

## ROUND 1

### TOSS-UP

1) BIOLOGY *Short Answer* What is the most common term for the substance recognized as foreign and able to elicit antibody production:

ANSWER: ANTIGEN

### BONUS

1) BIOLOGY *Multiple Choice* Mendel succeeded in forming the basis of modern hereditary theory in part because of his training:

W) as a printer of rare and scientific documents

X) in calligraphy of scientific manuscripts for the Royal Austrian Science Society

Y) in probability and mathematics

Z) as a scientific apostolic nuncio

ANSWER: Y) IN PROBABILITY AND MATHEMATICS

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### TOSS-UP

2) CHEMISTRY *Short Answer* Which of the halogens is a liquid at room temperature:

ANSWER: BROMINE

### BONUS

2) CHEMISTRY *Short Answer* What is the general term for a salt of one of the halogens?

ANSWER: HALIDE

### TOSS-UP

3) PHYSICS *Short Answer* What is the unit for electric current equal to 1 coulomb per second?

ANSWER: AMPERE (ACCEPT: AMP)

### BONUS

3) PHYSICS *Multiple Choice* Which of the following is the most dense at standard temperature and pressure:

- W) 10 kilograms of pure water
- X) 10 kilograms of tungsten
- Y) 2 kilograms of silver
- Z) 1 kilogram of mercury

ANSWER: X) 10 KILOGRAMS OF TUNGSTEN

(Solution: W = 1.0 g/cc, Hg = 13.5 g/cc, Ag = 10.5 g/cc, H<sub>2</sub>O = 1.0 g/cc)

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### TOSS-UP

4) ASTRONOMY *Short Answer* As of the summer of 2001, what planet was shown to have the most known moons orbiting it in our solar system?

ANSWER: SATURN

### BONUS

4) ASTRONOMY *Short Answer* What is another name for minor planets, starlike bodies, or planetoids, the vast majority of which have orbits roughly midway between the orbits of Jupiter and Mars?

ANSWER: ASTEROIDS

### TOSS-UP

5) MATH *Short Answer* What is the perimeter of a right triangle whose leg lengths are 6 and 8 and whose hypotenuse is 10?

ANSWER: 24

(Solution: perimeter =  $6+8+10=24$ )

### BONUS

5) MATH *Short Answer* The average of -40, 36, 5, 0, 10 and  $x$  is 5. What is the value of  $x$ ?

ANSWER: 19

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### TOSS-UP

6) EARTH SCIENCE *Multiple Choice* Boundaries that form where lithospheric plates are breaking apart to move away from each other are called:

- W) transform boundaries
- X) divergent margin boundaries
- Y) suture zone boundaries
- Z) subduction boundaries

ANSWER: X) DIVERGENT MARGIN BOUNDARIES

### BONUS

6) EARTH SCIENCE *Short Answer* Based on compositional boundaries, name the three different layers that make up the structure of the solid portion of the planet Earth?

ANSWER: CORE, MANTLE, CRUST (accept in any order)

### TOSS-UP

7) GENERAL SCIENCE *Short Answer* What do the abbreviations TC and TD stand for that are seen on some laboratory pipettes?

ANSWER: TO CONTAIN AND TO DELIVER

### BONUS

7) GENERAL SCIENCE *Short Answer* What Greek letter is used to symbolize wavelength?

ANSWER: LAMBDA

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### TOSS-UP

8) COMPUTER SCIENCE *Multiple Choice* Software that is often distributed free of charge and usually intended for sale after a trial period is called:

- W) freeware
- X) shareware
- Y) open source
- Z) public-domain

ANSWER: X) SHAREWARE

### BONUS

8) COMPUTER SCIENCE *Short Answer* The binary number 10101 (read as: one, zero, one, zero, one) is equivalent to what decimal number?

ANSWER: 21

(Solution:  $1 + 4 + 16 = 21$ )



### TOSS-UP

9) BIOLOGY *Short Answer* What is the most common scientific term for plant water loss through stomata:

ANSWER: TRANSPIRATION

### BONUS

9) BIOLOGY *Short Answer* What are the four main human blood types?

ANSWER: O, A, B, AND AB (accept in any order)

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### TOSS-UP

10) CHEMISTRY *Multiple Choice* Which of the following atomic features is the most important in controlling the reactivity of an atom:

- W) core electrons
- X) valence-shell electrons
- Y) protons
- Z) neutrons

ANSWER: X) VALENCE-SHELL ELECTRONS

### BONUS

10) CHEMISTRY *Short Answer* What is the rule that states that main-group elements tend to undergo reactions that leave them with 8 outer-shell electrons?

ANSWER: OCTET RULE

**TOSS-UP**

11) PHYSICS *Short Answer* How many nanometers are in an angstrom?

ANSWER: 0.1 (ACCEPT: ONE-TENTH)

**BONUS**

11) PHYSICS *Short Answer* For a perfectly spherical planet of uniform density, the gravitational acceleration at a point half way to the surface from its center will be what fraction of the gravitational acceleration at the surface?

ANSWER: 1/2

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**TOSS-UP**

12) ASTRONOMY *Short Answer* What planet is the most distant gas giant from the sun?

ANSWER: NEPTUNE

**BONUS**

12) ASTRONOMY *Multiple Choice* Refracting telescopes always contain which of the following:

- W) mirrors
- X) lenses
- Y) television systems
- Z) film

ANSWER: X) LENSES

**TOSS-UP**

13) MATH *Short Answer* What is the remainder of  $(148 + 10) / 7$ ?

ANSWER: 4

**BONUS**

13) MATH *Short Answer* If  $y$  varies directly as  $x$ , and  $y = 42$  when  $x = 30$ , find  $y$  if  $x = 45$ :

ANSWER: 63

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**TOSS-UP**

14) EARTH SCIENCE *Multiple Choice* Which of the following types of moraines does NOT parallel ice flow:

- W) medial
- X) lateral
- Y) double lateral
- Z) end

ANSWER: Z) END

**BONUS**

14) EARTH SCIENCE *Multiple Choice* The combination of lingering air and abundance of particulates and other pollutants in the air over cities produces what is commonly known as the:

- W) urban depletion area
- X) urban dust dome
- Y) urban frontal zone
- Z) urban overcast zone

ANSWER: X) URBAN DUST DOME

### TOSS-UP

15) GENERAL SCIENCE *Short Answer* Rounded to the nearest decimal place, convert 13 Kelvin into degrees Centigrade:

ANSWER: -260

### BONUS

15) GENERAL SCIENCE *Short Answer* Express the number 9587.3 in proper scientific notation with the correct amount of significant figures:

ANSWER:  $9.5873 \times 10^3$

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### TOSS-UP

16) COMPUTER SCIENCE *Multiple Choice* The file extension .MID (read as: dot, M, I, D) usually means that the file can be opened by what type of program:

- W) text editor
- X) graphics
- Y) database
- Z) music

ANSWER: Z) MUSIC

### BONUS

16) COMPUTER SCIENCE *Short Answer* The decimal number 15 is equivalent to what octal number?

ANSWER: 17

**TOSS-UP**

17) BIOLOGY *Short Answer* The spines of cacti are a modification of what plant structure?

ANSWER: LEAF (ACCEPT: LEAVES)

**BONUS**

17) BIOLOGY *Short Answer* What is the most common biochemical term for the degradative phases of metabolism?

ANSWER: CATABOLISM

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**TOSS-UP**

18) CHEMISTRY *Short Answer* In the periodic table, what name is given to the number representing the total of a given element's protons and neutrons?

ANSWER: ATOMIC MASS

**BONUS**

18) CHEMISTRY *Short Answer* What is the general term for a bond in which the shared bonding electrons are attracted somewhat more strongly by one atom than the other?

ANSWER: POLAR COVALENT BOND



**TOSS-UP**

19) PHYSICS *Short Answer* In additive color synthesis, what do equal proportions of two primary colors create?

ANSWER: A SECONDARY COLOR

**BONUS**

19) PHYSICS *Short Answer* If the speed of a charged particle is doubled while it is moving in a circular orbit in a uniform magnetic field, by what multiple will the orbital radius increase?

ANSWER: 2

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**TOSS-UP**

20) ASTRONOMY *Short Answer* Which of the Galilean moons orbiting Jupiter is the most geologically active object in the entire solar system, commonly referred to as the “pizza moon,” and has the longest diameter of 3,630 kilometers?

ANSWER: IO

**BONUS**

20) ASTRONOMY *Short Answer* The Tharsis bulge is the major geological feature of what planet?

ANSWER: MARS

**TOSS-UP**

21) MATH *Short Answer* The price of a postage stamp changes from 33 cents to 34 cents. What is the percent increase in price?

ANSWER: 3 (ACCEPT: 3.03)

**BONUS**

21) MATH *Short Answer* After a 20% increase, the new price of a tennis racket is \$180.00. What was the original price of the racket?

ANSWER: \$150.00

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**TOSS-UP**

22) EARTH SCIENCE *Multiple Choice* What scale is used to classify the strength of hurricanes based on its greatest wind speed:

- W) Saffir-Simpson
- X) Beaufort
- Y) Modified Mercalli
- Z) Fujita

ANSWER: W) SAFFIR-SIMPSON

**BONUS**

22) EARTH SCIENCE *Multiple Choice* Which of the following is NOT classified as a low-level cloud:

- W) altostratus
- X) nimbostratus
- Y) stratocumulus
- Z) stratus

ANSWER: W) ALTOSTRATUS

**TOSS-UP**

23) BIOLOGY *Short Answer* To prepare a tincture of iodine the iodine is mixed in what general type of solvent?

ANSWER: ALCOHOL

**BONUS**

23) BIOLOGY *Short Answer* What person, in 1676, reported to the Royal Society of London the first known observations of protozoans?

ANSWER: ANTON VAN LEEUWENHOEK (ACCEPT: LEEUWENHOEK)

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**TOSS-UP**

24) CHEMISTRY *Short Answer* What is the name of the element with the symbol Sb?

ANSWER: ANTIMONY

**BONUS**

24) CHEMISTRY *Short Answer* Which element has the lowest ionization energy of all stable neutral atoms?

ANSWER: CESIUM (ACCEPT: CS)

### TOSS-UP

25) PHYSICS *Short Answer* According to the typical color triangle, what are the three primary colors of light?

ANSWER: RED, GREEN, AND BLUE

### BONUS

25) PHYSICS *Short Answer* That no two electrons in an atom can have an identical set of quantum numbers is best known as what principle?

ANSWER: PAULI EXCLUSION PRINCIPLE (ACCEPT: EXCLUSION PRINCIPLE)