

## ROUND 6

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### TOSS-UP

1) LIFE SCIENCE *Multiple Choice* If you are looking at a specimen with a compound microscope using a 40X objective and a 10X eyepiece, what would be the total magnification?

- W) 4 times
- X) 40 times
- Y) 44 times
- Z) 400 times

ANSWER: Z) 400 TIMES

### BONUS

1) LIFE SCIENCE *Short Answer* By name or number, which of the following information can be detected with an electron microscope: 1) topography, 2) morphology, 3) composition, or 4) crystallographic information?

ANSWER: TOPOGRAPHY, MORPHOLOGY, COMPOSITION, OR CRYSTALLOGRAPHIC INFORMATION (ACCEPT: 1, 2, 3, 4, OR ALL)

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### TOSS-UP

2) MATH *Multiple Choice* Express in decimal form:  $0.99 - \frac{3}{4}$  (read as: 99 hun-DREDTHS minus three fourths).

- W) 0.24
- X) 0.75
- Y) 0.9825
- Z) 0.9975

ANSWER: W) 0.24

### BONUS

2) MATH *Short Answer* Simplify:  $0.99 - 0.0099$  (read as: 99 hun-DREDTHS minus 99 ten thous-ANDTHS).

ANSWER: 0.9801

**TOSS-UP**

3) EARTH AND SPACE SCIENCE *Short Answer* In which direction do winds circulate during a hurricane in the Northern Hemisphere?

ANSWER: COUNTERCLOCKWISE

**BONUS**

3) EARTH AND SPACE SCIENCE *Multiple Choice* Hurricane winds rotate in the opposite direction in the Southern Hemisphere due to:

- W) The cyclonic force
- X) The Coriolis effect
- Y) Ocean temperature differences
- Z) The presence of less land in the Southern Hemisphere

ANSWER: X) THE CORIOLIS EFFECT

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**TOSS-UP**

4) GENERAL SCIENCE *Multiple Choice* Weather systems can be considered either high or low pressure. Which of the following descriptions generally contrasts high and low pressure?

- W) High pressure indicates fair weather and low pressure indicates stormy weather
- X) Low pressure indicates fair weather and high pressure indicates stormy weather
- Y) Either high or low pressure can indicate fair or stormy weather, depending on the circumstances
- Z) High and low pressure have nothing to do with indicating fair or stormy weather systems

ANSWER: W) HIGH PRESSURE INDICATES FAIR WEATHER AND LOW PRESSURE INDICATES STORMY WEATHER

**BONUS**

4) GENERAL SCIENCE *Multiple Choice* Which of the following is NOT likely to change in response to an increase in atmospheric carbon dioxide?

- W) Barometric pressure
- X) Storm intensity
- Y) Mean annual temperature
- Z) Total precipitation

ANSWER: W) BAROMETRIC PRESSURE

**TOSS-UP**

5) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following is NOT true about carbon dioxide?

- W) It has been present in Earth's atmosphere for billions of years
- X) The present amount of carbon dioxide in our atmosphere is completely due to natural causes
- Y) Increased emissions of carbon dioxide from human industrial activities are causing global climate change
- Z) On Earth, it is emitted by humans, most other animals and plants

ANSWER: X) THE PRESENT AMOUNT OF CARBON DIOXIDE IN OUR ATMOSPHERE IS COMPLETELY DUE TO NATURAL CAUSES

**BONUS**

5) EARTH AND SPACE SCIENCE *Short Answer* What gas makes up the majority of our atmosphere?

ANSWER: NITROGEN

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**TOSS-UP**

6) PHYSICAL SCIENCE *Short Answer* What does pH measure?

ANSWER: THE ACIDITY OF A SOLUTION (ACCEPT: BASISITY OR ALKALINITY OF A SOLUTION, CONCENTRATION OF H<sup>+</sup> IONS)

**BONUS**

6) PHYSICAL SCIENCE *Short Answer* What is the approximate range of the pH scale?

ANSWER: 0 TO 14

### TOSS-UP

7) GENERAL SCIENCE *Short Answer* Spiders such as black widows, brown recluses, mouse spiders, and trapdoor spiders are not actually poisonous, because the term poisonous refers to substances that are harmful if ingested. These spiders, on the other hand, have dangerous bites. Therefore, what term would more accurately describe them?

ANSWER: VENOMOUS

### BONUS

7) GENERAL SCIENCE *Short Answer* Name the organ that spiders and many insect larvae use to build webs, make protective cocoons, and even to help catch the wind in order to fly.

ANSWER: SPINNERET

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### TOSS-UP

8) LIFE SCIENCE *Multiple Choice* Fruit flies are common in homes, restaurants, supermarkets and wherever else fruit is allowed to rot and ferment. Given the opportunity, about how many eggs will a fruit fly lay at a time?

- W) 50
- X) 500
- Y) 5000
- Z) 50,000

ANSWER: X) 500

### BONUS

8) LIFE SCIENCE *Multiple Choice* When larvae emerge from fruit fly eggs, where do they tend to feed?

- W) Near the surface of the fermenting fruit
- X) Deep within the fermenting fruit
- Y) In the non-fermenting portion of the fruit next to the overripe portion
- Z) In the seed

ANSWER: W) NEAR THE SURFACE OF THE FERMENTING FRUIT

**TOSS-UP**

9) EARTH AND SPACE SCIENCE *Multiple Choice* In which of the following locations are you most likely to find sandstone rock formations?

- W) Areas with a long history of earthquakes
- X) Ancient beaches or deserts
- Y) Swamps formed within the last thousand years
- Z) Areas with a history of lava deposition

ANSWER: X) ANCIENT BEACHES OR DESERTS

**BONUS**

9) EARTH AND SPACE SCIENCE *Short Answer* Name the insoluble siliceous nodules that can form within limestone.

ANSWER: CHERT

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**TOSS-UP**

10) LIFE SCIENCE *Multiple Choice* Chromosomes are composed of:

- W) DNA and proteins
- X) Genes and nucleotides
- Y) Proteins and chromatin
- Z) DNA and RNA

ANSWER: W) DNA AND PROTEINS

**BONUS**

10) LIFE SCIENCE *Multiple Choice* Which of the following mammals has the greatest diploid number of chromosomes?

- W) Aquatic rat
- X) Cat
- Y) Dog
- Z) Elephant

ANSWER: W) AQUATIC RAT

### TOSS-UP

11) ENERGY *Multiple Choice* Most mammals are able to eat both plants and animals. Therefore, most mammals are considered:

- W) Autotrophs (read as: AW-toh-trōefs)
- X) Carnivores
- Y) Herbivores (read as: (H)EHR-bi-vohrs)
- Z) Omnivores

ANSWER: Z) OMNIVORES

### BONUS

11) ENERGY *Short Answer* What type of organism obtains organic carbon for growth by consuming other organisms?

ANSWER: HETEROTROPH

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### TOSS-UP

12) GENERAL SCIENCE *Multiple Choice* You're doing an experiment with soda. You start by weighing the full, closed can of soda. Then you open the can and wait one hour. You weigh the can again and discover that it is lighter. What caused this difference in mass?

- W) An exothermic reaction
- X) Escape of dissolved gases
- Y) Loss of sugar
- Z) A series of redox reactions in the soda

ANSWER: X) ESCAPE OF DISSOLVED GASES

### BONUS

12) GENERAL SCIENCE *Short Answer* Dry ice is the solid form of what compound?

ANSWER: CARBON DIOXIDE

**TOSS-UP**

13) PHYSICAL SCIENCE *Short Answer* What happens to the freezing point of water as salt is added to it?

ANSWER: IT GOES DOWN

**BONUS**

13) PHYSICAL SCIENCE *Multiple Choice* The velocity-time graph of a body that starts from rest and moves away from the origin with constant positive acceleration appears as:

- W) A straight line with positive slope
- X) A straight, flat line
- Y) A straight line with negative slope
- Z) A curved line whose slope is increasing in time

ANSWER: W) A STRAIGHT LINE WITH POSITIVE SLOPE

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**TOSS-UP**

14) EARTH AND SPACE SCIENCE *Multiple Choice* What is the approximate salinity of the ocean in parts per thousand?

- W) 15
- X) 25
- Y) 35
- Z) 45

ANSWER: Y) 35

**BONUS**

14) EARTH AND SPACE SCIENCE *Short Answer* The salinity of the ocean is rarely measured directly. What characteristic of the water is measured as a proxy for salinity?

ANSWER: CONDUCTIVITY

**TOSS-UP**

15) MATH *Short Answer* Two boys and three girls are in a small group. Expressing your answer as a fraction in lowest terms, if a student is chosen at random, what is the probability that a girl is chosen?

ANSWER: 3/5

**BONUS**

15) MATH *Short Answer* Sam has 2 quarters, 4 dimes, 2 nickels, and 1 penny in his pocket. Expressing your answer as a fraction in lowest terms, if he reaches into his pocket and randomly pulls out a coin, what is the probability that the coin will be a penny or a dime?

ANSWER: 5/9

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**TOSS-UP**

16) PHYSICAL SCIENCE *Short Answer* What ion is known as the stable identity of the proton?

ANSWER: HYDROGEN ION (ACCEPT: H<sup>+</sup>)

**BONUS**

16) PHYSICAL SCIENCE *Multiple Choice* Which of the following units is used to measure the diameter of protons?

- W) Attometer
- X) Femtometer
- Y) Leptometer
- Z) Ziggimeter

ANSWER: X) FEMTOMETER



### TOSS-UP

17) LIFE SCIENCE *Multiple Choice* When you are sick with a virus, your body builds up a defense system by making antibodies against it. Why, then, do we need to get flu shots every year?

- W) Antibodies are usually only effective for a few months
- X) We need antibiotics to combat the flu
- Y) We could be flu carriers even if we are not sick
- Z) The flu virus mutates every year

ANSWER: Z) THE FLU VIRUS MUTATES EVERY YEAR

### BONUS

17 LIFE SCIENCE *Short Answer* There are two main kinds of vaccines. One kind contains an altered virus that produces immunity but does not produce the disease. What is this kind of vaccine called?

ANSWER: LIVE (ACCEPT: ATTENUATED VIRUS)

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### TOSS-UP

18) MATH *Multiple Choice* Which of the following correctly describes the number ?

- W) Integer
- X) Rational
- Y) Irrational
- Z) Whole

ANSWER: X) RATIONAL

### BONUS

18) MATH *Short Answer* What is the cube root of 343?

ANSWER: 7

### TOSS-UP

19) ENERGY *Multiple Choice* Sound energy passes as a wave through an object when energy causes the molecules in the object to:

- W) Vacillate
- X) Rotate
- Y) Vibrate
- Z) Translate

ANSWER: Y) VIBRATE

### BONUS

19) ENERGY *Multiple Choice* A passenger is sitting in a train that accelerates from a full stop. As it moves, there are a number of sounds associated with the acceleration of the train. Compare the frequency of those sounds to the frequency actually heard by the passenger.

- W) It will be lower
- X) It will be higher
- Y) It will vary
- Z) It will not be different

ANSWER: Z) IT WILL NOT BE DIFFERENT

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### TOSS-UP

20) PHYSICAL SCIENCE *Short Answer* There are two circuits with the same voltage applied and one resistor each. Circuit A's resistor has twice the resistance of Circuit B's resistor. How does Circuit B's current compare to Circuit A's?

ANSWER: TWICE (ALSO ACCEPT: DOUBLE)

### BONUS

20) PHYSICAL SCIENCE *Multiple Choice* Assuming that the light bulbs, wires, and batteries are all the same in two different circuits, how would the brightness of two light bulbs in series differ from the brightness of just one light bulb?

- W) The brightness of the two in series would be dimmer than the single bulb
- X) The bulbs in series would not light up with the same amount of battery power
- Y) The bulbs in series would be brighter than the single bulb
- Z) The bulbs in series and the single bulb would have the same brightness

ANSWER: W) THE BRIGHTNESS OF THE TWO IN SERIES WOULD BE DIMMER THAN THE SINGLE BULB

### TOSS-UP

21) MATH *Multiple Choice* If a 4-inch plant grows at the rate of  $\frac{1}{4}$  inch per day, what will its height be in 27 days?

W)  $6\frac{3}{4}$  inches

X) 7 inches

Y)  $10\frac{3}{4}$  inches

Z) 11 inches

ANSWER: Y)  $10\frac{3}{4}$  INCHES

### BONUS

21) MATH *Short Answer* If a 4-inch plant grows at the rate of  $\frac{1}{4}$  inch per day, in how many days will the plant reach 48 inches?

ANSWER: 176

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### TOSS-UP

22) LIFE SCIENCE *Multiple Choice* Bioluminescence is light originating in an organism that is produced by a chemical reaction. Which of the following statements is NOT true about bioluminescence?

W) It is the predominant source of light in the deep ocean

X) The luminescent wake of a ship is due to dinoflagellates (read as: dy-nōe-FLAH-jeg-lehts)

Y) Most marine bioluminescence is blue in color

Z) All firefly species are bioluminescent as adults

ANSWER: Z) ALL FIREFLY SPECIES ARE BIOLUMINESCENT AS ADULTS

### BONUS

22) LIFE SCIENCE *Short Answer* In addition to bioluminescent marine and insect life, there are also over 70 known bioluminescent species of this kind of organism, which, like insects, uses chitin as a structural carbohydrate.

ANSWER: MUSHROOM (ACCEPT: FUNGUS, FUNGI)

**TOSS-UP**

23) ENERGY *Short Answer* What sub-atomic particles commonly act as the source of electrical current?

ANSWER: ELECTRONS

**BONUS**

23) ENERGY *Multiple Choice* The purpose of a generator in a power plant is to convert one type of energy into another type. What are these two types of energy?

- W) Electrical to chemical
- X) Chemical to kinetic
- Y) Mechanical to electrical
- Z) Mechanical to kinetic

ANSWER: Y) MECHANICAL TO ELECTRICAL

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**TOSS-UP**

24) EARTH AND SPACE SCIENCE *Short Answer* Pikes Peak in the Rockies, Mount Rushmore in the Black Hills, Stone Mountain in Georgia, and Yosemite National Park in the Sierra Nevada are all areas where large quantities of what kind of rock are exposed at the surface?

ANSWER: GRANITE

**BONUS**

24) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following minerals is present in the highest concentrations in granite?

- W) Pyroxene
- X) Hornblende
- Y) Quartz
- Z) Plagioclase (read as: PLAY-jee-oh-klays) feldspar

ANSWER: Y) QUARTZ

### TOSS-UP

25) MATH *Multiple Choice* In the gift shop, semi precious gemstones sell for \$12 per pound. If there are 15 stones in a pound, what is the unit cost per gemstone?

- W) 75 cents
- X) 80 cents
- Y) \$1.06
- Z) \$1.25

ANSWER: X) 80 CENTS

### BONUS

25) MATH *Short Answer* Maria and Jonathon were selling shirts at a flea market for \$13 per shirt. However, they had the ability to bargain with purchasers down to a minimum price of \$10. At the end of the day, they had sold 2 shirts for \$10, 3 shirts for \$12, 2 shirts for \$12.50, and 5 shirts for \$13. To the nearest cent, what was their mean price?

ANSWER: \$12.17