

## ROUND 5A

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### TOSS-UP

1) General Science – *Short Answer* List the following four taxonomic levels in the correct order, from broadest to narrowest: 1) Species; 2) Kingdom; 3) Class; 4) Genus.

Answer: 2, 3, 4, 1 (ALSO ACCEPT: KINGDOM, CLASS, GENUS, SPECIES)

### BONUS

1) General Science – *Multiple Choice* When a measurement is made repeatedly and the results are constant, the measurement is which of the following?

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

ANSWER: X) PRECISE

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### TOSS-UP

2) Physical Science – *Short Answer* To the nearest gram, what is the mass of one-half liter of water at standard temperature?

ANSWER: 500

### BONUS

2) Physical Science – *Short Answer* A cube has a density of 6 grams per centimeter cubed and a volume of 300 millimeters cubed. Rounded to the nearest tenth and in grams, what is the cube's mass?

ANSWER: 1.8

**TOSS-UP**

3) Energy – *Multiple Choice* The power generated by a hydroelectric dam is proportional to all except which of the following?

- W) Acceleration due to gravity
- X) Water density
- Y) Water flow rate
- Z) Water temperature

ANSWER: Z) WATER TEMPERATURE

**BONUS**

3) Energy – *Short Answer* What group of pollutants is formed during combustion when nitrogen and oxygen react?

ANSWER: NO<sub>x</sub> (ACCEPT: NITROGEN OXIDES)

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**TOSS-UP**

4) Life Science – *Multiple Choice* Which of the following cellular organelles is responsible for energy production in the eukaryotic cell?

- W) Golgi apparatus
- X) Nucleus
- Y) Mitochondrion
- Z) Vacuole

ANSWER: Y) MITOCHONDRION

**BONUS**

4) Life Science – *Multiple Choice* In humans, which of the following is the name for the tube that makes up the complete digestive system?

- W) Alimentary canal
- X) Gastrovascular cavity
- Y) Gut
- Z) Gastric bypass

ANSWER: W) ALIMENTARY CANAL

**TOSS-UP**

5) Earth and Space – *Short Answer* What is the most abundant element in Earth's atmosphere?

ANSWER: NITROGEN

**BONUS**

5) Earth and Space – *Multiple Choice* Which of the following is a type of chemical weathering?

- W) Oxidation
- X) Abrasion
- Y) Erosion
- Z) Ice wedging

ANSWER: W) OXIDATION

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**TOSS-UP**

6) Math – *Short Answer* The radius of a sphere is tripled. By what factor is its surface area multiplied?

ANSWER: 9

**BONUS**

6) Math – *Short Answer* Your scores on your first 3 math tests are 83, 88 and 91. What do you need to score on the fourth test in order to average 90 on the 4 tests?

ANSWER: 98

**TOSS-UP**

7) Physical Science – *Multiple Choice* Electrodes are NOT found in which of the following?

- W) Electrophorus
- X) Battery
- Y) Permanent magnet
- Z) Capacitor

ANSWER: Y) PERMANENT MAGNET

**BONUS**

7) Physical Science – *Short Answer* A railroad car with a mass of 250,000 kilograms travels 10 meters in 2 seconds before it crashes into an identical, stationary car. The first car comes to a stop and the second car begins to move. What is the speed, in meters per second, of the second car after the collision?

ANSWER: 5



**TOSS-UP**

8) Math – *Short Answer* If a line is perpendicular to the line with equation  $y = 3x + 5$  at its  $y$  intercept, what is the slope of the perpendicular line?

ANSWER:  $-1/3$

**BONUS**

8) Math – *Short Answer* Identify all of the following 4 numbers that are divisible by 3: 1) 123; 2) 469; 3) 631; 4) 702.

ANSWER: 1, 4 (ACCEPT: 123 AND 702)

**TOSS-UP**

9) General Science – *Multiple Choice* Which of the following instruments measures air pressure?

- W) Hygrometer
- X) Thermometer
- Y) Barometer
- Z) Anemometer

ANSWER: Y) BAROMETER

**BONUS**

9) General Science – *Short Answer* What is the term for the study of vital statistics of populations and how they change over time?

ANSWER: DEMOGRAPHY (DO NOT ACCEPT: DEMOGRAPHICS)

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**TOSS-UP**

10) Life Science – *Multiple Choice* In a bacterial culture, there are 2000 *Escherichia coli* per milliliter of tryptic soy broth. What is the term used to describe this number?

- W) Dispersion
- X) Density
- Y) Turbidity
- Z) Population

ANSWER: X) DENSITY

**BONUS**

10) Life Science – *Short Answer* What is the most common inhibitory neurotransmitter in the human nervous system?

ANSWER: GABA (ACCEPT: GAMMA AMINO BUTYRIC ACID)

**TOSS-UP**

11) Energy – *Multiple Choice* Which of the following is a terminal for a battery?

- W) Anode
- X) Diode
- Y) Electrolyte
- Z) Transistor

ANSWER: W) ANODE

**BONUS**

11) Energy – *Multiple Choice* What pair of natural disasters led to the Fukushima Daiichi nuclear disaster?

- W) Earthquake and tsunami
- X) Tsunami and hurricane
- Y) Earthquake and tornado
- Z) Volcanic eruption and earthquake

ANSWER: W) EARTHQUAKE AND TSUNAMI



**TOSS-UP**

12) Life Science – *Multiple Choice* Which of the following cell organelles is responsible for the function of respiration?

- W) Endoplasmic reticulum
- X) Lysosome
- Y) Mitochondrion
- Z) Golgi apparatus

ANSWER: Y) MITOCHONDRION

**BONUS**

12) Life Science – *Short Answer* What category of molecular transport across membranes requires the input of energy in order to move a molecule against its concentration gradient?

ANSWER: ACTIVE TRANSPORT (DO NOT ACCEPT: BULK TRANSPORT, EXOCYTOSIS, ENDOCYTOSIS)

**TOSS-UP**

13) Earth and Space – *Multiple Choice* A light-year is a unit for measuring what?

- W) Time
- X) Speed
- Y) Distance
- Z) Momentum

ANSWER: Y) DISTANCE

**BONUS**

13) Earth and Space – *Short Answer* What landform is created when a stream meets a larger body of water, causing it to lose velocity and drop sediment?

ANSWER: DELTA

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**TOSS-UP**

14) Math – *Short Answer* Express the following number in scientific notation: 3,250,000.

ANSWER: 3.25 times  $10^6$

**BONUS**

14) Math – *Short Answer* One angle of an isosceles triangle measures 30 degrees. In degrees, what are the possible measures of the largest angle of the triangle?

ANSWER: 75 and 120

**TOSS-UP**

15) Energy – *Short Answer* Order the following three energy sources from least to greatest in terms of net electricity production in the US for the last three years: 1) Coal; 2) Natural gas; 3) Uranium.

ANSWER: 3, 2, 1 (ACCEPT: URANIUM, NATURAL GAS, COAL)

**BONUS**

15) Energy – *Short Answer* What was the top natural gas producing state in the US in 2014?

ANSWER: TEXAS

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**TOSS-UP**

16) Physical Science – *Short Answer* An element's atomic number represents the quantity per atom of what subatomic particle?

ANSWER: PROTON (DO NOT ACCEPT: ELECTRON)

**BONUS**

16) Physical Science – *Short Answer* Wind blowing across the top of a chimney creates lower pressure in the chimney, drawing smoke up through the fireplace rather than allowing it to spread into a room. What principle does this illustrate?

ANSWER: BERNOULLI'S PRINCIPLE (ACCEPT: BERNOULLI)

**TOSS-UP**

17) General Science – *Multiple Choice* Plate tectonics is studied most frequently under which of the following branches of Earth science?

- W) Geography
- X) Hydrology
- Y) Geology
- Z) Meteorology

ANSWER: Y) GEOLOGY

**BONUS**

17) General Science – *Multiple Choice* Students release a ball from the top of a ramp and measure the distance that the ball rolls. This is repeated with different heights for the ramp and with balls of different masses, but with the same external characteristics. The results will show that the distance a ball rolls depends on which of the following?

- W) The mass of the ball only
- X) The ramp height only
- Y) The mass of the ball and the ramp height
- Z) Neither the mass nor the height

ANSWER: X) THE RAMP HEIGHT ONLY

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**TOSS-UP**

18) Math – *Short Answer* How many integers are there between -3 and 5, inclusive?

ANSWER: 9

**BONUS**

18) Math – *Short Answer* What is the area of a triangle with sides of length 7, 7, and 6?

ANSWER:  $6\sqrt{10}$

**TOSS-UP**

19) Physical Science – *Multiple Choice* On the periodic table of elements, elements in the same column have which of the following in common?

- W) Same number of energy levels
- X) Similar masses
- Y) Same number of protons
- Z) Similar properties

ANSWER: Z) SIMILAR PROPERTIES

**BONUS**

19) Physical Science – *Short Answer* What is the force that opposes the motion of an object?

ANSWER: FRICTION (ACCEPT: DRAG)



**TOSS-UP**

20) Earth and Space – *Multiple Choice* Why is the equator warmer than the poles?

- W) The angle of sunlight is more direct at the equator
- X) The angle of sunlight is more direct at the poles
- Y) The seasons are shorter at the equator
- Z) The seasons are shorter at the poles

ANSWER: W) THE ANGLE OF SUNLIGHT IS MORE DIRECT AT THE EQUATOR

**BONUS**

20) Earth and Space – *Short Answer* Order the following three geologic time intervals from longest to shortest: 1) Phanerozoic [*fah-NAIR-oh-zoh-ik*] eon; 2) Carboniferous [*car-bon-IH-fur-us*] period; 3) Paleozoic era.

ANSWER: 1, 3, 2 (ACCEPT: PHANEROZOIC EON, PALEOZOIC ERA, CARBONIFEROUS PERIOD)

**TOSS-UP**

21) Life Science – *Short Answer* What is the smallest functional unit of skeletal muscle?

ANSWER: SARCOMERE

**BONUS**

21) Life Science – *Multiple Choice* In birds, which of the following is the correct order of organs in digestion?

- W) Crop, Stomach, Intestine, Gizzard
- X) Crop, Stomach, Gizzard, Intestine
- Y) Stomach, Crop, Intestine, Gizzard
- Z) Stomach, Crop, Gizzard, Intestine

ANSWER: X) CROP, STOMACH, GIZZARD, INTESTINE

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**TOSS-UP**

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

ANSWER: -4

**BONUS**

22) Math – *Short Answer* A circle with radius 5 is inscribed in a square. What is the area of the region inside the square but outside the circle?

ANSWER:  $100 - 25\pi$

### TOSS-UP

23) Earth and Space – *Multiple Choice* What rock type can be divided into intrusive and extrusive sub-categories?

- W) Metamorphic
- X) Sedimentary
- Y) Igneous
- Z) Clastic

ANSWER: Y) IGNEOUS

### BONUS

23) Earth and Space – *Short Answer* What integer is closest to the age of the Universe divided by the age of Earth's Moon?

ANSWER: 3