

## ROUND 7A

### TOSS-UP

1) Math – *Multiple Choice* A pair of headphones originally priced at 80 dollars is on sale at 25% off. If the sales tax is 10%, what is the total price, in dollars, of these headphones?

- W) 45
- X) 52
- Y) 66
- Z) 68

ANSWER: Y) 66

### BONUS

1) Math – *Short Answer* Simplify  $3x^2$  times open parenthesis  $2x - 8 + 5x^3$  close parenthesis minus open parenthesis  $4x^5 + 7x$  close parenthesis.

ANSWER:  $11x^5 + 6x^3 - 24x^2 - 7x$

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### TOSS-UP

2) Life Science – *Multiple Choice* Plant cells differ from animal cells in that only plant cells possess:

- W) Nuclei
- X) Mitochondria
- Y) Cell walls
- Z) Lysosomes

ANSWER: Y) CELL WALLS

### BONUS

2) Life Science – *Short Answer* What fatty layer covers some neurons at regular intervals and is responsible for the coloring of white matter in the brain?

ANSWER: MYELIN

**TOSS-UP**

3) General Science – *Short Answer* What is the name of the heat energy trapped in the Earth’s interior?

ANSWER: GEOTHERMAL

**BONUS**

3) General Science – *Short Answer* Colony collapse disorder is a phenomenon associated with what animals?

ANSWER: HONEY BEES



**TOSS-UP**

4) Physical Science – *Multiple Choice* Which factor does not influence the speed needed to put a satellite into orbit?

- W) Mass of the satellite
- X) Radius of the orbit
- Y) Shape of the orbit
- Z) Mass of the planet

ANSWER: W) MASS OF THE SATELLITE

**BONUS**

4) Physical Science – *Short Answer* Ice is placed into a beaker partially filled with water at room temperature and standard atmospheric pressure. If all of the ice melts, what is the lowest possible temperature of the new volume of water at the end of the melting process in degrees Celsius?

ANSWER: 0

### TOSS-UP

5) Earth and Space – *Multiple Choice* The climate of northwestern Europe is most directly affected by the:

- W) Gulf stream
- X) Abyssal zone
- Y) Trade winds
- Z) Labrador Current

ANSWER: W) GULF STREAM

### BONUS

5) Earth and Space – *Short Answer* Ninety-nine percent of the atmosphere is composed of what two gases?

ANSWER: NITROGEN AND OXYGEN

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### TOSS-UP

6) General Science – *Multiple Choice* By weight, what element is MOST common in petroleum?

- W) Carbon
- X) Hydrogen
- Y) Oxygen
- Z) Nitrogen

ANSWER: W) CARBON

### BONUS

6) General Science – *Multiple Choice* Which of the following activities best describes the practice of science as inquiry?

- W) Placing different objects in a tank of water to determine which ones sink
- X) Following directions in constructing a bridge made of popsicle sticks
- Y) Determining what materials are needed to build a terrarium
- Z) Assessing the conditions of a road to determine how long a trip will take

ANSWER: W) PLACING DIFFERENT OBJECTS IN A TANK OF WATER TO DETERMINE WHICH ONES SINK

### TOSS-UP

7) Energy – *Multiple Choice* In the United States, where does most of the hydropower production originate?

- W) Oceanic coastal regions
- X) Banks of the Mississippi river
- Y) Bases of mountain streams
- Z) Coasts of the Great Lakes

ANSWER: W) OCEANIC COASTAL REGIONS

### BONUS

7) Energy – *Multiple Choice* Which of the following requires the greatest percentage of energy in a household?

- W) Lighting
- X) Refrigeration
- Y) Cooking
- Z) Heating

ANSWER: Z) HEATING

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### TOSS-UP

8) Life Science – *Multiple Choice* Which of the following are abiotic factors?

- W) Plants
- X) Animals
- Y) Sunlight
- Z) Microorganisms

ANSWER: Y) SUNLIGHT

### BONUS

8) Life Science – *Short Answer* What specific major group of flowering plants, is traditionally recognized as possessing seeds with one primordial leaf and includes plants such as maize, rice, and wheat?

ANSWER: MONOCOT (ACCEPT: MONOCOTYLEDON)

**TOSS-UP**

9) Math – *Short Answer* Find the slope of the line with equation  $4x + 5y = -10$

ANSWER:  $-4/5$

**BONUS**

9) Math – *Short Answer* What is the product of the mean, median, and mode of the following list of seven numbers: 1, 1, 2, 3, 5, 8, 13?

Answer:  $99/7$  (ACCEPT:  $14 \frac{1}{7}$ )



**TOSS-UP**

10) Physical Science – *Short Answer* A 300 Newton stone sits atop a hill making an angle of 30 degrees with the horizontal. What is the force of gravity acting on the stone?

ANSWER: 300 NEWTONS

**BONUS**

10) Physical Science – *Multiple Choice* Which of the following statements about sound is not true?

- W) Sound usually travels faster in solids than liquids
- X) The speed of sound is not dependent on the density of the medium
- Y) Sound is a pressure wave
- Z) The speed of sound depends on the temperature of the medium

ANSWER: X) THE SPEED OF SOUND IS NOT DEPENDENT ON THE DENSITY OF THE MEDIUM

### TOSS-UP

11) Earth and Space – *Short Answer* The International Astronomical Union divides the night sky into regions based on star patterns, such as Aquila, Cygnus, and Orion. What are these regions called?

ANSWER: CONSTELLATIONS

### BONUS

11) Earth and Space – *Multiple Choice* Which of the following correctly describes Sputnik I?

- W) The first radio telescope
- X) The first space-based telescope
- Y) The first artificial satellite
- Z) The first observatory

ANSWER: Y) THE FIRST ARTIFICIAL SATELLITE

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### TOSS-UP

12) Life Science – *Short Answer* Cellular respiration is used by the cell to produce what energetically relevant molecule?

ANSWER: ATP (ACCEPT: ADENOSINE TRIPHOSPHATE)

### BONUS

12) Life Science – *Short Answer* Carbon dioxide enters plant leaves through what pores?

ANSWER: STOMATA

### TOSS-UP

13) Earth and Space – *Multiple Choice* A characteristic feature of the stratosphere is the relative abundance of:

- W) Clouds
- X) Ozone
- Y) Ions
- Z) Dust

ANSWER: X) OZONE

### BONUS

13) Earth and Space – *Short Answer* What extrusive igneous rock is formed when felsic lava cools rapidly and forms a glassy texture?

ANSWER: OBSIDIAN

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### TOSS-UP

14) Energy – *Short Answer* What commission in the US is responsible for licensing nuclear power plants and overseeing their construction and operation?

ANSWER: NUCLEAR REGULATORY COMMISSION (ACCEPT: NRC)

### BONUS

14) Energy – *Multiple Choice* Barrages with built in sluices are used to harvest energy from what source?

- W) Wind
- X) Tides
- Y) Coal
- Z) Natural gas

ANSWER: X) TIDES

### TOSS-UP

15) Physical Science – *Short Answer* Joseph Priestly discovered that a certain gas could be dissolved in water to form seltzer. What gas is found dissolved in seltzer?

ANSWER: CARBON DIOXIDE

### BONUS

15) Physical Science – *Multiple Choice* What fundamental force is primarily responsible for the formation of black holes?

- W) Strong nuclear
- X) Weak nuclear
- Y) Electromagnetic
- Z) Gravity

ANSWER: Z) GRAVITY

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### TOSS-UP

16) General Science – *Short Answer* The prefix “nano-” refers to 10 raised to what power?

ANSWER: -9

### BONUS

16) General Science – *Multiple Choice* Loudness of a sound is most closely related to what property?

- W) Wavelength
- X) Frequency
- Y) Amplitude
- Z) Harmonics

ANSWER: Y) AMPLITUDE



**TOSS-UP**

17) Math – *Multiple Choice* Which of the following numbers is equivalent to  $7^{-1}$ ?

- W) -7
- X) -1/7
- Y) 1/7
- Z) 7

ANSWER: Y) 1/7

**BONUS**

17) Math – *Short Answer* What is the slope of a line perpendicular to the line with equation  $8y - 2x = 4$ ?

ANSWER: -4

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**TOSS-UP**

18) Earth and Space – *Short Answer* What gemstone type of quartz is purple due to impurities such as iron oxide?

ANSWER: AMETHYST

**BONUS**

18) Earth and Space – *Short Answer* What is the term for the line of longitude at which longitude is defined to be zero degrees?

ANSWER: PRIME MERIDIAN (ACCEPT: GREENWICH MERIDIAN)

### TOSS-UP

19) Math – *Short Answer* Simplify the expression: negative  $2t$  – open parenthesis  $9 - 10t$  close parenthesis.

ANSWER:  $8t - 9$

### BONUS

19) Math – *Short Answer* On average, Shelley makes three free throws for every five that she attempts. If she attempts 30 free throws, how many is she expected to make?

ANSWER: 18

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### TOSS-UP

20) Physical Science – *Multiple Choice* Which type of radiation has the greatest ability to penetrate matter?

- W) Gamma rays
- X) Beta particles
- Y) Alpha particles
- Z) X-rays

ANSWER: W) GAMMA RAYS

### BONUS

20) Physical Science – *Short Answer* What property of a sound wave is most directly associated with pitch?

ANSWER: FREQUENCY

### TOSS-UP

21) General Science – *Short Answer* What electrical circuit component is described by a physical property measured in farads?

ANSWER: CAPACITOR

### BONUS

21) General Science – *Multiple Choice* Which type of bulk transport across the plasma membrane accounts for the majority of secretion processes?

- W) Phagocytosis
- X) Endocytosis
- Y) Exocytosis
- Z) Pinocytosis

ANSWER: Y) EXOCYTOSIS

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### TOSS-UP

22) Life Science – *Multiple Choice* Bacteria are more likely used to produce which of the following:

- W) Gelatin
- X) Honey
- Y) Pasteurized Milk
- Z) Vinegar

ANSWER: Z) VINEGAR

### BONUS

22) Life Science – *Short Answer* What is the pattern of inheritance when one allele is not completely dominant over another?

ANSWER: INCOMPLETE DOMINANCE

### **TOSS-UP**

23) Energy – *Short Answer* Order the following three sources of electricity generation from least to greatest in terms of percentage usage in the United States: 1) Natural gas; 2) Petroleum; 3) Nuclear.

ANSWER: 2, 3, 1

### **BONUS**

23) Energy – *Short Answer* Place the following three choices in order as to the percentage of total energy usage in a typical US single family home, from highest to lowest: 1) Electronics; 2) Heating; 3) Appliances.

ANSWER: 2, 3, 1