

## ROUND 5

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### TOSS-UP

1) LIFE SCIENCE *Multiple Choice* The suffix, “wort,” is commonly found in the names of which of the following?

- W) Leaf
- X) Seed
- Y) Herb
- Z) Root

ANSWER: Y) HERB

### BONUS

1) LIFE SCIENCE *Multiple Choice* To which of the following virus classes does HIV belong?

- W) Adenovirus
- X) Retrovirus
- Y) Rhabdovirus [*RAB-doh-vy-ruhs*]
- Z) Papovavirus

ANSWER: X) RETROVIRUS

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### TOSS-UP

2) EARTH AND SPACE *Short Answer* What type of tectonic plate environment is found off the coast of the Pacific Northwest and creates the Cascade Mountain chain?

ANSWER: SUBDUCTION ZONE (ACCEPT: OCEAN-CONTINENT CONVERGENT ZONE)

### BONUS

2) EARTH AND SPACE *Multiple Choice* Which of the following does NOT typically happen when a moist prevailing wind hits a mountain range?

- W) A rain shadow occurs on the leeward side of the mountain
- X) Leeward airmass subsidence and warming results
- Y) As air moves up the windward side of the mountain, it expands and warms
- Z) The windward side of a mountain receives a lot of rain

ANSWER: Y) AS AIR MOVES UP THE WINDWARD SIDE OF THE MOUNTAIN, IT EXPANDS AND WARMS

### TOSS-UP

3) PHYSICAL SCIENCE *Short Answer* On the periodic table, what is the name of the group of elements that includes lithium, potassium, cesium, and francium **[FRAN-see-uhm]**?

ANSWER: ALKALI METALS (ALSO ACCEPT GROUP 1 OR GROUP 1A)

### BONUS

3) PHYSICAL SCIENCE *Short Answer* When light from a light bulb passes through two polarizers whose axes are oriented 45 degrees apart, what percentage of the original light passes through both polarizers?

ANSWER: 25%

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### TOSS-UP

4) MATH *Short Answer* What is the slope of the line through the points (17, -13) and (17, 8)?

ANSWER: UNDEFINED (ACCEPT: NO SLOPE)

### BONUS

4) MATH *Short Answer* Consider the following equation:  $y = \frac{24x - 36}{x^2}$  **[y equals open parenthesis 24 x minus 36 close parenthesis over x squared]**. When  $y = 3$ , what are the possible values for  $x$ ?

ANSWER: 6 AND 2

### TOSS-UP

5) GENERAL SCIENCE *Multiple Choice* Which of the following is responsible for generating Earth's magnetic field?

- W) Movement of iron in Earth's core
- X) The Moon's strong gravitational pull on Earth
- Y) Solar wind streaming toward Earth
- Z) Earth's revolution

ANSWER: W) MOVEMENT OF IRON IN EARTH'S CORE

### BONUS

5) GENERAL SCIENCE *Multiple Choice* Which of the following provides the best evidence to support the idea that two different species might have a common ancestor?

- W) They share similar morphological features
- X) They have similar appendages for movement
- Y) Their fossils were discovered in the same location
- Z) Many of their genes are the same

ANSWER: Z) MANY OF THEIR GENES ARE THE SAME

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### TOSS-UP

6) ENERGY *Multiple Choice* Which of the following statements best describes the importance of composting?

- W) It is necessary for the growth of fruits and vegetables
- X) It helps to prevent air pollution
- Y) It puts organic material back in the ground
- Z) It prevents the decomposition of organic material

ANSWER: Y) IT PUTS ORGANIC MATERIAL BACK IN THE GROUND

### BONUS

6) ENERGY *Multiple Choice* Of the following, which should NOT go into a compost pile?

- W) Leaves
- X) Grass
- Y) Dairy products
- Z) Coffee grains

ANSWER: Y) DAIRY PRODUCTS

**TOSS-UP**

7) LIFE SCIENCE *Multiple Choice* Which of the following is a club fungus?

- W) Toadstools
- X) Hepatics
- Y) Glass sponges
- Z) Basidia [*buh-SID-ee-uh*]

ANSWER: W) TOADSTOOLS

**BONUS**

7) LIFE SCIENCE *Short Answer* "Adam's apple" is a common nickname for what anatomical structure?

ANSWER: LARYNX

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**TOSS-UP**

8) EARTH AND SPACE *Multiple Choice* Index fossils are most useful for which of the following reasons?

- W) They lived during only one short period of time
- X) They are not geographically widespread
- Y) They provide high resolution carbon isotope-based date ranges
- Z) They are not prone to weathering

ANSWER: W) THEY LIVED DURING ONLY ONE SHORT PERIOD OF TIME

**BONUS**

8) EARTH AND SPACE *Multiple Choice* What happens to rain water when sulfur and nitrogen oxides released by burning fossil fuels combine with water vapor in the air?

- W) It becomes acidic
- X) It becomes warmer than normal
- Y) It becomes more regionally concentrated
- Z) It becomes a buffering agent

ANSWER: W) IT BECOMES ACIDIC

### TOSS-UP

9) PHYSICAL SCIENCE *Short Answer* In an electrochemical cell, at which electrode does oxidation occur?

ANSWER: ANODE

### BONUS

9) PHYSICAL SCIENCE *Multiple Choice* A saturated aqueous solution of potassium chloride contains 34 grams of solute. Which of the following terms best describes an aqueous solution containing 30 grams of potassium chloride?

- W) Nonpolar
- X) Nonelectrolyte
- Y) Supersaturated
- Z) Unsaturated

ANSWER: Z) UNSATURATED

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### TOSS-UP

10) MATH *Short Answer* When sketching the line  $y = 10x - 10$ , the line will go through which quadrants?

ANSWER: I, III, AND IV (ACCEPT: FIRST, THIRD, AND FOURTH)

### BONUS

10) MATH *Short Answer* What is the slope intercept form of the equation for the line that is perpendicular to  $y = 5(x + 66)$  [***y equals 5 times the quantity x plus 66***] and has a y intercept of 0.7?

ANSWER:  $y = -1/5 x + 0.7$  (ACCEPT:  $y = -0.2x + 0.7$ ; DO NOT ACCEPT  $y = -x/5 + 0.7$ )

**TOSS-UP**

11) GENERAL SCIENCE *Short Answer* What kind of circuit consists of multiple different components, but has only one path for the current to follow?

ANSWER: SERIES

**BONUS**

11) GENERAL SCIENCE *Short Answer* Given the balanced chemical equation  $4P + 5O_2$  yields  $2P_2O_x$ , what should x equal?

ANSWER: 5

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**TOSS-UP**

12) ENERGY *Multiple Choice* Which of the following best describes an advantage of using an incinerator for solid waste?

- W) It helps to reduce air pollution
- X) It reduces the volume of materials that go to landfills
- Y) It allows waste products to be recycled
- Z) If operated as permitted, it is not at all hazardous to plants, animals, and people

ANSWER: X) IT REDUCES THE VOLUME OF MATERIALS THAT GO TO LANDFILLS

**BONUS**

12) ENERGY *Short Answer* What term describes the process of changing the design, manufacture, or use of materials to reduce their quantity or toxicity before they become municipal solid waste?

ANSWER: SOURCE REDUCTION

### TOSS-UP

13) LIFE SCIENCE *Multiple Choice* When present in large numbers, which of the following can cause red tides?

- W) Ulva [**UHL-vuh**]
- X) Euglena
- Y) Diatoms
- Z) Dinoflagellates [**din-uh-FLAJ-uh-layts**]

ANSWER: Z) DINOFLAGELLATES

### BONUS

13) LIFE SCIENCE *Multiple Choice* Which of the following chemical bonds is most important in DNA secondary structure?

- W) Covalent
- X) Hydrogen
- Y) Peptide
- Z) Ionic

ANSWER: X) HYDROGEN

### TOSS-UP

14) EARTH AND SPACE *Multiple Choice* Which of the following statements is NOT true about Antarctica?

- W) It has long periods of constant darkness
- X) Much of the sunlight it receives is reflected back to space
- Y) Cold air masses are continuously flowing off of the Antarctic ice cap
- Z) A great amount of snow falls in Antarctica

ANSWER: Z) A GREAT AMOUNT OF SNOW FALLS IN ANTARCTICA

### BONUS

14) EARTH AND SPACE *Multiple Choice* The geysers and hot springs found in Yellowstone Park are likely heated by which of the following?

- W) The mantle
- X) Local magma chambers
- Y) Crustal fault friction
- Z) Crustal radiation

ANSWER: X) LOCAL MAGMA CHAMBERS

### TOSS-UP

15) PHYSICAL SCIENCE *Multiple Choice* Which of the following does the subscript 3 indicate in the molecular formula for calcium carbonate?

- W) There are 3 oxygen atoms in one molecule of calcium carbonate
- X) There are 3 carbon atoms in one molecule of calcium carbonate
- Y) There are 3 calcium atoms in one molecule of calcium carbonate
- Z) There are 3 atoms each of oxygen, carbon and calcium in one molecule of calcium carbonate

ANSWER: W) THERE ARE 3 OXYGEN ATOMS IN ONE MOLECULE OF CALCIUM CARBONATE

### BONUS

15) PHYSICAL SCIENCE *Short Answer* An ice-auger is an example of what type of simple machine?

ANSWER: SCREW

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### TOSS-UP

16) MATH *Multiple Choice* The equation  $\frac{x^2}{4} + \frac{y^2}{9} = 1$  [***x squared over 4 plus y squared over 9 equals 1***] has a graph that is an example of which of the following shapes?

- W) Parabola
- X) Ellipse
- Y) Circle
- Z) Torus

ANSWER: X) ELLIPSE

### BONUS

16) MATH *Short Answer* Eight National Science Bowl contestants meet for the first time. Each shakes the hand of the other seven, except for one pair of contestants who refuse to shake each other's hands. How many handshakes are exchanged?

ANSWER: 27

### TOSS-UP

17) GENERAL SCIENCE *Multiple Choice* Which of the following is the term for the transfer of energy through matter by the collision of atoms in a material?

- W) Conduction
- X) Convection
- Y) Confluence
- Z) Radiation

ANSWER: W) CONDUCTION

### BONUS

17) GENERAL SCIENCE *Short Answer* What happens to the strength of the electric field due to an electron as you get closer to the electron?

ANSWER: IT INCREASES

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### TOSS-UP

18) ENERGY *Multiple Choice* Which of the following classes of coal has the highest carbon content?

- W) Anthracite [**AN-thruh-syt**]
- X) Bituminous [**by-TOO-muh-nuhs**]
- Y) Lignite
- Z) Peat

ANSWER: W) ANTHRACITE

### BONUS

18) ENERGY *Multiple Choice* Approximately how long would a 100 watt bulb burn on the energy needed to manufacture one throw-away soft drink can?

- W) 10 minutes
- X) 5 hours
- Y) 10 hours
- Z) 100 hours

ANSWER: Y) 10 HOURS

### TOSS-UP

19) LIFE SCIENCE *Multiple Choice* Which of the following is a distinguishing characteristic of cheetah paws?

- W) They have a sixth toe
- X) Their claws are semi-retractable
- Y) They have an extra dewclaw
- Z) Their claws are covered with a sheath of skin

ANSWER: X) THEIR CLAWS ARE SEMI-RETRACTABLE

### BONUS

19) LIFE SCIENCE *Multiple Choice* Which of the following is the best example of a vestigial structure on a marine organism?

- W) Pelvic bones on a whale
- X) Scales on a fish
- Y) Dorsal fin on a shark
- Z) Antennae on a lobster

ANSWER: W) PELVIC BONES ON A WHALE

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### TOSS-UP

20) EARTH AND SPACE *Multiple Choice* The presence of fossilized marine organisms in rocks high above sea level is best explained by which of the following statements?

- W) They were once land animals
- X) They were carried there by other animals
- Y) They were once beneath the sea and tectonic processes raised the sediments
- Z) They were once part of a volcanic eruption

ANSWER: Y) THEY WERE ONCE BENEATH THE SEA AND TECTONIC PROCESSES RAISED THE SEDIMENTS

### BONUS

20) EARTH AND SPACE *Short Answer* What kind of clouds are primarily composed of ice particles, form in the upper parts of thunderstorms, and have streaks of snow that fall from their edges?

ANSWER: ANVIL (ACCEPT: CUMULONIMBUS INCUS)

**TOSS-UP**

21) PHYSICAL SCIENCE *Multiple Choice* Which of the following solutions will conduct electricity the best?

- W) A saturated sugar-water solution
- X) A concentrated ethanol-water solution
- Y) A saturated salt-water solution
- Z) An unsaturated hydrogen-oxygen solution

ANSWER: Y) A SATURATED SALT-WATER SOLUTION

**BONUS**

21) PHYSICAL SCIENCE *Multiple Choice* Given a neutral atom of iron, which of the following causes it to have a charge of +2?

- W) It gains an electron
- X) It loses an electron
- Y) It gains two electrons
- Z) It loses two electrons

ANSWER: Z) IT LOSES 2 ELECTRONS

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**TOSS-UP**

22) MATH *Multiple Choice* Which of the following is the smallest integer greater than  $101^{\frac{1}{2}}$  **[101 to the power of one half]**?

- W) 9
- X) 10
- Y) 11
- Z) 12

ANSWER: Y) 11

**BONUS**

22) MATH *Short Answer* Given two coplanar angles whose sides are all noncollinear. What are all of the different numbers of points in which the angles can intersect?

ANSWER: 0, 1, 2, 3, AND 4

**TOSS-UP**

23) GENERAL SCIENCE *Multiple Choice* At which of the following locations does the continental shelf begin?

- W) At the bottom of the continental slope
- X) At the shoreline
- Y) At the ocean floor
- Z) At the mid-ocean ridge

ANSWER: X) AT THE SHORELINE

**BONUS**

23) GENERAL SCIENCE *Short Answer* What are the two most common types of root systems?

ANSWER: FIBROUS AND TAPROOT (ACCEPT ADVENTITIOUS IN PLACE OF FIBROUS)

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**TOSS-UP**

24) MATH *Short Answer* If 8 is 20% of a given number, what is 10% of the number?

ANSWER: 4

**BONUS**

24) MATH *Short Answer* If 273 students, or  $\frac{7}{8}$  of a graduating class, plan to attend college, how many students are there in the graduating class?

ANSWER: 312

### TOSS-UP

25) LIFE SCIENCE *Short Answer* What is the name for the cellular structure that is responsible for manufacturing proteins?

ANSWER: RIBOSOMES (ALSO ACCEPT "ROUGH ENDOPLASMIC RETICULUM" OR "ROUGH ER")

### BONUS

25) LIFE SCIENCE *Short Answer* List the following five classifications in order from least to most specific: 1) genus, 2) order, 3) phylum **[FY-luhm]**, 4) domain, 5) family.

ANSWER: 4, 3, 2, 5, 1 (ACCEPT: DOMAIN, PHYLUM, ORDER, FAMILY, GENUS)