Collegiate Written by Ewan MacAulay, Grant Boggess, Austin Brownlow, Michael Chuber, Alex Dzurick, Joey Novice 4 Goldman, Nicholas Karas, Melanie Keating, Paul Kelson, Benjamin Johnson, Grace Liu, Brian Fall 2013 Mongilio, Itamar Naveh-Benjamin, Robert Pond, Victor Prieto, Jacob Reed, Graham Reid, Jihye Shin, Packet 4 Jonathan Tong Xu, Eric Xu, and Haohang Xu. Edited by Andrew Hart.

1. These objects create Johnson-Nyquist noise, whose relationship to Joule heating is explained by the fluctuationdissipation theorem. Cadmium sulfide can be used to create the "light-dependent" type of these components. A Wheatstone bridge circuit consists of a pattern of four of these components, whose strength sums when they are arranged in series. The most common type of them is made from ceramic and has its characteristic property denoted on colored bands. For 10 points, name these circuit components whose namesake property is measured in ohms. ANSWER: resistors [do not accept "resistance"]
2. A work by this man ends with the title character flinging himself off a tall spire, which he has climbed after being pressed to do so by a girl to whom he promised a kingdom. Another of his works is about a man who discovers that the water used in his town's baths is contaminated. This man wrote a work about a woman who takes out a loan from Krogstad, who tries to blackmail Nora into having her husband Torvald reinstate him to his former job. For 10 points, The Master Builder, The Enemy of the People, and A Doll's House are by what Norwegian playwright? ANSWER: Henrik [Johan] Ibsen
3. According to rumors mentioned by Tacitus, this ruler's wife may have given him poisoned figs. This subject of the first-person funerary inscription Res Gestae exclaimed "Give me back my legions!" after his general Quintilius Varus lost the Battle of Teutoburg Forest. This ruler's only biological child was Julia the Elder, whom he married to his chief general Agrippa. He defeated Mark Antony at the Battle of Actium after allying with him and Marcus Lepidus in the Second Triumvirate. For 10 points, name the heir of Julius Caesar who founded the Roman Empire. ANSWER: [Imperator Caesar Divi Filius] Augustus [or Octavian; or Gaius Octavius]
4. Titles of works in this poetic genre include "The Trade Unions of Flute-Playing Geishas" and "Avarice is not a Family Value." A massive fish fit for only the emperor titles one work in this genre, which is also the form of a poem that claims there is nowhere in Rome for a Roman. The sixth of a collection of sixteen works in this genre originates the phrase "Who watches the watchmen?" This Roman literary genre was epitomized by Horace and Juvenal. For 10 points each, name this genre now most commonly seen in political cartoons and The Onion. ANSWER: satires
5. This laboratory technique may use Raschig rings to increase the surface area without sacrificing too much space. For certain products, this technique can be improved by using a spinning band of an inert material like Teflon. A solution of $96 \%$ ethanol and $4 \%$ water cannot be normally separated by this technique, because it deviates from Raoult's law as an azeotrope. One variant of this is used to refine petroleum. For 10 points, name this lab technique that separates two components of a solution based on boiling point, which comes in a "fractional" version. ANSWER: distillation [accept fractional distillation or extractive distillation; prompt on boiling]
6. This technique depends on magnesium chloride donating divalent magnesium cations. Special versions of this technique depend on compounds engineered by splicing HhH domains into an enzyme that was initially isolated from Thermus aquaticus. Samples are initially heated in the denaturation step of this technique, before being cooled to around 60 degrees Celsius to allow primers to anneal to template strands. For 10 points, name this laboratory technique in which thermally stable polymerases are used to amplify sections of DNA.
7. One structure in this city features distinctive X-braces on its exterior, which highlight its tubular system designed by Bruce Graham, who worked with Skidmore, Owings \& Merrill to design this city’s Inland Steel Building. This city contains a neo-Gothic skyscraper whose façade contains gargoyles and Aesop’s screen. The Carson, Pirie, \& Scott Building is found in this city that houses the John Hancock Center, Frank Lloyd Wright’s Robie House, and a skyscraper now called Willis Tower. For 10 points, name this home of the Tribune Tower and the Sears Tower. ANSWER: Chicago
8. This figure opened a war with the Byzantine Empire at the Battle of Tabouk and defeated a siege at the Battle of the Trench. After a night journey on a mule with wings attached to its thighs, this figure chose to drink milk instead of water or wine. This man was told to "read" on the Night of Power in the cave Hira. This man, who married the merchant Khadija, had his sayings collected as the Hadith. After the Hijra, this man's new home of Yathrib became known as Medina. For 10 points, the angel Gabriel revealed the Quran to what prophet of Islam?
ANSWER: [Abu al-Qasim] Muhammad [ibn Abd Allah ibn Abd al-Muttalib ibn Hashim]
9. In this president's inaugural address, he said America was not "the ordered, changeless and sterile battalion of the ants" but "the excitement of becoming." This president, who appointed Abe Fortas and Thurgood Marshall to the Supreme Court, had a namesake "Treatment" that involved talking while standing really close to someone. This president declared the "War on Poverty" as part of his plan for a "Great Society" and signed the Civil Rights Act of 1964. For 10 points, name this Texan who succeeded John F. Kennedy as president.

ANSWER: Lyndon Baines Johnson [or LBJ]
10. A poem by this man asks "Will we walk all night through solitary streets?" In that same poem, Walt Whitman is seen "childless, lonely old grubber, poking among the meats." This author of "A Supermarket in California" also wrote a poem that is noted for repeating the word Moloch and contains such nonsense lines as "Robot apartments! invisible suburbs!" The narrator of that poem by this author laments having seen "the best minds of my generation destroyed by madness." For 10 points, name this beat poet of "Howl."
ANSWER: [Irwin] Allen Ginsberg
11. This distribution's ability to describe a population is the subject of the Shapiro-Wilks test. This distribution has at most two nonzero cumulants and forms a straight line on a Q-Q plot. It approximately describes the mean of a large number of random variables, according to the central limit theorem. This distribution, whose "standard" version has a mean of zero and a variance of one, has 68 percent of its values within one standard deviation of the mean. For 10 points, name the probability distribution whose graph is a symmetric bell curve.
ANSWER: normal distribution [or Gaussian distribution; prompt on bell curve before mentioned]
12. This composer, who wrote piano trios nicknamed "Ghost" and "Archduke," also composed The Creatures of Prometheus. The second movement of one of his symphonies ends with a cadenza for flute, oboe, and clarinet and is subtitled "By the Brook." The finale of this composer's String Quartet No. 13 was published as his Grosse Fugue. This composer of the Pastoral Symphony incorporated a poem beginning "Freude, schöner Götterfunken" into his ninth symphony. For 10 points, name this German composer, whose Choral Symphony features the "Ode to Joy." ANSWER: Ludwig van Beethoven
13. This deity's quest to obtain a possession is chronicled in the Sorla pattr, which details how she slept with four dwarves. When this deity was promised with the sun and the moon for the building of a wall, another deity turned himself into a female horse to prevent the wall's completion. This deity receives half of slain warriors in her realm Fólkvangr. Thor once disguised himself as this deity, who has a chariot drawn by cats and owns the necklace Brísingamen. For 10 points, name this Vanir goddess, the sister of Frey and Norse god of love.
ANSWER: Freya [or Freyia]
14. This event, which was funded by the United States Office of Naval Research, had 24 participants who were divided into two groups. The chief organizer of this event provided wooden batons, mirrored sunglasses, and uniforms to its participants. The man who ran this event reflected upon it in writing The Lucifer Effect, which uses lessons from this event to discuss the atrocities at Abu Ghraib. For 10 points, name this infamous experiment that attempted to investigate causes of abuse in penitentiaries, the brainchild of Philip Zimbardo.
ANSWER: Stanford prison experiment [or SPE; prompt on partial answer]
15. During this war, one ruler gave himself up as a prisoner after his son dishonorably escaped from being held captive in place of him. That king, John the Good, was ransomed in the Treaty of Brétigny after being captured at the Battle of Poitiers during this war, which grew out of a succession dispute between Philip VI and Edward III. Its major turning points included Henry V's victory at Agincourt and the siege of Orléans, which was broken by Joan of Arc in 1429. For 10 points, name this really long war between England and France.
ANSWER: Hundred Years' War
16. In one song, this artist claimed "whatever colors you have in your mind / I'll show them to you, and you'll see them shine." This artist, who told the listener to "lay across my big brass bed" in "Lay Lady Lay," appeared on stage at the Newport Folk Festival amidst a chorus of boos when he "went electric." He discussed a woman who "used to be so amused at Napoleon in rags and the language that he used" in a song that begins "once upon a time you dressed so fine." For 10 points, name this singer of "Like a Rolling Stone."
ANSWER: Bob Dylan [or Robert Allen Zimmerman]
17. This artist of Young Acrobat on a Ball claimed that art's purpose "is washing the dust of daily life off our souls." This artist, whose painting Le Rêve sold for $\$ 155$ million in 2013, painted his mistress Dora Maar sitting in a wooden chair with a black cat. The suicide of Carlos Casagemas prompted this artist to paint an old man hunched over an instrument. He depicted The Weeping Woman and a light bulb in the shape of an eye above a screaming horse in a black-and-white mural. For 10 points, name this Spanish cubist who painted The Old Guitarist and Guernica.

## ANSWER: Pablo [Ruiz y] Picasso

18. Karl Popper claimed that readers of this man's works fell under his "spell" in The Open Society and its Enemies. This man used a cyclical argument to prove the soul's immortality. A character in one of this man's works calls another a "torpedo fish" and later teaches a slave how to double a square. This thinker wrote of a ring of invisibility to question morality in another work that advocates for rule by "philosopher-kings." For 10 points, name this thinker whose dialogues, like the Phaedo, the Meno, and the Republic, often featured his mentor, Socrates.
ANSWER: Plato [or Platon]
19. This dynasty, whose official currency was the chao, began after Zhang Hongfan won the Battle of Yamen. This dynasty used a four-tier caste system that favored northerners over southerners and foreigners over natives. It ended when the Red Turban Rebellion forced Togon Temür to flee its capital of Dadu in 1368. The founder of this dynasty invaded Japan twice, but both times its fleet was destroyed by "divine winds," or kamikaze. For 10 points, name the Chinese dynasty established in 1279 by the Mongol emperor Kublai Khan.
ANSWER: Yuan Dynasty [accept Mongol Dynasty before "Mongol"]
20. One poem by this author tells of a "squidgy-nosed old idol" who saves the narrator by plugging his wounds and giving him water. Another poem by this man exhorts the reader to "veil the threat of terror / and check the show of pride." A novel by this author tells the story of an orphan who becomes a spy during the Great Game. Another of his works is a collection of stories about a "man cub" called Mowgli. For 10 points, name this author of "Gunda Din," "The White Man's Burden," Kim, and The Jungle Book.
ANSWER: [Joseph] Rudyard Kipling
TB1. In connection with this event, New Orleans District Attorney Jim Garrison prosecuted Clay Shaw, who was acquitted. Officer J.D. Tippet was killed soon after this event, whose perpetrator was arrested in a movie theater. Governor John B. Connally Jr. was wounded during this event in Dealey Plaza. Two days after the event, Jack Ruby killed the suspect in the basement of the Dallas police station. It was captured on the Zapruder film and took place in Dallas. For 10 points, name this November 22, 1963 event perpetrated by Lee Harvey Oswald.
ANSWER: John F. Kennedy assassination [accept equivalents]

TB2. According to Kepler's second law, the "areal" type of this quantity for a planet is constant using the sun as the origin. Dividing Planck's constant by the product of mass and this quantity yields the de Broglie wavelength. The phase type of this quantity for a wave is defined as the angular frequency of the wave divided by the wavenumber. When the sum of the drag force and buoyancy equals the downward force of gravity, the terminal type of this quantity is achieved. For 10 points, name this physical vector quantity defined an object's rate of positional change. ANSWER: velocity [prompt on $\mathbf{v}$; do not accept "speed"]

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1. One character in this novel is hit on the head with a rifle, though he pretends that he is shot. For 10 points each: [10] Name this novel about Henry Fleming, a private in the Union Army, and his time during the Civil War. ANSWER: The Red Badge of Courage
[10] This man wrote The Red Badge of Courage in addition to the novella Maggie: A Girl of the Streets.
ANSWER: Stephen Crane
[10] This Crane short story tells the tale of four men, the captain, Billie, the oiler and the cook, who survive the loss of a boat on a dinghy and attempt to swim to shore.
ANSWER: "The Open Boat"
2. This man called democracy "the meanest and worst of all forms of government." For 10 points each:
[10] Name this man who led a 1630 crossing of the Atlantic and became the first governor of a colony founded at Boston.
ANSWER: John Winthrop
[10] John Winthrop was the first governor of this colony named for this bay, the second major one in New England after Plymouth.
ANSWER: Massachusetts Bay Colony
[10] In Winthrop’s sermon A Model of Christian Charity, he used this four-word phrase derived from the Sermon on the Mount to describe the Massachusetts Bay Colony, adding that "the eyes of all people are upon us."
ANSWER: "city on a hill" [accept "city upon a hill"]
3. This artist is traditionally referred to by only his first name in English. For 10 points each:
[10] Name this 17th-century Frenchman who painted The Embarkation of the Queen of Sheba and took his surname from the region of northern French where he lived.
ANSWER: Claude Lorrain [accept either; or Claude Gellée; or le Lorrain]
[10] Claude Lorrain is considered a master of this genre of art that depicts natural scenery.
ANSWER: landscapes [prompt on en plein air]
[10] This English landscape painter, the rival of Sir Joshua Reynolds, painted The Blue Boy and Mr. and Mrs. Andrews.
ANSWER: Thomas Gainsborough
4. Mehring's son Terry leaves for New York in this author's novel The Conservationist. For 10 points each:
[10] Name this author who created a fictional rebellion in her home country in July's People.
ANSWER: Nadine Gordimer
[10] Nadine Gordimer comes from this country, whose tense race relations form the backdrop of the plays of native son Athol Fugard.
ANSWER: Republic of South Africa [accept RSA]
[10] This South African author wrote about the priest Stephen Kumalo’s search for his son in Cry, the Beloved Country.
ANSWER: Alan [Stewart] Paton
5. Astronomers like it when things line up. For 10 points each:
[10] When three or more astronomical bodies are roughly in a line, astronomers use this term. This situation does not always involve the earth, and it comes from the Greek word for "union."
ANSWER: syzygy (SIZ-ih-jee)
[10] This solar type of this event occurs when the sun's light is blocked from reaching Earth by the moon.
ANSWER: solar eclipse
[10] This British astrophysicist, whose namesake limit is the maximum luminosity of a star, led a 1919 expedition to Brazil to observe a solar eclipse and found evidence to support relativity.
ANSWER: Sir Arthur [Stanley] Eddington
6. In one story, this god turns a group of pirates into dolphins. For 10 points each:
[10] Name this Greek god of alcohol and ritual madness, whose namesake festivals usually involved presentations of theatrical plays.
ANSWER: Dionysus
[10] This drink, usually tempered with water, was the favorite drink of Dionysus.
ANSWER: wine
[10] In this Eurpides play, which won first prize in the City Dionysia competition, King Pentheus and his mother, Agaue, are punished by Dionysus when they refused to worship him.
ANSWER: The Bacchae [or Bakchai; or The Bacchantes]
7. This man teamed up with Miles Davis in his first quintet, where he developed a style that would later be termed "sheets of sound." For 10 points each:
[10] Name this jazz musician who released the albums Giant Steps and A Love Supreme.
ANSWER: John [William] Coltrane [prompt on Trane]
[10] Coltrane was primarily known for playing this single-reed woodwind instrument, also the primary instrument of Wayne Shorter and Sonny Rollins.
ANSWER: saxophone [accept alto saxophone; do not accept any other type of saxophone]
[10] Coltrane participated in recording this Miles Davis album featuring the tracks "So What" and "Freddie Freeloader."
ANSWER: Kind of Blue
8. The title character's beloved dies of snake bite toward the end of this novel. For 10 points each:
[10] Name this short novel that tells a story of a man who befriends a ferryman and lives a life parallel to that of the Buddha.
ANSWER: Siddhartha
[10] This German author wrote Siddhartha as well as the novels Demian and Steppenwolf.
ANSWER: Hermann Hesse
[10] Joseph Knecht, the Magister Ludi, is sent to a monastery in Mariafels where he befriends Father Jacobus in this Hesse novel about the master of the title competition.
ANSWER: The Glass Bead Game [or Das Glasperlenspiel; prompt on Magister Ludi]
9. This process can result in traits becoming widespread or being lost from a population regardless of the survival or reproductive value of the alleles involved. For 10 points each:
[10] Name this process in which allele frequencies change because of random sampling.
ANSWER: genetic drift [prompt on partial answer]
[10] In this process, a key mechanism of evolution, allele frequency depends on the extent to which a trait promotes the reproductive success of an organism in a given environment.
ANSWER: natural selection
[10] This British biologist popularized the term "natural selection" and the theory of evolution in On the Origin of Species.
ANSWER: Charles [Robert] Darwin
10. Following this battle, the signing of the Treaty of Pressburg dissolved the Holy Roman Empire. For 10 points each:
[10] Name this December 2, 1805 battle, a major victory for France that ended the War of the Third Coalition. ANSWER: Battle of Austerlitz
[10] This French emperor won the Battle of Austerlitz during a string of victories that lasted until he invaded Russia. ANSWER: Napoleon I [or Napoleon Bonaparte; prompt on Bonaparte]
[10] At this September 7, 1812 battle, Napoleon won but refused to pursue the retreating Russian army, which eventually led to the failure of his invasion campaign. It was the single bloodiest day of the Napoleonic Wars.
ANSWER: Battle of Borodino
11. This long poem is the origin of the word Pandemonium, which is the capital city of Hell. For 10 points each:
[10] Name this poem that opens with the line "Of man's first disobedience" and tells of the Fall of Man.
ANSWER: Paradise Lost
[10] This author of Paradise Lost also wrote a polemic against censorship titled Areopagitica.
ANSWER: John Milton
[10] This Milton poem memorialized Edward King, a friend who died "ere his prime...and hath not left his peer."
ANSWER: "Lycidas"
12. This field was the chief area of expertise of Livy and Suetonius in Rome. For 10 points each:
[10] Name this discipline, whose "father" is usually regarded as Herodotus.
ANSWER: history [or historia]
[10] In his Lectures on the Philosophy of History, this author of Phenomenology of Spirit analyzed various cultures in terms of the World Spirit.
ANSWER: Georg Wilhelm Friedrich Hegel
[10] Hegel's work influenced this man, who wrote about Louis-Napoleon's reign to show how all history boils down to "the history of class struggles."
ANSWER: Karl [Heinrich] Marx
13. This man earned the Nobel Peace Prize for mediating the Suez Crisis. For 10 points each:
[10] Name this Liberal Prime Minister of Canada who was preceded in office by John Diefenbaker.
ANSWER: Lester [Bowles] Pearson [accept Mike Pearson]
[10] Lester Pearson advocated for Canada's current flag design, which has this symbol in red in the center.
ANSWER: maple leaf [prompt on partial answer]
[10] Lyndon Johnson reportedly grabbed Pearson by the collar and yelled "don't' you come into my living room and piss on my rug!" after Pearson criticized U.S. opposition to this North Vietnamese leader.
ANSWER: Ho Chi Minh [prompt on Minh; or Nguyen Sinh Cung; or Nguyen That Than; or Nguyen Ai Quoc]
14. Martin Luther derived the Sacramental union from this concept. For 10 points each:
[10] Name this transformation of consecrated food into the whole of Christ.

## ANSWER: transubstantiation

[10] Transubstantiation occurs during this part of the Mass, during which the faithful take consecrated bread and wine.

## ANSWER: communion [or Eucharist]

[10] During transubstatiation, consecrated wine turns into this holy substance that was "shed for you."
ANSWER: blood of Christ [accept equivalents]
15. In a flat mirror, an image of this type of the observer occurs at a distance behind the mirror equal to the distance from the observer to the mirror. For 10 points each:
[10] Name these non-real images in which the outgoing rays from a point on the object always diverge.
ANSWER: virtual images
[10] Unlike concave lenses, this type of outward-bulging lens produces a real image.
ANSWER: convex lens
[10] Sadly, no lens is perfect. This aberration, which prevents parallel rays from converging at a single focus, can be eliminated using a parabolic lens.
ANSWER: spherical aberration
16. The largest city on this body of water is Baku. For 10 points each:
[10] Name this sea, the largest lake in the world, which bordered to the west by Azerbaijan, to the south by Iran, and to the northeast by Kazakhstan.
ANSWER: Caspian Sea
[10] This rapidly retreating body of water in Central Asia lies between Kazakhstan and Uzbekistan.
ANSWER: Aral Sea
[10] This crescent-shaped lake, the largest entirely within Kazakhstan, is divided into a fresh water western half and a saline eastern half.
ANSWER: Lake Balkhash
17. This man included "Adoration of the Magi" as part of his Three Botticelli Pictures. For 10 points each:
[10] Name this Italian composer of three suites titled Ancient Airs and Dances, who included movements like "The Dove" and "The Nightingale" in The Birds.
ANSWER: Ottorino Respighi
[10] Respighi depicted trees at a catacomb, the Janiculum, and the Appian Way at different times of the day in his Pines of this city, whose "Fountains" he also depicted musically.
ANSWER: Rome [or Roma; accept Pines of Rome or Fountains of Rome]
[10] The Sistine Chapel is the site of the annual performance of this setting of Psalm 51, composed by Gregorio Allegri for two choirs. Mozart allegedly transcribed it from memory after hearing it on a visit to Rome.
ANSWER: Miserere mei, Deus
18. This battle turned when Kobayakawa Hideaki and his forces defected to the Eastern Army. For 10 points each: [10] Name this 1600 battle, a crippling defeat for the Toyotomi clan that ushered in the end of the Sengoku Period. ANSWER: Battle of Sekigahara
[10] Ieyasu, the commander of the Eastern Army at Sekigahara became shogun in 1603, established this clan of his as rulers of Japan during the Edo Period.

## ANSWER: Tokugawa

[10] During this 1868 event that ended the Tokugawa shogunate by returning official rule to its namesake emperor, a new government outlined plans to modernize the country.
ANSWER: Meiji Restoration/Revolution/Reform/Renewal/Ishin
19. These systems are mixtures that have a dispersed phase of particles in a medium. For 10 points each:
[10] Name these mixtures that include emulsions, gels, and aerosols.

## ANSWER: colloids

[10] This effect occurs when beams of light hit colloids and the photons scatter upon colliding with the suspended particles, such as when a car's headlights are pointed at fog.
ANSWER: Tyndall effect [or Tyndall scattering]
[10] When agitated, the suspended particles in a colloid can overcome electrostatic repulsion, or the zeta potential, and begin aggregating into flakes in this process.
ANSWER: flocculation [accept word forms]
20. This man proposed the "bancor" currency and lead the British delegation at the Breton Woods Conference. For 10 points each:
[10] Name this British economist who wrote The General Theory of Employment, Interest, and Money.
ANSWER: John Maynard Keynes
[10] Keynes advocated using this type of policy to regulate fluctuations in aggregate demand. It concerns the government's use of taxation and spending to influence the economy.
ANSWER: fiscal policy [do not accept or prompt on "monetary policy"]
[10] The effect of fiscal policy on output can be calculated as this factor, which generally measures how much one variable changes in response to an external variable.
ANSWER: multiplier [effect]
21. Old Man Warner declares that, if this event is held in June, "corn be heavy soon." For 10 points each:
[10] Name this short story in which Tessie Hutchinson is stoned to death after picking a black-spotted slip of a paper out of a black box.
ANSWER: "The Lottery"
[10] This author of "The Lottery" described the downfall of the Blackwood family in We Have Always Lived in the Castle.
ANSWER: Shirley [Hardie] Jackson
[10] Shirley Jackson's novel about Hill House is in this genre of fiction that also includes Henry James's "The Jolly Corner" and The Turn of the Screw.
ANSWER: ghost stories [accept equivalents including ghosts or spirits or haunted things]

