylvania valley where George Washington’s troops suffered through the winter of 1777.

ANSWER: Valley Forge

<BZ>

5. One character on this show has a distinct old-man smell that comes from the mung beans he sprouts in his desk. In an episode titled “Health Care,” another character reveals that he suffers from Count-Choculitis, and a marriage takes place on a beet farm in the series finale of this show. In Season 8 of this show, (*) Robert California is made CEO of Sabre and names Andy Bernard as head of the Scranton branch. A recurring prank in this show involves Jim putting Dwight’s stapler in Jello. For ten points, name this show which starred Steve Carell as Michael Scott, a Regional Manager of the Dunder-Mifflin Paper Company.

ANSWER: The Office

<SC>

6. In this novel, one character is painted blue and is called the “Sick Arab”. In another scene, the brothers of the deceased Peter Wilks are impersonated by two boys who hold a play called “The Royal Nonesuch” and claim to be a duke and dauphin. The title character of this novel is frightened by a feud between the (*) Grangerfords and Shepherdsons, and later teams up with Sid to rescue a slave in Phelps’ plantation. That title character, the son of the drunkard Pap, befriends Miss Watson’s slave, Jim. For ten points, name this work written by Mark Twain, a sequel to *The Adventures of Tom Sawyer*.

ANSWER: *The Adventures of Huckleberry Finn*

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7. One participant in this country’s June 1953 rebellion was fictionalized as Harry Melchior in the 2001 film *The Tunnel*. The movie *Night Crossing* depicted how two families fled this country via a hot air balloon, and Peter Fechter was left to die in a “death strip” after being shot while trying to escape it. Egon Krenz was the last leader of this country, whose citizens were policed by the (*) Stasi. Due to a massive brain drain, Walter Ulbricht began the construction of a structure in this country that would later be torn down in 1989 with pickaxes and sledgehammers. For ten points, name this Soviet-dominated nation that built the Berlin Wall and joined with West Germany in 1990.

ANSWER: East Germany [or Ostdeutschland; or Deutsche Demokratische Republik or DDR; or German Democratic Republic or GDR; prompt on “Germany” or “Deutschland”; do not accept or prompt on “Republic of Germany” or “Federal Republic of Germany”]

<BZ>

8. One of these places in Oslo contains a sculpture arrangement by Gustav Vigeland, while another of these in Barcelona contains a mosaic fountain in the shape of a salamander. Those examples of these places are called Frogner and Guell. One of these in London contains the Speakers’ Corner, adjoins Kensington Gardens, and was the site of the (*) Crystal Palace. The Metropolitan Museum of Art is located on the grounds of the most famous one of these in the United States, which is bordered on the east by Fifth Avenue and was designed by Calvert Vaux and Frederick Law Olmsted. For ten points, identify these usually grassy areas exemplified by a Central one in New York City.

ANSWER: park

<JD>

9. This god was once retrieved from a pillar in a palace at Byblos that later represented this god’s spine as the Djed pillar. During the Ptolemaic period, this god was replaced with a Greco-Egyptian hybrid called Serapis. This ruler of Duat wore the Atef crown and was commonly depicted as a (*) green-skinned mummy holding a flail and crook. His brother sealed him in a coffin with molten lead and dismembered his body into fourteen pieces, after which his wife Isis recovered thirteen of them. For ten points, identify this god who was killed by Set and became the Egyptian god of the underworld.

ANSWER: Osiris [accept Usiris, Aser, or Wesir]

<BZ>

10. Placing dots at the lattice points $[m,n]$ where m and n are coprime form this man's namesake orchard. His theorem of *pons asinorum* states that the base angles of an isosceles triangle are equal. The Chinese Remainder Theorem extends a method that repeatedly takes the difference between a pair of numbers to find their GCF, known as his namesake (*) algorithm. His most famous work also lists 10 axioms, one of which Playfair equated to the existence of only one line through a point not on a given line that does not intersect the given line; that is his parallel postulate. For ten points, identify this author of *Elements*, a Greek mathematician often called the "Father of Geometry."

ANSWER: Euclid of Alexandria

<EC>

11. In one section of this work, a cobbler asks a pastry-cook for five pounds of vermicelli-cake after weeping about his wife. In addition to Maruf, another character in this work threatens to execute his minister if he cannot find the murderer of a dead woman within three days. In another section, the central character notices a stream filled with precious stones when meeting the king of (*) Serendib. This work also describes a slave-girl from Cassim's household named Morgiana, who pours boiling oil on 37 thieves hiding in jars. For ten points, identify this collection of tales narrated by Scheherazade, which includes the stories of Sinbad and Ali Baba.

ANSWER: *Arabian Nights'* Entertainment [accept One Thousand and One Nights or One Thousand and One Arabian Nights or Kitāb alf laylah wa-laylah]

<KT>

12. This instrument represents King Solomon in Ernest Bloch's work, *Schelomo*. Luigi Boccherini composed twelve concertos for this instrument, which Gabriel Fauré used to accompany the piano in his *Sicilienne*. Tchaikovsky wrote *Variations on a Rococo Theme* for this instrument and orchestra, and Dvorak wrote a (*) concerto in B minor for it. In response to the First World War, Edward Elgar wrote a work for this instrument in E minor, which was famously played by Jacqueline du Pre. For ten points, name this second-lowest string instrument in the violin family, which is played by Pablo Casals and Yo-Yo Ma.

ANSWER: violoncello [accept celli]

<MP>

13. Galleons named for this modern-day country's capital city traded with Acapulco in New Spain. One politician from this country was assassinated upon arriving at the national airport after a three year exile; the man who ordered that assassination was ousted from the presidency of this country in the (*) People Power Revolution. One conflict in this country saw a fleeing general declare "I shall return" before the forces he left behind suffered through the Bataan Death March, while another saw the capture of Emilio Aguinaldo. For ten points, identify this island nation formerly led by Ferdinand Marcos, where Benigno Aquino now rules from Manila.

ANSWER: Republic of the Philippines

<JD>

14. The effectiveness of these cells and their products is lowered by the Hoskins effect. In birds, these cells mature in the bursa of Fabricius, while in mammals they remain in the bone marrow for the duration of their development. The recombination of Variable, Diverse, and Joining regions is responsible for the variation in the (*) heavy and light chains of substances produced by these cells. The effector forms of these cells are plasma cells, into which they can differentiate after the recognition of an epitope, and which mass produce proteins that tag antigens. For ten points, name these antibody-producing cells that work alongside T cells in the immune system.

ANSWER: B cells

<BZ>

15. This adjective describes the roofs of a Camille Pissarro painting set in La Côte des Boeufs. The young lady from Renoir's *A Girl with a Watering Can* wears a ribbon of this color, which Henri Matisse used for the tablecloth and the wall in his *Harmony in [this pigment]*. In Jan van Eyck's *Arnolfini Wedding*, the bedsheets are entirely painted in this color, as are the walls of Vincent van Gogh's (*) *Night Cafe*. Andy Warhol used this color to paint the upper half of his *Campbell's Soup Cans*. For ten points, identify this color, which was used in Thomas Eakins's painting, *The Gross Clinic*, to represent blood.

ANSWER: red

<KT>

16. Karl Popper argued that this work portrays the working class as “human sheep” in his work *The Open Society and Its Enemies*. One character in this work narrates the “earth-born” myth that claims each human has a predetermined nature as one of his “noble lies”, while another character, (*) Glaucon, responds to Thrasymachus by reciting the story of the ring of Gyges. Several definitions of justice are discussed in the beginning of this work, which advocates for the rule of the philosopher-king and in one scene, it describes the shadows shackled prisoners see from the fire behind them. For ten points, identify this Platonic dialogue which includes the Allegory of the Cave and describes the ideal society.

ANSWER: *The Republic* [or *Politeia*]

<KT>

17. In this novel, the anchoress Sister Gudule believes her child was tortured by the Gypsies, and that daughter would later marry a struggling poet who is almost executed by the Truands, Pierre Gringoire. The Captain of the King's Archers, (*) Phoebus, falls in love with a character in this work who is almost kidnapped by a man who only leaves during the Festival of Fools and rings church bells to show his devotion to the main antagonist. Archdeacon Claude Frollo kills Esmeralda in, for ten points, what Victor Hugo work whose English title references a deformed and ugly Parisian?

ANSWER: *The Hunchback of Notre Dame* [accept *Notre-Dame de Paris* or its translation: *Our Lady of Paris*]

<KT>

18. This element is bonded to four iodine atoms in Nessler's reagent, which it can precipitate out of when reacted with ammonia. This metal is found in the red pigment vermilion, since it is bonded to sulfur in cinnabar. Alloys of this metal used for dental fillings are called (*) amalgams. Measuring the height of this element in a column can determine pressure, with 760 millimeters corresponding to 1 atmosphere, and this element is also present in some thermometers. For ten points, identify this toxic metal that is liquid at room temperature with chemical symbol Hg.

ANSWER: mercury [or Hg early]

<EC>

19. This man stayed in a jail cell with Silas before an earthquake opened the cell doors and saved a jailor from killing himself. After that incident, this man traveled to Paphos with Barnabas, where he met the false prophet Barjesus. One of his works claims that women should be silent in church and that (*) “love is patient, love is kind.” He was under the care of Ananias for three days after an incident in which he was knocked off of his donkey, blinded, and asked “why do you persecute me?” For ten points, name this Christian missionary who wrote some epistles to Corinth and was converted on the road to Damascus.

ANSWER: Saint Paul the Apostle [accept Saul in place of “Paul”]

<MP>

20. The losing side in this battle was accompanied by the recently exiled tyrant Hippias. This battle occurred after one side sacked Eretria as retribution for participating in the Ionian Revolt. That side's forces were legendarily driven to madness during this battle by the intervention of the god Pan. The peaceful festivities of Carneia delayed the arrival of one army to this battle, in which Datis and Artaphernes were defeated by (*) Miltiades. The Athenians defeated the first Persian invasion under Darius I in, for ten points, what battle that prompted Pheidippides to run 26.2 miles to deliver news of victory?

ANSWER: Battle of Marathon

<JD>

21. The XENON100 experiment used particles scattering off liquid xenon to detect this entity, which is central to the Lambda-CDM parameterization of the Big Bang cosmological model. It commonly forms galactic halos, and Vera Rubin used this to explain how stars have a constant (*) rotational velocity independent of radial distance. In addition to axions, this substance interacts with gravity and the weak force in the form of WIMPs and MACHOs, and it is theorized to constitute 27% of the total mass-energy in the universe. For ten points, identify this substance that neither emits nor absorbs light and is thus unobservable.

ANSWER: dark matter [do NOT accept "dark energy" or "matter" or "antimatter"]

<EC>

22. One leader of this organization composed the marching song "Forward! Forward! Blare the bright fanfares" for it. Kurt Gruber was eventually replaced by Baldur von Schirach as head of this organization, which was militarized by the latter. The future Pope Benedict XVI was forced to join this organization while at a seminary in Traunstein, and was later conscripted as an antiaircraft assistant. One of this group's symbols consisted of a (*) rising sun with a swastika in it. This organization was further divided into sections like the League of German Girls and the German Young People. For ten points, identify this branch of the Nazi party that consisted of children and teenagers.

ANSWER: Hitler Youth [or Hitlerjugend; prompt on "HJ"; prompt on "Nazis" or "Nazi Party"]

<BZ>

Bonuses

1. Bonus: She was attacked by a gunman in Pakistan's Swat Valley. For ten points each:

[10] Name this BBC blogger who advocates for women's rights and education and was considered a frontrunner for the 2013 Nobel Peace Prize.

ANSWER: Malala **Yousafzai**

[10] Malala Yousafzai was targeted by a member of this Islamic fundamentalist organization, whose influence in Afghanistan diminished after the NATO-led invasion.

ANSWER: **Taliban**

[10] In October 2013, the European Union awarded Malala Yousafzai a prize named after this Soviet dissident scientist.

ANSWER: Andrei Dmitrievich **Sakharov**

<BZ>

2. Bonus: He lauded Berlioz as the resurrection of Beethoven, but refused to play Berlioz's piece, *Harold in Italy*. For ten points each:

[10] Name this composer with extraordinary instrumental talent from whom Franz Liszt borrowed a melody for the etude, *La Campanella*. His most famous work contains sections like "The Devil's Laughter" and "The Hunt."

ANSWER: Niccolò **Paganini**

[10] Paganini is perhaps best known for his *24 Caprices* for this instrument. His amazing talent in playing this instrument led some to believe that he made a deal with the devil.

ANSWER: **violin**

[10] This composer wrote *Rhapsody on a Theme of Paganini*. He also composed *Isle of the Dead* after seeing a Bocklin painting and wrote *The Bells* after reading Edgar Allan Poe's poem.

ANSWER: Sergei Vasilievich **Rachmaninoff**

<KT>

3. Bonus: Its protagonist goes on a fishing trip with Dr. Spivoy and several Acutes and Chronics. For ten points each:

[10] Identify this work about a struggle between the will of Randle McMurphy and the command of Nurse Ratched in a psychiatric hospital.

ANSWER: **One Flew Over the Cuckoo's Nest**

[10] This American author of *One Flew Over the Cuckoo's Nest* also wrote about gypso loggers in his novel *Sometimes a Great Notion*.

ANSWER: Kenneth Elton "Ken" **Kesey**

[10] This partially-Native American narrator of *One Flew Over the Cuckoo's Nest* smothers McMurphy after his lobotomy in the end of the work, and acts dumb and deaf until he accepts a Juicy Fruit offered by Randle.

ANSWER: Chief **Bromden** [accept "**the Chief**", but prompt on just "Chief"]

<KT>

4. Bonus: This entity found in the South Equatorial Belt used to be 40,000 kilometers in diameter, although it is observed to be steadily shrinking and slowing in rotation period. For ten points each:

[10] Name this large storm that, despite its name, can sometimes appear white.

ANSWER: The **Great Red Spot** [prompt on "GRS"; do NOT accept "Great Dark Spot"]

[10] The Great Red Spot is found on this gas giant, the largest planet in our solar system.

ANSWER: **Jupiter**

[10] This object orbiting Jupiter was unusually fragmented and crashed into the planet in 1994, providing the first observations of an extraterrestrial collision of Solar System objects.

ANSWER: Comet **Shoemaker-Levy 9** [accept **D/1993 F2**; prompt on "Shoemaker-Levy"]

<EC>

5. Bonus: Its inhabitants used steatite to create figurines, such as one of a seated man called “The Priest-King.” For ten points each:

[10] Identify this ancient city, among the first to use a grid plan, which may have been established by Dravidian peoples fleeing from the Aryan migrations. It was located downstream from Harappa.

ANSWER: Mohenjo-Daro

[10] Mohenjo-Daro and Harappa were both cities of this early civilization located along a river valley located on the Indian subcontinent.

ANSWER: Indus Valley Civilization

[10] The Indus Valley Civilization belonged to this period of ancient society. This period came after the Stone Age, before the Iron Age, and is named after an alloy of copper and tin.

ANSWER: Bronze Age

<JD>

6. Bonus: A sand desert known as the Empty Quarter dominates its southern portion. For ten points each:

[10] Identify this country, whose name comes from its ruling family. Popular pilgrimage sites in this country include Mecca and Medina.

ANSWER: Kingdom of Saudi Arabia

[10] Just outside the Masjid al-Haram in Mecca stands the recently-constructed Abraj Al-Bait Towers, the tallest of which serves as one of these buildings. Examples of them include the sail-shaped Burj al Arab in Dubai and the Savoy in London.

ANSWER: hotel

[10] Another construction project in Saudi Arabia is the one-kilometer-high Kingdom Tower, which is currently being built right outside this large port city on the Red Sea that serves as a gateway to Mecca.

ANSWER: Jeddah

<JD>

7. Bonus: Answer these things about demand, for ten points each:

[10] The equilibrium of a market is reached when the demand curve intersects with this positively sloping curve. This curve shows how much firms and individuals are willing to sell at a given price.

ANSWER: supply curve

[10] This quantity, taken by dividing the percent change in quantity demanded by the percent change in price, shows how responsive consumers are to price changes. A value of zero for this quantity implies a vertical demand curve.

ANSWER: price elasticity of demand [accept word forms like elastic; accept inelastic]

[10] A negative value for the cross-price elasticity of demand means that two goods have this kind of relationship. If two goods have this kind of relationship, a price increase for one will lead to an increase in demand for the other.

ANSWER: substitute goods or substitutes

<BZ>

8. Bonus: One character’s ghost steals a garment from the Prominent Person. For ten points each:

[10] Name this short story in which Akaky Akakievich purchases the expensive title item of clothing, only to have it stolen.

ANSWER: “The Overcoat” [accept “The Cloak” or “Shinel”]

[10] This Russian novelist wrote “The Overcoat” and a work in which Ivan Yakovlevich finds the nose of Major Kovalyov in his breakfast.

ANSWER: Nikolai Vasilievich Gogol [accept Mykola Vasyliovych Hohol]

[10] In this play by Gogol, Khlestakov pretends to have the title position and borrows immense “loans” from several people, but escapes the small town with Osip before the corrupt Mayor realizes his true identity.

ANSWER: *The* Inspector General [accept *The* Government Inspector or Revizor]

<KT>

9. Bonus: These solutions will cause phenolphthalein to turn pink. For ten points each:

[10] Identify these substances with a pH value between 7 and 14.

ANSWER: base

[10] A strong base such as sodium hydroxide is used to hydrolyze triglycerides in the process of creating these compounds, which are commonly used as surfactants and lubricants.

ANSWER: soaps [accept saponification]

[10] A triglyceride is this type of organic compound consisting of a carbonyl group linked with an ether. They can be produced by reacting a carboxylic acid with an alcohol in a process named after Fischer.

ANSWER: esters or esterification

<EC>

10. Bonus: Polyneices used one of this woman's possessions to bribe Amphiarus's wife Eriphyle. For ten points each:

[10] Identify this daughter of Ares and Aphrodite who was presented with a divinely forged necklace at her wedding to Cadmus.

ANSWER: Harmonia

[10] Harmonia's husband, Cadmus, founded this city, which was ruled by Laius and Oedipus. Oedipus's son Polyneices led a group of seven who fought against this city.

ANSWER: Thebes

[10] This sister of Polyneices buried his body and was sentenced to death for violating Creon's decree that forbade Polyneices' burial.

ANSWER: Antigone

<BZ>

11. Bonus: One of its characters prepares to die when he finds his servant has no more pain-killer. For ten points each:

[10] Identify this play in which Hamm is unable to stand and his servant Clov is unable to sit. Two characters in this work, Nagg and Nell, live in dustbins since they have no legs.

ANSWER: Endgame [or Fin de partie]

[10] The author of *Endgame* also wrote this play, in which Lucky and Pozzo join a pair of vagrant men, Vladimir and Estragon, who expect the arrival of the title person.

ANSWER: Waiting for Godot [or En attendant Godot]

[10] This Irish author wrote the plays *Endgame* and *Waiting for Godot*.

ANSWER: Samuel Barclay Beckett

<KT>

12. Bonus: He implemented a series of social programs known as the "Great Society". For ten points each:

[10] Name this President who defeated Barry Goldwater in 1964 and vastly expanded the scope of the Vietnam War. This man was able to implement many of John F. Kennedy's New Frontier proposals.

ANSWER: Lyndon Baines Johnson [prompt on "Johnson"; accept LBJ]

[10] One important factor in Lyndon Johnson's victory over Barry Goldwater in the 1964 election was this advertisement, which showed a young girl counting the petals of a flower immediately before a nuclear explosion.

ANSWER: Daisy advertisement [generously accept answers with Daisy in them, such as Daisy Girl]

[10] One of Lyndon Johnson's most famous persuasion tactics involved both verbal and physical intimidation and was known by this name.

ANSWER: the Treatment [or Johnson Treatment]

<BZ>

13. Bonus: It costs \$2,750 to advance to the first level of an “Operating” one of these. For ten points each:

[10] Name these beings, which were trapped in human bodies after Xenu went on a genocidal rampage and dropped hydrogen bombs in volcanoes.

ANSWER: thetans

[10] The progression to different Operating Thetan levels is an integral part of this religion, whose practitioners include John Travolta and Tom Cruise.

ANSWER: Church of Scientology

[10] The Church of Scientology was founded by this developer of Dianetics.

ANSWER: L[afayette] Ronald Hubbard

<BZ>

14. Bonus: The music video features the band walking through a dusty wasteland with broken houses, after which they bury a shiny stone in the ground. For ten points each:

[10] Name this song in which the singer is “packing my bags and giving the academy a rain check,” before stating “that I’m never changing who I am.”

ANSWER: “It’s Time”

[10] “It’s Time” is a song by this American rock band, who also performed songs such as “Demons” and “Radioactive,” the latter of which was named “the biggest rock hit of the year” by Rolling Stone.

ANSWER: Imagine Dragons

[10] This man, the lead vocalist for Imagine Dragons, founded the band with Wayne Sermon and Andrew Tolman after hearing the phrase, “Don’t do music because you want to do music—do music if you have to do music.”

ANSWER: Daniel Coulter “Dan” Reynolds

<EC>

15. Bonus: Multiplying two of these structures can only occur if the number of columns in the first equals the number of rows in the second. For ten points each:

[10] Name these rectangular arrays of numbers commonly enclosed in brackets.

ANSWER: matrix or matrices

[10] This property associated with a square matrix is calculated as ad minus bc for a 2 by 2 matrix. Used as a scale factor in linear transformations, the Jacobian type is also useful for substitutions in multivariable integration.

ANSWER: determinant

[10] To solve a system of equations, one can perform this technique, named after a German mathematician, to reduce the matrix of coefficients into row-echelon form by adding rows, swapping them, or multiplying by a scalar.

ANSWER: Gaussian elimination [accept Gauss-Jordan elimination]

<EC>

16. Bonus: In one of his works, Yasin discovers that his father plays the tambourine at nighttime. For ten points each:

[10] Name this author who wrote about the al-Jawad family in *The Cairo Trilogy* and a work in which Said Mahran develops a growing hatred for the world, *The Thief and the Dogs*.

ANSWER: Naguib Mahfouz

[10] Naguib Mahfouz’s *The Cairo Trilogy* is set in this country. Ancient literary works from this country were written on papyrus, including *The Book of the Dead*.

ANSWER: Arab Republic of Egypt

[10] This controversial novel by Mahfouz retells the story of the three Abrahamic religions in a 19th-century Cairene setting. Abraham, Jesus and Muhammad are all characters in this work.

ANSWER: Children of Gebelawi [accept Awlad Haretna, Children of Our Alley, or Children of Our Quarter]

<KT>

17. Bonus: His patronization of Richard Wagner resurrected the composer's later career. For ten points each:

[10] Name this German king who ordered the construction of Neuschwanstein Castle and was questionably diagnosed with mental illness.

ANSWER: **Mad King Ludwig** [or **Ludwig II**]

[10] Ludwig II was a king of this southeastern German kingdom, which is now the largest German state.

ANSWER: **Bavaria** or **Bavern**

[10] The death of Maximilian Joseph led to the end of the Wittelsbach dynasty and resulted in the War of the Bavarian Succession, which was nicknamed after this crop. In the 1840s, the Irish suffered from a blight of this crop.

ANSWER: **potato** [accept **Irish Potato Famine** or **Potato War**; accept **Kartoffelkrieg**]

<BZ>

18. Bonus: It can be applied to find the magnitude of the electric field strength for a single point charge. For ten points each:

[10] Identify this law that can be used to find the force experienced by two point charges given their charge and distance of separation. Both this law and the SI unit for charge are named after the same person.

ANSWER: **Coulomb's** law

[10] A negative value for the force between two charges indicates this type of electrostatic interaction. Like charges do not exhibit this, but opposite charges do.

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

[10] The coefficient k in Coulomb's law is equal to one over the quantity "four pi epsilon-zero," where epsilon-zero represents this quantity, approximately equal to 8.85 times 10 to the negative 12 farads per meter.

ANSWER: **permittivity of free space** [accept **vacuum permittivity** or **electric constant**; prompt on "permittivity"; do NOT accept or prompt on "permeability" or "permeability of free space"]

<EC>

19. Bonus: A period of the same name in China ended with the establishment of the Qin Dynasty. For ten points each:

[10] Identify this time of unrest in Japanese history that began with the Onin War. It resulted in the destruction of Kyoto, the capital of the ruling Ashikaga Shogunate.

ANSWER: **Warring States** Period [or **Sengoku** Period]

[10] The Warring States Period ended with the rise of this last Japanese shogunate, which moved the capital to Edo and eventually gave way to the Meiji Restoration.

ANSWER: **Tokugawa** Shogunate

[10] Though the Tokugawa Shogunate generally closed its doors to foreigners, they were finally visited in 1853 by the "black ships" of this American commodore, who ended Japan's isolationist policies with the Treaty of Kanagawa.

ANSWER: **Matthew C. Perry** [prompt on "Perry"]

<JD>

20. Bonus: He designed the TWA Flight Center terminal for New York City's JFK International Airport. For ten points each:

[10] Name this architect of the Kresge Auditorium at MIT and designer of the Tulip Chair.

ANSWER: Eero **Saarin**

[10] Eero Saarinen is perhaps best-known for designing the Gateway Arch to this Midwestern city.

ANSWER: **St. Louis**, Missouri

[10] Saarinen served in the jury overseeing the construction of this building, which was designed by Jørn Utzon and consists of several white sail-shaped shells.

ANSWER: **Sydney Opera House**

<KT>

21. Bonus: Cre-Lox recombination uses an enzyme and gene sequence from one of these organisms. For ten points each:

[10] Name these infectious agents which can come in T4 and lambda variants, and generally infect bacteria through either the lytic or lysogenic cycle.

ANSWER: bacteriophages

[10] Bacteriophages are one type of these pathogens, which are the cause of the common cold and influenza. “Retro” ones use reverse transcriptase to replicate themselves in their host cells, and one example of them is HIV.

ANSWER: virus

[10] T2 bacteriophages were used in this 1952 experiment, which showed that DNA was the genetic material because the bacteriophages only passed on the radioactively labeled DNA and not the radioactively labeled protein.

ANSWER: Hershey-Chase experiment

<BZ>

22. Bonus: The reversible type of this phenomenon is also isentropic. For ten points each:

[10]: Give this term that describes a process in which no heat is exchanged between a system and its surroundings.

ANSWER: adiabatic

[10]: Adiabatic expansion and isothermal compression are two steps in this thermodynamic process that gives the best possible efficiency for an amount of heat put in to be transformed into useful work.

ANSWER: Carnot cycle

[10]: Plotting the Carnot cycle on a graph with this property as the y-axis and entropy as the x-axis will yield a rectangle. This property can be measured on the Fahrenheit, Celsius, or Kelvin scales.

ANSWER: temperature

<EC>