

ROUND 4

TOSS-UP

1) EARTH AND SPACE *Multiple Choice* What size of particle is loess [**LOH-es**]?

- W) Clay
- X) Silt
- Y) Sand
- Z) Gravel

ANSWER: X) SILT

BONUS

1) EARTH AND SPACE *Multiple Choice* Which of the following is LEAST likely to occur at a subduction zone?

- W) Transform faulting
- X) Offshore trenches
- Y) Deep-focus earthquakes
- Z) Active volcanism

ANSWER: W) TRANSFORM FAULTING

TOSS-UP

2) LIFE SCIENCE *Multiple Choice* In pea plants, the yellow seed trait is completely dominant over the green seed trait. Suppose you cross a pea plant that is heterozygous [**het-er-uh-ZY-guhs**] for the yellow seed trait with a pea plant containing green seeds. What colors of seed will the offspring have?

- W) Green
- X) Yellow
- Y) Half of the offspring will have green seeds and half will have yellow seeds
- Z) A seed color that is halfway between green and yellow

ANSWER: Y) HALF OF THE OFFSPRING WILL HAVE GREEN SEEDS AND HALF WILL HAVE YELLOW SEEDS

BONUS

2) LIFE SCIENCE *Short Answer* Plants that are said to be non-vascular are lacking what two types of conductive tissues?

ANSWER: XYLEM AND PHLOEM

TOSS-UP

3) MATH *Multiple Choice* Which of the following is a real number that does NOT have a reciprocal?

- W) -1
- X) 0
- Y) 1
- Z) π

ANSWER: X) 0

BONUS

3) MATH *Short Answer* What is the total surface area of a cylinder with a base radius of 2 and a height equal to the diameter of the base?

ANSWER: 24π

TOSS-UP

4) ENERGY *Short Answer* If an electrochemical device is operating at 1.5 volts and delivering 1 ampere of current, how much power is it delivering in watts?

ANSWER: 1.5

BONUS

4) ENERGY *Multiple Choice* In a residence, how are appliances generally connected to the power supply?

- W) In series
- X) In parallel
- Y) In a delta to wye connection
- Z) In a wye to delta connection

ANSWER: X) IN PARALLEL

TOSS-UP

5) PHYSICAL SCIENCE *Short Answer* How many protons and how many neutrons are there in carbon-13?

ANSWER: 6 PROTONS; 7 NEUTRONS

BONUS

5) PHYSICAL SCIENCE *Multiple Choice* Which of the following does NOT describe ideal fluid flow?

- W) Viscous [**VIS-kuhs**]
- X) Laminar
- Y) Incompressible
- Z) Steady state

ANSWER: W) VISCOUS

TOSS-UP

6) GENERAL SCIENCE *Multiple Choice* Leprosy is a bacterial disease that results in skin lesions and nerve damage. Which of the following animals is known to be a common host of this disease?

- W) Raccoons
- X) Armadillos
- Y) Coyotes
- Z) Opossums

ANSWER: X) ARMADILLOS

BONUS

6) GENERAL SCIENCE *Short Answer* According to endosymbiotic theory, cyanobacteria [**sy-uh-noh-bak-TEER-ee-uh**] gave rise to which cellular organelle?

ANSWER: CHLOROPLAST

TOSS-UP

7) EARTH AND SPACE *Multiple Choice* Which of the following igneous minerals would be the first to melt as temperature increases?

- W) Quartz
- X) Potassium feldspar
- Y) Olivine
- Z) Hornblende

ANSWER: W) QUARTZ

BONUS

7) EARTH AND SPACE *Multiple Choice* In 1953, two scientists, Stanley Miller and Harold Urey, conducted a famous experiment on the origin of life. They passed an electrical charge through a closed system containing methane, ammonia, hydrogen, and water. What did this process produce that led to the currently accepted theory of biogenesis?

- W) Nucleic acids
- X) Lipids
- Y) Amino acids
- Z) Proteins

ANSWER: Y) AMINO ACIDS

TOSS-UP

8) LIFE SCIENCE *Short Answer* In what form does energy that is not passed on to the next level in a food web exit from an ecosystem?

ANSWER: HEAT (ACCEPT: THERMAL)

BONUS

8) LIFE SCIENCE *Short Answer* What are the names of the two different groups of trees: those that generally lose their leaves in autumn and those with needle-shaped leaves with cones?

ANSWER: DECIDUOUS, CONIFEROUS (ACCEPT: CONIFERS)

TOSS-UP

9) MATH *Short Answer* Simplify the following, if y is not equal to 1:
 $\frac{y}{(y-1)} - \frac{1}{(y-1)}$ [***y over open parenthesis y minus 1 close parenthesis minus 1 over the quantity y minus 1***].

ANSWER: 1

BONUS

9) MATH *Short Answer* Given the geometric sequence with first three terms of 8, 2, and $\frac{1}{2}$, respectively, what is its 6th term?

ANSWER: $\frac{1}{128}$

TOSS-UP

10) ENERGY *Multiple Choice* Why is copper one of the most common materials used to make wires that carry electricity?

- W) Because of its dielectric properties
- X) Because of its perfect insulating properties
- Y) Because it has both conducting and dielectric properties
- Z) Because it is a good conductor

ANSWER: Z) BECAUSE IT IS A GOOD CONDUCTOR

BONUS

10) ENERGY *Multiple Choice* Which of the following units is used to describe the amount of electric current passing through a conductor?

- W) Volt
- X) Ohm
- Y) Ampere
- Z) Weber

ANSWER: Y) AMPERE

TOSS-UP

11) PHYSICAL SCIENCE *Multiple Choice* Batteries require energy transfer in a redox reaction. Which of the following describes one possible type of cell in a battery?

- W) Magnetic
- X) Electrolytic
- Y) Galvanic
- Z) Electrochemical

ANSWER: Y) GALVANIC

BONUS

11) PHYSICAL SCIENCE *Multiple Choice* Which of the following is true of Coulomb's law?

- W) It describes the interaction of two magnets in a magnetic field
- X) It is independent of the separation distance between the two points of charge
- Y) It measures the total energy in an electric field
- Z) It is a vector function

ANSWER: Z) IT IS A VECTOR FUNCTION

TOSS-UP

12) GENERAL SCIENCE *Short Answer* Name one of the two elements that formed Earth's first atmosphere.

ANSWER: HYDROGEN OR HELIUM

BONUS

12) GENERAL SCIENCE *Short Answer* Put the following four atmospheric layers in order from lowest to highest altitude: 1) mesosphere, 2) troposphere, 3) thermosphere, 4) stratosphere.

ANSWER: 2, 4, 1, 3 (ACCEPT: TROPOSPHERE, STRATOSPHERE, MESOSPHERE, THERMOSPHERE)

TOSS-UP

13) EARTH AND SPACE *Multiple Choice* Which of the following types of coal has the highest carbon content?

- W) Bituminous
- X) Peat
- Y) Anthracite
- Z) Lignite

ANSWER: Y) ANTHRACITE

BONUS

13) EARTH AND SPACE *Multiple Choice* What class of mollusks [**MOL-uhsks**] includes modern day clams?

- W) Scaphopoda
- X) Gastropoda
- Y) Bivalvia
- Z) Cephalopoda

ANSWER: Y) BIVALVIA

TOSS-UP

14) LIFE SCIENCE *Multiple Choice* Which of the following biomes has the lowest net primary production?

- W) Tundra
- X) Tropical rainforest
- Y) Savannah
- Z) Coniferous forest [**koh-NIF-er-uhs**]

ANSWER: W) TUNDRA

BONUS

14) LIFE SCIENCE *Multiple Choice* Under which of the following conditions would a plant's stomata most likely be open?

- W) Cold and dry
- X) Hot and dry
- Y) Cold and moist
- Z) Hot and moist

ANSWER: Y) COLD AND MOIST

TOSS-UP

15) GENERAL SCIENCE *Short Answer* Fossil continuity, coastline shape, and other geologic data support today's continents arising from a supercontinent that existed during the late Paleozoic and early Mesozoic eras. What is the name given to that supercontinent?

ANSWER: PANGAEA

BONUS

15) GENERAL SCIENCE *Multiple Choice* Which of the following is a trace fossil?

- W) Petrified wood
- X) Brachiopod shell [**BRAY-kee-uh-pod**]
- Y) Worm burrow
- Z) Dinosaur bone

ANSWER: Y) WORM BURROW

TOSS-UP

16) MATH *Short Answer* Subtract $-97 + a$ from $3 + a$.

ANSWER: 100

BONUS

16) MATH *Short Answer* Express the following in scientific notation: $\frac{(6 \times 10^7)(6 \times 10^{11})}{(3 \times 10^8)}$ [**the fraction with numerator 6 times 10 to the 7th times 6 times 10 to the 11th and denominator 3 times 10 to the 8th**]?

ANSWER: 1.2×10^{11}

TOSS-UP

17) PHYSICAL SCIENCE *Multiple Choice* If in a given circuit with a 4.0 ohm resistor, the potential difference across it is 12 volts, what is the current traveling through it, in amperes?

- W) 1
- X) 3
- Y) 4
- Z) 48

ANSWER: X) 3

BONUS

17) PHYSICAL SCIENCE *Short Answer* Plasma is a common phase of matter on the Sun. On Earth, however, there are very specific times and places where plasma can be found. Other than fire, whose status as a plasma is hotly debated, what natural phenomenon can generate plasma on Earth?

ANSWER: LIGHTNING (ACCEPT: ST. ELMO'S FIRE, AURORAS)

TOSS-UP

18) GENERAL SCIENCE *Multiple Choice* Which of the following is true about permafrost?

- W) It exists in the Antarctic but not the Arctic
- X) It is not affected by the warming climate
- Y) It can support plant growth near the surface
- Z) It is a practical permanent substrate for roads and buildings

ANSWER: Y) IT CAN SUPPORT PLANT GROWTH NEAR THE SURFACE

BONUS

18) GENERAL SCIENCE *Short Answer* List the three primary layers that make up the Earth, in order of decreasing mass.

ANSWER: MANTLE, CORE, CRUST

TOSS-UP

19) LIFE SCIENCE *Multiple Choice* A glacier splits a population of rabbits in two. Which of the following best describes what might happen in the two populations over a long period of time?

- W) Allopatric speciation
- X) Sympatric speciation
- Y) Sexual selection
- Z) Migration

ANSWER: W) ALLOPATRIC SPECIATION

BONUS

19) LIFE SCIENCE *Short Answer* The following four features are common characteristics of which phylum of organisms: notochord, dorsal hollow nerve cord, pharyngeal [*fuh-RIN-jee-uhl*] slits, and a postanal tail?

ANSWER: CHORDATA

TOSS-UP

20) EARTH AND SPACE *Short Answer* What Atlantic island nation is located on top of both a hotspot and a divergent plate boundary?

ANSWER: ICELAND

BONUS

20) EARTH AND SPACE *Multiple Choice* Most groundwater is stored in pore spaces that are typically how big?

- W) 1 to 5 millimeters
- X) 1 to 5 centimeters
- Y) 1 to 5 decimeters
- Z) 1 to 5 meters

ANSWER: W) 1 TO 5 MILLIMETERS

TOSS-UP

21) MATH *Multiple Choice* If the point $(-2, y)$ lies on the line with equation $5x + 3y = 5$, what is the value of y ?

- W) -5
- X) $-5/3$
- Y) $3/5$
- Z) 5

ANSWER: Z) 5

BONUS

21) MATH *Short Answer* A standard pair of dice is rolled. What is the probability that the sum of the numbers on the two dice is 8?

ANSWER: $5/36$

TOSS-UP

22) ENERGY *Short Answer* What is the general term for a source of renewable energy that is made from organic material of plants or animals?

ANSWER: BIOMASS

BONUS

22) ENERGY *Multiple Choice* Ground source heat pumps, a form of geothermal energy, are most similar to which of the following renewable energy applications?

- W) Solar cooker
- X) Solar water heater
- Y) Solar dryer
- Z) Solar parabolic collector

ANSWER: X) SOLAR WATER HEATER

TOSS-UP

23) LIFE SCIENCE *Multiple Choice* Proteins can be separated by which of the following?

- W) Chromatography
- X) Electrolysis
- Y) Distillation
- Z) Reverse osmosis

ANSWER: W) CHROMATOGRAPHY

BONUS

23) LIFE SCIENCE *Multiple Choice* Which of the following is a vitamin D deficiency disease of the young, often marked by the faulty ossification of bone?

- W) Rhinitis [*ry-NY-tis*]
- X) Rickets
- Y) Scurvy
- Z) Psoriasis [*suh-RY-uh-sis*]

ANSWER: X) RICKETS

TOSS-UP

24) PHYSICAL SCIENCE *Multiple Choice* Compared to almost all other types of waves, electromagnetic waves are unique because they can travel through what?

- W) Solids
- X) Plasma
- Y) Bone
- Z) Vacuum

ANSWER: Z) VACUUM

BONUS

24) PHYSICAL SCIENCE *Multiple Choice* Which of the following is classified as a homogeneous [*hoh-muh-JEE-nee-uhs*] mixture?

- W) Solution
- X) Gel
- Y) Foam
- Z) Emulsion

ANSWER: W) SOLUTION

TOSS-UP

25) GENERAL SCIENCE *Multiple Choice* Which of the following is NOT true with regard to the organization of the periodic table?

- W) Elements are grouped into their natural states as solids, liquids, and gases
- X) Elements are in order of increasing atomic number
- Y) Elements are grouped into metals, metalloids, and nonmetals
- Z) Elements are divided into periods, groups, and series

ANSWER: W) ELEMENTS ARE GROUPED INTO THEIR NATURAL STATES AS SOLIDS, LIQUIDS, AND GASES

BONUS

25) GENERAL SCIENCE *Multiple Choice* Which of the following best describes why water has the ability to dissolve ionic compounds?

- W) It has high compressibility
- X) Its molecules are polar
- Y) It contains salt
- Z) It has high surface tension

ANSWER: X) ITS MOLECULES ARE POLAR