

ROUND 2

TOSS-UP

1) Earth and Space – *Multiple Choice* What water cycle process causes water molecules to move from a lake and into the atmosphere?

- W) Precipitation
- X) Evaporation
- Y) Transpiration
- Z) Condensation

ANSWER: X) EVAPORATION

BONUS

1) Earth and Space – *Short Answer* What reflecting space telescope has the largest collecting area?

ANSWER: HUBBLE

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### **TOSS-UP**

2) General Science – *Short Answer* Chemistry emerged from efforts to transmute lead into gold. What was the name of this practice?

ANSWER: ALCHEMY

### **BONUS**

2) General Science – *Multiple Choice* When a measurement is close to the theoretically correct value for that measurement, it is considered which of the following?

- W) Accurate
- X) Precise
- Y) Significantly correct
- Z) Insignificantly different

ANSWER: W) ACCURATE

### **TOSS-UP**

3) Life Science – *Multiple Choice* Which of the following is the general relationship between the availability of soil nutrients and bacterial populations?

- W) Increased bacterial populations are predicted as soil nutrients increase
- X) Decreased bacterial populations are predicted as soil nutrients increase
- Y) Bacterial populations are not impacted by nutrient availability
- Z) There are no bacteria in soil

ANSWER: W) INCREASED BACTERIAL POPULATIONS ARE PREDICTED AS SOIL NUTRIENTS INCREASE

### **BONUS**

3) Life Science – *Multiple Choice* Some scientists believe that humans have possibly caused the sixth mass extinction on Earth. Which of the following is a major consequence of mass extinction?

- W) Loss of biodiversity
- X) Increased fitness
- Y) Increased environmental health
- Z) Stabilizing population flux within a specific environment

ANSWER: W) LOSS OF BIODIVERSITY

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TOSS-UP

4) Physical Science – *Short Answer* What fundamental law states that “energy can be neither created nor destroyed?”

ANSWER: CONSERVATION OF ENERGY (DO NOT ACCEPT: 1ST LAW OF THERMODYNAMICS)

BONUS

4) Physical Science – *Short Answer* What is the name of the SI unit of measure for electric charge, equivalent to an ampere-second?

ANSWER: COULOMB

TOSS-UP

5) Energy – *Short Answer* A renewable energy source generates 7 kilowatts. If the power lost due to transmission is 1 kilowatt, what is the efficiency, to the nearest whole percentage, of the distribution system?

ANSWER: 86

BONUS

5) Energy – *Multiple Choice* What thermal property of home insulation does the R-value represent?

- W) Transmissibility
- X) Resistance per unit area
- Y) Flux resistance
- Z) Insolance per unit area

ANSWER: X) RESISTANCE PER UNIT AREA

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### **TOSS-UP**

6) Math – *Short Answer* Evaluate the following expression: 27 minus 19 minus open parenthesis 19 minus 27 close parenthesis.

ANSWER: 16

### **BONUS**

6) Math – *Short Answer* Identify all of the following four statements about angles that are true: 1) Two angles that form a linear pair must be supplementary; 2) Supplementary angles must form a linear pair; 3) An exterior angle of a triangle must be obtuse; 4) An exterior angle of a triangle must have greater measure than either of its remote interior angles.

ANSWER: 1 and 4

### **TOSS-UP**

7) Life Science – *Short Answer* The family Mephitidae is characterized by having contrasting black and white fur patterns and modified anal glands that expel a highly irritating fluid when faced with danger. What is the common name of species found in this family?

ANSWER: SKUNK

### **BONUS**

7) Life Science – *Multiple Choice* In a cell, the presence or absence of a nucleus distinguishes between:

- W) plant and animal cells
- X) gymnosperms and angiosperms
- Y) bacteria and viruses
- Z) prokaryotes and eukaryotes

ANSWER: Z) PROKARYOTES AND EUKARYOTES

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### **TOSS-UP**

8) General Science – *Short Answer* One of the qualitative characteristics used in evaluating minerals by their scratch resistance was invented by a mineralogist in 1812 and is used today. What is that scale called?

ANSWER: MOHS SCALE OF HARDNESS (ALSO ACCEPT: MOHS SCALE, MOHS HARDNESS SCALE)

### **BONUS**

8) General Science – *Short Answer* Fires are categorized by class. What type of fire is a class C fire?

ANSWER: ELECTRICAL FIRE

### **TOSS-UP**

9) Energy – *Short Answer* Natural gas is mostly composed of what hydrocarbon?

ANSWER: METHANE

### **BONUS**

9) Energy – *Multiple Choice* Cellulosic biomass can be converted via fermentation to what usable form of energy?

- W) Ethanol
- X) Biogas
- Y) Liquefied natural gas
- Z) Nitrogen

ANSWER: W) ETHANOL

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TOSS-UP

10) Earth and Space – *Short Answer* What layer of the Earth includes the crust and the uppermost mantle?

ANSWER: LITHOSPHERE

BONUS

10) Earth and Space – *Short Answer* Identify all of the following four choices that are tectonic plates:

- 1) Atlantic; 2) African; 3) Pacific; 4) Australian.

ANSWER: 2, 3, 4

TOSS-UP

11) Math – *Short Answer* A square of side length 4 is divided into four squares. One of these is then split diagonally. What is the area of one of the resulting triangles?

ANSWER: 2

BONUS

11) Math – *Short Answer* A ball moves 0.24 kilometers in one minute. What is the speed of this ball in meters per second?

ANSWER: 4

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### **TOSS-UP**

12) Physical Science – *Short Answer* The electric force on a point charge as a result of another charge is given as  $M$ . If the distance between the two particles is halved, then in terms of  $M$ , what is the new force on the point charge?

ANSWER:  $4M$

### **BONUS**

12) Physical Science – *Short Answer* In some materials, an electrical signal travels at about two-thirds the speed of light. Giving your answer in scientific notation to one significant figure and in meters per second, what is the speed of this signal?

ANSWER:  $2 \times 10^8$

### **TOSS-UP**

13) Life Science – *Multiple Choice* How many teeth do average human adults have?

- W) 28
- X) 32
- Y) 34
- Z) 36

ANSWER: X) 32

### **BONUS**

13) Life Science – *Short Answer* Benzyl bromide is a lacrymating agent. This means that it causes humans to produce what?

ANSWER: TEARS

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TOSS-UP

14) General Science – *Multiple Choice* Which of the following is the name of the grid or coordinate system on which points in a plane are described with ordered pairs?

- W) Descartes's plane
- X) Cartesian coordinate system
- Y) Ordered pairs graph
- Z) Scatter plot

ANSWER: X) CARTESIAN COORDINATE SYSTEM

BONUS

14) General Science – *Short Answer* Place the following four divisions of human prehistory in order, from earliest to most recent: 1) Paleolithic; 2) Bronze Age; 3) Neolithic; 4) Iron Age

ANSWER: 1, 3, 2, 4 (PALEOLITHIC, NEOLITHIC, BRONZE AGE, IRON AGE)

TOSS-UP

15) Physical Science – *Short Answer* Most room temperature permanent magnets are magnets due to what phenomenon that is commonly seen in iron, nickel, and cobalt?

ANSWER: FERROMAGNETISM

BONUS

15) Physical Science – *Short Answer* Pascal's principle states that applied forces are evenly distributed in what state of matter?

ANSWER: LIQUID

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### **TOSS-UP**

16) Earth and Space – *Multiple Choice* Fossils tell us about the evolution of life. In which of the following rock types are you most likely to find a well-preserved fossil?

- W) Basalt
- X) Granite
- Y) Shale
- Z) Amphibolite

ANSWER: Y) SHALE

### **BONUS**

16) Earth and Space – *Short Answer* Which one of the solar system's rocky planets rotates in the opposite direction from all the others?

ANSWER: VENUS (DO NOT ACCEPT: URANUS)

### **TOSS-UP**

17) Math – *Short Answer* For a group of 200 students, 75 percent had brown eyes, 15 percent had blue eyes, and the rest had green eyes. How many students in the group had green eyes?

ANSWER: 20

### **BONUS**

17) Math – *Multiple Choice* How many times do the graphs of the following equations intersect?

$$\underline{x \text{ squared plus } y \text{ squared} = 4} \text{ and } \underline{\text{open parenthesis } x - 2 \text{ close parenthesis squared plus}} \\ \underline{\text{open parenthesis } y - 2 \text{ close parenthesis squared} = 4}$$

- W) 0
- X) 1
- Y) 2
- Z) 4

ANSWER: Y) 2



### **TOSS-UP**

18) Energy – *Multiple Choice* How many states in the US mined coal in 2013?

- W) 10
- X) 25
- Y) 48
- Z) 50

ANSWER: X) 25

### **BONUS**

18) Energy – *Short Answer* As of the third quarter of 2015, what state generates the most electricity via wind power?

ANSWER: TEXAS

### **TOSS-UP**

19) Life Science – *Short Answer* In the human gut, what segment of the small intestine is between the duodenum and ileum?

ANSWER: JEJUNUM

### **BONUS**

19) Life Science – *Multiple Choice* Blood is classified as what type of body tissue?

- W) Epithelial tissue
- X) Connective tissue
- Y) Nerve tissue
- Z) Muscle tissue

ANSWER: X) CONNECTIVE TISSUE

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TOSS-UP

20) Earth and Space – *Short Answer* On the Mohs scale of hardness, what mineral is defined to have hardness 1?

ANSWER: TALC

BONUS

20) Earth and Space – *Multiple Choice* Which of the following is true every year when the United States experiences winter solstice?

- W) Earth is at its maximum distance from the Sun
- X) The Southern Hemisphere is tilted towards the Sun
- Y) Antarctica experiences 24 hours of darkness
- Z) The Moon is a waning crescent

ANSWER: X) THE SOUTHERN HEMISPHERE IS TILTED TOWARDS THE SUN

TOSS-UP

21) Physical Science – *Short Answer* What is the commonly used name for circuits that are composed of a resistor and a capacitor?

ANSWER: RC CIRCUIT (ALSO ACCEPT: FIRST ORDER RC CIRCUIT)

BONUS

21) Physical Science – *Short Answer* What electronic circuit components produce magnetic fields as current flows through them and can be used to block AC current while letting DC current pass?

ANSWER: INDUCTORS

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### **TOSS-UP**

22) Math – *Short Answer* A jet travels 2500 miles in 6 hours. To the nearest whole number of miles per hour, over the six-hour period, what is the average speed of the jet?

ANSWER: 417

### **BONUS**

22) Math – *Short Answer* Identify all of the following 4 sets of numbers that are Pythagorean triples:  
1) 5-12-13; 2) 13-13-15; 3) 6-9-12; 4) 9-40-41.

ANSWER: 1 and 4

### **TOSS-UP**

23) Physical Science – *Multiple Choice* The potential energy stored in a spring is proportional to which of the following?

- W) The square of the spring constant
- X) The square root of the spring's mass
- Y) The spring's height from Earth's surface
- Z) The square of the spring's stretch from equilibrium

ANSWER: Z) THE SQUARE OF THE SPRING'S STRETCH FROM EQUILIBRIUM

### **BONUS**

23) Physical Science – *Short Answer* Consider a Carnot engine operating between two reservoirs of different temperatures. If the absolute temperatures of both reservoirs are doubled, by what factor is the efficiency multiplied?

ANSWER: ONE