

## ROUND 2A

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### TOSS-UP

1) Earth and Space – *Multiple Choice* Specific gravity is a measure of what?

- W) Relative mass
- X) Relative density
- Y) Relative elasticity
- Z) Relative bouyancy

ANSWER: X) RELATIVE DENSITY

### BONUS

1) Earth and Space – *Multiple Choice* What is the term for a contour line connecting points of equal temperature on a weather map?

- W) Isobar
- X) Isochore
- Y) Isotherm
- Z) Isostasy

ANSWER: Y) ISOTHERM

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### TOSS-UP

2) Math – *Short Answer* Solve the following equation for  $s$ :  $-143 = -11s$

ANSWER: 13

### BONUS

2) Math – *Short Answer* What is the least common denominator of the three fractions  $1/6$ ,  $3/10$ , and  $1/28$ ?

ANSWER: 420

### TOSS-UP

3) Physical Science – *Multiple Choice* An atom that loses its outer electron or electrons readily is which of the following?

- W) Active nonmetal
- X) Active metal
- Y) Inactive nonmetal
- Z) Inactive metal

ANSWER: X) ACTIVE METAL

### BONUS

3) Physical Science – *Multiple Choice* Two objects have the same size and shape but one is twice as heavy as the other. If air resistance is negligible, what happens when they are dropped simultaneously from a building?

- W) The heavy one lands on the ground before the light one
- X) They land on the ground at the same time and have the same speed
- Y) They land on the ground at the same time but the heavy one has more speed
- Z) They land on the ground at the same time but the heavy object has a lower acceleration

ANSWER: X) THEY LAND ON THE GROUND AT THE SAME TIME AND HAVE THE SAME SPEED

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### TOSS-UP

4) Energy – *Short Answer* How many kilowatt-hours, rounded to the nearest tenth, does it require to light a 100-watt bulb for 1 hour?

ANSWER: 0.1

### BONUS

4) Energy – *Short Answer* The energy stored in a uranium atom can be released via what type of nuclear reaction?

ANSWER: FISSION

### TOSS-UP

5) General Science – *Multiple Choice* Doppler radar is best used in which of the following applications?

- W) Forecasting weather
- X) Searching for extraterrestrial life
- Y) Mapping the ocean floor
- Z) Tracking marine life

ANSWER: W) FORECASTING WEATHER

### BONUS

5) General Science – *Multiple Choice* Plates on the Earth's surface interact at three different types of tectonic boundaries. Which of the following describes the three interactions?

- W) Hot spots, fringing reefs, and earthquake zones
- X) Transform faults, subform faults, and reform faults
- Y) Seafloor spreading, transform faults, and subduction
- Z) Continental drift, seafloor spreading, and hot spots

ANSWER: Y) SEAFLOOR SPREADING, TRANSFORM FAULTS, AND SUBDUCTION

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### TOSS-UP

6) Life Science – *Short Answer* What is the name of the triplet of bases in the mRNA that codes for a specific amino acid?

ANSWER: CODON

### BONUS

6) Life Science – *Multiple Choice* What is a large community of plants and animals that live in the same place?

- W) Biome
- X) Biosphere
- Y) Quadridome
- Z) Abiotic environment

ANSWER: W) BIOME

### TOSS-UP

7) Physical Science – *Multiple Choice* Which of the following is the SI unit of mass?

- W) Gram
- X) Kilogram
- Y) Liter
- Z) Pound

ANSWER: X) KILOGRAM

### BONUS

7) Physical Science – *Short Answer* What is the term for the change in enthalpy that must occur for ice to become water at zero degrees Celsius?

ANSWER: HEAT OF FUSION (ACCEPT: ENTHALPY OF FUSION)



### TOSS-UP

8) General Science – *Short Answer* What element makes up about 24% of the Sun's mass?

ANSWER: HELIUM

### BONUS

8) General Science – *Short Answer* A researcher designs an experiment in which she compares the predation on a group of white mice to the predation on a control group of grey mice. What type of variable is fur color in this experiment?

ANSWER: INDEPENDENT

### TOSS-UP

9) Math – *Multiple Choice* Which of the following integers is a perfect square?

- W) 110
- X) 125
- Y) 225
- Z) 300

ANSWER: Y) 225

### BONUS

9) Math – *Multiple Choice* If  $k$ ,  $m$ , and  $n$  are 3 different non-zero numbers and  $1/k + 1/m = 1/n$ , what is  $k$  in terms of  $m$  and  $n$ ?

- W) 1 over open parenthesis  $m - n$  close parenthesis
- X) 1 over open parenthesis  $n - m$  close parenthesis
- Y)  $mn$  over open parenthesis  $m - n$  close parenthesis
- Z)  $mn$  over open parenthesis  $n - m$  close parenthesis

ANSWER: Y)  $mn$  OVER OPEN PARENTHESIS  $m - n$  CLOSE PARENTHESIS

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### TOSS-UP

10) Life Science – *Multiple Choice* Forest fires are important in some ecosystems for all of the following reasons except:

- W) They create a warmer climate, increasing precipitation
- X) They thin understory, making way for increased growth
- Y) They help clear dead and dying organisms
- Z) They can remove non-native, non-fire-resistant species

ANSWER: W) THEY CREATE A WARMER CLIMATE, INCREASING PRECIPITATION

### BONUS

10) Life Science – *Multiple Choice* Which of the following organelles regulates what enters and leaves the cell?

- W) Mitochondria
- X) Lysosome
- Y) Chloroplast
- Z) Cell membrane

ANSWER: Z) CELL MEMBRANE

### TOSS-UP

11) Earth and Space – *Short Answer* The common mineral quartz is composed of what two elements?

ANSWER: SILICON AND OXYGEN

### BONUS

11) Earth and Space – *Multiple Choice* Which of the following makes up 97% of the Earth's water?

- W) Groundwater
- X) Fresh water
- Y) Salt water
- Z) Spring water

ANSWER: Y) SALT WATER

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### TOSS-UP

12) Physical Science – *Short Answer* To the nearest kilometer, how far away was a lightning strike if thunder was heard 6 seconds after seeing the flash?

ANSWER: 2

### BONUS

12) Physical Science – *Short Answer* What general type of elements is characterized as shiny and good conductors of electricity and heat?

ANSWER: METALS

**TOSS-UP**

13) Earth and Space – *Short Answer* What is the term for celestial masses that have collapsed to such a small volume that their gravity prevents the escape of all radiation?

ANSWER: BLACK HOLES

**BONUS**

13) Earth and Space – *Short Answer* Bronze is an alloy of what two metals?

ANSWER: COPPER AND TIN (ACCEPT for tin: ARSENIC, ZINC, ALUMINUM, OR MANGANESE)



**TOSS-UP**

14) Life Science – *Short Answer* What are the names of the four chambers of the human heart?

ANSWER: LEFT VENTRICLE, RIGHT VENTRICLE, LEFT ATRIUM, RIGHT ATRIUM

**BONUS**

14) Life Science – *Short Answer* Gram staining is used to differentiate what general type of organism?

ANSWER: BACTERIA

### TOSS-UP

15) General Science – *Multiple Choice* Which of the following is the correct chemical formula of rock salt?

- W)  $\text{MgCl}_2$
- X)  $\text{NaCl}$
- Y)  $\text{LiCl}$
- Z)  $\text{NaF}$

ANSWER: X)  $\text{NaCl}$

### BONUS

15) General Science – *Multiple Choice* What series of elements, which includes thorium, uranium, and plutonium, are characterized by having two outer 7s electrons?

- W) Lanthanides
- X) Actinides
- Y) Transition metals
- Z) Rare earth metals

ANSWER: X) ACTINIDES

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### TOSS-UP

16) Math – *Multiple Choice* Find the volume of the circular cylinder formed by rotating a 9 by 10 rectangle about one of its shorter sides.

- W)  $270\pi$
- X)  $300\pi$
- Y)  $810\pi$
- Z)  $900\pi$

ANSWER: Z)  $900\pi$

### BONUS

16) Math – *Multiple Choice* Solve the following equation for y:  $3y - \text{open parenthesis } 2 - 2y \text{ close parenthesis} + 5 = 15 - y$ .

- W) 2
- X) 3
- Y) 5
- Z) 6

ANSWER: W) 2

### TOSS-UP

17) Earth and Space – *Short Answer* What constellation, found on the celestial equator, is named for a hunter and contains the stars Rigel [*rye-jel*] and Betelgeuse [*bee-tuhl-joos*]?

ANSWER: ORION

### BONUS

17) Earth and Space – *Short Answer* What is the term for the rapidly moving atoms and ions that escape from the solar corona and blow outwards through the solar system?

ANSWER: SOLAR WIND



### TOSS-UP

18) Energy – *Short Answer* Transesterification [*trans-es-ter-if-ik-ay-shun*] is a process commonly used to produce what kind of fuel?

ANSWER: BIODIESEL (ACCEPT: BIOFUEL)

### BONUS

18) Energy – *Multiple Choice* Which of the following is NOT necessarily an effect of global warming?

- W) Reduction in sea surface salinity
- X) Heat waves
- Y) Extinction events
- Z) Advancement of glaciers

ANSWER: Z) ADVANCEMENT OF GLACIERS

### TOSS-UP

19) Physical Science – *Multiple Choice* If the kinetic energy of a non-rotating rigid object is nonzero, which of the following must also be non-zero?

- W) Mass and velocity
- X) Velocity and angular momentum
- Y) Speed and acceleration
- Z) Mass and acceleration

ANSWER: W) MASS AND VELOCITY

### BONUS

19) Physical Science – *Multiple Choice* Which of the following is not part of Dalton's atomic theory?

- W) All matter is composed of atoms of elements
- X) Chemical reactions occur when atoms are rearranged
- Y) Atoms are composed of protons, neutrons and electrons
- Z) Atoms cannot be created or destroyed

ANSWER: Y) ATOMS ARE COMPOSED OF PROTONS, NEUTRONS AND ELECTRONS

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### TOSS-UP

20) Math – *Short Answer* What is the value of  $3^0 + 2^{-1} - 3$ ?

ANSWER: -1.5 (ACCEPT: -3/2, -1 ½)

### BONUS

20) Math – *Short Answer* The owners of an office building are painting the rooms in their building. Each room requires  $2\frac{1}{3}$  gallons of paint. They purchased 21 total gallons of paint and have already painted 6 rooms. How many more rooms should they be able to paint?

ANSWER: 3

**TOSS-UP**

21) General Science – *Multiple Choice* Which of the following is not a bird of prey?

- W) Red tailed hawk
- X) Great horned owl
- Y) Crow
- Z) Osprey

Answer: Y) CROW

**BONUS**

21) General Science – *Short Answer* What is the hexadecimal equivalent of the binary number 10101?

ANSWER: 15



**TOSS-UP**

22) Life Science – *Short Answer* How many walking legs are found in arachnids?

ANSWER: 8

**BONUS**

22) Life Science – *Multiple Choice* A geneticist breeds two pea plants that are heterozygous for seed color. Given that 2001 of the F<sub>2</sub> generation are homozygous recessive, which of the following is closest to the number of plants that exhibit the dominant trait?

- W) 2001
- X) 4002
- Y) 6006
- Z) 8008

ANSWER: Y) 6006

### **TOSS-UP**

23) Energy – *Short Answer* Iceland, the world's leader in generating electricity by no-carbon production methods, uses primarily what TWO methods of energy generation?

ANSWER: GEOTHERMAL AND HYDROELECTRIC

### **BONUS**

23) Energy – *Short Answer* Order the following three fuels from highest to lowest by the amount of carbon dioxide produced from burning each to produce equal amounts of energy: 1) Natural Gas; 2) Oil; 3) Coal.

ANSWER: 3, 2, 1