

ACF Nationals 2016
Packet by Georgia Tech (Adam Silverman)
Tossups

1. A 2008 paper by Haynes et al. described implementing a computer made of *E. coli* to solve a variant of this problem. In 1995, Manuel Blum solved a variant of this problem for n inputs with “ $23n$ over 14 plus c ” operations, where c is a constant. The first algorithm to solve this problem non-trivially showed that when n is greater than 10 , a runtime of $5/3 n$ could be achieved. This problem can be solved trivially using “ $2n$ minus 3 ” operations, since anyone can find the largest item, move it to the top and move it to the bottom in two operations. *Futurama* co-creator David X. Cohen’s most cited paper and Bill Gates’s only academic paper both focused on this problem, whose “burnt” variant requires one extra “flip” to solve in the naive solution. For 10 points, name this computer science problem which is often visualized as a sorting problem in which a spatula is used to rearrange the namesake items.

ANSWER: **pancake** sorting [accept anything indicating this is the (burnt) **pancake** problem; accept **prefix reversal**; prompt on sorting problem]

2. The Sabayel Castle in this city fell into the sea in the 14th century. Ludwig and Robert Nobel, Alfred's brothers, made their fortunes in the Branobel company while living in its “Black City.” Fath Ali Khan died in this city after uniting its khanate with the Quba khanate. Adolf Hitler symbolically chose a piece of dark chocolate cake representing this city for his birthday in 1941. Ten thousand Muslims were shot during this city’s “March Days” after 26 commissars formed a commune composed of Bolshevik and SR members in 1918. During classical times, this city was known for its Yanar Dag or continuous natural fires on its Absheron peninsula. During World War II, it was the target of Operation Edelweiss, which led to the Battle of Stalingrad. In the 1890s, this city produced more than 50 percent of the world’s oil. For 10 points, name this city on the Caspian, which is now the capital of Azerbaijan.

ANSWER: **Baku**, Azerbaijan

3. A man greedily holds one of these animals in a 1951 cartoon advertising an exposition at the Galerie Henri Tronche. A little boy stands behind a colorful ball and clutches one of these creatures in a painting made when the artist was 20 years old. Many images of these animals were rendered based on a gift from Henri Matisse. Two of these animals brawling in a cage represent Marie-Theresa Walter and Dora Maar in a 1937 allegory. These animals are depicted from the balcony of the La Californie Ville studio on the Cote d’Azur in a series of nine paintings which are usually included in the artist’s series reimagining *Las Meninas*. Yellow, red, green, and blue flowers are drawn all over a penciled-in rendering of these animals, which were used as a symbol for the 1949 World Peace Conference in Paris. For 10 points, Picasso frequently depicted what type of bird, otherwise often shown holding an olive branch?

ANSWER: Pablo Picasso’s **doves** [or **pigeons**; prompt on birds]

4. A fictional version of this person appears in a novel originally titled *The Elephant Path*—in that book, Madame Reynaud asks a character who read Franz Mesmer’s *An Abridged History of Animal Magnetism* to treat this man. This author wrote “and so many years, and always, much always, always, always!”, in “Today I Like Life Much Less” from his posthumously published *Payroll of Bones*. Clayton Eshelman translated a poetry collection by this author which begins “There are blows in life, so powerful ... I don’t know!” This poet is afflicted with hiccups while dying in Paris in Roberto Bolano’s novel *Monsieur Pain*. The Spanish Civil War inspired him to write *Spain, Take this Cup From Me*, though his first published collection was *The Black Heralds*. For 10 points, name this author of the modernist sequence *Trilce*, who was exiled from his native Peru.

ANSWER: Cesar [Abraham] **Vallejo** [Mendoza]

5. University of Wisconsin professors Thomas DuBois and James P. Leary currently edit the major American journal on this subject. George Lyman Kittredge and his mentor Francis James Child were teachers of this subject in the US. A classic 1965 book on the study of this subject was written by Berkeley professor Alan Dundes. Kaarle Krohn invented the “Finnish” method approach to studying this subject; then, his students Stith Thompson and Antti Arne developed a namesake index to categorize it. A list of 31 “narratemes” is presented in a book titled for the morphology of this field, written by Vladimir Propp. The earliest definitive work in this discipline, usually abbreviated KHM, was intended as a sequel to a collection by Clemens Brentano and Achim von Arnim titled *The Boy’s Magic Horn*, based on stories told by German peasants. For 10 points, name this discipline which studies namesake tales of a people.

ANSWER: **folklore** [or **folk** tales; or specific types of folklore such as American **folklore**; prompt on cultural **anthropology**]

6. This unnamed character cites celebrations of the “debaucheries of Jupiter” and “the continence of Xenocrates being revered” as examples of evil in men, but concludes that “at the bottom of our hearts [is] an innate principle of justice and virtue.” While in a “state of uncertainty and doubt which Descartes considers to be necessary for the search for truth,” this character “ponders” on the “sad fate of mortals” before deciding to follow the “Inner Light.” After its author was charged with “impiety” for creating the ideas spoken by this character, he wrote *Letters from the Mountain* to defend ancient civic religion. In *Reveries of a Solitary Walker*, the author who created this character suggests that this figure’s ideas about natural religion may “one day make a revolution amongst men.” For 10 points, name this religious figure, who explains his “Creed” in Jean-Jacques Rousseau’s *Emile*.

ANSWER: Creed of the **Savoyard Vicar** [or The Profession of Faith of the **Savoyard Priest**; accept any answer indicating that it is a **priest** from **Savoy**; prompt on **priest** or **vicar**]

7. In North Dakota, this organization accepted \$5000 from Charles Crittenton to build 70 shacks called the Crittenton Homes. This entity set up the Temple Building Association in Chicago to finance its activities. Its international wing began by employing six “round-the-world missionaries” and established a minister position on Ellis Island. A low-ranking member of this organization received a dream message to “Go to Kiowa” while living in Medicine Lodge, Kansas. The leader of this group gave a speech outlining the “Do Everything” policy of social reform to the “White Ribbon Army.” This organization, which released the journal *The Union Signal* and issued the Polyglot Petition, was split after a debate on whether to support Clinton Fisk for president. Its “Non-Partisan” faction separated from its leader Frances Willard, while one of its chapters was started by Carrie Nation. For 10 points, name this organization of religious ladies who fought for Prohibition in the late 19th century.

ANSWER: **Women’s Christian Temperance Union** [or the **WCTU**]

8. In Ben Jonson’s *The Entertainment at Althorp*, a satyr named Vere mocks this character, who is supposedly a stand-in for Elizabeth I. In *Sense and Sensibility*, Willoughby promises to give Marianne a horse with this name. An author lost custody of his children to Lord Eldon after publishing an atheistic poem dedicated to Harriet Westbrook and titled for this character. In another work, this character is said to have a “team of little atomies,” to bake “the elflocks in foul sluttish hairs,” and to plait “the manes of horses in the night.” This character names a nine-part poem which was the first published work of Percy Bysshe Shelley. She is said to gallop over lawyers’ fingers, causing them to dream of fees, even though she comes “in shape no bigger than an agate-stone.” A speech about this character convinces the protagonist of a play to forget Rosaline and attend a dinner party. For 10 points, name this “fairies’ midwife,” the subject of a speech that Mercutio gives Romeo.

ANSWER: Queen **Mab**

9. The KATRIN experiments at the University of Mainz developed the MAC-E filter to study these particles. The mass of these particles can be expressed via the vacuum expectation value of a Higgs triplet field. An asymmetry between these particles traveling “up” and those traveling “down” was discussed in a 1998 paper by Y. Fukuda et al. Up to three CP-violating phases are needed to parameterize a construct describing these particles, which can have mixing angles as large as 45 degrees. An experiment at Brookhaven showed that these particles spin opposite their momentum, suggesting that they are all left-handed. The PMNS matrix predicts the relative contribution of three mass eigenstates to these particles. Arthur McDonald and Takaaki Kajita won the 2015 Nobel in Physics for detecting their flavor oscillations. For 10 points, name these actually-not-massless neutral leptons.

ANSWER: **neutrinos** [or anti**neutrinos**; or electron **neutrinos**; or muon **neutrinos**; or tau **neutrinos**]

10. The first volume of *A Marginal Jew* uses the “criterion of embarrassment” to argue that this event was not fabricated, since it was so “embarrassing” for its author to include it that the author has no reason to lie. This event is said to have occurred at the Qasr El-Yahud, or the “Castle of the Jews.” In one account, immediately before this action is described, a man imagines that a winnowing-fan is in God’s hand so that he can clear the threshing floor, but will burn the chaff with an inextinguishable flame. John Paul II made this event the first of the five Luminous Mysteries. In Eastern Orthodoxy, this event is commemorated on January 19th. After this event, a voice remarks, “This is my Son, in whom I am well pleased.” The Holy Spirit descends like a dove after this event, which occurred at the start of Christ’s ministry. For 10 points, name this event in which Jesus was dunked in the Jordan River.

ANSWER: **baptism** of **Christ** [or John the Baptist **baptizing Jesus**; or obvious equivalents; prompt on partial answer]

11. On his first adventure, this man kills a one-eyed bull demon who was hiding in a sack. On another quest, he fights off a strange giant with a single long chisel-shaped incisor, as well as the gigantic snake *bashe* (bah-shay). This man narrowly avoids killing his wife, then gives her a silver fox fur as a wedding present; that wife later gets turned into a three-legged toad for disobeying him. This man is beaten to death by one of his students with a club made from a peach tree. For building a summer palace on Mount Kunlun, this man is given either two elixirs or a single pill granting immortality, which are then consumed by his wife. His most memorable action is required after several birds decide to fly out of a tree at the same time. After this representation of the *yang* ended an unbearable drought, the emperor stole his final arrow. For 10 points, name this husband of Chang’e, a mythical archer who shot down nine of the ten suns in Chinese myth.

ANSWER: **Houyi** [or **Hou-i**; or **Yi**; or **Shenyi**]

12. This company settled the Kingsbury Commitment with the Department of Justice. This corporation operated Room 641A, where Mark Klein worked alone and spied for the NSA. Knoyme King sued this company in 2015 over racist texts sent by its executive Aaron Slator. Evelyn Beatrice Longman sculpted a golden boy that now stands at this company’s headquarters in the Whitacre Tower in Dallas, Texas. The Modification of Final Judgment clarified a 1982 consent decree concerning this corporation. In March 2015, Apple pushed this company out of the Dow after it underperformed the average by 39 percent. Anish Kapoor’s Cloud Gate sculpture in Millennium Park is in a public plaza named for this company. While working for this corporation’s scientific division, Penzias and Wilson discovered the CMBR. In the early 20th century, this corporation was nicknamed “Ma Bell.” This company merged with DirecTV in July 2015. For 10 points, name this telecommunications giant.

ANSWER: **AT&T** Inc. [or **American Telephone & Telegraph**; prompt on **Southwestern Bell Corporation** or **SBC** or **Bell Corporation** or **Bell Labs**]

13. This artist beat four contemporaries in a competition to sculpt a wounded Amazon warrior leaning on a pillar. A sculpture by this artist is easily outlined by two diagonals, one curved and one straight, according to this artist's chiasmic principle. This man's advocacy of *to kallos* and *to eu* was strongly influenced by Pythagoras. Cicero's "hardness" scale culminates in the "perfection" of this sculptor. This artist showed a man with both arms bent at the elbow, tying a fillet around his neck, in his series *Diadumenes*. This artist constructed the square root of two by using the length of three *phalanges* in his sculptural treatise, the *Canon*. The *contrapposto* athlete in his best-known sculpture no longer holds a weapon on his shoulder. For 10 points, name this ancient Greek sculptor of a gold-and-ivory statue of Hera at Argos and the *Doryphoros*, or *Spear-Bearer*.

ANSWER: **Polykleitos** Sicyonius [or **Polycletus**]

14. During this military campaign, the leader of one side reportedly drew his dagger and stabbed a marble table to show he refused to surrender. The Italian inventor of the field mill, Pompeo Targone, designed a preliminary seawall for this campaign which was destroyed by cold weather. Inspired by Alexander the Great, a commander during this action built a mole overlooking the bay. This campaign was partly launched to retain control of salt deposits on the islands of Olerón and Rhé. It began five years after the Treaty of Montpelier was signed. The Duke of Soubise was supported by the English under the Duke of Buckingham, but Governor Toiras triumphed after Louis XIII personally led troops into battle in this campaign, which led to the Peace of Alais. For 10 points, name this 13-month siege in 1627 engineered by Cardinal Richelieu against a Huguenot stronghold.

ANSWER: siege of **La Rochelle** [prompt on Huguenot rebellions; prompt on Anglo-French War]

15. SMTC inhibits an enzyme which synthesizes this compound. ACE, PDGF-B, and the enzyme which synthesizes this compound share a G-A-G-A-C-C consensus sequence which is activated by shear stress. The enzyme which synthesizes this compound is structurally analogous to cytochrome P450 reductase and uses five cofactors, including calmodulin, BH₄, heme, and FAD. That five-electron enzymatic reaction oxidizes 1.5 moles of NADPH per mole of this compound. The enzyme which makes this compound has three isoforms: inducible, neuronal, and endothelial. This compound binds to the heme groups of soluble guanylate cyclases, resulting in the activation of protein kinase G in smooth muscle. This compound's namesake synthase produces citrulline and this compound from arginine. For 10 points, what radical gaseous neurotransmitter acts as a vasodilator and has formula NO?

ANSWER: **nitric oxide** [or **NO** until it is read; or **endothelium-derived relaxation factor** until it is read]

16. A minor character in this play talks by alternately sucking air in and blowing it out, which causes consternation when she blows out birthday candles. Several characters in this play reminisce about drinking vile mustard soup. Every scene in this play except the first and the last begins with a voiceover of a letter written by a traveling scrap metal worker. A woman in this play marries a mentally-challenged movie usher named Johnny and borrows five thousand dollars to start a restaurant with him. To pay for some pretzels, a protagonist of this play volunteers to carry a small black satchel for his uncle Louie, an ex-mobster. In this play's opening scene, set in an apartment above a candy store, Eddie forbids Bella from making ice cream sundaes for his children, Jay and Arty. For 10 points, name this Pulitzer-winning play about a dictatorial Jewish grandmother, written by Neil Simon and set in a namesake city in New York.

ANSWER: *Lost in Yonkers*

17. After the bishops Celidonus and Projectus appealed to this pope, he responded by stripping Hilary of Arles of his jurisdiction over the province of Vienne. John Cassian wrote *On the Incarnation* for this pope, who led a peace envoy along with Avienus and Trygetius during which the apostles Peter and Paul allegedly appeared magically and put swords over this man's head. The stance taken by this pope in his letter to Flavian led his views to be rejected by Eutyches in the "Robber Synod," but at the subsequent Council of Chalcedon, this pope's namesake "tome" was reinstated. This pope led negotiations after the Battle of Chalons organized by Valentinian III, and he met with Genseric of the Vandals to try to appease him. For 10 points, name this canonized pope who negotiated with Attila the Hun, the only pope besides Gregory to have the epithet "the Great."

ANSWER: St. **Leo I** [or St. **Leo the Great**; prompt on Leo]

18. This character is introduced in the chapter "Father and Son," which has a fake epigraph stating "E sara mia colpa, Se cosi e?" While examining a piece of torn paper on a lectern, this character finds the words "*The First Step*" on one side, but is shocked to read about the execution of a man whose name is an anagram of his own on the other. In Strasbourg, this man receives a letter from his fiancé stating "All is lost!", which causes him to return home and hire a gunsmith to make a pair of pistols. Initially, this character gets a tutoring job for knowing the entire Bible in Latin by heart, but later gets kicked out of a school in Besançon for being a Jansenist. This character's lover, inspired by her martyred ancestor Boniface, kisses his severed head, and builds a marmoreal shrine for him. This worker for the Marquis de la Mole is guillotined for shooting Madame de Renal. For 10 points, name this tragic hero of *The Red and the Black*.

ANSWER: **Julien** Sorel [or Julien **Sorel**]

19. Chromium acetylacetonate is often added to speed up this specific technique. The INADEQUATE form of this specific technique can only be performed at high concentrations. The results from this technique are plotted on the axis with a larger range in HMBC or HMQC experiments. One form of this technique produces positive peaks at 45 and 90 degrees and either positive or negative peaks at 135 degrees. That form of this technique improves sensitivity with polarization transfer and is called DEPT. Perfect broadband decoupling in this technique gives a signal enhancement of up to 1.99 via the NOE, which is useful since this technique must overcome a small gyromagnetic ratio. This technique produces a cluster of background peaks at 77 ppm due to deuterated chloroform. For 10 points, name this technique which measures energy absorption by nuclei with atomic mass 13.

ANSWER: **carbon-13 NMR** [or **C-13 NMR**; or **carbon-13 nuclear magnetic resonance**, UNTIL “1.99” is read, accept answers containing “**NMR**” and any of the following elements: **Nitrogen-15**, **Fluorine-19**, **Silicon-29**, **Phosphorus-31**; accept **DEPT** or **dimensionless enhancement through polarization transfer** until it is read; prompt on **NMR** or **nuclear magnetic resonance**; prompt on **2D-NMR**]

20. The second theme in this piece’s first movement is oddly in E flat major in the exposition but A flat major in the recapitulation. Krystian Zimerman performed a landmark recording of this piece with Seiji Ozawa and the Boston Symphony Orchestra. The French horn plays a mournful quarter-note solo near the end of this work’s first movement. A solo flute, then a clarinet, introduces the theme of this work’s second movement, which is heavy in arpeggiated triplets and is thematically based on a romance written for the Skalon sisters. This work was dedicated to the composer’s psychiatrist Nikolai Dahl, who cured him of depression. It begins with a series of chords, alternating with low F half notes, crescendoing all the way from pianissimo to fortissimo, to imitate the sound of tolling bells. For 10 points, name this C minor work for keyboard instrument and orchestra, composed by Sergei Rachmaninoff.

ANSWER: Sergei Rachmaninoff’s **Piano Concerto No. 2** [or **Rachmaninoff 2**; or Op. **18**; prompt on partial answer]

Tiebreaker: Every abelian extension of the rational numbers is contained in an extension of the rationals with one of these values, according to the Kronecker-Weber theorem. A Gaussian period, an early predecessor of Galois theory, is defined as the sum of these values. Kummer extensions adjoin one of these values to a field which already contains at least one of them. These values are called “twiddle factors” when applied in the Cooley-Tukey algorithm. Liouville disproved Lamé’s proof of Fermat’s Last Theorem by showing that a polynomial decomposition representing these values was non-unique. The eigenvectors of a circulant matrix must consist entirely of these numbers, which are the solutions to cyclotomic polynomials. The nth order of these values form a regular n-gon inscribed in the unit circle on the complex plane. They can be calculated using de Moivre’s theorem. For 10 points, name these values which satisfy the equation “z to the n minus one equals zero.”

ANSWER: **roots of unity** [or **De Moivre** numbers before de Moivre is mentioned]

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Bonuses

1. In contrast to his student, who wrote *The Argonautica*, this poet argued that Homer should not be emulated and that long poems exemplified the dictum “Big Book, Big Evil.” For 10 points each:

[10] Name this Hellenistic poet who wrote the *Pinakes*, a catalog of the authors in a certain institution that is sometimes considered to be the first bibliography.

ANSWER: **Callimachus** [or **Kallimachos**]

[10] The authors mentioned in the *Pinakes* were found in this institution, which was once led by Apollonius Rhodius. It was apocryphally destroyed by Muslims invading Egypt.

ANSWER: Royal **Library of Alexandria** [or Ancient **Library of Alexandria**]

[10] Callimachus fictionalized a story in which Berenice II dedicated a lock of hair to preserve her husband’s safety in a military campaign in this book, which explains the “causes” of various customs from myths.

ANSWER: **Aetia**

2. This man’s *Odhecaton* included works by Antoine Brumel and Alexander Agricola, and was the first book of polyphonic music printed with moveable type. For 10 points each:

[10] Name this Italian printer who was instrumental in popularizing polyphonic music in the early 1500s. His methods of musical typography lasted for centuries.

ANSWER: Ottaviano **Petrucchi**

[10] Petrucci’s *Odhecaton* also contained pieces by this composer of the *Missa Prolationum*, which consists entirely of mensuration canons. He was memorialized in his student Josquin des Prez’s *Nymphes des bois*.

ANSWER: Johannes **Ockeghem** [accept Jean or Jan (de) **Ockeghem** or **Okeghem**, **Ogkegum**, **Okchem**, **Hocquegam**, **Ockegham**]

[10] Josquin’s other works include several frottolas as well as these successor pieces, which were polyphonic and, unlike motets, secular. Monteverdi wrote nine books of them, including some “of love” and “of war.”

ANSWER: **madrigals**

3. This man built the first ship in order to bring his family to Argos. For 10 points each:

[10] Name this man, whose daughters married the sons of Aegyptus. Hypermnestra was the only daughter of this man not forced to fill a sieve with water in the Underworld.

ANSWER: **Danaus**

[10] Danaus and Aegyptus were descendants of this lover of Zeus, who introduced the worship of Isis in Egypt after fleeing a gadfly sent by Hera.

ANSWER: **Io**

[10] This fourth brother of Aegyptus, Cepheus, and Danaus was engaged to Andromeda before Perseus stole her away. Another Greek man with this name was blinded for telling the children of Phrixus how to get to Colchis.

ANSWER: **Phineus**

4. The “hot-melt” form of this process is commonly used in the pharmaceutical industry to form drug-polymer composites. For 10 points each:

[10] Name this process in which raw polymers are melted down and pressurized while being fed through a screw, then forced through a die and rapidly cooled to shape the final product’s cross-section.

ANSWER: polymer or plastic **extrusion**

[10] Hot-melt extrusion is also a way to introduce these compounds into a drug product. These compounds include flavorings, granulating agents, or stability agents other than the active pharmaceutical ingredient.

ANSWER: **excipients**

[10] A very common excipient added to improve aqueous solubility is the polymer of this two-carbon diol, which is the main component of antifreeze.

ANSWER: **ethylene glycol** [or 1,2-**ethanediol**, or **polyethylene glycol**; or **PEG**]

5. The term “bobbies” comes from a distortion of this man’s name. For 10 points each:

[10] Name this mid-19th century English prime minister who reformed and organized the Metropolitan Police Service. His Tamworth Manifesto laid out the principles of the Conservative Party.

ANSWER: Sir Robert **Peel**

[10] Peel also earned a fair share of controversy for supporting this bill, which awarded an increase in money paid to a namesake Catholic seminary in Ireland. William Gladstone resigned his ministry in protest over this law.

ANSWER: **Maynooth** Grant [or the **Maynooth** Bill]

[10] Peel was preceded in office by this prime minister, who tutored Queen Victoria, but whose resignation in 1839 kicked off the Bedchamber Crisis. This Whig’s wife coined the phrase “mad, bad, and dangerous to know” to describe Lord Byron.

ANSWER: William **Lamb** [or Lord **Melbourne**; or 2nd Viscount **Melbourne**]

6. Swami Sivanada published a modern version of this text with annotations, in its usual division into four chapters and 555 aphorisms. For 10 points each:

[10] Name this text of Vedanta Hinduism compiled by Bradayana, which is named for the greatest principle unifying human beings.

ANSWER: **Brahma Sutra** [or the **Sarikara Sutra** or the **Bhikshu Sutra**; prompt on partial answers]

[10] The Brahma Sutra mostly clarifies and summarizes the points made in these texts. There are 108 of these texts, which serve as commentaries on the Vedas.

ANSWER: **Upanishads**

[10] This Hindu philosopher promoted a form of monism called *Advaita Vedanta*. He was revered as “Eka-Sruti-Dara,” which translates to something like “He can remember everything he has ever read.”

ANSWER: Adi **Shankara**

7. Name some presidents of the Royal Academy of Arts, for 10 points each.

[10] This painter of the delightfully dynamic *Benjamin Franklin Drawing Electricity from the Sky* was the only person to hold the office twice. He depicted the aftermath of a battle at the Plains of Abraham in *The Death of General Wolfe*.

ANSWER: Benjamin **West**

[10] West was succeeded at his death by this painter, whose portrait of Charles William Lambton, *The Red Boy*, was dubbed a “wretched histrionic thing” by Wordsworth. His portrait of Sarah Barrett Moulton hangs in the Huntington Library.

ANSWER: Sir Thomas **Lawrence** [That portrait is called *Pinkie*]

[10] This holder of the shortest-lived peerage in history painted a Gothic-influenced depiction of Perseus and Andromeda and depicted a sleeping woman in a bright orange dress in his magnum opus, *Flaming June*.

ANSWER: Lord Frederic **Leighton**, 1st Baron **Leighton**

8. Doctor Harry continually teases this character, who imagines spanking her excessively “dutiful” daughter Cornelia. For 10 points each:

[10] Name this title character of a 1929 story who experiences the title event twice: once, sixty years before the story, when George abandoned her at the altar, and again at the story’s end when God fails to give her a sign that she is loved.

ANSWER: Granny **Weatherall** [accept “The **Jilting of Granny Weatherall**”; prompt on “Granny”]

[10] This Texan author of “The Jilting of Granny Weatherall” wrote about Laura, who is sort of in love with a Mexican revolutionary named Eugenio, in “Flowering Judas.” She also wrote the novel *Ship of Fools*.

ANSWER: Katherine Anne **Porter** [or Callie Russell **Porter**]

[10] At the end of “Flowering Judas,” Eugenio comes to Laura in a dream and convinces her to take this action. After Laura does this symbolic action, Eugenio symbolically calls her a murderer.

ANSWER: **eating the flowers** of the Judas tree [prompt on partial answer]

9. Up to 50 of these people were slaughtered at Slaughterhouse Creek, or Waterloo Creek, in January 1838. For 10 points each:

[10] Name these indigenous people whose children made up the “Stolen Generation” in the 20th century, a fact that finally got recognized with “National Sorry Day” in 1998.

ANSWER: Australian **Aborigines** [or **Torres Strait Islanders**]

[10] In June 1838, around thirty Aborigines were slaughtered at this creek in New South Wales as part of a namesake massacre, but this time, a few of their killers actually were hanged.

ANSWER: **Myall** Creek

[10] Aborigines provided the *ngardu* seedcakes which accidentally poisoned the members of this failed expedition, named for two men, which in 1861 attempted to traverse the continent from south to north. Only a single soldier survived its return journey.

ANSWER: **Burke** and **Wills** expedition [or the expedition of Robert O'Hara **Burke** and William John **Wills**]

10. In prokaryotes, one of these proteins with a molecular weight of 70 kilodaltons binds to the -10 and -35 boxes. For 10 points each:

[10] Name this family of proteins which enables the binding of RNA polymerase to DNA in prokaryotes.

ANSWER: **sigma** factors [prompt on “transcription factors”]

[10] The sigma protein binds to one of these regions of DNA. Transcription factors bind to these regions to initiate transcription.

ANSWER: **promoters**

[10] Roger Kornberg discovered this regulatory protein complex, which in eukaryotes activates RNA polymerase II by binding to its C-terminal domain.

ANSWER: **Mediator** complex

11. In “Languages and Language,” this thinker defines language as a function that assigns truth-conditions to sentences to show that action and belief inferable by language underlies communication. For 10 points each:

[10] Name this philosopher, whose book *Convention* uses the theory of coordination games to argue that convention underlies all language.

ANSWER: David Kellog **Lewis**

[10] In *Convention*, Lewis argues that this concept is most likely to be generated if parties are in a Nash equilibrium for a signaling game. Semantics and pragmatics both study this concept, which is transmitted by words.

ANSWER: **meaning**

[10] In *Truth and Truthfulness*, this philosopher argues that a “convention of truthfulness certainly ... cannot be right” since people utter “false sentences in all sorts of contexts.” He also wrote *Moral Luck*.

ANSWER: Sir Bernard [Arthur Owens] **Williams**

12. This scene was inspired by Gustave Doré's illustrations of the *Divine Comedy* and takes place during an opium trip after the protagonist's love interest is bitten by a snake hiding in a bouquet of flowers. For 10 points each:

[10] Name this scene in which 24 dancers, representing ghosts coming down from the Himalayas, concurrently perform the same arabesque 39 times in a row.

ANSWER: the **Kingdom of the Shades** scene

[10] The Kingdom of the Shades occurs in Act III of this Ludwig Minkus and Marius Petipa ballet, whose plot centers on the tragic love between Solor and Nikiya.

ANSWER: *La* **Bayadère** [or *The* **Temple Dancer**]

[10] *La Bayadère* premiered at this Saint Petersburg theater in 1877. It shares its name with a much larger and more prominent Moscow theater home to the world's largest ballet company, where *Swan Lake* premiered.

ANSWER: **Bolshoi** Theater [or the Imperial **Bolshoi** Theater of Moscow; or the Imperial **Bolshoi** Kamenny Theater]

13. Edward Fitzgerald stated that he was not translating this author, but rather engaging in “transmogrification,” when he was translating such lines as “A Jug of Wine, A Loaf of Bread-- and Thou.” For 10 points each:

[10] Name this author who wrote that line in the *Rubaiyat*.

ANSWER: Omar **Khayyam** [or Ghiyath ad-Din Abu'l-Fath Umar ibn Ibrahim al-**Khayyam** Nishapuri]

[10] This man once criticized Edward Fitzgerald for making Omar Khayyam's poem appear to be a “drunkard’s rambling profession of a hedonistic creed.” With Ali-Shah, he produced a hilariously flawed translation of Khayyam, which begins “A haunch of mutton and a gourd of wine / Set for us two alone on the wide plain.”

ANSWER: Robert [von Ranke] **Graves**

[10] In one section of the *Rubaiyat*, the speaker goes to a shop and sees 2,000 of these things, and states “fate for sometime our moves steer / Into the chest of non-existence, one by one disappear.”

ANSWER: clay **pots** [or clay **cups** or clay **jars**]

14. Polar front theory, also known as the Norwegian model, explains the formation of these systems, which occur when a wave develops on the front, creating an area of low pressure. For 10 points each:

[10] Name these closed, circularly-rotating air flows. They usually rotate counterclockwise in the northern hemisphere.

ANSWER: **cyclones** [or extratropical **cyclones**; or other specific types of **cyclones**]

[10] The polar front is established at the boundary between the polar cell and this other circulation pattern, in which air moves from 30 degrees latitude to 60 degrees latitude in a direction opposite that of a Hadley cell.

ANSWER: **Ferrel** cell

[10] The movement of a cyclone is often approximated by evaluating the flow at this height, which corresponds to around 500 millibars. The bulk movement of cyclones is usually around 50 percent of the velocity at this level and in the same direction.

ANSWER: **steering** level

15. In a cartoon, Paul Szep showed this man committing seppuku with a sword labelled “unity.” For 10 points each:

[10] Name this politician, who declared that he would not seek and would not accept the Democratic nomination for presidency in a live TV address in March 1968, sending the party into turmoil.

ANSWER: Lyndon Baines **Johnson** [or **LBJ**]

[10] Johnson’s decision may have been partly sparked by this man’s “Who, What, When, Where, Why?” report, which was actually written by Ernest Lesier. Johnson remarked that he’d lost Middle America after this man turned against the Vietnam War.

ANSWER: Walter [Leland] **Cronkite** Jr.

[10] Eventual nominee Hubert Humphrey didn't campaign during the primaries, which led to results like Roger D. Branigin, the governor of this state, picking up delegates. This state’s governor Matthew Welsh, who introduced the first state sales tax, also ran in 1964.

ANSWER: **Indiana**

16. These two factors of production underlie most models of the macroeconomy. For 10 points each:

[10] Name these two inputs to neoclassical production, which earn constant shares of output if their exponents sum to one in a Cobb-Douglas aggregate production function, because changes to their price and quantity exactly offset.

ANSWER: **labor** and **capital** [or **L** and **K**; accept either order; prompt on partial answer]

[10] Constant factor shares is an implication of a unit value for this parameter. In *Capital in the 21st Century*, Piketty argues that this parameter is in fact greater than one, which is why the capital share and capital-to-output ratio move together.

ANSWER: **elasticity** of **substitution** between capital and labor. [prompt on partial answer; also accept “**marginal rate** of **substitution**”]

[10] A paper Piketty published with this Berkeley economist finds that the post-tax rate of return on capital is approximately constant in the long run. This economist also published the book *The Hidden Wealth of Nations* about tax havens.

ANSWER: Gabriel **Zucman**

17. This author theorized that several Shakespeare plays take place in a “Green World,” or forest, where the characters congregate to work out their conflicts. For 10 points each:

[10] Name this Canadian literary critic best known for outlining a hierarchy of literary modes in his *Anatomy of Criticism*.

ANSWER: [Hermann] Northrop **Frye**

[10] Frye argues that thematic poetry relies most heavily on this Aristotelian aspect of poetry, which refers to the “thought” of a poem, compared to the *mythos* or the *ethos*. He contends that expressing this feature is a way around the “existential projection.”

ANSWER: **dianoia**

[10] Frye’s explication of the “garrison mentality” of Canadian literature in *The Bush Garden* inspired the similar attitudes of this Canadian author’s book *Survival*. She also wrote the novels *Alias Grace* and *The Blind Assassin*.

ANSWER: Margaret **Atwood** [or Margaret Eleanor **Atwood**]

18. This caliphate was destroyed when its last leader, Idris II, was assassinated by a slave and the Marinids took over their capital at Marrakech. For 10 points each:

[10] Name this notoriously intolerant caliphate founded by ibn Tumart, which lost to the forces of Alfonso VIII of Castile at Las Navas de Tolosa.

ANSWER: **Almohad** Caliphate

[10] The Almohad movement was originally founded by ibn Tumart as the unification of this Berber tribe, which is usually distinguished from the Zanata and Sanhaja tribes.

ANSWER: **Masmuda** Berbers

[10] The distinction between the Berber tribes was first made by this 14th century Muslim historian, whose *Muqaddimah* was intended as a preface to a larger work of universal history.

ANSWER: Ibn **Khaldun** [or Abu Zayd 'abdur-Rahman bin Muhammad bin **Khaldun** al-Hadrami]

19. Two police officers and eight soldiers reportedly engaged in an orgy in this city in November 2015. For 10 points each:

[10] Name this European capital city which was placed under lockdown following the Paris terrorist attacks. On March 22 of 2016, three nail bombings were carried out here, two at its airport and one at Maelbeek metro station.

ANSWER: **Brussels**, Belgium

[10] This man, who owned a bar in the Molenbeek neighborhood of Brussels, was the subject of an extensive manhunt which apparently failed because Belgian authorities could not carry out night-time raids. He was a childhood friend of the attacks' planner Abdelhamid Abaaoud.

ANSWER: Salah **Abdeslam**

[10] Abaaoud claimed to be the leader of a terrorist cell in Belgium in a January 2015 interview with this online magazine, the major media outlet of IS.

ANSWER: **Dabiq**

20. This length is usually defined as the distance at which the velocity first equals 99 percent of the free-stream velocity. For 10 points each:

[10] Name this quantity symbolized delta, which increases with the square root of distance travelled along a flat plate according to Blasius theory.

ANSWER: **thickness** of the hydrodynamic **boundary layer** [prompt on partial answer, but do NOT accept or prompt on ANY answers containing the phrases "displacement thickness" or "momentum thickness"]

[10] According to Blasius theory, the ratio of the boundary layer thickness over the lateral distance is very close to this integer over the square root of Reynolds number, since the argument of the stream function would be half of this number.

ANSWER: **five**

[10] Blasius theory is only valid for a boundary layer of this type. In a pipe, this type of flow transitions into turbulent flow at Reynolds numbers above 2000.

ANSWER: **laminar** flow