

OOT 2020: [The Search for a Middle Clue]

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**THIS IS A FINALS PACKET. DO NOT READ IT.**

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

### Packet 13 - Finals II

#### Toss-ups:

1. Swedish scholar David Solander and illustrator Sydney Parkinson were employed by this organisation to assist in the creation of a *Florilegium* that was not published until the 20th century. An expedition supported by this organisation was not attacked during the Seven Years' War because it was carrying out a 'service to all mankind'. One head of this organisation accompanied James Cook to Tahiti to observe the 1769 Transit of Venus, and was the first person to record the name 'kangaroo'. That president of this institution was Joseph Banks. This institution, the publisher of the *Philosophical Transactions*, awarded Benjamin Franklin the Copley Medal for his study of electricity. For 10 points, name this oldest national scientific institution, founded by Charles II in 1660.

ANSWER: the **Royal Society** <OSC>

2. Depictions of this being may give it the head of a flying fox and a body decorated with water lilies. It has been argued that the first images of this being came about once climatic conditions had settled at the start of the Holocene, and that those depictions were influenced by pipefish washed up during the flooding of Arnhem Land by rising sea levels. This being is connected in some traditions with the menstrual cycle, and its appearance in the sky is described as this being moving between waterholes. In one period this being's movements created hills and valleys before they woke other animals such as the wombat. For 10 points, name this being, a deity of change and water, who formed the landscape of Australia in Dreamtime stories.

ANSWER: **Rainbow Serpent(s)** <OSC>

3. This author's acquaintance with the children of another deceased writer led them to posthumously publish the *Fragments from an Unnamed Author*. This writer discussed the relationship between human reason and divine revelation in *The Education of the Human Race* and elaborated a problem called their namesake 'ditch' in other religious works. After this author's freedom from censorship was revoked, they wrote a play in which the mystic Al-Hafi leaves Jerusalem for India, while a Templar and a Jewish girl are revealed to be siblings and the children of a sultan's brother. The title character of that play tells the parable of the ring to Saladin. The writer of plays like *Emilia Galotti*, for 10 points, name this German Enlightenment author of *Nathan the Wise*.

ANSWER: Gotthold Ephraim **Lessing** <CJ>

4. For a subset A of a Lorentzian manifold, this mathematician names the set of points such that every past inextendible curve through that point meets A. Boundary conditions named for this mathematician specify both a function value and the normal derivative. Any sequence whose terms become arbitrarily close together is named for this mathematician. This mathematician is the alphabetically first namesake of a set of equations that form a necessary condition for complex differentiability, which they name with Riemann. For 10 points,

name this mathematician, the alphabetically first to name an inequality that compares inner products to norms along with Schwarz.

ANSWER: Augustin-Louis **Cauchy** <DD>

5. Saira Wasim used this art form to depict two men playing chess with guns in their pockets. A large number of these art forms can be found within a work that depicts a parrot narrating 52 adventures called the *Tutinama*. One artist who produced a work depicting a musician dressed as a European with viol was referred to as the last great master of one form of this art form called *muraqqa* [moo-RAH-kah]. An artist called Nakkas Osman after this genre used it to illustrate the *Siyer-i Nebi*. Nicolas Hilliard depicted Elizabeth I using this art form, which dominated Mughal painting and was often used to depict Ottoman sultans. For 10 points, name this art form, the decoration of illuminated manuscripts with paintings that are often small.

ANSWER: **miniatures** [accept **manuscript illustration**s before 'Hilliard' - prompt on **illustrations**] <GDC>

6. In 2018, accusations of child molestation surfaced against Jimmy Williams, a deceased coach in this sport, while in 2019 George Morris received a lifetime ban from this sport for sexual misconduct. In 2004, the Court of Arbitration for Sport reinstated 14 time penalties given to Bettina Hoy for crossing the starting line twice in one event, overruling the FEI. The oldest British gold medalist since 1908 won an individual medal in this sport in 2016, while the 2012 Olympics saw the participation of another athlete known for their partnership with High Kingdom and Toytown. Nick Skelton and Zara Phillips have represented Great Britain in, for 10 points, what sport in which riders on horseback compete in dressage, eventing, and jumping?

ANSWER: **equestrian** [accept **horse riding**; anti-prompt on **showjumping** or **dressage**] <CJ>

7. Groups such as the Red Girls and the White Couple perform in a ballet choreographed by this person to music by Meyerbeer. As well as choreographing *Les Patineurs*, this person commissioned a revision of a work by Ferdinand Herold and appeared in and choreographed a 'Jodelling Song' in another ballet, Walton's *Façade*. This person created the ballet *Marguerite and Armand* especially for Rudolf Nureyev and Margot Fonteyn, and this choreographer's best known ballet features a complex ribbon dance and Widow Simone's 'Clog Dance'. This artistic director of the Royal Ballet trained under Ninette de Valois. For 10 points, name this English choreographer of a 1960 staging of *La fille mal gardée*.

ANSWER: Frederick **Ashton** <AP>

8. The army of one member of this family defeated William Villehardouin, who later agreed to the Treaty of Viterbo to oppose them. George Mouzalon's assassination was supported by that member of this family, whose religious policies were repudiated by the Council of Blachernae [Bla-CUR-nye]. Representations from this family prompted the Second Council of Lyon, while a later member of this family met Urban V and converted to Catholicism. That person's grandson was made a vassal of Murad II after the fall of Morea. The first ruling member of this family overthrew the Latin Empire, while the last is known as the 'Marble Emperor' after disappearing during the Fall of Constantinople. For 10 points, name this family, the last Byzantine dynasty.

ANSWER: **Palaiologos** <AP>

9. An electrochemical experiment by Rule and La Mer confirmed a prediction that the amount by which this quantity is increased in heavy water varies approximately linearly with the value of this quantity in water. A significant change in structure may be inferred if Pauling's first rule for this quantity is broken. For a series of related compounds, this quantity may be estimated using a linear free energy relationship named after

Hammett. This quantity plus the logarithm of a ratio of concentrations is equal to pH, according to the Henderson-Hasselbalch equation. Equal to the pH at which half of a compound is deprotonated, for 10 points, name this quantity, defined as minus log, base ten, of the acid dissociation constant.

ANSWER: **pKa** [prompt on acid dissociation constant or Ka before mention] <AG>

10. In a novel by an author from this country, a performer tallies the number of guests who leave a show on a chalkboard. That novel by an author from this country features a retired judge being asked to attend a stand-up show by a comedian he knew forty years earlier. In one work by an author from this country, a woman married to a geology student fantasises about having a servant like Michael Strogoff and befriends a teenaged poet. The authors of *A Horse Walked into a Bar* and *My Michael* are from this country, and a novelist who died here wrote a novel in which Reb Gudel travels through Galicia to visit Jewish villages. That novel is *The Bridal Canopy*. For 10 points, name this country home to Amos Oz and Shmuel Agnon.

ANSWER: **Israel** <GDC>

11. In Poulenc's *Concerto for Two Pianos*, this instrument briefly accompanies the soloists in repeating bars of an eighth note, two sixteenth notes, and six eighth notes, marked *très précis*. In its only appearance in *Tannhäuser*, this instrument plays variations on a rhythm of four eighth notes, then an eighth note, two sixteenth-notes, and two eighth notes toward the end of the bacchanale. In another opera, the title character accompanies themselves with this instrument during the aria 'Je vais danser en votre honneur'. This instrument plays four sixteenth notes and a quarter note throughout most of the 'Feria' movement of Ravel's *Rhapsodie espagnol*. Played by Carmen, for 10 points, name this shell-shaped percussion instrument often held by *flamenco* dancers.

ANSWER: **castanets** <AP>

12. With SP Brown, this scientist wrote a paper arguing that autumn coloration in trees serves as a signal of defensive commitment against pests. This scientist argued that in localised populations, the consequences of sex for recombination are nearly eliminated, leading to 'extraordinary sex ratios'. The idea that an organism has an incentive to attack less-closely-related individuals than average is this scientist's concept of 'spite'. This scientist developed an explanation for altruism which makes use of an equation that states that genes increase in frequency when 'rB is greater than C', a result rederived by George R. Price. For 10 points, name this biologist whose namesake rule was the first quantitative treatment of kin selection.

ANSWER: William D. **Hamilton** <GDC>

13. A person with this last name guaranteed the release of the philosopher Otto Neurath from a British detention centre and was the assistant secretary of the Council for At-Risk Academics. A person with this last name wore a blue Mainbocher wedding dress, now displayed in the Met, for their 1937 wedding. That person with this last name released the memoirs *The Heart Has Its Reasons* and called Nassau in the Bahamas 'our personal St. Helena'. Upon meeting a person with this surname, Adolf Hitler claimed that 'she would have made a good queen', and Stanley Baldwin threatened to resign if a person of this name was to become, in his words, 'Queen Wally'. For 10 points, give this surname of the wife of Edward VIII, Wallis.

ANSWER: **Simpson** <GDC>

14. In an essay on this author, G.K. Chesterton noted that 'It is positively because [they are] quick-witted that [they are] long-winded'. As well as comparing the title character to Napoleon, this author wrote that 'Crime, like disease, is not interesting' at the start of one work. In that work, the laying of five-dozen eggs is seen as a miracle, and a character in another work by this author first appears as 'the Note Taker' identifying where

people are from. That work's preface remarks that 'English is not accessible even to Englishmen'. A 'sequel' ends that work, describing how the protagonist 'likes Freddy and [...] the Colonel; and she does not like Higgins and Mr. Doolittle'. For 10 points, name this author who affixed to lengthy prefaces plays like *Saint Joan* and *Pygmalion*.

ANSWER: George Bernard **Shaw** <AP>

15. Arch Oboler claimed that this genre 'began at midnight [in] Chicago's Merchandise Mart'. Clyde Criswell's *The Secret Wave* was written in this genre, much like the original version of Joe Orton's *The Ruffian on the Stair*. In a work in this genre, Mr. Pugh imagines poisoning Mrs. Pugh during dinner, and Polly Garter sings for her lost love, while the music-obsessed Organ-Morgan is uninterested in the gossip his wife brings from her general shop. That work in this genre takes place in Llareggub. In the 1930s, another work adapted into this genre supposedly persuaded a large number of people that Earth was being invaded by Mars. For 10 points, give this genre of *Under Milk Wood* and the terrifying broadcast of *The War of the Worlds*.

ANSWER: **radio drama** [or **radio plays** or **audio drama**; prompt on partial answers] <AH>

16. In *Sacred Narrative*, Alan Dundes argued that this thinker, 'like most universalists [is] content to merely assert universality rather than bother to document it'. In one work, this thinker used the image of a four-year old claiming that a burnt match is a witch to illustrate the play-acting nature of 'primitive religion'. This thinker popularised Adolf Bastian's distinction between 'elementary ideas' and 'folk ideas'. One 17-stage concept developed by this thinker is often illustrated using a circle cut into two uneven parts labelled with phrases like 'ultimate boon' and 'call to adventure': that concept is sometimes called one character's 'journey'. For 10 points, name this thinker who popularised the term 'monomyth' and wrote *The Hero of A Thousand Faces*.

ANSWER: Joseph **Campbell** <GDC>

17. In one of these conflicts, Caupo of Turaida was killed in the Battle of St Matthew's Day, while a defeat at the Battle of Saule saw the destruction of an organisation set up to fight these conflicts. William of Modena divided up the Terra Mariana during that one of these conflicts, while Christian of Oliva invited a different organisation to join another one of these conflicts. One result of the first of these conflicts was Albert the Bear's creation of the Margraviate of Brandenburg, while a religious order founded in Acre entered these conflicts under Grand Master Hermann von Salza, eventually controlling most of Prussia. For 10 points, name this series of conflicts against European pagans pursued by the Livonian Sword Brothers and the Teutonic Knights.

ANSWER: **Baltic Crusades** or **Northern Crusades** [prompt on crusades; accept **Livonian Crusade** before Christian of Oliva, anti-prompt afterwards; anti-prompt on Prussian and Wendish Crusades or the campaigns of the Teutonic Knights] <AP>

18. A philosopher who still works at this university introduced the modern definition of structural realism, which they defended by claiming that the theory is 'the best of both worlds'. A philosopher who was teaching at this university at the time of their death argued that theoretical assumptions make up a 'hard core' of a 'research programme' in one work and names the prize given to outstanding contributions to philosophy of science. John Maynard Keynes represented Cambridge in a debate against Frederick von Hayek representing this university. This university, the primary intellectual home of Imre Lakatos, was founded by Sidney and Beatrice Webb in 1895. For 10 points, name this university established to study its namesake discipline in the capital of the UK.

ANSWER: London School of Economics <GDC>

19. The Jordan-Wigner transformation associates spins with the product of a fermionic operator and a factor named for this word. The A.d.S./C.F.T correspondence relates quantum field theories to theories named for this word. The Mersenne-Taylor formula states that the speed of waves on objects with this name is proportional to the square root of their tension. Objects described by this word trace out world sheets rather than world lines. A hypothetical object named for Dirac and this word would join two magnetic monopoles. Popular theories of quantum gravity are named after, for 10 points, what one-dimensional objects, with which you might tie brown-paper packages?

ANSWER: strings <LW>

20. In a novel by this author, a teacher becomes aware that Victoria has had an affair with Mr Saladin. In 2015, a radio host called this author a 'traitor' after they stated that their country was run by 'neo-liberal, profit-obsessed politicians'. A series of events in a novel by this author are triggered by the death of the hermit Crosbie Wells. The shipping agent Thomas Balfour is a Sagittarius, according to the zodiac chart this author inserted at the start of one novel. This author began that novel with Walter Moody arriving at the Crown Hotel and ends it with him leaving the South Island town of Hokitika to prospect for gold. For 10 points, name this New Zealand novelist of *The Luminaries*.

ANSWER: Eleanor Catton <AH>

**Bonuses:**

1. These methods do not require any input other than physical constants, in contrast to semi-empirical methods, which fit parameters to experimental data. For 10 points each:

[10] Name these methods in quantum chemistry, which calculate energies and electron densities ‘from first principles’ and include Hartree-Fock theory and some versions of Density Functional Theory.

ANSWER: ab initio methods

[10] The use of Slater determinants in Hartree-Fock theory guarantees that the exchange interaction is accounted for, but does not account for the rest of this property, which arises because the positions of the electrons are not independent of one another.

ANSWER: electron correlation

[10] Attempts to capture electron correlation include this method, which expresses the wavefunction as a linear combination of determinants excited from the Hartree-Fock ground state and optimises it variationally. When every possible excited state is included, it is exact, within a given basis set.

ANSWER: Configuration Interaction [prompt on CI] <AG>

2. It is plausible that this ruler hired the military architect Master James of Saint George in Savoy while returning from the Eighth and Ninth Crusades. For 10 points each:

[10] Name this King of England, who employed James in the construction of castles such as Conwy and Harlech following their conquest of the Principality of Wales.

ANSWER: Edward I [prompt on Edward; accept Longshanks; accept Hammer of the Scots]

[10] The bands of coloured stone and polygonal walls of this Welsh castle, the birthplace of Edward II, may have been inspired by the walls of Constantinople. This castle’s location near the Roman fort of Segontium built upon Welsh legends of Constantine and Maccsen Wledig [MAX-en wuh-LED-ig].

ANSWER: Caernarfon

[10] While still under construction, Caernarfon was captured and burned by Madog, a distant cousin of this Prince of Wales, who before their final rebellion signed the Treaty of Aberconwy with Edward and married Elisabeth, daughter of Simon de Montfort

ANSWER: Llywelyn ap Gruffudd [accept Llewellyn the Last, Llywelyn Ein Llyw Olaf, or Llywelyn II; prompt on Llywelyn] <OSC>

3. This psychoanalyst’s contrast between ‘depressive’ and ‘paranoid/schizoid’ positions was influentially taken up by Eve Sedgwick to call for ‘reparative’ as well as ‘paranoid’ readings of literary texts. For 10 points each:

[10] Name this psychoanalyst, who contrasted between ‘part’ and ‘whole’ objects and the notion of the ‘bad breast’. This thinker engaged in the so-called ‘Controversial Discussions’ with Anna Freud in the early 1940s.

ANSWER: Melanie Klein

[10] Together with Anna Freud, Klein was among the first to carry out psychoanalysis on these people. Donald Winnicott would later argue that these people required ‘good-enough mothering’ in order to develop.

ANSWER: children [or infants]

[10] According to Winnicott, these objects help the child to separate the ‘me’ from the ‘not-me’ while maintaining a fantasized bond with the mother. Common examples include dolls, teddy bears, and blankets.

ANSWER: transitional objects <NC>

4. A piece commemorating one of these ceremonies was originally titled ‘The Well-Wishers Are Coming’. For 10 points each:

[10] Name this ceremony that is often accompanied by an intermezzo from Mendelssohn's *Midsummer Night's Dream* Suite or the opening to Act III of *Lobengrin*.

ANSWER: **weddings**

[10] This composer commemorated their 25th wedding anniversary with a collection of piano pieces including 'Watchman's song' and 'Homesickness'. They also described the 'abduction of the bride' in the prelude to Act II of a piece of incidental music.

ANSWER: Edvard **Grieg**

[10] This movement of the *Peer Gynt Suite* is in contrasting verse-chorus form between an Andante A minor section and an A major *Allegretto tranquillamente* section. Although it appears in Act III of the incidental music to the play, this is the last movement of the *Second Peer Gynt Suite*.

ANSWER: **Solveig's Song** <DD>

5. In Dick Davis' translation of the duel between these two figures, the eventual winner praises his opponent as 'O hero, lion destroyer, mighty lord' in order to escape death. For 10 points each:

[10] Name these two figures. One of them, the son of the princess Tahmineh, is killed by the other, his father, who only recognises the clasp he had given Tahmineh after breaking his son's back.

ANSWER: **Rostam** and **Sohrab**

[10] The tragic tale of Rostam and Sohrab appears in this epic of Persian literature, written by Ferdowsi.

ANSWER: the ***Shahnameh*** [or *The Book of Kings*]

[10] One of the kings who appears in the *Shahnameh* is Alexander the Great, who after conquering Persia attempts to reach this place with Khezr, but instead encounters a group of talking birds. The search for this place is a recurring storyline in the Alexander romance and legends.

ANSWER: the **Fountain of Youth** [accept any answer that mentions **water** that will grant either **eternal youth** or **eternal life**] <AH/OSC/CJ>

6. This author wrote *The Impossibility of Sex*, which weaves explanations of psychological concepts with fictional stories from therapy. For 10 points each:

[10] Name this author whose most famous work examined why people, and women in particular, eat when they are not hungry, and the problem of overdieting. This author railed against the 'myth of obesity' in *Bodies*.

ANSWER: Susie **Orbach**

[10] Orbach is married to this author, who wrote about a character called Dog Woman in *Sexing the Cherry*, as well as a semi-autobiographical work about her childhood in Accrington, Lancashire.

ANSWER: Jeanette **Winterson**

[10] Orbach's most famous work is titled for the claim that 'fat' is an issue relating to this political and social movement. Orbach is often seen as being part of the 'second wave' of this movement, along with figures like Betty Friedan and bell hooks.

ANSWER: **feminism** <GDC>

7. This party's support collapsed in an election prompted in part by the warnings of a committee led by Sir George May. For 10 points each:

[10] Name this party, defeated in a landslide by the National Government in 1931. The split in this party was driven by its leader, Ramsay MacDonald, forming a coalition with Stanley Baldwin's Conservatives.

ANSWER: **Labour** Party

[10] After MacDonald's expulsion from the party, he was succeeded as Labour leader by this politician, who had been Foreign Secretary. This leader lost 235 seats in the 1931 election, including his own of Burnley, and

was in turn succeeded by George Lansbury.

ANSWER: Arthur **Henderson**

[10] This politician, who had resigned from the Labour government after the rejection of their namesake Memorandum by the fiscally conservative Chancellor of the Exchequer in 1930, formed the New Party and unsuccessfully stood in Stoke-on-Trent in 1931.

ANSWER: Sir Oswald **Mosley** <OSC>

8. 'Flat' polynomials named for this man exist according to a paper uploaded to the ArXiv [archive] in 2019. For 10 points each:

[10] Name this mathematician who, along with Offord, asked how many subsets of  $n$  complex numbers contained in the unit disc can sum to zero.

ANSWER: John Edensor **Littlewood**

[10] Littlewood is better known for his work with Hardy, including the first Hardy-Littlewood conjecture, which concerns the rarity of the 'twin' type of these numbers that are divisible by one and themselves.

ANSWER: (twin) **primes**

[10] Littlewood is also famous for a conjecture in the field of approximations related to this kind of equation, whose solutions must be integers.

ANSWER: **Diophantine** equations <JR>

9. John Dennis wrote a defence of this play that notes the similarity between a rakish character and Wilmot, Earl of Rochester. For 10 points each:

[10] Name this play, which begins with an attempted seduction being interrupted by an orange seller. The song 'How charming Phyllis how fair!' is sung at a party in this play.

ANSWER: **Man of Mode**

[10] *Man of Mode* is an example of a type of drama named for this period of English history. Other dramas named for this period include *The Country Wife* and *The Rover*.

ANSWER: **Restoration**

[10] The themes of *Man of Mode* are reused in *Mr. Limberham*, a play by this author that was only performed three times. More successful plays by this author include one in which Serapion hosts a festival to celebrate Mark Antony, *All For Love*, as well as *Marriage à la Mode*.

ANSWER: John **Dryden** <GDC>

10. In the winter of 2019, this band announced it would postpone touring plans ahead of its new album because of environmental concerns and would only tour when it could be 'actively beneficial' as well as carbon neutral. For 10 points each:

[10] Name this band, which released the double album *Everyday Life* in November 2019. Their previous albums include *Mylo Xyloto*, *Parachutes*, and *A Head Full Of Dreams*.

ANSWER: **Coldplay**

[10] Despite Chris Martin holding a first-class degree in Classics, he claimed in a collaboration with this electronic music duo that he had been 'reading books of old... Achilles and his gold, Hercules and his gifts' - references with little foundation in Greek mythology.

ANSWER: The **Chainsmokers**

[10] In the music video for this Coldplay single, the band's lead singer dresses up as an elephant, escapes from a zoo, takes the Tube to Heathrow, and boards a plane to Cape Town. A special version of this track was recorded for the 2012 London Paralympics.

ANSWER: **Paradise** <BP>

11. One deity of this place is said to have been a mortal man struck blind after abandoning his wife for a younger woman, who later had his sight restored. For 10 points each:

[10] Name this place, where that deity's leg was the only part of him recovered from a fire. Another deity of this location wields a wooden mallet and stands on rice bales in many depictions.

ANSWER: **kitchen**

[10] The Kitchen God is worshipped at the Chinese New Year, when he is said to report to this ruler of heaven, who will punish or reward the family based on his report. This deity assigned the zodiac and is named for a certain gemstone.

ANSWER: the **Jade Emperor** [accept **Yu Huang**, **Yu Di**, or **Tien Kung**]

[10] One god associated with kitchens in Japan is Daikokuten, one of the Seven Lucky Gods, six of whom came to Japan from elsewhere. Daikokuten entered Japanese tradition from this country, where he was originally a war god known as Mahakala.

ANSWER: **India** <OSC>

12. This author wrote that 'night fell howl / on Soweto' in a poem which ends with the repeated word 'bruggadung'. For 10 points each:

[10] Name this author, who also wrote that 'the white dream wrestle(s) to life' in the poem 'Bread'. This author coined the term 'nation language' to describe the use of non-standard English in works by the African diaspora.

ANSWER: (Edward) Kamau **Brathwaite**

[10] While in London, Brathwaite created an artistic movement named for this area of the world. Other authors from this broad area of the world include Derek Walcott and Patrick Chamoiseau [SHA-mwuh-zoh].

ANSWER: the **Caribbean** Sea [accept **Caribbean** Artists Movement]

[10] Brathwaite claimed that 'the hurricane does not roar in' this poetic metre in a *History of the Voice*, in which he argued that this poetic metre, used in poems like 'Ode to Autumn', has been the dominant form of English poetry since the time of Chaucer.

ANSWER: **pentameter** [accept iambic **pentameter**] <GDC>

13. A bearded man attempts to strike a blond boy with a stick on the left-hand side of this painting, while in the center a man in an orange robe walks amid a crowd of people swinging a censer. For 10 points each:

[10] Name this painting depicting a group of Orthodox priests transporting an icon of the Virgin Mary.

ANSWER: **Religious Procession in Kursk Province**

[10] *Religious Procession in Kursk Province* is a work by this Realist painter, who also portrayed everyday scenes in other works like *Barge Haulers on the Volga*.

ANSWER: Ilya **Repin**

[10] The leader of the international Realist movement, Gustave Courbet [kooor-BAY], painted two scenes of this activity, one depicting two nudes and the other a woman at a spinning wheel. A Toulouse-Lautrec painting is also titled for this activity.

ANSWER: **sleep** <CJ>

14. Proteins may recognise specific DNA sequences by direct readout, which involves hydrogen bonding between amino acid side chains and specific bases, such as this one. For 10 points each:

[10] Name this nucleobase, which is recognised by hydrophilic uncharged residues such as serine and threonine, and forms base pairs with thymine.

ANSWER: **adenine** [accept **A**]

[10] One common DNA-binding motif is usually 20 amino acids in length with a glycine at position 9, and consists of two instances of this secondary structure linked by a short turn. This is one of the most common secondary structures along with beta sheets.

ANSWER: **alpha helix** [prompt on **helix**]

[10] Indirect readout involves sequence-dependent deformations of the DNA helix, such as when TATA-binding protein recognises a TATA box. A sharp bend in the DNA is induced by bulky phenylalanine residues inserting into this feature of the helical structure, which is 12 angstroms wide.

ANSWER: **minor groove** [prompt on **groove**] <ML>

15. Victory at the Battle of Guadalete resulted in the capture of this city by Tariq ibn Ziyad. For 10 points each:

[10] Name this city. The capital of the Visigothic kingdom of Spain, it was displaced by Seville and then Cordoba as the centre of al-Andalus.

ANSWER: **Toledo**

[10] This person was the last Visigothic king to rule from Toledo, apparently usurping the throne from Achila II and ruling from 710 until his death at Guadalete about two years later.

ANSWER: **Roderick** [accept **Rodrigo**]

[10] A 739-43 revolt of these nomadic North African people, who had made up the majority of the Umayyad army, precipitated the withdrawal of Umayyad forces from northern Spain, allowing the survival of the Kingdom of Asturias.

ANSWER: **Berbers** [prompt on **Moors**] <AP>

16. This work criticises Empedocles's idea of 'mingling' and Democritus's atomic theory, since neither properly explains how a thing might materially change, rather than merely be altered. For 10 points each:

[10] Name this work, in which the Four Causes of an earlier work by the same author are applied to the material substratum to explain this work's title actions.

ANSWER: ***On Generation and Corruption* / *On Coming-To-Be and Passing-Away* / *De Generatione et Corruptione***

[10] In *On Generation and Corruption*, Aristotle associated these four things with being hot or cold, and dry or wet. In *De Caelo* [ky-lo], Aristotle described the heavens as made from an imperishable addition to these things, aether.

ANSWER: the classical **elements** [accept **fire, air, water, earth** together in any order]

[10] The material, agent, efficient, and final causes were first discussed in this other Aristotelian work of natural philosophy. This work's eighth book first advances the idea of the Unmoved Mover as the first cause of all things.

ANSWER: ***Physics*** <AP>

17. This novel, along with the rest of its author's work, was dismissed as 'whining, unenjoyable public pornography' by a writer who resigned from the Swedish Academy in protest over the awarding of the 2004 Nobel Prize to Elfriede Jelinek. For 10 points each:

[10] Name this novel that follows the sexually repressed Erika's relationship with one of her students at the Vienna Conservatory.

ANSWER: *The **Piano Teacher***

[10] A somewhat less controversial female German-language author to win the Nobel Prize was Herta Müller, who wrote about the struggles of the Banat Swabians living in this country in novels like *The Passport* and drew on her experiences of being questioned by this country's secret police in *The Land of Green Plums*.

ANSWER: **Romania**

[10] In its statement awarding the prize to Müller, the Academy compared her to this other author for their similar use of German as a minority language. This author worked mostly in Prague, where they produced works like *The Castle* and *The Metamorphosis*.

ANSWER: Franz **Kafka** <CJ>

18. In 2019, a team at Google announced that they had achieved quantum supremacy using qubits [cubits] made from these materials. For 10 points each:

[10] Name these materials with no resistance at low temperatures. These materials exhibit the Meissner effect, and qubits made from them consist of Josephson junctions.

ANSWER: **superconductor** [accept word forms such as **superconducting**]

[10] One of the issues facing quantum computing is this phenomenon, in which the qubit becomes entangled with its environment and thus ceases to be in a pure state. Qubits often have to be cooled to very low temperatures to make this phenomenon as slow as possible.

ANSWER: **decoherence** [accept **loss of coherence** or **no longer being coherent**]

[10] This topological quantum error correcting code is defined on a two-dimensional spin lattice and is the simplest model of topological order. Operations on the stored qubits are performed by moving anyons around two topologically non-trivial loops.

ANSWER: **toric code** [prompt on **torus**] <LW>

19. This musician composed a twelve-piece *Zodiac Suite*, along with the piece 'Black Christ of the Andes', inspired by their Catholicism. For 10 points each:

[10] Name this jazz musician, who often told a story about Louis Armstrong picking them up and kissing them at Harlem's Rhythm Club. This person composed pieces for many top jazz musicians, including Armstrong and Art Blakey.

ANSWER: Mary Lou **Williams** [accept Mary Elfrieda **Scruggs** or Mary Lou **Winn** or Mary Lou **Burley**]

[10] Williams wrote 'In the Land of Oo-Bla-Dee' for this jazz musician, who themselves composed many standards, including 'Straight, No Chaser'. This musician released the album *Brilliant Corners* in 1957.

ANSWER: Thelonious Sphere **Monk**

[10] Mary Lou Williams and Thelonious Monk both played this instrument, as did Fats Waller and Art Tatum.

ANSWER: **piano** <ML/GDC>

20. The last emir of this state, Said Mir Mohammed Alim Khan, was overthrown in 1920 during the Russian Civil War. For 10 points each:

[10] Name this state, which lost Samarkand to Russia in 1868 and became a protectorate 5 years later. This emirate had arisen in the aftermath of the conquest of the khanate of the same name by Nadir Shah of Persia.

ANSWER: Emirate of **Bukhara**

[10] The conquest of Bukhara and the neighbouring khanates of Khiva and Kokand was seen by some in the west as part of this broad confrontation between the Russian and British empires. The coiner of this term, Arthur Conolly, was executed by Emir Nasrullah Khan of Bukhara for spying in 1842.

ANSWER: the **Great Game**

[10] As part of the Great Game, Afghanistan became a buffer zone between British and Russian spheres of

influence. After a joint commission demarcated Afghanistan's border with Russia, this boundary was drawn by a namesake diplomat between Afghanistan and British India, dividing Pashtun populations.

ANSWER: **Durand** Line <OSC>