

## **Bulldog High School Academic Tournament 2016 (XXV): "Pencil and paper ready..."**

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### **Packet 5 Tossups**

1. **It's not chirality, but in particle physics the analogue of spin for massless particles is named for this shape. A symmetry operation that combines a simultaneous rotation and translation is named for either the "screw" operation or this shape. In Cartesian coordinates, this curve has the parametrization "cosine- $t$ , sine- $t$ ,  $t$ ." The most abundant protein in the (\*) human body has this shape. The bacteria that cause ulcers and syphilis have this shape. Collagen is made of three of these shapes. As opposed to *cocci* and *bacilli*, spirochetes have this shape. For 10 points, Watson and Crick discovered that DNA has the "double" form of what shape?**

ANSWER: helix [accept word forms like helices or helical; accept double helix or triple helix; prompt on "spiral" until that word is read] <SE>

2. **A song about this man's creative process includes the lines "Blue blue, electric blue, that's the color of my room" and is titled "Sound and Vision." That song appears on an album with "Warszawa" and "Speed of Life." With Brian Eno, he created a "Berlin trilogy" that includes *Low* and *Heroes*." A song by this artist, "Ashes to Ashes," references an earlier song, saying "Major (\*) Tom's a junkie." He wrote "Space Oddity" and, with Queen, sang "Under Pressure." This singer's most recent music video shows him frail on a hospital bed, foreshadowing his death. For 10 points, name this artist who performed as the Thin White Duke and Ziggy Stardust.**

ANSWER: David Bowie [accept David Robert Jones] <IKD>

3. **An isotonic and non-toxic one of these compounds is made from salt and a hydrogen phosphate. Citric acid is often used as one of these compounds. One of these compounds is regulated by carbonic anhydrase. Taking the log of the (\*) acid dissociation constant equation and rearranging gives a formula describing these compounds. These compounds create a region of shallow upward slope on a titration curve. They are described by the Henderson-Hasselbalch equation. These solutions contain a weak acid or base and its conjugate base or acid. For 10 points, name these solutions that prevent sharp changes in pH.**

ANSWER: buffers <JR>

4. **These people were welcomed by Queen Hypsipyle and invited to help repopulate Lemnos. The leader of this group released a dove before crossing the Symplegades. Following the disappearance of Hylas, Heracles abandoned these people, who included the sons of Phrixus. These people, whose adventures were recorded by (\*) Apollonius of Rhodes, were joined by Atalanta and Orpheus. Other member of this group included the Boreads, who drove off the harpies. This group sought the land of Colchis, and they were led by a man wearing only one sandal. For 10 points, name this group of heroes who quested for the Golden Fleece and were led by Jason.**

ANSWER: the Argonauts [accept anything involving people on the Argo] <CX>

5. **In an adaptation of one of this author's works, one character declares "There's a ship: the Black Freighter, with a skull on its masthead will be coming in." This playwright had characters verbalize their decision process to enhance the "distancing" or "alienation" effect. This author adapted a John (\*) Gay play in a work that includes songs like "Pirate Jenny" and "Mack the Knife." In the most famous play by this promoter of "epic theatre," the title characters Katrin, Eilif, and Swiss Cheese all die in the Thirty Years' War. For 10 points, name this twentieth-century German playwright, who wrote *The Threepenny Opera* and *Mother Courage and Her Children*.**

ANSWER: (Eugen) Bertolt (Friedrich) Brecht <JR>

6. These structures are unusually differentiated in *Amborella*. Their development is described in the ABC model. These structures sit atop receptacles. Part of this structure thickens to become the pericarp. In part of a "double" process in these structures, the (\*) endosperm is formed. These structures include styles and stigmas in their carpels. Most plants with these organs are classified as monocots or dicots. Angiosperms are characterized by the presence of these reproductive organs, which have evolved nectar to attract pollinators. For 10 points, name these plant parts that contain pistils, stamens, and petals.

ANSWER: flowers [if they answer with "plant ovaries" or just "ovaries," anti-prompt by asking for the broader structure] <JR>

7. This material was used to create *The Waltz* by Camille Claudel, whose teacher specialized in it. This material was used to make the *Walking Man* series by Alberto Giacometti, as well as a *Monument to Balzac*. A live model was supposedly used to make a work called *The (\*) Age of [This Material]*. A famous artwork in this material depicts the poet Dante resting his chin on his fist. This material was used to make *The Burghers of Calais* and *The Gates of Hell*, which also survives in its plaster original. For 10 points, Auguste Rodin's ("roh-DAN's") *The Thinker* is cast out of what metal?

ANSWER: bronze [prompt on "metal" or "copper alloy"; do not accept or prompt on "copper" or "brass"] <JR>

8. Diane Rehm ("reem") once erroneously asked this man if he had dual citizenship. The extension of the Bush Tax cuts led this man to filibuster for eight hours. He gave a speech at Liberty University citing Matthew 7:12 and framing his support for family leave as "family values." In August 2015, he was interrupted in Seattle by two activists from (\*) #BlackLivesMatter. His healthcare plan has been criticized for both "dismantling" and being radically larger than Obamacare. Recently, he got sixty percent of the vote to win the New Hampshire primary. For 10 points, name this man who is running as a "democratic socialist" against Hillary Clinton.

ANSWER: Bernie Sanders [Bernard Sanders] <IKD>

9. The group velocity of a wave equals the derivative of this quantity with respect to wavenumber. The Fourier transform expresses a signal in the "domain" named for this quantity. The energy of a photon equals Planck's constant times this parameter. The perceived value of this quantity is decreased for a source (\*) moving away from an observer in the Doppler effect. This quantity times wavelength equals the speed of a wave, so this quantity is higher for blue light than for red light. For 10 points, name this quantity, the number of periods of an oscillation per unit time, which is measured in hertz.

ANSWER: frequency [accept angular frequency until "domain"] <SE>

10. A king with this name rescued his sister Joan from Tancred of Sicily and built the enormously expensive Château Gaillard. An Earl with this first name was opposed by Elizabeth Woodville and killed at the Battle of Barnet. This was the first name of an Earl of Warwick nicknamed "Kingmaker." The early reign of a king with this name was dominated by John of (\*) Gaunt, and that king with this name was deposed by Henry IV. Another king with this name besieged Acre, was succeeded by King John, and fought Saladin in the Third Crusade. For 10 points, give this name of an English king nicknamed "the Lionheart."

ANSWER: Richard [accept more specific Richards, like Richard the Lionheart] <JR>

11. A character from this country startles a policeman by going to a masquerade ball in traditional costume. One character from this country holds friendly discussions with Akunna, and is contrasted with another character from here, who prompts the overzealous convert Enoch to unmask an (\*) *egwugwu*. A character from this country plans to write *The Pacification of the Primitive Tribes of the Lower Niger*. Another character from this country prevents the ritual suicide of Elesin in *Death and the King's Horseman*. For 10 points, name this home country of Simon Pilkings, and Mr. Brown and Reverend Smith in *Things Fall Apart*.

ANSWER: the United Kingdom [or U.K.; or Great Britain; accept England] <JR>

12. *Description acceptable.* A country in this region was ruled by the Marinids and was first established by the Idrisid dynasty. In this region, Portuguese power was crippled by the Battle of Alcazar. The historian Ibn Khaldun and the traveller Ibn Battuta were both from this region. An empire based primarily in this region was defeated at the Battle of Las (\*) Navas de Tolosa. A modern country in this region has been ruled since 1631 by the Alaouite dynasty. This region's Almoravid and Almohad Caliphates had their capitals at its city of Marrakesh. This region is home to the Berbers. For 10 points, name this region now home to Algeria and Morocco.

ANSWER: the Greater Maghreb [accept Northwest Africa; accept North Africa; accept Ifriqiya; prompt on just "Africa"] <JR>

13. This thinker justified the suffering of both good and bad people by noting that people can suffer in good and bad ways. While in his garden, this man heard a child's voice say "take up and read," and then decided to renounce desire. This author's most famous work ends with a commentary on the beginning of the book of (\*) Genesis. Thomas Aquinas elaborated on this man's idea that one could be a Christian and still fight in wars, the concept of a "just war." This student of Saint Ambrose wrote the first major Western autobiography. He wrote his longest work in response to the 410 A.D. sack of Rome. For 10 points, name this Church Father and author of *City of God* and *Confessions*.

ANSWER: Saint Augustine of Hippo [accept Saint Austin; accept any answer including the name Augustine] <JR>

14. This composer founded a "New Journal for Music" that was supposedly edited by the "League of David," who march against the Philistines at the end of one of his piano cycles. Another of his piano works ends with the movement "The Poet Speaks." He set poems by Heinrich Heine, like "Ich grolle nicht," in the song cycle (\*) *Dichterliebe*. This composer was likely schizophrenic, and jumped into the Rhine in February 1854. His early piano cycles include *Papillons*, *Kreisleriana*, and *Scenes from Childhood*. For 10 points, name this German romantic composer of *Carnaval* and the "Rhenish" symphony, who married the pianist Clara Wieck.

ANSWER: Robert (Alexander) Schumann <CW/JR>

15. A poem from this movement repeatedly invokes an "unreal city." That poem from this movement references Philomela's transformation into a nightingale with two lines consisting only of the words "Twit" and "Jug." That poem from this movement begins with a twisted reference to the opening of the *Canterbury Tales* and was published with extensive (\*) notes. This movement was summarized by the maxim "Make it new!" The disillusionment of this movement is represented by poems like "The Hollow Men," written after World War I. For 10 points, name this movement characterized by difficult fragmented poetry like T.S. Eliot's *The Waste Land*.

ANSWER: Modernism [accept word forms like "modernist"; if they answer with "Imagism" or "imagist," anti-prompt by asking for the broader movement] <JR>

16. A reformist ruler with this name was heavily influenced by his tutor, Frédéric-César de LaHarpe, who later helped found the Helvetic Republic. That ruler with this name came to power after the assassination of Paul I. A ruler with this name sought to promote peace, Christianity, and monarchies with his Holy Alliance. That ruler of this name agreed to join the (\*) Continental System by signing the Treaty of Tilsit with Napoléon. A later ruler with this name created the system of local government called *zemstvo* and was assassinated in 1881 by the "People's Will." For 10 points, give this name of the Russian Tsar who freed the serfs.

ANSWER: Alexander [accept Alexander I or Alexander II; do not accept or prompt on "Alexei"] <JR>

17. **During this holiday, a big, white candle inscribed with an alpha and an omega is often processed around. Southern churches often hold Mass at sunrise on this day. In many churches, this is the last day in which the cross is covered with a purple shroud. The (\*) *Exsultet* is sung on this day. Ascension is celebrated forty days after this holiday. This holiday is roughly on the Sunday after the first full moon on or after the Vernal equinox. This holiday is preceded by Maundy Thursday, Palm Sunday, and Good Friday, and it marks the end of Lent. For 10 points, name this Christian celebration of the Resurrection of Jesus.**

ANSWER: Easter Sunday [or Pascha; or Resurrection Sunday] <JR>

18. **The title character of one of this author's novels revels in the pleasure of being treated as a woman on a boat from Turkey to England; that novel ends with the title character baring her breasts to meet her husband after publishing *The Oak Tree*. In the first section of another novel by this author, many characters insist that the weather will decline, including (\*) Lily Briscoe; in that book's section "Time Passes," Mrs. Ramsay dies. This author imagined the suppressed sister "Judith Shakespeare" and created the gender changing *Orlando*. For 10 points, name this English author of *A Room of One's Own* and *To the Lighthouse*.**

ANSWER: (Adeline) Virginia Woolf <IKD>

19. **The final scene of a hyper-stylized action movie set in this city shows the title "drifter" walking down a completely white hallway. In another movie, a content old man whistles on a swing-set of the playground he built in this city. An old couple take a train to this city, only to be ignored by their children in a movie named *[This City]* (\*) *Story*. Scientists make use of the "Oxygen Destroyer" to save this city in a classic *kaiju* movie. That movie used a rubber suit and a miniature model of this city to simulate its destruction by a monster that symbolizes nuclear weapons. For 10 points, name this city destroyed by Godzilla.**

ANSWER: Tokyo [accept Tokyo Drifter; accept Tokyo Story; accept Tokyo Monogatari] <IKD>

20. **This was the first battle after Joseph Rochefort's team at HYPO station was able to completely decrypt the JN-25b code. Much of the success of this battle was due to the Douglas SBD Dauntless. This battle took place at the same time as the beginning of the Aleutian Islands Campaign. Before this battle, Raymond Spruance took over for William (\*) Halsey. This battle was followed by the Solomon Islands campaign and preceded by the Battle of the Coral Sea. In this battle, Admiral Nimitz lost the *Yorktown*, but Admiral Yamamoto lost all four of his large aircraft carriers. For 10 points, name this turning point of the Pacific Theater of World War II.**

ANSWER: Battle of Midway <JR>

*Tiebreaker*

21. **Before founding Methodism, John Wesley led an unsuccessful mission to evangelize this colony on behalf of its Board of Trustees. The ship *Anne* brought over the founder of this colony, which initially banned alcohol and slavery, instead having colonists grow their own crops. During the War of Jenkin's Ear, the Spanish invaded this colony, leading to the Battle of (\*) Bloody Marsh on St. Simons Island. Later, Andrew Jackson said "let them enforce it" when the Supreme Court overturned this state's conviction of Samuel Worcester, who was living on Cherokee lands. For 10 points, name this southern colony founded as a haven for debtors by James Oglethorpe.**

ANSWER: Province of Georgia [or Georgia Colony] <CW>

## Packet 5 Bonuses

1. Famous early pieces in this genre include "The Erl-King" and "Gretchen at the Spinning-Wheel." For 10 points each:

[10] Name this small-scale genre popular throughout the nineteenth century. Pieces in this genre were sometimes integrated into "cycles" like *Winterreise*.

ANSWER: lieder ("leader") [prompt on "songs"]

[10] Many of the most famous *lieder* were written by this composer before he went and died at the age of thirty-one. His instrumental pieces include the "Trout" Quintet and the "Unfinished" Symphony.

ANSWER: Franz (Peter) Schubert

[10] Schubert often used his *lieder* as the basis for instrumental pieces; for instance, he used part of his song "Death and the Maiden" in a piece in *this* genre. Beethoven dedicated a set of pieces in this genre to Count Razumovsky.

ANSWER: string quartets [prompt on just "quartet"] <JR>

2. This technique is often performed with a QUISTOR. For 10 points each:

[10] Name this technique usually preceded by electrospray ionization or MALDI. It is frequently enhanced by being performed in tandem with capillary electrophoresis.

ANSWER mass spectrometry

[10] Mass spectrometry is often preceded by the vapor phase form of *this* technique. Another form of this technique uses a sheet of an absorbent like silica gel or cellulose to separate out a mixture.

ANSWER: chromatography [accept more specific answers like gas chromatography or thin layer chromatography; accept GC or TLC]

[10] A "radical" one of these entities must be formed prior to mass spec. These positively charged particles are contrasted with anions.

ANSWER: cations <AF>

3. After the passage of this bill was delayed, riots broke out in Nottingham and Bristol. For 10 points each:

[10] Name this 1832 bill that expanded the British franchise to the industrial cities of Manchester and Birmingham. It was proposed by John Russell and passed during the Prime Ministership of Earl Grey.

ANSWER: Great Reform Bill [accept First Reform Bill, accept "Act" and "Law" in place of "Bill"; prompt on just "Reform Bill," Act, or Law]

[10] The Great Reform Bill got rid of most of *these* entities. They only had a few constituents, as the membership of the House of Commons before the Great Reform Bill did not reflect population changes.

ANSWER: Rotten Borough [accept Pocket Borough, Nomination Borough or Proprietorial Borough]

[10] William IV was king during the passing of the Great Reform Bill; he was preceded as king by the fourth ruler of *this* name. The third king of this name was mentally ill due to his porphyria and ruled from 1760 to 1820.

ANSWER: George <LL>

4. Name some things associated with mythological horns, for 10 points each.

[10] In Greek mythology, the mythical horn of plenty was created when a horn was snapped off the head of Amalthea, who was one of these animals. The bottom half of a satyr was derived from these animals.

ANSWER: goats

[10] This son of Poseidon and Amphitrite serves as the messenger of the sea by blowing on a conch shell horn to make waves. He is typically depicted as a merman with a fish tail and a bearded face.

ANSWER: Triton

[10] After a dream of Odysseus's return, this wife of Odysseus explains that meaningful dreams pass through gates of horn, while false dreams pass through gates of ivory.

ANSWER: Penelope <CX/AF>

5. In this play, Hedvig Ekdal's failing eyes turn out to be inherited from Haakon Werle. For 10 points each:

[10] Name this play that centers on the portrait photographer Hjalmar, who is obsessed with a "great invention."

ANSWER: *The **Wild Duck*** [or ***Vildanden***]

[10] *The Wild Duck* was written by this Norwegian playwright, who also wrote *Hedda Gabler* and *A Doll's House*.

ANSWER: Henrik (Johan) **Ibsen**

[10] Ibsen straddled many literary movements. *The Wild Duck* represents his work in both naturalism and this related movement.

ANSWER: **realism** [accept word forms like "**realist**"] <JR>

6. A precursor to this country defeated Champa under Ly Thai Tong. For 10 points each:

[10] Name this country, precursors to which won several important battles at the Bach Dang River.

ANSWER: **Vietnam** [accept **Dai Viet**]

[10] At one of those battles, Dai Viet gained independence from China, which had dominated it under this dynasty. This Chinese dynasty was the last to have its capital at Chang'an and was targeted by An Lushan's rebellion.

ANSWER: **Tang** Dynasty

[10] At another Battle of Bach Dang River, a Tran-dynasty general defeated an invasion from this group of people, who were at the time led by Genghis Khan's grandson, Kublai.

ANSWER: **Mongols** <JR>

7. One of this artist's works depicts an illuminated lamp at the center of an otherwise dark painting of a tree and a house. For 10 points each:

[10] Name this creator of *The Empire of Light*. In *The Human Condition*, he depicted a painting of a landscape in front of the exact same landscape as seen through a window.

ANSWER: René (François Ghislain) **Magritte**

[10] Magritte was the foremost artist of the Belgian branch of this art movement that featured strange juxtapositions and "dream logic." Other artists from this movement include Max Ernst and Salvador Dalí.

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

[10] This artist strongly influenced the development of Surrealism with "metaphysical" paintings like *The Love Song*.

ANSWER: Giorgio **de Chirico** <AF>

8. Answer some questions about anarchy in philosophy, for 10 points each.

[10] This French "father of anarchism" famously asserted that "property is theft!"

ANSWER: Pierre-Joseph **Proudhon**

[10] In a defense of *this* political position, Robert Nozick advocated the minimalist state that comes directly from anarchy. This philosophy emphasizes freedom of choice above all else, and thus advocates a small government.

ANSWER: **libertarianism** [accept **minarchism**; do not accept or prompt on "conservatism"]

[10] Nozick's *Anarchy, State, and Utopia* was a response to John Rawls's theory of *this* concept, which he argued was a form of fairness. Usually, this concept involves the distribution of punishments and rewards.

ANSWER: **justice** <JR>

9. While holding this object, its owner worries about her piano playing and describes a conversation with Mother Elizabeth. For 10 points each:

[10] Name this item that the morphine-addicted Mary Tyrone holds during a long monologue at the end of the play.

ANSWER: her **wedding dress** [accept **wedding gown**; prompt on just "dress" or "gown"]

[10] Mary Tyrone appears in this play, in which the actor James Tyrone argues with his son Edmund, who is afflicted with tuberculosis. This play was written in 1941, but was only published posthumously, in 1956.

ANSWER: ***Long Day's Journey Into Night***

[10] *Long Day's Journey into Night* was written by this twentieth-century American playwright, who also wrote *Desire Under the Elms* and *The Iceman Cometh*.

ANSWER: Eugene (Gladstone) **O'Neill** <LL>

10. One ruler of this name beheaded Pompey, and another erected the Rosetta Stone. For 10 points each:

[10] Give this regnal name of rulers whose queens were often named Arsinoë or Berenice.

ANSWER: **Ptolemy**

[10] The last pharaoh of the Ptolemaic dynasty was this beautiful queen of Egypt, who had affairs with both Julius Caesar and Marc Antony.

ANSWER: **Cleopatra** VII Philopator

[10] Cleopatra bore this son to Julius Caesar. He co-ruled with his mother but was strangled after her death—on Octavian's orders, according to some sources.

ANSWER: **Caesarion** [accept "**Ptolemy XV** Philopator Philometor Caesar"] <CW>

11. This country has often been cited as the "greenest in the world," since it produces all of its electricity from renewable sources. For 10 points each:

[10] Name this small Central American country. It abolished its standing army, like its southern neighbor, Panama.

ANSWER: Republic of **Costa Rica** [or Republica de **Costa Rica**]

[10] Costa Rica's economy was once dominated by the production of bananas and this other cash crop. Like chocolate, the Costa Rican variety of this crop is known for being especially high in caffeine.

ANSWER: **coffee** [or *Coffea arabica*]

[10] Colloquially, Costa Ricans are referred to by this Spanish-language term, which has become one of the nicknames of their national soccer team.

ANSWER: **ticos** <JR>

12. This movement grew out of Hanbalism. For 10 points each:

[10] Name this fundamentalist movement in Islam. Its namesake helped build the Emirate of Diriyah in the eighteenth century.

ANSWER: **Wahhabism** [accept **Salafism**]

[10] Wahhabism was adopted by the kings of this largest country on the Arabian Peninsula. Because of its fundamentalism, this country only allowed women to vote last year, and women in it still cannot drive.

ANSWER: Kingdom of **Saudi Arabia** [or **KSA**; or Al-Mamlakah al-**Arabiyah as-Saudiyyah**]

[10] Wahhabi Muslims emphasize this belief, which is called *tawheed* in Arabic. The Jewish *shema* and the opening words of the Nicene Creed also declare this belief.

ANSWER: **monotheism** [accept descriptions like "there is only **one God**," "I believe in **one God**," "**God is one**," etc.] <JR>

13. These devices are the canonical examples of elastic objects, which are described by Hooke's law. For 10 points each:

[10] Name these objects that store mechanical energy in the compression of their metal coils. They are used to provide elastic restoring forces in mattresses, watches, and vehicular suspensions.

ANSWER: **springs**

[10] For a large object on a spring, the oscillation frequency is given by: "the square root of: the spring constant over *this* property of the object." This value for the spring itself is usually ignored.

ANSWER: its **mass** [prompt on "*m*"]

[10] If you want to describe elastic vibrations in solids, you'll need to replace Hooke's law with a more complicated tensor expression—unless the material has *this* property, meaning its elastic stiffness is the same in all directions.

ANSWER: **isotropy** ("eye-SAW-troh-pee") [or **isotropic** ("eye-soh-TRAW-pick")] <SE>

14. Answer some questions about the word "CROATOAN," for 10 points each.

[10] The word was found carved into a fence-post after the disappearance of this colony in modern North Carolina. Founded in 1585, it was home to Virginia Dare, the first Christian baby born in England's New World colonies.

ANSWER: **Roanoke** Colony [accept "the **Lost** Colony"]

[10] This English gentleman financed the Roanoke Colony, but never visited North America, although he went looking for El Dorado in South America. This onetime favorite of Queen Elizabeth popularized tobacco in England.

ANSWER: Sir Walter **Raleigh**

[10] This colony in modern Virginia attempted to discover the fate of the Roanoke colony. Important people from this first permanent English settlement in the Americas included John Rolfe and John Smith.

ANSWER: **Jamestown** <LL>

15. Answer some questions about Chilean poet Pablo Neruda, for 10 points each.

[10] Neruda wrote a large number of these poems about everyday things like artichokes, his socks, and a large tuna fish in the market. In 1819, Keats wrote a set of six of these poems, including one "To Psyche."

ANSWER: **odes** [or **odas**; accept "**Ode to Psyche**"]

[10] Neruda's most famous collection is a set of twenty poems about this emotion, and a "Song of Despair." Earlier poems about this emotion include Shakespeare's sonnet "Shall I compare thee to a Summer's day?"

ANSWER: **love** [or **amor**]

[10] At several moments, including the last line, the "Song of Despair" repeats that "it is [*this specific moment*]". Give the specific phrase Neruda uses for this moment.

ANSWER: the **hour of departure** [or la **hora de partir**] <JR>

16. Answer some questions about director Billy Wilder, for 10 points each.

[10] Wilder is probably most famous for directing this actress in films like *Some Like It Hot*.

ANSWER: Marilyn **Monroe** [or Norma Jeane **Mortenson**]

[10] This much more serious Billy Wilder movie stars William Holden as the out-of-work screenwriter Joe Gillis, and Gloria Swanson as the former movie star Norma Desmond.

ANSWER: **Sunset Boulevard**

[10] At the end of *Sunset Boulevard*, Norma Desmond says that she's ready for *this* kind of shot. Carl Theodore Dreyer's *The Passion of Joan of Arc* uses this kind of shot to force you to pay attention to Joan's tortured face.

ANSWER: **close-up** <JR>



17. Answer some questions about cystic fibrosis, for 10 points each.

[10] The primary symptom of CF is a buildup of *this* substance in the lungs. This substance is also produced from membranes in the nose.

ANSWER: mucus

[10] Another symptom of CF is *this* condition in men, due to the congenital absence of the vas deferens.

ANSWER: infertility [prompt on descriptions like "cannot reproduce"]

[10] CF is caused by a mutation in the gene CFTR at position 508, which results in a loss of this amino acid. This aromatic amino acid's namesake hydroxylase converts it into tyrosine.

ANSWER: phenylalanine [accept F] <AF>

18. It follows the fight over desegregation of Yonkers public housing in the late '80s. For 10 points:

[10] Name this HBO mini-series, which follows Mayor Nick Wasicsko, public housing residents and city planners as they struggle to integrate the city following a court order.

ANSWER: Show Me a Hero

[10] *Show Me a Hero* stars this actor as Mayor Wasicsko. You probably know him best as Poe Dameron from *Star Wars: The Force Awakens*, but he's also appeared in *Drive*, *Ex Machina* and *Inside Llewyn Davis*.

ANSWER: Oscar Isaac (Hernandez Estrada)

[10] *Show Me a Hero* was co-written by David Simon, who also created *The Wire*. Like *Breaking Bad*, *The Wire* centers around the production and sale of these commodities.

ANSWER: illegal drugs [accept any more specific answers] <IKD>

19. Answer some questions about literary lightning strikes, for 10 points each.

[10] This character saw a lightning strike completely destroy an oak outside his home when he was fifteen. That briefly led him away from natural philosophy, although he returned to the problem of artificial life at Ingolstadt.

ANSWER: Victor Frankenstein [accept either name]

[10] This character accepts a proposal from Adele Varens' guardian under a "great horse-chestnut tree" in the Thornfield Hall orchard, only to discover, the next day, that the tree has been split by lightning.

ANSWER: Jane Eyre [accept either]

[10] Like Lucy Snowe, a teacher at a French boarding school in *Villette*, Jane Eyre is the protagonist and narrator of a novel by this author.

ANSWER: Charlotte Bronte [prompt on "Brontë"] <GL>

20. Elementary school students frequently memorize tables of the results of this operation. For 10 points each:

[10] Name this arithmetic operation, frequently denoted with an asterisk, dot, or "X."

ANSWER: multiplication [accept "times"]

[10] The Strassen and Coppersmith–Winograd algorithms are used to multiply these array-like mathematical structures. The study of these objects forms the basis of linear algebra.

ANSWER: matrix [plural matrices]

[10] The spectral theorem states that a real matrix of *this* kind can always be diagonalized. This type of matrix equals its own transpose.

ANSWER: symmetric matrix <CX>

*Tiebreaker*

21. Identify the following people who conducted physics research in the great state of Illinois, for 10 points each.

[10] This Italian-American physicist directed the construction of the Chicago Pile-1 reactor during the Manhattan Project. The Tevatron near Chicago is part of "[His name] Lab."

ANSWER: Enrico **Fermi** [accept **Fermilab**]

[10] This Chicago physicist used an interferometer to measure the diameter of Betelgeuse. You probably know him for a collaboration with Edward Morley that disproved the theory of the luminiferous ether.

ANSWER: Albert A. **Michelson** [Albert Abraham Michelson; accept **Michelson–Morley** experiment]

[10] This man, who spent much of his career at the University of Illinois, is the only person to win two Nobel Prizes in Physics. He won the first of those prizes for work with Shockley and Brattain to invent the transistor.

ANSWER: John **Bardeen** <SE>