

ROUND 12

Tossup 1. **This philosopher asks if a limited vocabulary for particular occupation, such as a builder, can be considered a form of primitive language for a tribe of builders. He proposes that people connect ideas through (*) family resemblances in one work, while his most famous work enumerates seven propositions including, “The world is everything that is the case” and “What we cannot speak of, we must pass over in silence”. For 10 points, name this linguist and philosopher who wrote *Philosophical Investigations* and *Tractatus Logico-Philosophicus*.**

ANSWER: Ludwig Wittgenstein

Bonus 1. Name some works in which airplanes crash, for 10 points each:

[10] An airplane crash leaves a group of boys stranded on a remote island in this novel by William Golding, which sees Ralph use a conch to maintain order. Jack usurps Ralph as “chief” and crushes Piggy’s glasses.

ANSWER: Lord of the Flies

[10] Joe Keller chooses to commit suicide rather than turn himself in for selling faulty airplane parts to the Air Force, inadvertently causing 21 plane crashes, in this play by Arthur Miller.

ANSWER: All My Sons

[10] After an airplane crash-lands in the mountains over Tibet, Hugh Conway and four other survivors make their way to the fantastical land of Shangri-La, where they cease to age, in this novel by James Hilton.

ANSWER: Lost Horizon

T2. **Half of a cane found behind a door in this novel confirms Inspector Newcomen’s suspicions. Mr. Enfield recounts an incident when one character in this novel paid the family of a trampled girl with a cheque in another man’s name. Mr. Guest comments on the similarity of the two title characters’ (*) handwriting which causes the lawyer Utterson to believe his friend has committed a forgery for the murderer of Sir Danvers Carew. Dr. Lanyon dies after witnessing the second title character drink a potion and transform into the first. For 10 points, name this novella in which the titular doctor splits his personality, by Robert Louis Stevenson.**

ANSWER: *The Strange Case of* Dr. Jekyll and Mr. Hyde

B2. This painting exemplifies the Ruckenfugen technique, whereby the subject is placed with his back to the viewer in order to heighten the sense of mystery. For 10 points each:

[10] Name this work depicting a man, possibly Colonel Friedrich von Brincken, with a cane gazing over a cliff at mountains covered by the title entity.

ANSWER: Wanderer Above the Sea of Fog [or Wanderer Above the Mist, Der Wanderer über dem Nebelmeer]

[10] *Wanderer Above the Sea of Fog* is by this Romantic painter who portrayed the polar expedition of William Edward Parry trapped among icebergs in *The Sea of Ice*.

ANSWER: Caspar David Friedrich

[10] Friedrich was part of the Romantic movement of this country, where members of the New Objectivity movement such as George Grosz and Max Beckmann had their art branded as “degenerate.”

ANSWER: Federal Republic of Germany [or Bundesrepublik Deutschland]

T3. This composer opens a work with a section titled “Night Moths” and another with a depiction of a water nymph seducing a mortal. This composer of “Ondine” composed a ballet that originally depicted a woman in a bar leaping onto a table and dancing. This composer of the aforementioned *Miroirs* created a tribute to friends who died in World War I, *Le (*) Tombeau de Couperin*, as well as a tribute to a Spanish Infanta in his *Pavane for a Dead Princess*. His most famous work is a steady, 18-section crescendo with a constant snare drum ostinato. For 10 points, name this French Impressionist composer of *Bolero*.

ANSWER: Maurice **Ravel**

B3. Sheeting is a type of this process that occurs on gravestones. For 10 points each,

[10] This process can be physical or chemical, and sees the breakdown of rocks and minerals by the atmosphere, water or even biological life. It differs from a similar concept in that the rocks and minerals do not move.

ANSWER: **weathering** [the “similar concept” is erosion, in which materials are broken down through movement]

[10] This kind of terrain is an example of chemical weathering. The bedrock, which is composed of a soluble rock such as limestone, dolomite, or gypsum, is slowly weathered away, leaving caves, tunnels, or underground rivers.

ANSWER: **Karst** topography

[10] The dissolution of limestone that occurs in Karst is possible due to rain water picking up atmospheric carbon dioxide, which gives it this property. When rain picks up sulfur dioxide or nitrogen oxides, it is classified as this type of rain.

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

T4. Born and Fock developed a theorem described by this adjective which states that the probability density remains unchanged for a quantum mechanical system subject to rapidly varying conditions. The magneto-caloric effect is also known as this type of demagnetization. The equation “ PV to the $5/3$ ” describes a monoatomic ideal gas undergoing this type of process. Carnot cycles alternate between (*) isothermal processes and this type of process, while all reversible ones are isentropic because there is no change in entropy. For 10 points, give this term that describes thermodynamic processes in which there is no heat transfer.

ANSWER: **adiabatic**

B4. ‘Ello, mate! Answer the following about cities in Australia. For 10 points each,

[10] This city was founded specifically to be the capital of Australia, a function which it still serves today.

ANSWER: **Canberra**

[10] This largest Australian city serves as the capital of the province of New South Wales and is located on its namesake Harbor.

ANSWER: **Sydney**

[10] The cities of Darwin and Alice Springs are part of this Australian territory, which also includes the notable Ayers Rock.

ANSWER: **Northern Territory**

T5. One of these figures named Svava dubs her lover “Helgi”, and while Svava reincarnates as Sigrun and Kara, “Helgi” is reincarnated twice with the same name. These figures served the *Einherjar* [AIN-hehr-yahr]. One of these figures’ armor was cut open by Sigurd — also known as (*) Siegfried — who in another tale known as the *Nibelungenlied* [neeb-uh-LOONG-in-lead] helped Gunther marry that woman, Brunhilde. Often taking the form of swans, their duties also consisted of serving mead to warriors they had brought to the hall of Odin. For 10 points, name these shieldmaidens who protected warriors in battle and brought the worthy dead to feast at Valhalla.

ANSWER: **Valkyries**

B5. Towards the end of this work, the lodgers refuse to pay rent after seeing the protagonist. For 10 points each,

[10] Name this novella in which Gregor Samsa’s appearance frightens his sister Grete, which leads his father to throw an apple at him, after he wakes up transformed into an insect.

ANSWER: **The Metamorphosis** [accept *Die Verwandlung*; accept *The Transformation*]

[10] “The Metamorphosis” was written by this man, who wrote about a man who starves to death in a cage in “The Hunger Artist” and Joseph K.’s punishment for an unknown crime in *The Trial*.

ANSWER: Franz **Kafka**

[10] In this other Kafka story, Red Peter imitates human behavior so that his captors will let him out of a cage. He has trouble learning how to drink alcohol and becomes a performer on a vaudeville stage at the end of this story.

ANSWER: “A **Report to an Academy**” [accept “Ein **Bericht für eine Akademie**”]

T6. In one novel by this author, Violet slashes the 17-year-old Dorcas’ face after Joe shoots Dorcas at a party. In another novel, a black girl named Florens, a Native American named Lina, and a sailor’s daughter named Sorrow all work for Jacob Vaark. In a more famous novel by this author, Guitar shoots Pilate instead of (*) Milkman, who travels to Shalimar and learns about his flying ancestor, Solomon. Sethe murders her daughter whose ghost returns to haunt 124 Bluestone Road in this woman’s most famous novel. For 10 points, name this African-American author of *Jazz*, *A Mercy*, *Song of Solomon*, and *Beloved*.

ANSWER: Toni **Morrison** [accept Chloe Ardelia **Wofford**]

B6. Answer the following about a scandal during the Reagan Administration. For 10 points each:

[10] Name this political affair, during which weapons were sold to the namesake country in exchange for hostages, after which money was diverted to helping Nicaraguan rebels.

ANSWER: **Iran-Contra** Affair

[10] Reagan set up this three-person commission to investigate the Iran-Contra affair, which later published a report saying that Reagan himself was largely unaware of the issue after his testimonies before this commission.

ANSWER: **Tower** Commission

[10] The Contras to whom funding was given were rebelling against the regime of this political party which controlled the government of Nicaragua at the time. It is still the majority party in Nicaragua.

ANSWER: “**Sandinista** National Liberation Front” [or Frente **Sandinista** de Liberación Nacional, **FSLN**]

T7. One ruler of this polity supposedly received a namesake birthmark when his mother was fed slightly poisoned food. That ruler's father repulsed an invasion by Seleucus I but later gave him 500 war elephants. This empire, which was ruled by Bindusara, was written about extensively by Megasthenes. One minister of this empire wrote a (*) textbook on statecraft, the *Artha-Shastra*, and another fasted until death as per the Jain tradition. Yet another ruler of this empire, with capital Pataliputra, attacked the region of Kalinga and converted to Buddhism. For 10 points, name this empire founded by Chandragupta and ruled by Ashoka.

ANSWER: **Mauryan Empire**

B7. For 10 points each, name some animals that appear in the Abrahamic religions:

[10] In Christianity, Abraham sacrifices one of these animals instead of Isaac after intervention from the Lord. In one parable, Jesus is referred to as the "Good Shepherd" who laid down his life for these animals.

ANSWER: **sheep** [accept **ram**]

[10] The Yemeni king Abraha's army of these animals was destroyed by a flock birds that dropped stones on them, according to Surat-al-Fil. Prophet Muhammad was supposedly born in the "Year of [this animal]".

ANSWER: **elephant**

[10] Jerobaum built two of these in Bethel and Dan. More famously, Moses had the Levites kill around 3,000 men after he returned from Mt. Sinai to see the Israelites worshipping one of these.

ANSWER: **golden calf** [accept **golden calves**; prompt on partial]

T8. Mutations can be incited in this process by using manganese ions instead of magnesium ions. The quantitative variant uses fluorescent dyes to evaluate the amount of product in real-time. The touchdown variant of this process incrementally lowers the annealing temperature until it is equal or slightly less than the melting (*) temperature of the primer. This procedure often uses deoxynucleoside triphosphates, or dNTPs, as building blocks for its product, while the Pfu polymerase is used to increase accuracy over the heat-resistant Taq [TACK] polymerase in this procedure. For 10 points, name this bio technique used to amplify short pieces of DNA.

ANSWER: **polymerase chain reaction** [or **PCR**]

B8. In one film from this country, a man known as the "Number Three" assassin for the yakuza is stalked by the mysterious "Number One" before finally battling him in a gymnasium. For 10 points each:

[10] Name this country in which Seijun Suzuki's *Branded to Kill* is set. A more famous film from this country follows a group of samurai hired by farmers to protect them from bandits.

ANSWER: **Japan** [or **Nippon-koku**, **Nihon-koku**]

[10] That aforementioned film, *Seven Samurai*, is a work by this director and collaborator with Toshiro Mifune. He adapted Ryūnosuke Akutagawa's story "In a Grove" into the film *Rashomon*.

ANSWER: Akira **Kurosawa**

[10] This other Japanese director created a film where an old couple visits their children in the title city only for them to be too busy to pay attention in *Tokyo Story*. He also directed *Early Summer* and *Late Spring*.

ANSWER: Yasujiro **Ozu** <GG>

T9. This president created the National Wilderness Preservation System and the Corporation for Public Broadcasting, which itself went on to create the Public Broadcasting Agency. The Secretary of Health, Education, and Welfare under this president, John W. Gardner, pioneered such legislation as the (*) Elementary and Secondary Education Act. Other legislation passed under this president was geared towards his “War on Poverty”. For 10 points, name president who created Medicare and Medicaid as part of his “Great Society” programs, but is better known for passing the Civil Rights Acts.

ANSWER: Lyndon Baines Johnson

B9. Answer the following about Islamic militants in Iraq. For 10 points each,

[10] This self-proclaimed “caliphate” took over large amounts of territory and Iraq and Syria in 2014, and has been accused of terrorism and war crimes.

ANSWER: Islamic State of Iraq and the Levant [accept Islamic State of Iraq and Syria, ISIS, and ISIL]

[10] A humanitarian crisis occurred when thousands of people from this Kurdish religious sect were trapped on Mount Sinjar due to attacks and persecution by ISIS.

ANSWER: Yazidi

[10] This significant dam located on the Tigris River is the largest in Iraq, and was held by the ISIS for a period of around 10 days in August 2014.

ANSWER: Mosul Dam

T10. In an Alexander Dumas novel , Cornelius van Baerle tries to grow a tulip of this color. The last room the revellers enter after Prince Prospero’s death has walls of this color, in Edgar Allan Poe’s “The Masque of Red Death”. Anna (*) Sewell wrote a novel from the perspective of a stallion of this color that is abused by human domestication. Richard Wright burns down the family home in Natchez, Mississippi, in a semi-autobiographical work titled “[this color] Boy”. This color represents the clergy in a Stendhal work. Including one that is brutally flayed in a Poe short-story, for 10 points, give this color of cats that are considered unlucky.

ANSWER: black

B10. This quantity’s elevation means that it is higher for solutions than for the raw solvents. For 10 points each,

[10] Give this point at which the vapor pressure of a liquid equals the atmospheric pressure around it. This point for water, 212°, is when the substance goes from a liquid state to a gaseous state.

ANSWER: boiling point

[10] Boiling point elevation is this type of property. This type of property depends on the the numbers of solute and solvent particles, and not on the identity of the particles.

ANSWER: colligative properties

[10] This equation can be used to calculate boiling point, given heat of vaporization and vapor pressure. This equation gives the slope of the tangent to the line that separates two phases on a P-T diagram.

ANSWER: Clausius-Clayperon equation

T11. In his early years, this man was encouraged to read the Bhagavad Gita by the London Vegetarian Society. During an 1896 outbreak of the bubonic plague in his home country, this man found that the wealthy had the worst sanitation problem. He was thrown off a train at Pietermaritzburg Station in (*) South Africa, where he later successfully protested the “Black Act.” Back in his home country, this man led protesters from the Sabarmati Ashram to Dandi in the Salt March. Rabindranath Tagore gave this man an honorary name meaning “Great Soul.” For 10 points, name this advocate of *satyagraha*, the Father of the Indian Independence Movement.
 ANSWER: Mohandas Karamchand “Mahatma” Gandhi <FK>

B11. “Mechanical solidarity” is created in primitive societies that don’t have a division of this. For 10 points each,

[10] The division of this in industrial society creates “organic solidarity” because specialized workers are interdependent. Adam Smith used the analogy of a pin factory to describe the division of this concept.

ANSWER: labor

[10] *The Division of Labor in Society* is a work by this sociologist who also wrote about *Elementary Forms of Religious Life*. He popularized the term anomie to describe people who are morally misguided by society.

ANSWER: Emile Durkheim

[10] “Anomic” is one of the four types of the titular “social fact” that Durkheim describes in this other work. The fatalistic type is when a person commits this action due to extreme oppression in their present condition.

ANSWER: Suicide

T12. One of this artist’s works shows a nude woman lying in the grass and holding up a lantern, but is only visible through peepholes in a wooden door. Another of this man’s works is a birdcage with marble cubes and a thermometer inside whose title references his female alter ego. This artist of *Etant Donnes* and (*) *Why Not Sneeze, Rose Selavy?* painted a work that uses cones and cylinders with motion lines to represent the title action. Another work by this artist is signed “R. Mutt” and consists of a urinal turned upside-down. For 10 points, name this Dadaist who painted *Nude Descending a Staircase, No. 2* and created many “ready-mades” such as *Fountain*.

ANSWER: Marcel Duchamp

B12. This composer famously feared the “Curse of the Ninth” For 10 points each,

[10] Name this German composer who wrote the *Song of the Earth* instead of a ninth symphony, and who composed the *Resurrection Symphony* and *Symphony of a Thousand*.

ANSWER: Gustav Mahler

[10] This symphony by Mahler includes three “hammer blows of fate” at its end and a motif named for Mahler’s wife Alma. Its nickname comes from its dramatically sad themes.

ANSWER: Tragic Symphony, #6 in A Minor

[10] The first of Mahler’s symphonies is known by this nickname. It features a minor rendition of the tune *Frere Jacques* and contains material from Mahler’s *Songs of a Wayfarer*.

ANSWER: Titan Symphony

T13. The van't Hoff equation extends this statement's effect to thermodynamic systems as temperature increases. One consequence of this statement is that deoxygenated blood has greater affinity for carbon dioxide. This statement explains why increasing pressure decreases output in the

(*) Haber-Bosch process. One consequence of this statement is the buffer effect, and it can be used to explain why systems tend toward homeostasis. For 10 points, name this principle which states that a system in chemical equilibrium will shift to counteract change, proposed by its namesake Frenchman.

ANSWER: Le Chatelier's principle

B13. T. S. Eliot called one famous line a "serious blemish on a beautiful poem". For 10 points each, [10] That line, "Beauty is truth, truth beauty", is found in this poem which begins by calling the title object, "Thou unravish'd bride of quietness/ Thou foster child of silence and slow Time".

ANSWER: "Ode on a Grecian Urn" [as usual, do NOT accept "Ode TO a Grecian Urn"]

[10] "Ode on a Grecian Urn" is by this English Romantic poet, who also wrote "Ode to a Nightingale", "On First Looking into Chapman's Homer", "Hyperion" and "La Belle Dame Sans Merci".

ANSWER: John Keats

[10] This other poet's "Adonais" was an elegy for John Keats. This man also wrote a political poem commemorating the Peterloo Massacre, titled "The Masque of Anarchy".

ANSWER: Percy Bysshe Shelley

T14. The protagonist of this novel dreams that his best friend turns into a woman after asking him, "Why has't thou forsaken me?", while in another dream he sees his lover's rare songbird dead in a cage. The protagonist of this novel uses his intense gaze to extract permission from an elder (*)

samana to find "Gotama" with his friend Govinda. That character learns "the art of love" from Kamala after becoming an apprentice to the merchant Kamaswami. Vasudeva helps the protagonist learn the secrets of the river in, for 10 points, what novel that chronicles the titular Brahmin's search for enlightenment, by Hermann Hesse?

ANSWER: Siddhartha

B14. Answer the following about national leaders following successful independence movements. For 10 points each:

[10] This leader of Gran Colombia during most of its existence was known as El Libertador for being a major figure in the independence of South American nations from Spain.

ANSWER: Simón José Antonio de la Santísima Trinidad Bolívar y Palacios Ponte y Blanco

[10] This advocate of Pan-Africanism became the first president of free Ghana after giving his "Motion of Destiny" Speech.

ANSWER: Kwame Nkrumah [en-KROO-mah]

[10] Tajuddin Ahmad served as this nation's first Prime Minister after rising to power through his party, the Awami League. It broke away from Pakistan in 1971 to form a new nation with capital Dhaka.

ANSWER: Bangladesh

T15. Muslims must cross as-Sirat during this event, in which only seven groups are shaded by Allah's throne. On this day, all of mankind will assemble on the Plains of Arafat after Israfil blows his horn the second time. God will "separate people from one another as a shepherd separates his sheep from the goats" during this event, according to the Gospel of Matthew. This event contrasts with the (*) "particular judgment" a Christian receives immediately after death. For 10 points, name this religious event in which the dead will be resurrected and their deeds will be evaluated to determine whether they go to Heaven or Hell.

ANSWER: the Last Judgment [accept Day of Judgment; accept Yawm al-Qiyamah; accept descriptions and clear knowledge-equivalents, incl "Final Judgment", or "judgment by Allah" in the first clue]

B15. The first of these happens at the end of the G1 phase. For 10 points each, [10] Name these events that must be passed in order for a cell to move into the next phase of the cell cycle. Cyclin activates cyclin-dependent kinases which prepare the cell to proceed through these events.

ANSWER: cell cycle checkpoints

[10] The checkpoint at the end of this phase of the cell cycle ensures the mitotic spindle is attached to all chromosomes before anaphase begins.

ANSWER: metaphase

[10] One cyclin-Cdk complex, the maturation promoting factor, moves the cell past this checkpoint by phosphorylating condensins to condense DNA and lamins to break down the nuclear membrane.

ANSWER: G2 checkpoint

T16. This player was originally drafted into his sport's main league by the Milwaukee Bucks, where he would have joined forces with Kareem and Oscar Robertson, but he never signed. Instead, this player played for the Virginia Squires and developed a rivalry with George Gervin until the Squires traded him to the Long Island Nets. This man gained a pop culture following with his (*) afro. He finally won an NBA Championship after the ABA folded into the NBA and he was traded to the Philadelphia 76ers. For 10 points, name this basketball superstar who teamed up with Moses Malone to win the 1983 NBA Championship and was known as Dr. J.

ANSWER: Julius Erving [Accept Dr. J before mention]

B16. This man's defeat of Yang Guozhong caused the Emperor at the time to order the latter's suicide. For 10 points each:

[10] Name this Sogdian general whose namesake rebellion in China was only put down after 22,000 Uighur soldiers were brought in. He gained power after finding favor with Yang Guifei, a mistress of the Emperor.

ANSWER: An Lushan

[10] The An Lushan Rebellion occurred during this dynasty of China, during which lived the poets Li Bai and Du Fu. It also saw the rule of China's only empress in her own right, Wu Zetian.

ANSWER: Tang Dynasty

[10] While the Silk Road flourished during the Tang dynasty, it was actually begun under this dynasty that followed the Qin. Its name is still used to describe the largest ethnic group in China and Chinese characters.

ANSWER: Han Dynasty

T17. **“Timing noise” refers to rotational irregularities observed in these objects and might be related to the glitches or “spin-ups” observed in them. Their namesake phenomenon occurs due to the misalignment of their rotational axis and magnetic axis. Some millisecond varieties of these objects are more accurate than (*) atomic clocks.** The first exoplanets were observed rotating around one of these, and the Crab Nebula is powered by the wind from one. Dubbed “Little Green Men”, for 10 points, name these rapidly-rotating neutron stars that regularly emit radiation.

ANSWER: pulsars [prompt on “neutron star(s)” until mention]

B17. Answer the following about the Shinto god of storms, Susano'o. For 10 points each,

[10] This god, Susano'o's sister, hid in a cave due to Susano'o's anger and refused to come out until she saw her reflection in a mirror.

ANSWER: Amaterasu

[10] Amaterasu and Susano'o parents were these two gods, who created the island of Japan. One of them said that they would kill 1000 people every day, to which the other said 1500 people would be born every day.

ANSWER: Izanagi-no-Mikoto and Izanami-no-Mikoto [both answers required; prompt just one answer; accept in any order]

[10] This fearsome 8-headed dragon harassed two “earthly deities” by eating their seven daughters, so Susano'o slew him after drugging him with eight vats of sake.

ANSWER: Yamato no Orochi

T18. Certain delegates crossed into what was then this nation to sign the The Vyborg Manifesto. During this country's civil war, the Åland [OH-land] Islands attempted to secede from it. Vyborg and the Karelian Isthmus were later transferred to the Soviet Union after one conflict involving this country, during which C. G. E. (*) Mannerheim led its country's forces. That conflict led to the naming of Molotov Cocktails as was the Winter War. A set of “Accords” occurred were signed in 1975 by the US, Canada, and most European nations to recognize human rights in all countries. For 10 points, name this country with capital Helsinki.

ANSWER: Finland

B18. Under his government the Good Friday Agreement was signed. For 10 points each:

[10] Name this Prime Minister of the UK who led the Labour Party to a landslide victory in 1997 and brought his country into the War on Terror.

ANSWER: Tony Blair

[10] This “Iron Lady” was a conservative prime minister. She presided over the Falklands War as well as a coal miners' strike, and when she died, many people reportedly sang “Ding-Dong! The Witch is Dead”.

ANSWER: The Right Honorable Baroness Margaret Hilda Thatcher

[10] This prime minister of the UK was succeeded by Margaret Thatcher after labor unrest and strikes caused the so-called “Winter of Discontent”.

ANSWER: James Callaghan

T19. Daniel Everett used the isolate Pirahã language of a tribe living in this country as a counterexample to Chomsky's theory of Universal Grammar. This country is home to a group called "the fierce people" by anthropologist Napoleon Chagnon, the Yanomami tribe. The Marajó culture flourished on an island in this country's most prominent (*) river. Cinta Larga villagers in country were attacked by cultivators of Pará rubber tree, which later fueled the economy of the city of Manaus. This country provides 20% of the world's natural oxygen production. For 10 points, name this country home to the Amazon Rainforest.

ANSWER: Brazil <FK/TC>

B19. The phrase "I'm with you in Rockland" is repeated 20 times in one poem. For 10 points each, [10] Name that poem dedicated to Carl Solomon, which begins "I saw the best minds of my generation destroyed by madness".

ANSWER: "Howl"

[10] This other poem includes the line "Strange now to think of you, gone without corsets & eyes". This poem is an elegy for the poet's mother Naomi, and is titled after a Jewish prayer.

ANSWER: "Kaddish"

[10] "Howl" and "Kaddish" are by this Beat poet, who saw Walt Whitman "eyeing the stable boys" and asking "Who killed the pork chops?" in "A Supermarket in California."

ANSWER: Irwin Allen Ginsburg

T20. In one painting, this artist showed Saint George lifting his helmet as he introduces the title white-robed carrying a book and a pair of glasses, while in another work he depicted an angel crowning the Virgin Mary on the right as an infant Christ is presented to the praying title figure. This artist of *Virgin and Child with Canon van der Paele* and (*) *Madonna of Chancellor Rolin* painted an altarpiece with a panel featuring the Adoration of the Lamb, while another of his paintings shows a woman in green holding hands with her husband who wears a tabard and a black hat. For 10 points, name this artist of the *Ghent Altarpiece* and *The Arnolfini Wedding*.

ANSWER: Jan van Eyck <GG>

B20. Lauterbur and Mansfield won the 2003 Nobel Prize in Medicine for their discovery of this technique. For 10 points each,

[10] Name this technique in which radio pulses and a static magnetic field are used to detect hydrogen atoms changing between parallel and anti-parallel states, that ultimately produces detailed images of human tissues.

ANSWER magnetic resonance imaging [accept MRI; prompt NMR or nuclear magnetic resonance I guess]

[10] In MRI, the magnetic field causes the magnetic moment of the hydrogen atom to experience torque perpendicular to the angular momentum of the nucleus, which is called the Larmor type of this phenomenon.

ANSWER: precession

[10] This effect can be described as the splitting of spectral lines into multiple closely spaced lines, and it is observed in MRI when the *magnetic field* interacts with the magnetic moment of the hydrogen atom.

ANSWER: Zeeman effect

TB. In one work by this man, Scratchy Wilson refrains from shooting Jack Potter. The protagonist's regiment in one of this man's works is called "mule drivers" and "mud diggers". A captain, cook, correspondent and oiler abandon their dinghy and swim to shore at the end of this man's (*) "The Open Boat". In another work by him, Nellie convinces the bartender Pete to abandon Maggie, "a girl of the streets". The "tattered soldier" and Jim Conklin die in a novel by this man about Henry Fleming's experience as a soldier in the Civil War. For 10 points, name this author of *The Red Badge of Courage*.
ANSWER: Stephen Crane [first line is "A Bride Comes to Yellow Sky"]