

ROUND 1 A

TOSS-UP

1) GENERAL SCIENCE *Short Answer* In plants and animals, what class of nucleic acid polymer is the primary form of genetic material that is heritable from one generation to the next?

ANSWER: DEOXYRIBOSE NUCLEIC ACIDS (ACCEPT: DNA)

BONUS

1) GENERAL SCIENCE *Multiple Choice* What part of the pistil forms a closed receptacle for the ovules?

- W) Carpel
- X) Petal
- Y) Sepal
- Z) Peduncle

ANSWER: W) CARPEL

TOSS-UP

2) MATH *Multiple Choice* Identify the 21st term of the arithmetic sequence with first three terms 5, 10, 15.

- W) 100
- X) 105
- Y) 110
- Z) 125

ANSWER: X) 105

BONUS

2) MATH *Short Answer* There are 5 different paths through a maze designated as Path 1, Path 2, Path 3, Path 4, and Path 5. Each path is equally likely to be chosen. What is the percent probability of NOT choosing Path 1?

ANSWER: 80%

TOSS-UP

3) PHYSICAL SCIENCE *Multiple Choice* Which of the following does NOT represent a chemical reaction?

- W) Water falling from a tap
- X) Grape juice turning into wine
- Y) Milk turning to cheese
- Z) Rust forming on a nail

ANSWER: W) WATER FALLING FROM A TAP

BONUS

3) PHYSICAL SCIENCE *Short Answer* Thomas Edison championed the use of direct current for homes and industry. Who favored the use of alternating current because of its ability to be transmitted great distances?

ANSWER: NIKOLA TESLA (ACCEPT: TESLA, GEORGE WESTINGHOUSE, or WESTINGHOUSE)

TOSS-UP

4) LIFE SCIENCE *Short Answer* What is the common name of the members of the class Aves?

ANSWER: BIRDS

BONUS

4) LIFE SCIENCE *Multiple Choice* Which of the following organisms were the earliest life forms to evolve in the ocean?

- W) Protozoa [*proh-tuh-ZOH-uh*]
- X) Algae
- Y) Bacteria
- Z) Fungi

ANSWER: Y) BACTERIA

TOSS-UP

5) EARTH AND SPACE *Multiple Choice* Ocean waves are created by which of the following?

- W) Wind
- X) Shape of the ocean floor
- Y) Water depth
- Z) Currents

ANSWER: W) WIND

BONUS

5) EARTH AND SPACE *Short Answer* What type of earthquakes occurring on the island of Hawaii are a result of magma movement underneath Kilauea [**kee-lou-AY-ah**]?

ANSWER: HARMONIC TREMORS (ACCEPT: VOLCANIC TREMORS)

TOSS-UP

6) GENERAL SCIENCE *Short Answer* Sand dollars, sea stars, sea cucumbers, and sea urchins all belong to what phylum [**FY-luhm**]?

ANSWER: ECHINODERMATA

BONUS

6) GENERAL SCIENCE *Multiple Choice* Which of the following are NOT found in both prokaryotes [**proh-KAR-ee-ohts**] and eukaryotes [**yoo-KAR-ee-ohts**]?

- W) Flagella
- X) Ribosomes [**RY-buh-sohms**]
- Y) Mitochondria [**my-tuh-KON-dree-uh**]
- Z) Plasma membrane

ANSWER: Y) MITOCHONDRIA

TOSS-UP

7) MATH *Multiple Choice* Assuming that the Earth is a sphere of radius r , what is the surface area of the Northern hemisphere?

- W) $\frac{2}{3}\pi r^3$
- X) $2\pi r^2$
- Y) $3\pi r^2$
- Z) $4\pi r^2$

ANSWER: X) $2\pi r^2$

BONUS

7) MATH *Short Answer* How many positive integers are between $\sqrt{3}$ and $\sqrt{82}$?

ANSWER: 8

TOSS-UP

8) ENERGY *Short Answer* Coal and natural gas are the leading sources of fuel for electricity production in the U.S. What is the third leading source?

ANSWER: NUCLEAR

BONUS

8) ENERGY *Multiple Choice* In most geothermal applications, what substance is used to rotate the generation turbines?

- W) Liquid water
- X) Natural gas
- Y) Brine
- Z) Steam

ANSWER: Z) STEAM

TOSS-UP

9) PHYSICAL SCIENCE *Multiple Choice* Which of the following materials best prevents the flow of electricity?

- W) Copper
- X) Silicon
- Y) Gold
- Z) Distilled water

ANSWER: Z) DISTILLED WATER

BONUS

9) PHYSICAL SCIENCE *Multiple Choice* In the periodic table, elements are arranged by which of the following?

- W) Atomic number
- X) Binding energy
- Y) Mass number
- Z) Number of isotopes

ANSWER: W) ATOMIC NUMBER

TOSS-UP

10) LIFE SCIENCE *Multiple Choice* Which of the following has the function of modifying, sorting, and preparing substances for use within the eukaryotic [*yoo-KAR-ee-oh-tik*] cell or for transport outside of the cell?

- W) Ribosome [*RY-buh-sohm*]
- X) Endoplasmic reticulum [*EN-duh-plaz-mik ri-TIK-yuh-luhm*]
- Y) Golgi apparatus
- Z) Mitochondria [*my-tuh-KON-dree-uh*]

ANSWER: Y) GOLGI APPARATUS

BONUS

10) LIFE SCIENCE *Multiple Choice* Which of the following marine organisms would be considered ectothermic?

- W) Gull
- X) Penguin
- Y) Sea turtle
- Z) Manatee

ANSWER: Y) SEA TURTLE

TOSS-UP

11) EARTH AND SPACE *Multiple Choice* In the deep ocean, the continuous shower of mostly organic detritus falling from the upper layers of the water column is called which of the following?

- W) Marine snow
- X) Fecal snow
- Y) Organic snow
- Z) Carbon snow

ANSWER: W) MARINE SNOW

BONUS

11) EARTH AND SPACE *Multiple Choice* Which of the following is NOT considered a rift valley?

- W) Mid-ocean ridges
- X) Rhine River Valley
- Y) Red Sea
- Z) Mississippi River Valley

ANSWER: Z) MISSISSIPPI RIVER VALLEY

TOSS-UP

12) GENERAL SCIENCE *Short Answer* You are setting up an experiment looking at the effects of increased phosphorus concentrations on the growth of *Glycine* [**GLY-seen**] *max*. In this experiment, the concentration of phosphorus is what kind of variable?

ANSWER: INDEPENDENT

BONUS

12) GENERAL SCIENCE *Multiple Choice* Which of the following BEST describes a hypothesis?

- W) The process of investigating a question
- X) A possible explanation based on prior evidence
- Y) A widely accepted explanation
- Z) An observation

ANSWER: X) A POSSIBLE EXPLANATION BASED ON PRIOR EVIDENCE

TOSS-UP

13) MATH *Multiple Choice* What is the standard form of the following equation: $2x = 3y - 5$?

- W) $2x - 3y = 5$
- X) $2x - 5 = 3y$
- Y) $2x + 3y = 5$
- Z) $2x - 3y = -5$

ANSWER: Z) $2x - 3y = -5$

BONUS

13) MATH *Short Answer* How many parallel pairs of faces does a right regular hexagonal prism have?

ANSWER: 4

TOSS-UP

14) PHYSICAL SCIENCE *Multiple Choice* An atom's ability to react with other atoms is determined by what type of subatomic particle?

- W) Protons
- X) Neutrinos
- Y) Neutrons
- Z) Electrons

ANSWER: Z) ELECTRONS

BONUS

14) PHYSICAL SCIENCE *Multiple Choice* The atomic weight (in amu) of an element most nearly reflects the atom's total number of which of the following?

- W) Protons and neutrons
- X) Protons and electrons
- Y) Neutrons only
- Z) Protons only

ANSWER: W) PROTONS AND NEUTRONS

TOSS-UP

15) LIFE SCIENCE *Multiple Choice* In which part of the plant would you expect to find the largest concentration of photosynthetic pigments?

- W) Roots
- X) Shoots
- Y) Leaves
- Z) Fruit

ANSWER: Y) LEAVES

BONUS

15) LIFE SCIENCE *Short Answer* What is the vector for the organism that causes malaria?

ANSWER: MOSQUITO (ACCEPT: ANOPHELES)

TOSS-UP

16) EARTH AND SPACE *Multiple Choice* The hardness of a mineral determines how resistant it is to which of the following?

- W) Mass loading
- X) Fracture
- Y) Scratching
- Z) Temperature flux

ANSWER: Y) SCRATCHING

BONUS

16) EARTH AND SPACE *Multiple Choice* The early atmosphere of the Earth probably was rich in all EXCEPT which of the following gases?

- W) Oxygen
- X) Carbon monoxide
- Y) Carbon dioxide
- Z) Nitrogen

ANSWER: W) OXYGEN

TOSS-UP

17) ENERGY *Multiple Choice* DC/DC converters operate on the principle of volt-second balance. Based on this assumption, which of the following average values is zero?

- W) Voltage across the inductor(s)
- X) Voltage across the capacitor(s)
- Y) Voltage across the load(s)
- Z) Voltage across the transistor(s)

ANSWER: W) VOLTAGE ACROSS THE INDUCTOR(S)

BONUS

17) ENERGY *Short Answer* What is thought to be driving the rapid (and accelerating) expansion of the universe, while accounting for nearly three-quarters of the mass and energy that exists in the universe?

ANSWER: DARK ENERGY (DO NOT ACCEPT: DARK MATTER)

TOSS-UP

18) GENERAL SCIENCE *Short Answer* Which group of plants enclose their seeds within a fruit?

ANSWER: ANGIOSPERMS

BONUS

18) GENERAL SCIENCE *Multiple Choice* Atopic dermatitis is a medical condition predominantly affecting which organ system?

- W) Hepatobiliary [*hep-uh-oh-BIL-er-ee*]
- X) Integumentary [*in-teg-yuh-MEN-tuh-ree*]
- Y) Skeletal
- Z) Circulatory

ANSWER: X) INTEGUMENTRY

TOSS-UP

19) MATH *Short Answer* Mike buys hot dogs that come in packages of 10. If hot dog buns come in packages of 8, what is the fewest number of hot dog packages he can buy in order have the same number of hot dogs as buns?

ANSWER: 4

BONUS

19) MATH *Multiple Choice* Which of the following conditions is NOT used for similarity of two triangles?

- W) SSS [*side, side, side*]
- X) AAA [*angle, angle, angle*]
- Y) SSA [*side, side, angle*]
- Z) SAS [*side, angle, side*]

ANSWER: Y) SSA

TOSS-UP

20) PHYSICAL SCIENCE *Multiple Choice* According to the Richter scale, which of the following is closest to the ratio of the energy released in a magnitude 10 earthquake to that released in a magnitude 8 earthquake?

- W) 10
- X) 20
- Y) 100
- Z) 1000

ANSWER: Z) 1000

BONUS

20) PHYSICAL SCIENCE *Multiple Choice* Atoms of which of these elements tend to form three covalent bonds?

- W) Carbon
- X) Nitrogen
- Y) Oxygen
- Z) Chlorine

ANSWER: X) NITROGEN

TOSS-UP

21) ENERGY *Short Answer* Ozone is an important gas in the stratosphere. What is the chemical formula of ozone?

ANSWER: O₃

BONUS

21) ENERGY *Multiple Choice* Which of the following rates, referring to costs for peak hour cost versus off-peak hour cost, respectively, would most incentivize a homeowner for running their large appliances during off-peak hours rather than peak hours?

- W) \$2 per kilowatt and \$0.10 per kilowatt hour
- X) \$1 per kilowatt and \$0.10 per kilowatt hour
- Y) \$1 per kilowatt and \$0.12 per kilowatt hour
- Z) \$3 per kilowatt and \$0.10 per kilowatt hour

ANSWER: Z) \$3 PER KILOWATT AND \$0.10 PER KILOWATT HOUR

TOSS-UP

22) LIFE SCIENCE *Short Answer* In what organelle of a plant cell does photosynthesis occur?

ANSWER: CHLOROPLAST

BONUS

22) LIFE SCIENCE *Multiple Choice* In addition to being birds, what do the Great Auk, moa, passenger pigeon, and Carolina parakeet have in common?

- W) They are all listed as invasive species in North America
- X) They are all extinct
- Y) They are all listed as threatened species in their native habitats
- Z) They are all being raised in captive breeding programs for later release into the wild

ANSWER: X) THEY ARE ALL EXTINCT

TOSS-UP

23) EARTH AND SPACE *Short Answer* What must a glacier meet in order to form an ice shelf?

ANSWER: AN OCEAN (ACCEPT: BODY OF WATER; SEA; OR BAY)

BONUS

23) EARTH AND SPACE *Multiple Choice* What major geologic forces operate at the shoreline?

W) Surface water and wind

X) Waves and tides

Y) Wind and tides

Z) Chemical and physical weathering

ANSWER: X) WAVES AND TIDES