

ROUND 4

TOSS-UP

1) GENERAL SCIENCE *Multiple Choice* An approximate representation or simulation of a system being studied is called which of the following?

- W) Hypothesis
- X) Model
- Y) Experiment
- Z) Scientific law

ANSWER: X) MODEL

BONUS

1) GENERAL SCIENCE *Multiple Choice* Which of the following best represents the proper order of steps in the scientific process?

- W) Test, discuss, observe, hypothesize
- X) Test, observe, discuss, hypothesize
- Y) Observe, hypothesize, test, discuss
- Z) Discuss, observe, hypothesize, test

ANSWER: Y) OBSERVE, HYPOTHESIZE, TEST, DISCUSS

TOSS-UP

2) MATH *Multiple Choice* Which of the following is a polyhedron whose base is a polygon and whose other faces meet at a point?

- W) Pyramid
- X) Cone
- Y) Prism
- Z) Regular polyhedron

ANSWER: W) PYRAMID

BONUS

2) MATH *Short Answer* What is the surface area, in feet squared and to the nearest integer, of a sphere with a radius of 1 foot?

ANSWER: 13

TOSS-UP

3) PHYSICAL SCIENCE *Short Answer* What is the density in grams per cubic centimeter of a substance that has a mass of 50 grams and a volume of 10 cubic centimeters?

ANSWER: 5

BONUS

3) PHYSICAL SCIENCE *Short Answer* If calcium were to combine with bromine to form a neutral molecule, what is the least number of calcium and bromine atoms, respectively, that would be required?

ANSWER: CALCIUM = 1; BROMINE = 2

TOSS-UP

4) ENERGY *Multiple Choice* The energy used in our households comes through electrical lines originating from which of the following locations?

- W) A generation station
- X) A rectifying bridge
- Y) A power supply
- Z) A DC to DC converter

ANSWER: W) A GENERATION STATION

BONUS

4) ENERGY *Multiple Choice* Fuel cells work in which of the following ways?

- W) By converting chemical energy into electrical energy
- X) By processing plant matter to generate electricity
- Y) By converting thermal energy into electrical energy
- Z) By using fossil fuels to generate mechanical energy

ANSWER: W) BY CONVERTING CHEMICAL ENERGY INTO ELECTRICAL ENERGY

TOSS-UP

5) LIFE SCIENCE *Multiple Choice* Which of the following organisms has the most recent common ancestor with humans?

- W) Orangutan
- X) Gorilla
- Y) Chimpanzee
- Z) Lemur

ANSWER: Y) CHIMPANZEE

BONUS

5) LIFE SCIENCE *Short Answer* What metallic element in hemoglobin [*HEE-muh-gloh-bin*] binds oxygen?

ANSWER: IRON

TOSS-UP

6) MATH *Short Answer* A parallelogram has a height of 20 feet. If its area is 600 square feet, what is its base in feet?

ANSWER: 30

BONUS

6) MATH *Short Answer* Giving your answer as a percent, what is the grade, or slope, of a dirt road that rises 20 feet for a horizontal distance of 400 feet?

ANSWER: 5%

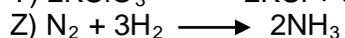
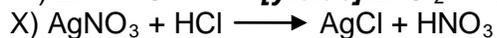
TOSS-UP

7) GENERAL SCIENCE *Short Answer* On a velocity graph, what is the acceleration when the line is level and horizontal?

ANSWER: ZERO

BONUS

7) GENERAL SCIENCE *Multiple Choice* Which of the following represents a synthesis reaction?



ANSWER: Z) $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$

TOSS-UP

8) EARTH AND SPACE *Multiple Choice* Which of the following is characteristic of all plankton?

W) Microscopic

X) Single-celled

Y) Limited in mobility

Z) Photosynthetic

ANSWER: Y) LIMITED IN MOBILITY

BONUS

8) EARTH AND SPACE *Short Answer* What is the name for igneous **[IG-nee-uhs]** rock that cuts across the structure of adjoining rock, usually as a result of magma intrusion?

ANSWER: DIKE

TOSS-UP

9) PHYSICAL SCIENCE *Multiple Choice* It is impossible for a sound wave to travel through which of the following?

- W) Water
- X) Air
- Y) A vacuum
- Z) Wood

ANSWER: Y) A VACUUM

BONUS

9) PHYSICAL SCIENCE *Multiple Choice* Which of the following statements is NOT true?

- W) Stirring a solution will decrease the rate at which a solid solute dissolves
- X) For most solid solutes, increasing the temperature of the solvent speeds up the dissolution rate
- Y) Decreasing the surface area of the solute decreases the dissolution rate
- Z) For a gaseous solute, cooling the solvent increases the dissolution rate

ANSWER: W) STIRRING A SOLUTION WILL DECREASE THE RATE AT WHICH A SOLID SOLUTE DISSOLVES

TOSS-UP

10) ENERGY *Short Answer* If a single phase circuit contains at least one live wire, what is the minimum number of wires needed in a three phase system?

ANSWER: THREE

BONUS

10) ENERGY *Multiple Choice* Which of the following is a characteristic of appliances labeled under the Energy Star logo?

- W) They consume 10-15% less energy than required by federal standards
- X) They consume 20-30% less energy than required by federal standards
- Y) They convert 30% of the electrical energy into mechanical energy
- Z) They have an energy loss of around 20-30%

ANSWER: X) THEY CONSUME 20-30% LESS ENERGY THAN REQUIRED BY FEDERAL STANDARDS

TOSS-UP

11) LIFE SCIENCE *Multiple Choice* Which of the following hormones induces glucose uptake by cells after food consumption?

- W) Glucagon [**GLOO-kuh-gon**]
- X) Glucuronidase [**gloo-koh-ROH-nee-dayz**]
- Y) Insulin
- Z) Thyroxin [**thy-ROK-seen**]

ANSWER: Y) INSULIN

BONUS

11) LIFE SCIENCE *Short Answer* What plant hormone causes tree leaves to fall in the autumn?

ANSWER: ABSCISIC ACID (ALSO ACCEPT ABA, ABSCISIN II, OR DORMIN)

TOSS-UP

12) MATH *Short Answer* Providing your answer in terms of pi and in centimeters, what is the circumference of a circular disk whose area is 100π square centimeters?

ANSWER: 20π

BONUS

12) MATH *Short Answer* What is the height in centimeters of a trapezoid for which the two bases measure 13 centimeters and 27 centimeters, and its area is equal to 400 square centimeters?

ANSWER: 20

TOSS-UP

13) EARTH AND SPACE *Short Answer* The largest shield volcano in our solar system, Olympus Mons, is located on which planet?

ANSWER: MARS

BONUS

13) EARTH AND SPACE *Multiple Choice* On which of the following types of volcanoes is scoria commonly found?

- W) Shield volcano
- X) Composite volcano
- Y) Cinder cone
- Z) Fissure vents

ANSWER: Y) CINDER CONE

TOSS-UP

14) LIFE SCIENCE *Multiple Choice* Down syndrome is a condition associated with which of the following genetic abnormalities?

- W) Duplication of chromosome 3
- X) Trisomy 21
- Y) No sex chromosome
- Z) Monosomy 7

ANSWER: X) TRISOMY 21

BONUS

14) LIFE SCIENCE *Multiple Choice* The human disease malaria is caused by which of the following types of pathogen?

- W) Prion
- X) Virus
- Y) Protist
- Z) Bacterium

ANSWER: Y) PROTIST

TOSS-UP

15) GENERAL SCIENCE *Multiple Choice* Which of the following forms of RNA carries genetic information from the nucleus to the ribosomes **[ry-buh-sohms]**?

- W) Regulatory
- X) Messenger
- Y) Transfer
- Z) Micro

ANSWER: X) MESSENGER

BONUS

15) GENERAL SCIENCE *Multiple Choice* Which of the following correctly lists two of the three types of rocks in the rock cycle?

- W) Igneous and metamorphic
- X) Metamorphic and megamorphic
- Y) Sedimentary and morphometric
- Z) Morphometric and sedimentary

ANSWER: W) IGNEOUS AND METAMORPHIC

TOSS-UP

16) EARTH AND SPACE *Short Answer* What is the name of the large transform boundary found in western California?

ANSWER: SAN ANDREAS FAULT

BONUS

16) EARTH AND SPACE *Multiple Choice* Which of the following cloud types is most commonly associated with major thunderstorms?

- W) Nimbostratus **[nim-boh-STRAT-uhs]**
- X) Cumulonimbus **[kyoo-myuh-loh-NIM-buhs]**
- Y) Cirrus **[SIR-uhs]**
- Z) Stratus

ANSWER: X) CUMULONIMBUS

TOSS-UP

17) PHYSICAL SCIENCE *Multiple Choice* Which of the following characteristics is NOT related to sound?

- W) Wavelength
- X) Speed
- Y) Mass
- Z) Amplitude

ANSWER: Y) MASS

BONUS

17) PHYSICAL SCIENCE *Multiple Choice* How is the magnetism of an electromagnet turned on and off?

- W) With a galvanometer
- X) Adding more turns in the coil
- Y) Reversing the direction of the current
- Z) Turning the current through the coil on and off

ANSWER: Z) TURNING THE CURRENT THROUGH THE COIL ON AND OFF

TOSS-UP

18) ENERGY *Multiple Choice* Which of the following best describes a carbon footprint?

- W) A footprint that is left when someone steps on carbon
- X) The emission of greenhouse gases caused by a product or individual
- Y) A monetary credit awarded to people who reduce their greenhouse gas emissions
- Z) A factor that does not merit consideration when buying energy efficient appliances

ANSWER: X) THE EMISSION OF GREENHOUSE GASES CAUSED BY A PRODUCT OR INDIVIDUAL

BONUS

18) ENERGY *Multiple Choice* Beside batteries, which of the following is another way to store energy from renewable energy systems for later use?

- W) Ultra inductors
- X) Tesla coils
- Y) Ultra capacitors
- Z) Fuel cells

ANSWER: Y) ULTRA CAPACITORS

TOSS-UP

19) LIFE SCIENCE *Multiple Choice* Which of the following molecules gives carrots their orange color?

- W) Vitamin A
- X) Carotene
- Y) Lycopene [**LY-kuh-peen**]
- Z) Vitamin C

ANSWER: X) CAROTENE

BONUS

19) LIFE SCIENCE *Multiple Choice* Standardized terms are used to describe locations on an organism's body. Which of the following terms refers to the region of the body with the stomach?

- W) Ventral
- X) Dorsal
- Y) Posterior
- Z) Anterior

ANSWER: W) VENTRAL

TOSS-UP

20) MATH *Short Answer* Given a triangle FGE, such that GT is one of its medians, if $TE = 8$, what is the length of FE?

ANSWER: 16

BONUS

20) MATH *Short Answer* Given the parallelogram with vertices $(2, 6)$, $(8, 6)$, and $(7, 2)$, what are the coordinates of the fourth vertex if the sum of those two coordinates is as small as possible?

ANSWER: $(1, 2)$

TOSS-UP

21) GENERAL SCIENCE *Multiple Choice* Which of the following terms is known as the set of alleles present in an organism?

- W) Genotype
- X) Trait
- Y) Gene
- Z) Phenotype

ANSWER: W) GENOTYPE

BONUS

21) GENERAL SCIENCE *Short Answer* Providing your answer as a decimal, how much energy in kilowatt hours is needed to run a 50 watt light bulb for 5 hours?

ANSWER: 0.25

TOSS-UP

22) EARTH AND SPACE *Short Answer* What type of weathering is defined by disintegration of rock into smaller and smaller fragments, each with the same properties of the original?

ANSWER: MECHANICAL

BONUS

22) EARTH AND SPACE *Short Answer* What is the name of a rock or boulder that differs from the surrounding rock and is believed to have been brought from a distance through glacial action?

ANSWER: ERRATIC

TOSS-UP

23) PHYSICAL SCIENCE *Multiple Choice* Which of the following elements is a metalloid?

- W) Silicon
- X) Calcium
- Y) Iron
- Z) Argon

ANSWER: W) SILICON

BONUS

23) PHYSICAL SCIENCE *Multiple Choice* Which of the following statements best describes the properties of semiconductors?

- W) They are more conductive than metals but less conductive than nonmetal insulators
- X) Their conductivity is the same as metals
- Y) Impurities make them less conductive than metals and nonmetals
- Z) They are less conductive than metals but more conductive than insulators

ANSWER: Z) THEY ARE LESS CONDUCTIVE THAN METALS BUT MORE CONDUCTIVE THAN INSULATORS

TOSS-UP

24) MATH *Multiple Choice* Which of the following proportions is NOT correct?

- W) $\frac{15}{9} = \frac{5}{3}$
- X) $\frac{30}{50} = \frac{600}{1000}$
- Y) $\frac{8}{24} = \frac{4}{16}$
- Z) $\frac{4.2}{8.4} = \frac{5}{10}$

ANSWER: Y) $\frac{8}{24} = \frac{4}{16}$

BONUS

24) MATH *Short Answer* The length of rectangle A is 24 centimeters, and the length of rectangle B is 96 centimeters. Given that the two rectangles are similar, what is the ratio of the area of A to the area of B?

ANSWER: 1:16 (ACCEPT: 1/16)

TOSS-UP

25) LIFE SCIENCE *Multiple Choice* Which of the following organs is the first to lose its function under hypoxic conditions?

- W) Heart
- X) Brain
- Y) Liver
- Z) Lungs

ANSWER: X) BRAIN

BONUS

25) LIFE SCIENCE *Short Answer* You have isolated a pathogen which contains RNA surrounded by a protein coat, but which lacks other cellular organelles. What type of pathogen is it?

ANSWER: VIRUS (ACCEPT: RETROVIRUS)