

ROUND 5

TOSS-UP

1) GENERAL SCIENCE *Multiple Choice* Which of the following does the prefix “photo” (spell out the letters p, h, o, t, o) mean, as in the word photometer:

- W) record (read as: REE-cord)
- X) light
- Y) measure
- Z) expose

ANSWER: X) LIGHT

BONUS

1) GENERAL SCIENCE *Short Answer* Arrange the following 3 choices in order of DECREASING average size: blood platelet; grain of common table salt; ragweed pollen

ANSWER: GRAIN OF SALT; RAGWEED POLLEN; BLOOD PLATELET

TOSS-UP

2) LIFE SCIENCE *Multiple Choice* Which of the following is NOT a structure found in human cells:

- W) mitochondrion
- X) cell wall
- Y) lysosome
- Z) peroxisome

ANSWER: X) CELL WALL

BONUS

2) LIFE SCIENCE *Multiple Choice* Which of the following is closest to the meaning of intercellular (read carefully as: in-TER-cellular):

- W) from within cells
- X) between cells
- Y) inside of cells
- Z) underneath cells

ANSWER: X) BETWEEN CELLS

TOSS-UP

3) PHYSICAL SCIENCE *Multiple Choice* Which of the following must be TRUE for a tree that doubled its mass over a growing period of 2 years:

- W) it has doubled its volume
- X) it has doubled its number of atoms
- Y) it has doubled its inertia
- Z) it has doubled its density

ANSWER: Y) IT HAS DOUBLED ITS INERTIA

BONUS

3) PHYSICAL SCIENCE *Short Answer* What is the ideal mechanical advantage of a ramp that is 24 meters long and 4 meters higher at one end versus the other?

ANSWER: 6

(Solution: input distance/output distance: $24/4 = 6$)

TOSS-UP

4) EARTH SCIENCE *Multiple Choice* The presence of which of the following is evidence that 2 valley glaciers have or had at one time joined into a larger glacier:

- W) perpendicular striation pattern
- X) overlapping end moraines
- Y) medial moraine
- Z) V-shaped valley

ANSWER: Y) MEDIAL MORAINE

BONUS

4) EARTH SCIENCE *Multiple Choice* Which of the following is NOT generally true regarding glaciers:

- W) the Antarctic ice sheet is depressing the crust of the Earth
- X) we are currently in an interglacial period
- Y) the ice front of a glacier with a large zone of ablation is rapidly advancing
- Z) the Little Ice Age ended around the mid-nineteenth century

ANSWER: Y) THE ICE FRONT OF A GLACIER WITH A LARGE ZONE OF ABLATION IS RAPIDLY ADVANCING

TOSS-UP

5) MATH *Multiple Choice* Which of the following is the exact interval notation for all real numbers greater than or equal to -10 and less than 5 :

W) $(-10, 5]$ (read as: open parenthesis, negative 10, comma, 5, close bracket)

X) $[-10, 5]$ (read as: open bracket, negative 10, comma, 5, close bracket)

Y) $[-10, 5)$ (read as: open bracket, negative 10, comma, 5, close parenthesis)

Z) $(-10, 5)$ (read as: open parenthesis, negative 10, comma, 5, close parenthesis)

ANSWER: Y) $[-10, 5)$

(note: if student interrupts, accept: "bracket, negative or minus 10, 5 parenthesis)

(Solution: bracket for numbers included in the set; parenthesis for # not included in the set)

BONUS

5) MATH *Short Answer* Name all of the following 5 numbers that are NOT prime numbers:

2; 5; 17; 33; 37

ANSWER: 33

TOSS-UP

6) GENERAL SCIENCE *Short Answer* What is the average internal Celsius temperature of the human body?

ANSWER: 37

BONUS

6) GENERAL SCIENCE *Short Answer* By name or number, arrange the following 3 choices from the one with the LOWEST temperature to the HIGHEST temperature: 1) coldest temperature recorded on Earth; 2) average surface temperature of Saturn; 3) coldest ocean water temperature

ANSWER: 2) AVERAGE SURFACE TEMPERATURE OF SATURN; 1) COLDEST TEMPERATURE RECORDED ON EARTH; 3) COLDEST OCEAN WATER TEMPERATURE
(ACCEPT: 2; 1; 3)

TOSS-UP

7) LIFE SCIENCE *Short Answer* What is the name of the blood vessels in vertebrate bodies where most of the exchange of oxygen and carbon dioxide occurs?

ANSWER: CAPILLARIES (ACCEPT: CAPILLARY)

BONUS

7) LIFE SCIENCE *Short Answer* What specific part of the human brain is most responsible for regulating body temperature?

ANSWER: HYPOTHALAMUS

TOSS-UP

8) PHYSICAL SCIENCE *Short Answer* Which one of Newtons Laws of motion most directly deals with the resistance of a body to a change in its motion?

ANSWER: FIRST LAW (ACCEPT: LAW OF INERTIA)

BONUS

8) PHYSICAL SCIENCE *Short Answer* Jerry has a mass of 100 kilograms. He runs with a velocity of 0.5 meters per second. Giving your answer in proper SI units, what is his momentum?

ANSWER: 50 KILOGRAM METERS PER SECOND (must give units)

(Solution: momentum = $mv = (100\text{kg})(0.5\text{ m/s}) = 50\text{ kg}\cdot\text{m/s}$)

TOSS-UP

9) EARTH SCIENCE *Multiple Choice* Which of the following geological terms best refers to deposits of unsorted and unstratified sediments deposited by the movement of a glacier:

- W) till
- X) loess (read as: LUSS)
- Y) varve
- Z) glacial milk

ANSWER: W) TILL

BONUS

9) EARTH SCIENCE *Short Answer* What is the most abundant element in the Sun?

ANSWER: HYDROGEN

TOSS-UP

10) MATH *Multiple Choice* Which of the following is undefined:

- W) $2 \div 0$
- X) $0 \div 2$
- Y) $0 - 0$
- Z) 0^2

ANSWER: W) $2 \div 0$

BONUS

10) MATH *Short Answer* Add the following 2 fractions and give your answer as a mixed fraction

in lowest terms: $\frac{23}{2} + 2\frac{3}{4}$

ANSWER: $14\frac{1}{4}$

TOSS-UP

11) GENERAL SCIENCE *Short Answer* What is the SI base unit used for the intensity of a light source?

ANSWER: CANDELA

BONUS

11) GENERAL SCIENCE *Short Answer* Giving your answer in proper scientific notation, convert 400 grams per liter into milligrams per liter:

ANSWER: 4×10^5

TOSS-UP

12) LIFE SCIENCE *Multiple Choice* Which of the following describes the shape of a bacterial pilus:

- W) a solid sphere
- X) a cuboidal shaped cell
- Y) a thin tube
- Z) a helical thick solid fiber

ANSWER: Y) A THIN TUBE

BONUS

12) LIFE SCIENCE *Short Answer* Name all of the following 4 groups of plants that are legumes: peas; rice; soy beans; peanuts

ANSWER: PEAS; SOY BEANS; PEANUTS (ACCEPT: ALL BUT RICE)

TOSS-UP

13) PHYSICAL SCIENCE *Multiple Choice* The most useful unit of concentration in the chemistry lab is:

- W) mole fraction
- X) mass percent
- Y) normality
- Z) molarity

ANSWER: Z) MOLARITY

BONUS

13) PHYSICAL SCIENCE *Multiple Choice* Which of the following is NOT true of chemical reactions:

- W) they are always reversible
- X) energy is either absorbed or released
- Y) a new substance is formed
- Z) chemical bonds are broken and formed

ANSWER: W) THEY ARE ALWAYS REVERSIBLE

TOSS-UP

14) EARTH SCIENCE *Short Answer* What northward-moving ocean current is the dominant feature generally located off the east coast of the U.S.?

ANSWER: GULF STREAM

BONUS

14) EARTH SCIENCE *Short Answer* Spring tides typically coincide with what 2 phases of the Moon?

ANSWER: FULL; NEW (in any order)

TOSS-UP

15) MATH *Short Answer* What is the length, in inches, of one side of a square if the diagonal measures $7\sqrt{2}$?

ANSWER: 7

BONUS

15) MATH *Short Answer* If the area of a rectangle is 200 centimeters squared and the length is 20 centimeters, what is the perimeter of the rectangle, in centimeters?

ANSWER: 60

(Solution: $200 = (20)(w)$, $w = 10$; $P = 2(20) + 2(10) = 60$ cm)

TOSS-UP

16) GENERAL SCIENCE *Multiple Choice* Which of the following is the study of spiders:

- W) arachnology
- X) dendrochronology
- Y) planktology
- Z) lepidopterology

ANSWER: W) ARACHNOLOGY

BONUS

16) GENERAL SCIENCE *Short Answer* What is the astronomical term for the orbital arrangement of a superior planet with reference to the positions of the Sun and Earth, at which time the superior planet will usually appear its brightest?

ANSWER: OPPOSITION

TOSS-UP

17) LIFE SCIENCE *Multiple Choice* Which of the following is the location of the human thymus gland:

- W) upper chest
- X) inguinal canal
- Y) abdomen
- Z) brain

ANSWER: W) UPPER CHEST

BONUS

17) LIFE SCIENCE *Short Answer* What is the most common globular protein in red blood cells?

ANSWER: HEMOGLOBIN

TOSS-UP

18) PHYSICAL SCIENCE *Multiple Choice* Which of the following is a heterogeneous mixture:

- W) 5.0% glucose solution
- X) rubbing alcohol
- Y) mixture of hydrogen and oxygen gases
- Z) concrete

ANSWER: Z) CONCRETE

BONUS

18) PHYSICAL SCIENCE *Multiple Choice* Which of the following would be the most logical instrument to use when a small amount of suspended particles must be separated from a liquid:

- W) pH meter
- X) centrifuge
- Y) spectrometer
- Z) tweezers

ANSWER: X) CENTRIFUGE

TOSS-UP

19) EARTH SCIENCE *Multiple Choice* Which of the following best describes how stalagmites in caves are formed:

- W) mechanical weathering
- X) chemical weathering
- Y) melting
- Z) decaying

ANSWER: X) CHEMICAL WEATHERING

BONUS

19) EARTH SCIENCE *Multiple Choice* Which of the following is the chief constituent of limestone:

- W) quartz
- X) clay
- Y) sand
- Z) calcite

ANSWER: Z) CALCITE

TOSS-UP

20) MATH *Short Answer* If a line has a slope of 10, what is the slope of every line that is perpendicular to it?

ANSWER: $-\frac{1}{10}$ (ACCEPT: -0.1)

BONUS

20) MATH *Short Answer* Consider an isosceles triangle whose vertex angle measures 20° . Find the measure of one of the EXTERIOR angles, in degrees, at the base of the triangle:

ANSWER: 100

TOSS-UP

21) GENERAL SCIENCE *Short Answer* What is the name of the atomic process that provides the energy for a star to shine?

ANSWER: FUSION

BONUS

21) GENERAL SCIENCE *Short Answer* The zodiac is typically considered to be made of how many constellations?

ANSWER: 12

TOSS-UP

22) LIFE SCIENCE *Multiple Choice* Which of the following is NOT found in prokaryotes:

- W) DNA
- X) RNA
- Y) ribosomes
- Z) golgi

ANSWER: Z) GOLGI

BONUS

22) LIFE SCIENCE *Short Answer* Name all of the following 4 groups of organisms that are insects: flies; beetles; crayfish; moths

ANSWER: FLIES; BEETLES; MOTHS (ACCEPT: ALL BUT CRAYFISH)

TOSS-UP

23) PHYSICAL SCIENCE *Multiple Choice* Ultrasonic sound frequencies are typically considered to be:

- W) above 20 hertz
- X) below 20 hertz
- Y) above 20 kilohertz
- Z) above 2,000 hertz

ANSWER: Y) ABOVE 20 KILOHERTZ

BONUS

23) PHYSICAL SCIENCE *Short Answer* In color synthesis using visible light, what is the most common term for the colors produced by combining equal proportions of two primary colors?

ANSWER: SECONDARY

TOSS-UP

24) EARTH SCIENCE *Multiple Choice* The transfer of energy from the Sun across space is accomplished primarily by:

- W) conduction
- X) convection
- Y) radiation
- Z) radio waves

ANSWER: Y) RADIATION

BONUS

24) EARTH SCIENCE *Short Answer* What layer of Earth's atmosphere starts at about the stratopause and extends upwards to about 55 miles above the Earth?

ANSWER: MESOSPHERE

TOSS-UP

25) MATH *Short Answer* If a car travels at a rate of 50 miles per hour, what is the distance, in miles, traveled in 5 hours?

ANSWER: 250

(Solution: $d = rt = (50\text{mi/hr})(5\text{ hr}) = 250\text{ miles}$)

BONUS

25) MATH *Short Answer* Giving your answer in exponential form, simplify the following expression: $\frac{10^3 \times 10^4}{10^2}$

ANSWER: 10^5