

ROUND 6A

TOSS-UP

1) Earth and Space – *Multiple Choice* Which of the following is a scale of earthquake intensity?

- W) Saffir-Simpson
- X) Fujita
- Y) EF-scale
- Z) Moment magnitude

ANSWER: Z) MOMENT MAGNITUDE

BONUS

1) Earth and Space – *Short Answer* What is the term for subsoil that remains frozen year round?

ANSWER: PERMAFROST

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### TOSS-UP

2) General Science – *Multiple Choice* Which of the following is the study of spiders?

- W) Arachnology [*air-ack-nol-oh-gee*]
- X) Dendrochronology [*den-dro-chron-ol-oh-gee*]
- Y) Planktology
- Z) Lepidopterology [*lep-uh-dop-ter-ol-oh-gee*]

ANSWER: W) ARACHNOLOGY

### BONUS

2) General Science – *Multiple Choice* Which of the following is an example of a high-altitude cloud type?

- W) Altostratus
- X) Stratocumulus
- Y) Stratus
- Z) Cirrocumulus

ANSWER: Z) CIRROCUMULUS

### TOSS-UP

3) Physical Science – *Multiple Choice* Which of the following is formed when three atoms combine to produce a single unit of a larger substance?

- W) Nucleus
- X) Mixture
- Y) Solution
- Z) Molecule

ANSWER: Z) MOLECULE

### BONUS

3) Physical Science – *Short Answer* Identify all of the following four quantities that are considered vector quantities: 1) Mass; 2) Velocity; 3) Speed; 4) Acceleration.

ANSWER: 2 AND 4

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TOSS-UP

4) Life Science – *Short Answer* What infectious particles consist of nucleic acids packaged into a protein coat?

ANSWER: VIRUS

BONUS

4) Life Science – *Multiple Choice* Eukaryotic and prokaryotic cells both contain:

- W) Cytoplasmic organelles
- X) Nuclear membrane
- Y) Cell membrane
- Z) Chromosomal proteins

ANSWER: Y) CELL MEMBRANE

TOSS-UP

5) Energy – *Short Answer* What are the two gases used to power the first generation fuel cell cars?

ANSWER: HYDROGEN AND OXYGEN

BONUS

5) Energy – *Short Answer* To the nearest ten percent, what percent of the sun's energy that hits the Earth is reflected back into space?

ANSWER: 30



TOSS-UP

6) Math – *Multiple Choice* What is the distance of the point (2, 3) from the origin?

- W) Square root of 5
- X) Square root of 13
- Y) 5
- Z) 13

ANSWER: X) SQUARE ROOT OF 13

BONUS

6) Math – *Short Answer* Given the linear function $f(x) = 3x + b$, if $f(-1) = 7$, what is $f(5)$?

ANSWER: 25

TOSS-UP

7) Earth and Space – *Short Answer* Scientists were able to determine that the outer core of the Earth is a liquid because what seismic waves cannot pass through it?

ANSWER: SECONDARY WAVES (ACCEPT: S-WAVES)

BONUS

7) Earth and Space – *Multiple Choice* Which of the following features is created by a volcano?

- W) Fjord
- X) Caldera
- Y) Moraine
- Z) Esker

ANSWER: X) CALDERA

TOSS-UP

8) Physical Science – *Multiple Choice* In a vacuum, all photons have the same:

- W) Speed
- X) Frequency
- Y) Wavelength
- Z) Energy

ANSWER: W) SPEED

BONUS

8) Physical Science – *Short Answer* What is the efficiency of an engine that consumes 7500 Joules of energy to load a box that requires 4500 Joules of work?

ANSWER: 60%

TOSS-UP

9) General Science – *Multiple Choice* What astronomical measurement is analogous to latitude?

- W) Declination
- X) Right ascension
- Y) Conjunction
- Z) Superposition

ANSWER: W) DECLINATION

BONUS

9) General Science – *Short Answer* Halite is composed of what two elements?

ANSWER: SODIUM AND CHLORINE (Accept: Na AND Cl)

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### TOSS-UP

10) Math – *Short Answer* A father's age is twice that of his son. Expressed as a fraction, what is the ratio of the son's age to the father's age?

ANSWER: 1/2

### BONUS

10) Math – *Short Answer* If  $x$  and  $y$  are positive, simplify the following expression: the fraction with numerator  $4x^5y^{-1}$  and denominator  $3x^{-4}y^2$ .

ANSWER:  $(4x^9)/(3y^3)$

### TOSS-UP

11) Energy – *Short Answer* Most gasoline in the United States is E10, meaning that 10% of its content is made up of what?

ANSWER: ETHANOL

### BONUS

11) Energy – *Multiple Choice* Which of the following countries generates the highest percentage of its electricity by nuclear power?

- W) Japan
- X) France
- Y) United States
- Z) Russia

ANSWER: X) FRANCE

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TOSS-UP

12) Life Science – *Short Answer* By what process does a mother cell split into two genetically identical daughter cells?

ANSWER: MITOSIS

BONUS

12) Life Science – *Multiple Choice* Which of the following types of plant cell tissue is considered most important for structural support?

- W) Mesophyll
- X) Parenchyma [*pahr-ehn-ky-muh*]
- Y) Collenchyma [*cohl-ehn-ky-muh*]
- Z) Sclerenchyma [*skleh-rehn-ky-muh*]

ANSWER: Z) SCLERENCHYMA

TOSS-UP

13) Math – *Short Answer* For what value of x does the graph of the function $y = -5x + 15$ cross the x -axis?

ANSWER: 3

BONUS

13) Math – *Short Answer* What two numbers have a sum of 36 and a product of 323?

ANSWER: 17 AND 19



TOSS-UP

14) Life Science – *Multiple Choice* Which of the following pairs of structures both contain linear DNA?

- W) Animal cell nucleus and chloroplast
- X) Animal cell nucleus and plant cell nucleus
- Y) Fungal cell nucleus and mitochondria
- Z) Mitochondria and bacteria

ANSWER: X) ANIMAL CELL NUCLEUS AND PLANT CELL NUCLEUS

BONUS

14) Life Science – *Short Answer* What green pigment gives plants their color?

ANSWER: CHLOROPHYLL

TOSS-UP

15) Earth and Space – *Multiple Choice* Which of the following variables is most responsible for lake stratification?

- W) Wind
- X) Biological activity
- Y) Temperature
- Z) Current

ANSWER: Y) TEMPERATURE

BONUS

15) Earth and Space – *Short Answer* What is the term for the days during which the Sun is furthest south or north of the equator?

ANSWER: SOLSTICES



TOSS-UP

16) General Science – *Multiple Choice* Which of the following causes the Coriolis Effect?

- W) Mesospheric winds
- X) Strong electric field gradients
- Y) Tidal forces
- Z) The Earth's easterly rotation

ANSWER: Z) THE EARTH'S EASTERLY ROTATION

BONUS

16) General Science – *Short Answer* What term is used to describe the ever-increasing amount of “disorder” in the universe?

ANSWER: ENTROPY

TOSS-UP

17) Physical Science – *Multiple Choice* A cubic centimeter of water has a mass of almost exactly one of which of the following?

- W) Milliliter
- X) Kilogram
- Y) Gram
- Z) Fluid ounce

ANSWER: Y) GRAM

BONUS

17) Physical Science – *Short Answer* What is the chemical formula of magnesium nitrate?

ANSWER: $Mg(NO_3)_2$

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### TOSS-UP

18) Energy – *Multiple Choice* Which of the following materials yields the greatest percentage reduction in energy to manufacture when it is made from recycled material rather than from raw materials?

- W) Aluminum
- X) Glass
- Y) Newsprint
- Z) Plastics

ANSWER: W) ALUMINUM

### BONUS

18) Energy – *Short Answer* What is the term for the total energy used to manufacture a finished product, including the energy to extract raw materials from nature, plus the energy used in primary and secondary manufacturing activities?

ANSWER: EMBODIED ENERGY (ACCEPT: EMBEDDED ENERGY)

### TOSS-UP

19) Physical Science – *Multiple Choice* Water is formed when oxygen and hydrogen undergo what process?

- W) Homogeneous mixture
- X) Hydrophobic reaction
- Y) Chemical reaction
- Z) Spontaneous condensation

ANSWER: Y) CHEMICAL REACTION

### BONUS

19) Physical Science – *Short Answer* How many bonds exists between two nitrogen atoms in dinitrogen gas?

ANSWER: THREE



### TOSS-UP

20) Math – *Short Answer* In how many different orders can you play 5 songs once each?

ANSWER: 120

### BONUS

20) Math – *Multiple Choice* Which of the following equations represents a line with slope of  $7/5$ ?

- W)  $5x + 7y - 11 = 0$
- X)  $7x = -5y - 12$
- Y)  $7x - 5y = 14$
- Z)  $7y/5 = x + 4$

ANSWER: Y)  $7x - 5y = 14$

### TOSS-UP

21) Life Science – *Short Answer* Sand dollars, sea stars, sea cucumbers, and sea urchins all belong to what phyla?

ANSWER: ECHINODERMATA

### BONUS

21) Life Science – *Short Answer* Rubisco can use oxygen as a substrate in a process known as what?

ANSWER: PHOTORESPIRATION



### TOSS-UP

22) General Science – *Multiple Choice* A lunar eclipse occurs when:

- W) The moon casts a shadow on the earth
- X) The earth casts a shadow on the moon
- Y) The earth, sun, and moon form a 90° angle
- Z) The moon casts a shadow on the sun

ANSWER: X) THE EARTH CASTS A SHADOW ON THE MOON

### BONUS

22) General Science – *Short Answer* Alfred Wegener proposed what theory, which suggested that 200 million years ago, a supercontinent named Pangaea existed?

ANSWER: CONTINENTAL DRIFT

### **TOSS-UP**

23) Earth and Space – *Short Answer* What is the term for exceptionally bright stars that are up to 1000 times the sun's diameter?

ANSWER: SUPERGIANTS

### **BONUS**

23) Earth and Space – *Short Answer* Most of the convection that occurs in the Earth occurs in what layer?

ANSWER: MANTLE