

ROUND 8

TOSS-UP

1) EARTH SCIENCE *Multiple Choice* Which of the following is NOT generally characteristic of oceanic-continental plate boundaries:

- W) high mountain systems
- X) wide continental shelves
- Y) ocean trenches
- Z) earthquake prone areas

ANSWER: X) WIDE CONTINENTAL SHELVES

BONUS

1) EARTH SCIENCE *Multiple Choice* Which of the following is an example of an island arc collision zone:

- W) Japan
- X) Oregon
- Y) Maine
- Z) Chile and Peru

ANSWER: W) JAPAN

TOSS-UP

2) MATH *Short Answer* In what quadrant of the coordinate system are both x and y negative?

ANSWER: 3 (ACCEPT: III or THIRD)

BONUS

2) MATH *Short Answer* Bottled water is selling for 60-cents per bottle. If you buy a dozen bottles and hand the cashier a ten-dollar bill, how much change are you owed, in dollars and cents?

ANSWER: \$2.80

TOSS-UP

3) GENERAL SCIENCE *Multiple Choice* Which of the following is CLOSEST to the volume of 4 liters in quarts:

- W) 3.8
- X) 4.0
- Y) 4.2
- Z) 4.4

ANSWER: Y) 4.2

(Solution: 1 L = 1.06 q; 4 L = 4.24 q)

BONUS

3) GENERAL SCIENCE *Short Answer* Arrange the following 3 choices in order of INCREASING mass: largest moon of Saturn; Brown dwarf star; Earth

ANSWER: LARGEST MOON OF SATURN; EARTH; BROWN DWARF STAR

TOSS-UP

4) LIFE SCIENCE *Multiple Choice* Which of the following terms do biologists most often use to describe animals that do not move by their own design or effort:

- W) saprophytic
- X) instar
- Y) motile
- Z) sessile

ANSWER: Z) SESSILE

BONUS

4) LIFE SCIENCE *Short Answer* What is the base nucleotide to which adenine binds on its opposing strand in DNA?

ANSWER: THYMINE

TOSS-UP

5) PHYSICAL SCIENCE *Short Answer* Light typically travels in waves that are oriented in all planes traveling in a given direction. What is the term for light waves that are traveling in one plane?

ANSWER: POLARIZED (ACCEPT: LINEAR POLARIZED)

BONUS

5) PHYSICAL SCIENCE *Short Answer* Name all of the following 4 choices that are electromagnetic radiation: radio waves; x-rays; cathode rays; visible light

ANSWER: ALL

TOSS-UP

6) EARTH SCIENCE *Short Answer* Name all the planets that appear to have phases like our Moon to Earthbound observers?

ANSWER: MERCURY; VENUS

BONUS

6) EARTH SCIENCE *Multiple Choice* The greatest annual variation in the intensity of solar radiation on Earth throughout the year is in which of the following locations:

- W) tropics
- X) north of the Arctic Circle
- Y) south of the Antarctic Circle
- Z) temperate, middle latitude zone

ANSWER: Z) TEMPERATE, MIDDLE LATITUDE ZONE

TOSS-UP

7) MATH *Multiple Choice* Pick any arbitrary point in the interior of a circle 12-inches in diameter and cut the circle into 8 slices by cutting at 45° angles through that arbitrary point. If you color alternate pieces blue and yellow, then the total area of the blue slices will:

- W) equal the area of the yellow slices
- X) be twice the area of the yellow slices
- Y) be one-half the area of the yellow slices
- Z) be one-third the area of the yellow slices

ANSWER: W) EQUAL THE AREA OF THE YELLOW SLICES

BONUS

7) MATH *Short Answer* Consider the four angles formed by two intersecting lines. If one angle measures 50° , find the measure of the remaining three angles, in degrees:

ANSWER: 50; 130; 130

TOSS-UP

8) GENERAL SCIENCE *Multiple Choice* Which of the following is NOT a property of diamonds:

- W) extremely hard
- X) transparent
- Y) poor thermal conductor
- Z) good electrical insulator

ANSWER: Y) POOR THERMAL CONDUCTOR

BONUS

8) GENERAL SCIENCE *Short Answer* Give the Roman numeral equivalent of 2009:

ANSWER: MMIX (DO NOT ACCEPT: MMVIII)

TOSS-UP

9) LIFE SCIENCE *Short Answer* What anatomical structure in boney fish allows them to adjust their buoyancy and stay afloat without swimming?

ANSWER: SWIMBLADDER (ACCEPT: AIR BLADDER or GAS BLADDER)

BONUS

9) LIFE SCIENCE *Short Answer* What is the most common name for the fluid in a spider that serves a similar function to blood in vertebrates?

ANSWER: HAEMOLYMPH (ACCEPT: HEMOLYMPH)

TOSS-UP

10) PHYSICAL SCIENCE *Multiple Choice* In which of the following units would capacitance most likely be given:

- W) webers
- X) farads
- Y) teslas
- Z) ohms

ANSWER: X) FARADS

BONUS

10) PHYSICAL SCIENCE *Short Answer* Name all of the following 3 choices that are DC voltage sources: 9-volt battery; lightning; static electricity

ANSWER: ALL

TOSS-UP

11) EARTH SCIENCE *Multiple Choice* Which of the following best describes how volcanic glass or obsidian is formed:

- W) magma cools rapidly and crystals do not form
- X) magma cools slowly and 1 large crystal is formed
- Y) magma cools in direct contact with water
- Z) magma is heated, cooled, then reheated

ANSWER: W) MAGMA COOLS RAPIDLY AND CRYSTALS DO NOT FORM

BONUS

11) EARTH SCIENCE *Multiple Choice* The dominant component of most magma is:

- W) carbon
- X) sulfur dioxide
- Y) silicon dioxide
- Z) nitrogen

ANSWER: Y) SILICON DIOXIDE

TOSS-UP

12) MATH *Short Answer* Any number, except zero, to the zero power equals what?

ANSWER: 1

BONUS

12) MATH *Short Answer* Give the numerical value of 20 factorial divided by 18 factorial:

ANSWER: 380

TOSS-UP

13) GENERAL SCIENCE *Short Answer* From what element are most semiconductors primarily composed?

ANSWER: SILICON

BONUS

13) GENERAL SCIENCE *Multiple Choice* Which of the following is CLOSEST to 56 miles per hour in kilometers per hour:

- W) 20
- X) 50
- Y) 90
- Z) 120

ANSWER: Y) 90

TOSS-UP

14) LIFE SCIENCE *Short Answer* What organelle with attached ribosomes is most directly responsible for the translation of proteins destined to be transported out of the cell?

ANSWER: ENDOPLASMIC RETICULUM
(ACCEPT: ER or RER or ROUGH ER or ROUGH ENDOPLASMIC RETICULUM)
(DO NOT ACCEPT: SER or SMOOTH ER or SMOOTH ENDOPLASMIC RETICULUM)

BONUS

14) LIFE SCIENCE *Short Answer* Name all of the following 4 functional groups that are found in all amino acids: carboxyl; ketone; amino; phosphate

ANSWER: CARBOXYL; AMINO

TOSS-UP

15) PHYSICAL SCIENCE *Short Answer* What is the resultant force when a force of 50 newtons is opposed in an opposite direction by a 10-newton force?

ANSWER: 40

BONUS

15) PHYSICAL SCIENCE *Short Answer* A dog-sled team runs at 15 kilometers per hour for 6 hours and gets stuck in a partially melted lake for 3 hours, where it make no progress. It then runs at 10 kilometers per hour for another 5 hours and crosses the finish line. What is the dog sled team's average speed for the entire race, in kilometers per hour?

ANSWER: 10

(Solution: $(6 \times 15 = 90) + (5 \times 10 = 50) = 140$; $140/14 = 10$ km/hr)

TOSS-UP

16) EARTH SCIENCE *Multiple Choice* Banded iron formations that are present in mountain ranges around the world formed during the Achaean Era as a direct result of the presence of:

- W) nitrogen
- X) oxygen
- Y) hydrogen
- Z) methane

ANSWER: X) OXYGEN

BONUS

16) EARTH SCIENCE *Multiple Choice* Which of the following is a carbonate mineral:

- W) halite
- X) fluorite
- Y) feldspar
- Z) dolomite

ANSWER: Z) DOLOMITE

TOSS-UP

17) MATH *Short Answer* How many terms are in the following variable expression and what is the coefficient of the second term: $5x^2 - x - 12yz^2 + 9$

ANSWER: TERMS = 4; COEFFICIENT = -1

BONUS

17) MATH *Short Answer* Sue and Sierra are making necklaces. If Sue makes an average of 3 every 30 minutes and Sierra averages 6 every hour, how many necklaces do they average every hour if they work together?

ANSWER: 12

(Solution: $3/0.5 + 6/1 = 12$)

TOSS-UP

18) GENERAL SCIENCE *Short Answer* What specific cell in your body becomes sickle-shaped if you are afflicted with sickle cell anemia?

ANSWER: RED BLOOD CELL (ACCEPT: RBC or ERYTHROCYTE or RED CORPUSCLE)

BONUS

18) GENERAL SCIENCE *Short Answer* Name all of the following 4 laboratory tools that would require a user to read a meniscus: graduated pipet; pH paper; watch glass; Buchner funnel

ANSWER: GRADUATED PIPET

TOSS-UP

19) LIFE SCIENCE *Short Answer* What is the most common name of the plant pigments that give fruits and many plant parts their orange color?

ANSWER: CAROTENOIDS

BONUS

19) LIFE SCIENCE *Multiple Choice* Which of the following organisms has an archegonium:

- W) moss
- X) bird
- Y) frog
- Z) oak tree

ANSWER: W) MOSS

TOSS-UP

20) PHYSICAL SCIENCE *Short Answer* What is the most commonly used scientific name for the compound with the chemical formula $C_6H_{12}O_6$, which is a product of photosynthesis?

ANSWER: GLUCOSE (ACCEPT: D-GLUCOSE or DEXTROSE)

BONUS

20) PHYSICAL SCIENCE *Short Answer* Arrange the following 4 substances in order of DECREASING pH: normal human saliva; black coffee; bleach; stomach acid

ANSWER: BLEACH; NORMAL HUMAN SALIVA; BLACK COFFEE; STOMACH ACID

(Solution: bleach = 13; saliva = 6.5-7.4; coffee = 5; stomach acid = 2)

TOSS-UP

21) EARTH SCIENCE *Multiple Choice* Stratovolcanoes are typically found in which of the following locations:

- W) continents and volcanic arcs
- X) the abyssal plain
- Y) along basaltic plateaus
- Z) above hot spots in Earth's crust

ANSWER: W) CONTINENTS AND VOLCANIC ARCS

BONUS

21) EARTH SCIENCE *Multiple Choice* Which of the following is NOT true of the troposphere:

- W) the air is much dryer above the troposphere
- X) the troposphere is 78% nitrogen gas and 21% oxygen gas
- Y) the troposphere extends from the Earth's surface up to an average of 27 miles
- Z) the troposphere ends where temperature no longer varies with height

ANSWER: Y) THE TROPOSPHERE EXTENDS FROM THE EARTH'S SURFACE UP TO AN AVERAGE OF 27 MILES

TOSS-UP

22) MATH *Short Answer* For the equation $y = mx + b$, b represents what value?

ANSWER: Y-INTERCEPT (ACCEPT: WHERE THE LINE CROSSES THE Y OR ORDINATE AXIS)

BONUS

22) MATH *Short Answer* Find a number such that 10-times the number reduced by 3 equals 4-times the number increased by 15:

ANSWER: 3

(Solution: $10x - 3 = 4x + 15$)

TOSS-UP

23) GENERAL SCIENCE *Short Answer* From what constellation do the Geminids meteor shower appear to originate?

ANSWER: GEMINI

BONUS

23) GENERAL SCIENCE *Multiple Choice* Which of the following astronomers devised a system of the orbits for the planets that is considered heliocentric and published in his book “On the Revolutions of the Heavenly Spheres”:

- W) Galileo
- X) Copernicus
- Y) Newton
- Z) Kepler

ANSWER: X) COPERNICUS

TOSS-UP

24) LIFE SCIENCE *Short Answer* How many pairs of wings do beetles typically have?

ANSWER: 2

BONUS

24) LIFE SCIENCE *Short Answer* How many cervical vertebrae are found in most mammals?

ANSWER: 7

TOSS-UP

25) PHYSICAL SCIENCE *Short Answer* How many wavelengths per second are equal to 5 kilohertz?

ANSWER: 5,000

BONUS

25) PHYSICAL SCIENCE *Short Answer* What is the percent efficiency for a lever that has a work input of 2,000 joules and a work output of 1,600 joules?

ANSWER: 80

(Solution: %efficiency = Work out/ Work in \times 100 \rightarrow 1600/2000 \times 100 = 80%)