

ROUND ROBIN – ROUND 8

TOSS-UP

1) Life Science – *Short Answer* What is the term for a period of time marked with a rapid die-off of many species of organisms?

ANSWER: MASS EXTINCTION (ACCEPT: EXTINCTION EVENT, BIOTIC CRISIS)

BONUS

1) Life Science – *Multiple Choice* Which of the following animals typically moves around through propagating rhythmic contractions known as peristalsis [*peh-rih-STALL-sis*]?

- W) Shark
- X) Squid
- Y) Earthworm
- Z) Armadillo

ANSWER: Y) EARTHWORM

TOSS-UP

2) Physical Science – *Multiple Choice* Which of the following SI units can be used to measure weight?

- W) Kilogram
- X) Joule
- Y) Watt
- Z) Newton

ANSWER: Z) NEWTON

BONUS

2) Physical Science – *Multiple Choice* Which of the following quantities measures the amount of friction between two layers of a fluid moving at different velocities?

- W) Ram pressure
- X) Surface tension
- Y) Refraction
- Z) Viscosity

ANSWER: Z) VISCOSITY

TOSS-UP

3) Earth & Space – *Short Answer* What major rock type is produced when magma cools and solidifies?

ANSWER: IGNEOUS (ACCEPT: INTRUSIVE IGNEOUS, PLUTONIC)

BONUS

3) Earth & Space – *Multiple Choice* The Earth's tectonic plates are made up of lithosphere. Which of the following best describes lithosphere?

- W) The top half of the crust
- X) The crust
- Y) The crust and the upper mantle
- Z) The crust and most of the mantle

ANSWER: Y) THE CRUST AND THE UPPER MANTLE

TOSS-UP

4) Energy – *Multiple Choice* Scientists at Savannah River National Lab are analyzing microbial activity through staining cells with DAPI [*DAP-ee*], which marks regions rich in adenine [*AD-eh-noon*] and thymine [*THIGH-meem*]. Which of the following organelles will be stained the most?

- W) Cell wall
- X) Endoplasmic reticulum
- Y) Nucleus
- Z) Cytoplasm

ANSWER: Y) NUCLEUS

BONUS

4) Energy – *Short Answer* Scientists at Los Alamos National Lab are synthesizing radium-223 for cancer therapy. What type of decay does thorium-227 undergo to become radium-223?

ANSWER: ALPHA (ACCEPT: ALPHA DECAY)

TOSS-UP

5) Math – *Short Answer* Solve the following equation for x : 4 to the power open parenthesis $x + 3$ close parenthesis = $1/64$

ANSWER: -6

BONUS

5) Math – *Short Answer* What is the square root of the least common multiple of 16 and 18?

ANSWER: 12

TOSS-UP

6) Earth & Space – *Short Answer* What celestial object was created as the result of a collision involving the Earth approximately 4.5 billion years ago?

ANSWER: THE MOON (ACCEPT: EARTH'S MOON)

BONUS

6) Earth & Space – *Short Answer* Identify all of the following three solar system bodies that have dunes: 1) Titan; 2) Mars; 3) Venus.

ANSWER: ALL

TOSS-UP

7) Energy – *Short Answer* Scientists at the Joint Genome Institute are studying infectious agents best described as simple protein coats surrounding a DNA or RNA payload. What are these infectious agents known as?

ANSWER: VIRUSES

BONUS

7) Energy – *Short Answer* Scientists supported by the Department of Energy are developing new methods to synthesize tagatose [***TAG-ah-tose***], an isomer of glucose that is nearly as sweet as sucrose. What is the chemical formula of tagatose?

ANSWER: C₆H₁₂O₆

TOSS-UP

8) Life Science – *Short Answer* Charles Darwin suggested that evolution in the wild occurs by what process, in which environmental conditions determine what individuals will produce the most offspring?

ANSWER: NATURAL SELECTION

BONUS

8) Life Science – *Short Answer* What structure controls the size of the pupil in the human eye?

ANSWER: IRIS

TOSS-UP

9) Physical Science – *Short Answer* What vector quantity includes both the speed of an object and its direction of motion?

ANSWER: VELOCITY

BONUS

9) Physical Science – *Short Answer* Identify all of the following three types of radioactivity that when emitted by an atom, results in a change in its atomic number but NOT a change in its atomic mass number: 1) Alpha; 2) Beta; 3) Gamma.

ANSWER: 2

TOSS-UP

10) Earth & Space – *Short Answer* What detrital [*deh-TRY-tul*] sedimentary rock contains a significant proportion of rounded granules, pebbles, cobbles, or boulders cemented by a fine-grained matrix?

ANSWER: CONGLOMERATE

BONUS

10) Earth & Space – *Short Answer* Identify all of the following three characteristic that are true about Earth's magnetic field: 1) It is uniform across Earth's surface; 2) It originates in the inner core; 3) The magnetic poles are stationary.

ANSWER: NONE

TOSS-UP

11) Math – *Short Answer* What is the slope of a line perpendicular to the line with equation $y = -6x + 4$ at the point $(2, -8)$?

ANSWER: 1/6

BONUS

11) Math – *Short Answer* What is the area of the triangle formed by the x -axis, the y -axis, and the line passing through the point $(0, 24)$ with slope -3 ?

ANSWER: 96

TOSS-UP

12) Energy – *Short Answer* Brookhaven National Lab researchers are using quadrupole magnets to focus electron beams. How many ordinary bar magnets are assembled to form a quadrupole?

ANSWER: FOUR

BONUS

12) Energy – *Short Answer* Savannah River National Lab scientists are studying immune functions in the context of hyperglycemia. This is a condition in which there is an excess of what substance in the blood?

ANSWER: SUGAR (ACCEPT: GLUCOSE, DEXTROSE)

TOSS-UP

13) Life Science – *Short Answer* What molecule is the initial substrate in the process of glycolysis [*glye-KAWL-eh-sis*]?

ANSWER: GLUCOSE (ACCEPT: DEXTROSE)

BONUS

13) Life Science – *Multiple Choice* Which of the following populations of cells is likely to be most dramatically reduced in the brain of a patient with Parkinson's disease?

- W) Leukocytes
- X) Astroglia [*ass-TRAW-glee-ah*]
- Y) Motor neurons
- Z) Dopaminergic [*dope-ah-min-UR-jik*] neurons

ANSWER: Z) DOPAMINERGIC NEURONS

TOSS-UP

14) Earth & Space – *Short Answer* In 2019, the Event Horizon Telescope captured the first photo of what type of stellar remnant?

ANSWER: BLACK HOLE

BONUS

14) Earth & Space – *Short Answer* What planet in the solar system has a mean orbital radius of 228 million kilometers?

ANSWER: MARS

TOSS-UP

15) Physical Science – *Short Answer* What instrument is used to measure atmospheric pressure?

ANSWER: BAROMETER

BONUS

15) Physical Science – *Short Answer* In degrees Celsius, at what temperature will the temperature as measured in degrees Fahrenheit be double that in Celsius?

ANSWER: 160

TOSS-UP

16) Math – *Short Answer* A 75-foot rope is stretched across 75 feet. How many cuts would be required to cut it into 5-foot sections?

ANSWER: 14

BONUS

16) Math – *Short Answer* If an 8-by-13 rectangle has its linear dimensions increased by 50%, what is the area of the new larger rectangle?

ANSWER: 234

TOSS-UP

17) Life Science – *Short Answer* Although urine is stored in the bladder, it is produced in what organ?

ANSWER: KIDNEY

BONUS

17) Life Science – *Multiple Choice* Which of the following pathways harvests the largest number of ATP molecules per molecule of glucose?

- W) Glycolysis [*glye-KAWL-eh-sis*]
- X) Aerobic respiration
- Y) Lactic acid fermentation
- Z) Alcohol fermentation

ANSWER: X) AEROBIC RESPIRATION

TOSS-UP

18) Physical Science – *Multiple Choice* Galvanometers [*GAL-van-AW-meh-tur*] and ammeters are used to most directly measure which of the following quantities?

- W) Current
- X) Voltage
- Y) Resistance
- Z) Power

ANSWER: W) CURRENT

BONUS

18) Physical Science – *Short Answer* A battery is connected to a circuit with an overall resistance of 6 ohms, causing a 4-ampere current to flow through the circuit. In volts, what is the voltage output of the battery?

ANSWER: 24

TOSS-UP

19) Math – *Short Answer* Evaluate the quotient $7/3$ divided by $1/6$.

ANSWER: 14

BONUS

19) Math – *Short Answer* If the ratio of a sphere's volume to its surface area is 36, what is the radius of the sphere?

ANSWER: 108

TOSS-UP

20) Life Science – *Short Answer* What is the ecological term for the consumption of one animal by another?

ANSWER: PREDATION

BONUS

20) Life Science – *Short Answer* Identify all of the following three orders of mammals that form a placenta during embryonic development: 1) Monotremata [*mono-TREH-mah-tah*]; 2) Marsupialia [*mar-soop-ee-AY-lee-ah*]; 3) Eutheria [*yoo-THEER-ee-ah*].

ANSWER: 2, 3

TOSS-UP

21) Physical Science – *Short Answer* What physical quantity regarding an electric circuit is defined as the product of the current through the circuit and the voltage drop across the circuit?

ANSWER: POWER

BONUS

21) Physical Science – *Short Answer* Consider a table resting on the surface of the Earth. Which of the four fundamental forces is responsible for resisting the pull of the gravitational force on the table?

ANSWER: ELECTROMAGNETIC (ACCEPT: EM)

TOSS-UP

22) Earth & Space – *Short Answer* What is the name of the physical weathering phenomenon in which water trapped in a crack freezes, expands, and forces the crack to grow?

ANSWER: FROST WEDGING (ACCEPT: FREEZE WEDGING)

BONUS

22) Earth & Space – *Multiple Choice* Which of the following geologic periods is closest to when insects, seed bearing plants, and tetrapods first lived simultaneously on land?

- W) Cambrian
- X) Devonian
- Y) Cretaceous [*kreh-TAY-shus*]
- Z) Triassic

ANSWER: X) DEVONIAN

TOSS-UP

23) Math – *Short Answer* The temperature at 8 AM was 68 degrees Fahrenheit. If the temperature rose 4 degrees Fahrenheit per hour, what was the temperature, in degrees Fahrenheit, at 2 PM?

ANSWER: 92

BONUS

23) Math – *Short Answer* Three apples and two oranges cost 120 cents. Four apples and one orange cost 115 cents. How many cents would two apples and three oranges cost?

ANSWER: 125