

OOT 2020: [The Search for a Middle Clue]

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THE ANSWER TO THE LAST TOSS-UP SHOULD HAVE BEEN: Walker

Packet 8

Toss-ups:

1. A potato salad named for this city is similar to the Russian Olivier salad, but includes boiled sausage. As a result of the climate of this city making it difficult to grow beets, a borscht from this city is made with tomato paste. The most widespread dialect of the Wu language is sometimes spoken in schools in this city in order to stop it from dying out. It's not Beijing, but *Shikumen* are a type of Western-style house found in this city that are sometimes named for the '*lilong*' lanes that make up many of its streets. The Oriental Pearl Tower was the tallest building in this city before its World Financial Centre was built in 2007. For 10 points, name this most populous Chinese city.

ANSWER: **Shanghai** <GDC>

2. The second movement of a piece set in this city features a sixteenth-note ostinato based on seven consecutive Es, then D, E, E, G, E, and is marked 'come [CO-may] salmodiando' or 'like a psalmody'. Another work set in this city uses a trombone to depict a drunk man. The fourth and final movement of a piece set in this city was described by its composer as a 'rhythm of numberless steps' and requires six curved trumpets. The end of that piece's third movement features a recording of a nightingale, while another piece by the same composer depicts a day in this city through its fountains, such as the Triton. For 10 points, name this city, the subject of three works by Respighi depicting its *Festivals*, *Fountains*, and *Pines* scattered across its seven hills.

ANSWER: **Rome** <AP>

3. Temperature may be considered as a generalised kind of this quantity; in that context it is conjugate to entropy. Certain kinds of this quantity can be written as the velocity gradient of Rayleigh's function. The pure form of this quantity does not change the mass of the objects on which it acts. The parallel component of this quantity is equal to the Lorentz factor cubed times the non-relativistic expression for that component while the perpendicular component is only increased by a single gamma factor. The impulse is defined as the integral of this quantity with respect to time. For 10 points, name this quantity, given by Newton's second law as mass times acceleration.

ANSWER: **force** [accept **pressure** until 'velocity gradient'] <LW>

4. Anthony Van Dyck painted the wife of an advisor to the rulers of this empire in European dress, alongside her husband in the dress of this empire. William Baffin was killed during the 1622 capture of a Portuguese fort by the East India Company and this empire. Teresa Sampsonia's husband Robert Shirley trained the musketeers of this empire, which ceded territory in the treaties of Amasya and Zuhab, ending several decades of war following its defeat by another empire at the Battle of Chaldiran. The founder of this empire lost its capital city despite the assistance of the Qizilbash, and one of their successors moved the capital to Isfahan.

For 10 points, name this Shia Iranian dynasty whose rulers included Ismail I and Abbas the Great.

ANSWER: **Safavid** <OSC>

5. At the end of a party, this character delays leaving for fifteen minutes, not seeing 'how heartily they were wished away'. This character describes Mrs Long as 'a selfish, hypocritical woman, and I have no opinion of her.' With 'no turn for economy', this person seeks to claim credit when their daughter is stranded at another house due to rain. This character is shocked that their husband will spend nothing on the marriage of their youngest daughter and is uncharacteristically speechless upon learning of their second daughter's engagement to a man with 'Ten thousand a year' and a house at Pemberley. For 10 points, name this mother of five daughters in *Pride and Prejudice*.

ANSWER: **Mrs Bennet** [prompt on **Bennet**] <AP>

6. Majid Rahnema claimed that this concept served to 'strengthen the structures that generate poverty'. James Ferguson analysed the 'unintended consequences' of this concept in a work that examines the bureaucratic power in one country. That work, called the *Anti-Politics Machine*, asks 'what do programs [involving this concept] do besides fail poor people?'. William Easterly critiqued a work by Jeffrey Sachs by arguing that this policy was implemented by ineffective 'planners' in *The White Man's Burden*. That work by Sachs advocates this policy as a means of accomplishing the title goal in *The End of Poverty*. For 10 points, name this voluntary transfer of resources from one country to another.

ANSWER: international **aid** [accept **development**] <GDC>

7. A review of a £300 design book named for this company was used by James Vincent as evidence of its 'arrogance'. Dieter Rams argued that the design philosophy of this company is in line with his ten principles. Along with Frog Design, this company developed the 'Snow White' design vocabulary, which included lines two millimetres wide and deep. A oft-cited rare design misstep by this company was the G4 Cube. This company sued another manufacturer for infringing on their patented rounded corner design. From 2015 to 2019 this company's chief design officer was the Bauhaus-inspired Sir Jony Ive. For 10 points, name this US electronics manufacturer founded by Steve Jobs.

ANSWER: **Apple** <GDC>

8. Religious paintings from this country known as Paubhas are traditionally made by members of the Chitrakara caste. A pilgrimage site in this country was supposedly built on the spot where a hen landed, while the Master Plan for another pilgrimage site in this non-Myanmar country developed by U Thant features a large monastic zone divided by a canal. The religion of those two sites was taken up by this country's Newar people, and the latter is the only one of the Eight Great Places not in India. This country's Maya Devi Temple marks the site where a woman gave birth, having earlier dreamt of an elephant entering her side. The Buddha was born at Lumbini in, for 10 points, which country, also home to the Boudhanath stupa in Kathmandu?

ANSWER: **Nepal** <AP>

9. The extent and periodicity of these events was described in a 1982 paper by Raup and Sepkoski. The 'Murder on the Orient Express' model assigned multiple causes to the largest of these events, while the 'clathrate gun' hypothesis attempts to explain some of them. Black shale can serve as evidence of these events since they form in low-oxygen environments. Lystrosaurus was the dominant terrestrial vertebrate following one of these events. Luis and Walter Alvarez proposed that a certain feature located near Chicxulub

[CHEEK-shuh-loob], Mexico, is a remnant of one of these events. For 10 points, name these events, one of which occurred at the end of the Cretaceous and is hypothesized to have been caused by an asteroid.

ANSWER: mass **extinction** [accept **extinction** event, prompt on answers like **asteroid impact**, **rapid warming/cooling**, or **ocean anoxic event** with 'what type of event did that end up causing?'] <LM>

10. The death of this ruler in six months' time was predicted to some pilgrims by an old man in the Holy Land claiming to be John the Apostle, who also asked them to return a ring which this ruler had given a beggar. A *Life* of this ruler was commissioned by their wife, the daughter of the Earl of Wessex, who probably helped secure the Earldom of Northumbria from this ruler for her brother Tostig. Edith had no children with this ruler and refounder of Westminster Abbey, who as a result may have made a promise to their cousin, an event depicted in the Bayeux Tapestry. With their succession contested by Harold Godwinson and William the Conqueror, for 10 points, name this Anglo-Saxon king who was canonized for his piety.

ANSWER: St **Edward** the **Confessor** [prompt on **Edward**] <OSC>

11. Stephen George claims that a character in this work is 'the essence of cruelty'. That character in this work asserts that she would rather be a 'dog than a human' and calls men who frequent a brothel 'gray slugs'. One character from this novel burns \$15,000 that their father rejected, while another recalls stealing a book from Samuel Hamilton while reading Marcus Aurelius' *Meditations*. In this novel, Lee discusses translations of the word 'timshel' with Samuel and Adam, and Aron enlists in World War One after discovering that his mother Cathy Ames owns a brothel. For 10 points, name this novel in which the Trask family moves to California, a work by John Steinbeck.

ANSWER: ***East of Eden*** <GDC>

12. Spontaneous sparks of this ion were discovered in rat cardiomyocytes using the indicator fluo-3. Caffeine increases the spark rate in a concentration-dependent manner by activating ryanodine receptors, which are selective intracellular channels for this ion. Probes for this ion include fura-2 and genetically-encoded Cameleons. This ion is coordinated by 7 oxygens in an EF hand, a domain that is found in parvalbumin and calmodulin. The cytosolic concentration of this ion is usually around 100 nanomolar, but can increase 10- to 100-fold during signalling processes involving this ion as a second messenger. For 10 points, name this metal ion with a 2+ charge that is essential for healthy bones.

ANSWER: **calcium** ion <ML>

13. In this play's final act, masked figures dance representing the Devil and his wife, described in a stage direction as carrying 'a feeling of pure earth'. Maria surprises this play's protagonist by buying lace, cloth and ribbons instead of coffee, sugar and bread, after which Victor arrives to find the protagonist sewing. This play's second act opens with a group of laundry-women gossiping about the title character beside a river. That title character visits the wise woman Dolores and subsequently chokes her husband Juan to death outside a hermitage. For 10 points, name this play about the title woman's desperation to cure her infertility, a work by Federico García Lorca.

ANSWER: ***Yerma*** <AH>

14. While in prison, this person sent messages using their pug Fortuné, and André Dupont was employed by this person to create new hybrids for their pioneering rose garden. This person's first husband Alexandre de Beauharnais was executed after failing to defend Mainz, though that city was later recovered by their second

husband shortly before this person purchased the estate of Malmaison. A letter complaining about this person's affair with Hippolyte Charles was published in England after its interception by Nelson while coming from Egypt. This person was divorced in favour of Marie-Louise of Austria six years after their coronation in Notre Dame in 1804. Born in Martinique, for 10 points, name this first wife of Napoleon Bonaparte.

ANSWER: **Joséphine Bonaparte** / **de Beauharnais** / Marie Joséphe Rose Tascher de La Pagerie [prompt on **Bonaparte**] <AP>

15. The music video for this artist's first single features their mother and another artist called Inch. In one single by this artist they claim to 'breathe fire every time [they] yawn'. A diss track directed at this artist is entitled 'Hotline' and was written by Cadell. This artist had a number one in the UK with a song that includes the lyrics 'my brothers don't dab, we just perform the title action, and in another song they chastise a 'rude boi' for '[mentioning] my name in your tweets'. This artist released the album *Heavy is the Head* in 2019 and proclaimed 'fuck the government and fuck Boris' in a song performed at Glastonbury last year. For 10 points, name this British grime artist of 'Shut up' and 'Vossi Bop'.

ANSWER: **Stormzy** [accept Michael Ebenazer Kwadjo **Omari** Owuo Jr.] <GDC>

16. These algorithms are used in the most realistic ray-tracing techniques, and many computer games use these algorithms in a namesake tree search for decision-making. An adaptation of the Buffon's needle problem to calculate pi is thought to be one of the earliest examples of one of these algorithms. These algorithms can be sped up using importance sampling and, when used to calculate integrals, they have a computation time independent of the number of dimensions. The Metropolis-Hastings algorithm is one of, for 10 points, what algorithms, whose use of random sampling to solve numerical problems gave them their name after a famous casino?

ANSWER: **Monte Carlo** methods [or **Monte Carlo** experiments; accept **Monte Carlo** algorithms; prompt on answers involving probabilistic or word forms] <AG>

17. Studies for one depiction of this figure sketched them reclining on a sofa, while another painting by the same artist showed this figure *Drinking a Toast* with their right arm outstretched over some pink flowers. In the best-known painting of this figure, they wear a small crescent tiara to evoke the goddess Diana. This figure was depicted facing away from the viewer and holding a fan by António de la Gándara, and in a white dress by Gustave Courtois. The latter portrait showed this figure in profile, as did an earlier portrait displayed in the Paris Salon, and like that portrait also showed one of the straps of her dress slipping down her shoulder. For 10 points, give this pseudonym of Virginie Gautreau that titles a scandalous portrait by John Singer Sargent.

ANSWER: **Madame X** [accept Virginie **Gautreau** before mention] <CJ>

18. In one play from this country, a man sticks a piece of paper in the face of people who lose to him at cards. In the prologue of a play from this country, two nuns tell the story of a couple whose daughter dies in a storm after it is revealed she has engaged in incest. In a play from this country, the setting of *Thunderstorm*, an Old Man claims to want to visit a town in order to play against a chess champion, and a character called Glasses notices a year has passed while all the characters have been waiting at the title location. The works of an author from this country, which include *The Alarm Signal* and *Bus Stop*, have been banned for being critical of its Communist Party. For 10 points, name this country home to the authors Cao ['tsao'] Yu and Gao Xingjian.

ANSWER: China <GDC>

19. One man who fought in this conflict was described as the 'bulletproof major' because he often stood up in the line of fire to encourage his troops. The largest airlift since Berlin occurred during this war in an attempt to stave off a famine in which many victims suffered from kwashiorkor. The leader of the victorious power in this war declared that there would be 'No victor, no vanquished'. Médecins Sans Frontières was founded by French doctors who gave aid during this conflict. One side in this war was led by Yakubu Gowon, whose standoff with Odumegwu Ojukwu following a 1966 coup sparked pogroms targeting people from the south of one country. For 10 points, name this conflict triggered by the secession of the Igbo-majority states of Nigeria.

ANSWER: Biafran War [accept Nigerian Civil War before 'Nigeria' is read] <OSC>

20. Alexander Nehamas wrote a paper examining 'predication and forms of opposites in' this work. An ambiguous argument in this work revolves around two apparently equal sticks not actually being equal to one another. In this work, an example of a man thinking of his lover when hearing a lyre played is used to support an argument that is similar to one presented in *Meno* involving a slave boy 'recalling' basic geometry. This work is the chronologically first by its author to introduce the Theory of Forms. Near the beginning of this work, it is claimed that humans are 'chattel of the Gods' to argue against the protagonist of this work's committing suicide. For 10 points, name this Platonic dialogue, which sees the death of Socrates.

ANSWER: Phaedo <GDC>

Bonuses:

1. An action of a group G on a set S is one of these functions from G to the automorphism group of S . For 10 points each:

[10] Name these functions between groups, which preserve group multiplication by mapping products in the domain to products in the codomain. Unlike isomorphisms, these functions do not have to be injective.

ANSWER: group **homomorphisms** [do NOT accept or prompt on 'homeomorphism']

[10] Along with left multiplication, this is one of the most natural ways for a group to act on itself. Sylow [SEE-loh] subgroups are related to each other via this operation.

ANSWER: **conjugation**

[10] If the group multiplication has this property, then conjugation is trivial, in the sense that conjugating by any element has no effect. Groups where the multiplication has this property are called abelian, and a multiplication rule has this property if a times b equals b times a .

ANSWER: **commutative** [accept word forms like **commutativity**] <JR>

2. Augustus' stepson Drusus was present at the foundation of the sanctuary that brought together aristocratic individuals from three provinces of this region. For 10 points each:

[10] That sanctuary to Rome and the Augusti was founded at Lugdunum in this region, when this region's 'Longhaired' subdivision was divided into Aquitania, Lugdunensis, and Belgica.

ANSWER: **Gallia** [accept **Gaul**, prompt on **France**]

[10] The Sanctuary of the Three Gauls at Lugdunum was where a speech by this emperor, the son of Drusus and born in the city, was discovered inscribed on bronze. The speech, a version of which is also in Tacitus, proposed that Gaulish elites be allowed to enter the Senate.

ANSWER: Tiberius **Claudius** Caesar Augustus Germanicus

[10] Lugdunum was severely damaged after a huge battle outside the city between Clodius Albinus, governor of Britain, and this man, his erstwhile ally against another imperial claimant, Pescennius Niger, following the death of Pertinax. This emperor reformed the cult to focus exclusively on the Caesars.

ANSWER: Lucius Septimius **Severus** Augustus <OSC>

3. This author wrote about the young African woman Sissie, who travels to Germany to 'better herself' in a novel that comments on colonialism and the colonisation of the mind. For 10 points each:

[10] Name this author of *Our Sister Killjoy*, who also wrote the novel *Changes: a Love Story*.

ANSWER: Ama Ata **Aidoo**

[10] Aidoo is an author from this country, where she was Minister of Education under the regime of Jerry Rawlings.

ANSWER: Republic of **Ghana**

[10] Aidoo discussed the African diaspora in a play titled for *The Dilemma of* one of these figures. Recent analysis has compared Nigerian and Western stories about these supernatural figures, which also feature in *The Turn of the Screw*.

ANSWER: **ghosts** [accept *The Dilemma of a **Ghost***, accept **ghost** stories] <AH>

4. In *Civilisation Matérielle, Économie et Capitalisme*, this thinker argued that the function of the state has tended to be to reinforce monopolists. For 10 points each:

[10] Name this thinker, most famous for their analysis of the Mediterranean in the time of Phillip II. An example of this thinker's use of their best-known technique is their analysis of tensions between mountain- and plain-dwellers.

ANSWER: Fernand **Braudel**

[10] Fernand Braudel was part of this 20th-century school of history, adherents of which often employed *longue durée* analysis.

ANSWER: **Annales** school

[10] The *longue durée* is sometimes used to analyse the 'settler' form of this concept. This concept is more broadly the process by which less developed countries or regions are controlled as outposts of another polity.

ANSWER: **colonialism** <GDC>

5. In this opera, three 'Passing Clouds' recount in turn the birth of Dionysus, the myth of Lycurgus, and the myth of Pentheus. For 10 points each:

[10] Name this opera, whose second act sees its title character travel through seventeen arches, beginning with Countryside, and ending with Fear.

ANSWER: *The* **Mask of Orpheus**

[10] As well as featuring Birtwistle's *The Mask of Orpheus*, the English National Opera's 2019 season saw Emma Rice direct an adaptation of this comic operetta, in which Public Opinion tries, unmasked, to salvage Orpheus and Euridice's unhappy marriage.

ANSWER: **Orphée aux enfers** [or **Orpheus in the Underworld** or **Orpheus in Hell**]

[10] This composer's *L'Orfeo* is the earliest opera still in regular production. As well as nine books of madrigals, this composer also wrote *The Coronation of Poppaea*.

ANSWER: Claudio **Monteverdi** <AP>

6. Through his wife Philippa Roet, this person was the brother-in-law of John of Gaunt. For 10 points each:

[10] Name this person. Comptroller of Customs in the port of London from 1374 to 1386, this person lived over Aldgate during the Peasants' Revolt and was appointed Clerk of the King's Works by Richard II.

ANSWER: Geoffrey **Chaucer**

[10] Chaucer's son Thomas was Chief Butler to four different kings and was elected to this position five times, a record not equalled until Arthur Onslow in 1754. Other holders of this position include William Lenthall, who said 'I have neither eyes to see nor tongue to speak' to a later king.

ANSWER: **Speaker** of the House of **Commons**

[10] Chaucer's granddaughter Alice became Duchess of Suffolk, and was so associated with the policies of this king that she was tried in effigy during Jack Cade's Rebellion. This king, who ruled twice during the Wars of the Roses, was married to Margaret of Anjou.

ANSWER: **Henry VI** <AP>

7. The essay 'The Professor of Parody' accuses this philosopher of propounding a politics that 'collaborates with evil' and argues that 'women deserve better' than this philosopher. For 10 points each:

[10] Name this philosopher who built on Derrida to argue that gender is not only performative but also citational in their book *Bodies That Matter*.

ANSWER: Judith **Butler**

[10] In her earlier *Gender Trouble*, Butler argues that heterosexual gender identifications are formed primarily in response to the taboo on homosexuality and so are marked by this particular response to loss, which Freud contrasted with 'mourning'.

ANSWER: **melancholia** [accept **melancholic** heterosexuality]

[10] Butler begins *Gender Trouble* by quoting this philosopher's claim that 'one is not born a woman, but rather becomes one', which appears in their book *The Second Sex*.

ANSWER: Simone de **Beauvoir** <NC>

8. In the juvenile stage, *Mes.em.bry.anth.e.mum crystallinum* carries out only C.4 photosynthesis, before switching to this form of photosynthesis as an adult. For 10 points each:

[10] Name this form of photosynthesis, which is often an adaptation to avoiding transpiration losses, as it involves only opening stomata to take up carbon dioxide at night. It is also found in some cacti and pineapples.

ANSWER: **C**rassulacean **A**cid **M**etabolism Photosynthesis

[10] The switch to CAM ['cam'] photosynthesis in *M. crystallinum* is associated with stress induced by this compound, which is accumulated in bladder cells. Species that hyperaccumulate this compound are known as halophytes, and are often found in mangroves and deserts.

ANSWER: **salt** [accept **sodium chloride** or **NaCl**]

[10] An extreme example of hyperaccumulation is *Pteris* [ter-is] *vitatta*, a fern that can act to remove this toxic metalloid from soils. In humans, this metalloid can cause DNA damage, leading to cancer, and it was present in the first effective syphilis drug, Salvarsan.

ANSWER: **arsenic** [accept **As**] <LC>

9. In a 2015 interview, Kamel Daoud stated that 'By removing [their victims'] names, [white men] render banal murder and crimes' with reference to this novel. For 10 points each:

[10] Name this novel by Albert Camus [al-BEAR ca-MOO], in which all Arab characters, including the person Meursault ['mer-SOH'] murders on the beach, are unnamed.

ANSWER: *The **Stranger*** [or *L'**Étranger***]

[10] Another nameless character in *The Stranger* works in this profession and feels embarrassed at having to ask Meursault certain questions. The protagonist of Camus' *The Fall*, Jean-Baptiste Clamence, also works in this profession.

ANSWER: defence **lawyers** [accept **legal** profession; accept **justice** or **judge**-penitent or **magistrate**]

[10] In this short story by Camus, the title workers at a cooper's shop are all unnamed. They offer no condolences for the shop-owner's ill daughter, although one of them, Yvers [ee-VAIR], later expresses his feelings to his wife.

ANSWER: 'The **Silent Men**' [or 'Les **Muets**'] <AH>

10. This leader sent a force to suppress the Greek War of Independence, only to have their navy destroyed at one battle by Edward Codrington. For 10 points each:

[10] Name this ruler, who was only stopped from deposing the reigning sultan when a coalition of European powers forced them to sign the Convention of London.

ANSWER: **Muhammad Ali** Pasha

[10] Among Muhammad Ali's more successful military campaigns were his conquest of Sudan and his war against this dynasty, in which he succeeded in destroying its first state and retaking the holy cities of Mecca and Medina.

ANSWER: **Saud**

[10] During Muhammad Ali's rule, a Frenchman known as Clot [clɒh] Bey established a school for women in this discipline, whose graduates were known as *hakimas*. Enrollment was initially so low that a majority of the school's first pupils were enslaved girls.

ANSWER: **medicine** [anti-prompt on specific answers like obstetrics] <CJ>

11. *The Lonely City* by Olivia Lang is about exploring this city through its art. For 10 points each:

[10] Name this city. A painting by Edward Hopper is titled *[this city] Movie*, while Georgia O'Keeffe depicted its Shelton Hotel.

ANSWER: **New York**

[10] One of the artists examined in the *Lonely City* is this painter of *Campbell's Soup Cans*. This artist's studio in New York was called The Factory.

ANSWER: Andy **Warhol**

[10] *The Lonely City* also analyses this artist, who became posthumously famous after the illustrated manuscript of their work *The Story of the Vivian Girls* was discovered. This artist's extensive watercolour and collage works are now housed in the American Folk Art Museum.

ANSWER: Henry **Darger** <GDC>

12. The formal poetry of this language has twenty-four types of cynganedd [cung-HA-neth], or harmony, which structure individual lines based on alliteration, rhyme, and stress. For 10 points each:

[10] Name this language. The *awdl* is the most prestigious poetic form in this language and is rewarded in the Chaining of the Bard at the National Eisteddfod [eye-STETH-vod], held in Cardiff in 2018.

ANSWER: **Welsh**

[10] The Eisteddfod of the Black Chair was so named after this poet was elected as the Bard with the poem *Yr Arwr*, or *The Hero*, six weeks after his death, and the Chair was covered in a black sheet.

ANSWER: Hedd [heth] **Wyn** [accept Ellis Humphrey **Evans**; accept **Fleur-de-Lys**]

[10] Hedd Wyn died on the first day of the Battle of Passchendaele, as did a man whom 'Squire nagged and bullied' in 'Memorial Tablet', a poem by this English war poet, who also wrote 'Aftermath'.

ANSWER: Siegfried Loraine **Sassoon** <AP>

13. Answer the following about the year 1985 in Latin America, for 10 points each:

[10] With the election of Tancredo Neves, 1985 saw the end of the military dictatorship that had held power in Brazil since 1964, following the 'Direct Elections Now' protests in this most populous Brazilian city.

ANSWER: **São Paulo**

[10] In the same year, the Trial of the Juntas prosecuted former members of Argentina's right-wing military dictatorship, including this president from 1976 to 1981 who deposed Isabel Perón and disappeared many of their own citizens as part of the Dirty War.

ANSWER: Jorge Rafael **Videla**

[10] Meanwhile, the M-19 guerrilla movement carried out an attack on this government building in Bogotá. The military's retaking of this building the next day on the orders of President Belisario Betancur killed half of the Colombian Supreme Court.

ANSWER: **Palace of Justice** siege <CJ>

14. Mustard gas is one of a whole family of compounds called mustards, whose cytotoxicity is caused by this mechanism, through which they can form a cyclic cation intermediate that readily alkylates DNA. For 10 points each:

[10] Name this reaction mechanism, in which a Lewis base such as nitrogen attacks a partially positively-charged centre to replace a leaving group. Mustards can undergo these reactions because they contain both a Lewis base and a good leaving group, separated by two carbons.

ANSWER: **nucleophilic substitution** [accept intramolecular **nucleophilic substitution**, **S_N2**-like, **S_N1** (the reaction is still first-order), or other more specific answers]

[10] Instead of nitrogen, many of the most common mustards use this element as the nucleophile. This element's most common allotrope is an eight-membered ring that forms yellow crystals under standard conditions, and compounds of it are known for their smell of rotten eggs.

ANSWER: **Sulphur** [accept **S**]

[10] This effect explains why alkylation is much faster by a mustard than by an equivalent haloalkane, since the interaction responsible is between the reacting centre and a lone pair on the same molecule but not conjugated to it.

ANSWER: **Neighbouring Group Participation** [accept **anchimeric assistance**] <AG>

15. Daisy Johnson drew on fairy tales to write about a protagonist with this first name in *Everything Under*. For 10 points each:

[10] Give this first name of a character who is kidnapped by a witch along with Hansel.

ANSWER: **Gretel**

[10] In *Everything Under*, Gretel lives in one of these places. A 1979 Booker-winning novel by Penelope Fitzgerald is set among inhabitants of these things, inspired by Fitzgerald's years living in one of them.

ANSWER: **houseboats** [prompt on **boats** or **ships** with 'what kind of boat/ship?']

[10] 'Hansel and Gretel' is designated as Class 327A of this system, which categorises European folklore. The German folklorist Hans-Jörg Uther revised and expanded this system in 2004.

ANSWER: **Aarne-Thompson-Uther Index** [or **ATU Index**] <AH>

16. This word features twice in the title of a Walt Whitman poem that encourages 'my tan-faced children' to 'take up the task eternal, and the burden and the lesson'. For 10 points each:

[10] Give this word. In a novel with this word in its title, Frank Shabata drunkenly shoots Emil and Marie under a white mulberry tree, a crime later discovered by Crazy Ivar.

ANSWER: **pioneers** [accept *O **Pioneer!*** or '**Pioneers!** O Pioneers!']

[10] *O Pioneer!* is a novel by this American author. Along with *My Ántonia*, it forms part of this author's Great Plains trilogy.

ANSWER: Willa **Cather**

[10] A poem about this place interjects 'O, Pioneers!' after it admits being 'Hungry yet today despite the dream'. Earlier, that poem describes this place as 'the pioneer on the plain / Seeking a home where he himself is free'.

ANSWER: **America** [accept 'Let **America** Be America Again'; accept the **USA**] <AH>

17. Described as a 'mere mechanic' by Mozart, one of this Lichfield-resident composer's piano sonatas nevertheless provided the theme for the Allegro section of the overture to *The Magic Flute*. For 10 points each:

[10] Name this composer. As well as writing piano works such as the sonata *Didone abbandonata*, they also published Beethoven's works in England and made many mechanical improvements to the piano.

ANSWER: Muzio **Clementi**

[10] Clementi is now best known for his *Grados ad Parnassum*, comprising 100 piano pieces and exercises. As 'Doctor Gradus ad Parnassum', it was parodied by this French composer in *Children's Corner*.

ANSWER: Claude **Debussy**

[10] This student of Beethoven thought very highly of Clementi's works. Though a very accomplished composer, they are now known mostly for educational works such as their 100 *Études*.

ANSWER: Carl **Czerny** <AP>

18. This number is used to determine whether a flow can be approximated as incompressible. For 10 points each:

[10] Name this dimensionless number, the ratio of the flow velocity to the local speed of sound in the fluid.

ANSWER: **Mach** number [prompt on **M** or **Ma**]

[10] When the Mach number is between about 1.3 and 5, a theory described by this term can be used. Sound waves are usually treated in a theory with this property, in which perturbations are assumed to have small amplitude.

ANSWER: **linear** [or **linearised**]

[10] Supersonic flow can also be treated using an expansion named for this scientist and Theodor Meyer, in which a flow passing a corner is treated as a fan consisting of an infinite number of Mach waves. This scientist also names a dimensionless number whose size determines whether convection or conduction dominates thermal transport.

ANSWER: Ludwig **Prandtl** <LW>

19. Because Rabbi Akiva legendarily finished reciting this prayer at the moment of his death, it has become traditional for some Jews to say it as their last words. For 10 points each:

[10] Name this prayer, the centerpiece of a Jewish service, whose first sentence declares 'Hear, O Israel: The Lord is our God, the Lord is One'.

ANSWER: **Shema** Yisrael

[10] The second line of the Shema, the *Baruch Shem*, is normally recited silently by the congregation, except during this holiday, when it is said aloud. The evening service on this Day of Atonement begins with the Kol Nidre.

ANSWER: **Yom Kippur**

[10] A directive to recite the Shema twice every day is included in Deuteronomy and thus considered one of these commandments, given in the Bible and confirmed by rabbinic law. Nevertheless, in Orthodox Judaism, women are exempt from the requirement to pray the Shema.

ANSWER: **mitzvot** [accept **mitzvah**] <CJ>

20. A song about this event deliberately borrows from the theme tune of 'You Only Live Twice'. For 10 points each:

[10] Name this event. A song about this event includes the lyrics 'overdose at Christmas / and give it up for Lent' and was the lead single from the album *I've Been Expecting You*. That song about this event was also the first UK number 1 by a singer who also had a number 1 with 'Candy'.

ANSWER: the **Millenium** [accept anything related to the end of the 2nd millennium CE]

[10] Fireworks during the Millenium celebrations in this city read 'eternity' in reference to the chalk graffiti work made by John Stace in this city between 1932 and 1967.

ANSWER: **Sydney**

[10] To celebrate the millenium, four tonnes of confetti rained down on crowds of up to three million people in this New York location, which sees the dropping of the ball every New Year's Eve.

ANSWER: **Times Square** <GDC>

