

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

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, H₂O = 1.0 g/cc)

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

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

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)

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

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

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: 9.5873×10^3

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

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

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

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)

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)