NATIONAL TIE BREAKER - 1

1. **GENR; Short Answer: When he was discovered in 1891, he was erroneously considered the "missing link" between man and ape in the popular press. What popular name do modern day anthropologists call him?**

   ANSWER: JAVA MAN

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2. **CHEM; Short Answer: Only five of the elements on the Periodic Table are liquids at 30 degrees Celsius and standard pressure. Name any four.**

   ANSWER: GALLIUM, BROMINE, CESIUM, MERCURY, FRANCIUM

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3. **PHYS; Short Answer: What is the ideal efficiency of a reversible heat engine cyclically operating between a source temperature of 600 degrees Kelvin and a sink temperature of 150 degrees Kelvin?**

   ANSWER: 75 PERCENT

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4. **BIOL; Short Answer: What is the material that is oxidized to produce bioluminescence is some creatures?**

   ANSWER: LUCIFERASE

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5. **COMP; Short Answer: What 4-letter command is used in BASIC to resume execution of a program at the point it was interrupted by a STOP or END statement?**

   ANSWER: CONT

NATIONAL TIE BREAKER - 2

1. ERSC; Short Answer: Iceland spar is a pure, transparent form of what mineral?

ANSWER: CALCITE (ACCEPT CALCIUM CARBONATE)

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2. ASTR; Short Answer: Name the first scientist to apply for a patent on a telescope.

ANSWER: (HANS) LIPPERSHEY

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3. PHYS; Short Answer: Who developed the wave equation that is used to determine the PROBABILITY of finding the electron in any given place?

ANSWER: SCHRODINGER (PRON: SHRAD'-IN-ER)

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4. CHEM; Short Answer: Joseph Priestley called it dephlogisticated (pron: de-flow-jis-tee-kated) air. Who named it oxygen?

ANSWER: LAVOISIER

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5. GENR; Short Answer: Before he became a consulting engineer to General Electric, in 1897 he co-authored "The Theory and Calculation of Alternating Current Phenomena." What was his name?

ANSWER: (CHARLES) STEINMETZ

NATIONAL TIE BREAKER - 3

1. **BIOL; Short Answer: Plant movements that are growth responses towards or away from a stimuli are called**

   ANSWER: TROPISMS

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2. **MATH; Short Answer: In how many ways can 4 different books be given to 2 children so that each child gets exactly 2 books?**

   ANSWER: 6 (WAYS)

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3. **ERSC; Short Answer: Who was the 16th century cartographer (pron: car- tog'-re-fer) who thought there ought to be a large land mass south of the equator to balance that in the north. He gave his name to one style of map projection.**

   ANSWER: MERCATOR (PRON: MER-KAY'-TOR)

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4. **CHEM; Short Answer: What is the common name for potassium sodium tartrate?**

   ANSWER: ROCHELLE SALT

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5. **PHYS; Short Answer: What scientist first successfully explained Brownian motion?**

   ANSWER: EINSTEIN

NATIONAL TIE BREAKER - 4

1. **GENR; Short Answer: What is the name of the calendar introduced in 1582 to make a ten day correction?**

   ANSWER: GREGORIAN

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2. **ASTR; Short Answer: The Asteroid Belt is between the orbits of which two planets?**

   ANSWER: MARS AND JUPITER

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3. **BIOL; Short Answer: The Rh (pron: R-h) factor was named after what animal?**

   ANSWER: RHESUS MONKEY

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4. **MATH; Short Answer: In a triangle, what is the name given to the intersection of the perpendicular bisectors of the sides?**

   ANSWER: CIRCUMCENTER

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5. **PHYS; Short Answer: Which physicist, after whom a very important physical constant is named, formulated the quantum theory?**

   ANSWER: (MAX) PLANCK

NATIONAL TIE BREAKER - 5

1. GENR; Short Answer: What is the name of the island between Java and Sumatra that disappeared during a huge volcanic eruption in 1883?

ANSWER: KRAKATOA (PRON: KRAK-E-TO'-A) OR KRAKATAU OR KRAKATAO

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2. CHEM; Short Answer: What is the maximum number of electrons that a metal usually has in its outer energy level?

ANSWER: 3

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3. PHYS; Short Answer: According to the quantum theory, the strong nuclear force is carried or conveyed by particles. What are these particles called?

ANSWER: GLUONS

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4. BIOL; Short Answer: What is the name of one of the most primative land plants, consisting of algae and fungus growing in a mutually helpful association?

ANSWER: LICHEN

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5. ASTR; Short Answer: Name the two constellations that make up the famous "Great Square of Pegasus."

ANSWER: PEGASUS, ANDROMEDA

NATIONAL TIE BREAKER - 6

1. MATH; Short Answer: What is the name given to the radius of a circle that can be inscribed in any regular polygon?

ANSWER: APOTHEM (PRON: AP'-O-THEM)

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2. ERSC; Short Answer: Name the dryest continent.

ANSWER: ANTARCTICA

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3. PHYS; Short Answer: Suppose the power of a prescription lens is 5 diopters. What is the focal length of the lens, in centimeters?

ANSWER: 20 CENTIMETERS (ACCEPT 0.2 METERS)

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4. CHEM; Short Answer: Name three elements that were named after Greek or Roman gods.

ANSWER: MERCURY, URANIUM, NEPTUNIUM, PLUTONIUM

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5. GENR; Short Answer: What measure of length, mainly used for sea depths, was originally the breadth of the outstretched arms?

ANSWER: FATHOM

NATIONAL TIE BREAKER - 7

1. CHEM; Short Answer: Who discovered Nitrogen

ANSWER: (DANIEL) RUTHERFORD

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2. GENR; Short Answer: The temperature at which water vapor begins to condense in the atmosphere is called the

ANSWER: DEW POINT

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3. PHYS; Short Answer: Suppose the power of a prescription lens is 5 diopters. What is the focal length of the lens, in centimeters?

ANSWER: 20 (CENTIMETERS)

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4. ASTR; Short Answer: Whose name is associated with the formula for estimating the probability of extra-terrestrial intelligence?

ANSWER: DRAKE

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5. BIOL; Short Answer: Retinol is the common name for what vitamin?

ANSWER: VITAMIN A

NATIONAL TIE BREAKER - 8

1. **BIOL; Short Answer: What common poisonous gas kills humans by strongly binding to hemoglobin in the bloodstream?**

   ANSWER: CARBON MONOXIDE

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2. **ERSC; Short Answer: Outside of Alaska, what is the name of North America's longest continuous mountain range?**

   ANSWER: SIERRA NEVADA

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3. **MATH; Short Answer: The boundary of a Mandelbrot set has a fractal dimension of**

   ANSWER: 2

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4. **PHYS; Short Answer: In 1932, the first ARTIFICIAL source of radiation was created in France by two famous scientists. Name the TWO scientists.**

   ANSWER: IRENE and FREDERIC (JOLIOT-) CURIE

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5. **CHEM; Short Answer: What is the name for a material that has the capacity to behave as either an acid or a base?**

   ANSWER: AMPHOTERIC (ACCEPT AMPHIPROTIC)

NATIONAL TIE BREAKER - 9

1. MATH; Short Answer: What is the area of the square inscribed in a circle of unit radius?

ANSWER: 2

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2. ASTR; Short Answer: What is the term for the boundary between our solar system and interstellar space?

ANSWER: HELIOPAUSE

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3. ERSC; Short Answer: What is the last name of the famous husband and wife team who discovered fossils in Africa that were estimated to be over 3.5 million years old?

ANSWER: LEAKEY

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4. GENR; Short Answer: What is the term for time measured with respect to the stars rather than with respect to the sun?

ANSWER: SIDEREAL (PRON: SI-DER'-E-AL)

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5. BIOL; Short Answer: What plant nutrient is the most common cause of eutrophication?

ANSWER: PHOSPHORUS OR PHOSPHATES

NATIONAL TIE BREAKER - 10

1. **ASTR; Short Answer: Seen from the earth, which two heavenly bodies other than the Moon exhibit phases?**

   ANSWER: MERCURY AND VENUS

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2. **BIOL; Short Answer: The cells of a root's endodermis are thickened suberin, a waterproofing material. This waterproof band is called the**

   ANSWER: CASPARIAN STRIP

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3. **GENR; Short Answer: What unit was originally defined as one ten-millionth of the distance from the equator to a pole of the earth?**

   ANSWER: A METER

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4. **MATH; Short Answer: If it cost $3 to paint the plane surface of a hemisphere, what will it cost to paint the hemisphere's curved surface?**

   ANSWER: $6

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5. **CHEM; Short Answer: What chemical is commonly known as blue vitriol?**

   ANSWER: COPPER SULFATE