

ROUND 6

TOSS-UP

1) EARTH AND SPACE *Multiple Choice* Which of the following is the distance of one degree of longitude?

- W) 360 kilometers
- X) 111 kilometers
- Y) 60 kilometers
- Z) It varies from 111 kilometers to a point

ANSWER: Z) IT VARIES FROM 111 KILOMETERS TO A POINT

BONUS

1) EARTH AND SPACE *Short Answer* What is the term for one of several bright spots 22 degrees on each side of the solar halo and at the same elevation as the Sun, caused by the diffraction of light by ice crystals in the atmosphere?

ANSWER: PARHELION (ACCEPT: SUN DOG)

TOSS-UP

2) LIFE SCIENCE *Multiple Choice* Which of the following animals does NOT have a four-chambered heart?

- W) Mouse
- X) Frog
- Y) Bird
- Z) Crocodile

ANSWER: X) FROG

BONUS

2) LIFE SCIENCE *Short Answer* Identify all of the following four choices which are characteristics of both arthropods [**AHR-thruh-pods**] and annelids: 1) jointed appendages, 2) segmented bodies, 3) setae [**SEE-tee**], 4) exoskeleton.

ANSWER: 2, 3 (ACCEPT: SEGMENTED BODIES, SETAE)

TOSS-UP

3) GENERAL SCIENCE *Multiple Choice* Iron is a magnetic material, but an iron nail does not behave like a magnet for which of the following reasons?

- W) Its magnetic domains are aligned
- X) Its magnetic domains are arranged randomly
- Y) It contains too few magnetic domains
- Z) The atoms in the iron exert a force on all the other atoms

ANSWER: X) ITS MAGNETIC DOMAINS ARE ARRANGED RANDOMLY

BONUS

3) GENERAL SCIENCE *Short Answer* Name all of the following four choices which are parts of the human central nervous system: 1) brain, 2) nerves, 3) neurons, 4) spinal cord.

ANSWER: 1, 3, 4 (ACCEPT: BRAIN, NEURONS AND SPINAL CORD)

TOSS-UP

4) MATH *Short Answer* If the first eight numbers of the Fibonacci sequence are 0, 1, 1, 2, 3, 5, 8, and 13, what is the next number in this sequence?

ANSWER: 21

BONUS

4) MATH *Short Answer* Solve: $-x^{3/2} = -27$ [**negative x to the power of three halves equals negative 27**].

ANSWER: 9

TOSS-UP

5) PHYSICAL SCIENCE *Short Answer* What term describes a compound produced by combining a substance chemically with water?

ANSWER: HYDRATE

BONUS

5) PHYSICAL SCIENCE *Short Answer* Given a constant number of gas molecules, the ideal gas law describes the relationship between pressure, volume, and what other property?

ANSWER: TEMPERATURE

TOSS-UP

6) EARTH AND SPACE *Multiple Choice* If illuminated by the same light source, which of the following surfaces will emit the most infrared radiation?

- W) Asphalt
- X) Granite
- Y) Ice
- Z) A green lawn

ANSWER: W) ASPHALT

BONUS

6) EARTH AND SPACE *Short Answer* When the Moon, Earth, and Sun are aligned, what kinds of tides occur?

ANSWER: SPRING

TOSS-UP

7) LIFE SCIENCE *Multiple Choice* The leaves on coniferous trees have evolved primarily as an adaptation against which of the following conditions?

- W) Physiological drought
- X) Soils with poor nutrients
- Y) Wind
- Z) Low levels of sunlight

ANSWER: W) PHYSIOLOGICAL DROUGHT

BONUS

7) LIFE SCIENCE *Short Answer* By number, identify all of the following four statements which are true: 1) protists can be single-celled or multicellular; 2) all protists feed by filtering; 3) all protists are eukaryotic [*yoo-KAR-ee-oh-tik*]; 4) all protists have chlorophyll [*KLOHR-uh-fil*].

ANSWER: 1 AND 3

TOSS-UP

8) ENERGY *Multiple Choice* Which of the following does NOT represent a type of electromagnetic radiation?

- W) Radio
- X) Sound
- Y) X-rays
- Z) Infrared

ANSWER: X) SOUND

BONUS

8) ENERGY *Short Answer* To absorb the most heat from the Sun, a collector should be what color?

ANSWER: BLACK

TOSS-UP

9) GENERAL SCIENCE *Multiple Choice* Which of the following is true regarding a benzene molecule?

- W) There are three carbon-carbon double bonds and three carbon-carbon single bonds
- X) Each carbon-carbon bond is equal in bond length
- Y) Each carbon is bound to two hydrogen atoms
- Z) Benzene will exhibit intermolecular hydrogen bonding with other benzene molecules

ANSWER: X) EACH CARBON-CARBON BOND IS EQUAL IN BOND LENGTH

BONUS

9) GENERAL SCIENCE *Multiple Choice* Hormones regulate which of the following?

- W) Growth and temperature
- X) Digestion and reproduction
- Y) Development and growth
- Z) Temperature and reproduction

ANSWER: Y) DEVELOPMENT AND GROWTH

TOSS-UP

10) MATH *Short Answer* An 8 inch by 10 inch photograph is glued onto the center of a 10 inch by 12 inch piece of white construction paper. What is the area, in square inches, of the white paper not covered by the picture?

ANSWER: 40

BONUS

10) MATH *Short Answer* Vince mixed together 9 gallons of Brand A fruit drink and 6 gallons of Brand B fruit drink, which contains 5% juice. What is the percent of fruit juice in Brand A if the mixture contained 11% fruit juice?

ANSWER: 15

TOSS-UP

11) PHYSICAL SCIENCE *Multiple Choice* Which of the following metals is the least magnetic?

- W) Cobalt
- X) Iron
- Y) Nickel
- Z) Titanium

ANSWER: Z) TITANIUM

BONUS

11) PHYSICAL SCIENCE *Short Answer* What is the name given to the process in which cations and anions separate inside a solution?

ANSWER: DISSOCIATION

TOSS-UP

12) MATH *Multiple Choice* Which of the following points is NOT on the graph of the equation $y = 4x + 2$?

- W) (-2, 4)
- X) (-1, -2)
- Y) (0, 2)
- Z) (1, 6)

ANSWER: W) (-2, 4)

BONUS

12) MATH *Short Answer* Providing your answer in simplest radical form, if the lengths of one leg and the hypotenuse of a right triangle are 8 meters and 16 meters, respectively, what is the length of the other leg, in meters?

ANSWER: $8\sqrt{3}$

TOSS-UP

13) LIFE SCIENCE *Multiple Choice* In the symbiotic relationship that allows survival of lichens, which of the following is the photosynthetic component?

- W) Ascomycete [*as-kuh-MY-seet*]
- X) Moss
- Y) Green algae
- Z) Vascular plant

ANSWER: Y) GREEN ALGAE

BONUS

13) LIFE SCIENCE *Short Answer* Identify all of the following five animals that can sleep standing up under normal circumstances: 1) flamingo, 2) sheep, 3) cow, 4) horse, 5) roadrunner.

ANSWER: 1, 4 (ACCEPT: FLAMINGO, HORSE)

TOSS-UP

14) ENERGY *Multiple Choice* In the U.S., the frequency of alternating current is which of the following cycles per second?

- W) 50
- X) 60
- Y) 70
- Z) 80

ANSWER: X) 60

BONUS

14) ENERGY *Short Answer* When a strip mine is closed, the mining company is responsible for planting vegetation and restoring the area. What name is given to this process of restoration?

ANSWER: RECLAMATION

TOSS-UP

15) GENERAL SCIENCE *Multiple Choice* Which of the following scientists codified the Greek geocentric view of the universe and rationalized the apparent motions of the planets as they were known in his time?

- W) Copernicus
- X) Ptolemy
- Y) Aristotle
- Z) Galileo

ANSWER: X) PTOLEMY

BONUS

15) GENERAL SCIENCE *Multiple Choice* A very large star undergoes a supernova and forms an extremely dense remnant that has a radius of only around ten kilometers and continues to emit light. Which of the following terms best describes this celestial body?

- W) White dwarf
- X) Black hole
- Y) Neutron star
- Z) Brown dwarf

ANSWER: Y) NEUTRON STAR

TOSS-UP

16) MATH *Multiple Choice* If you were to graph a line for each of the following equations, which would NOT intersect the origin?

- W) $y = \frac{1}{3}x$
- X) $y = 4x$
- Y) $x = 4y$
- Z) $x = 5$

ANSWER: Z) $x = 5$

BONUS

16) MATH *Short Answer* Given a parallelogram WXYZ, such that angle Z is 80 degrees and angle Y is $(11x - 10)$ degrees, solve for x .

ANSWER: 10 (DO NOT ACCEPT: 10 DEGREES)

TOSS-UP

17) PHYSICAL SCIENCE *Multiple Choice* Which of the following pairs are allotropes?

- W) Diamond and graphite [*gra-FYT*]
- X) L-alanine and D-alanine [*AL-n-een*]
- Y) Hydrochloric acid and sodium hydroxide
- Z) Adenine [*AD-n-een*] and thymine

ANSWER: W) DIAMOND AND GRAPHITE

BONUS

17) PHYSICAL SCIENCE *Short Answer* List the following four components of Earth's air from most abundant to least abundant at sea level: 1) carbon dioxide, 2) nitrogen, 3) argon, 4) oxygen.

ANSWER: 2, 4, 3, 1 (ACCEPT: NITROGEN, OXYGEN, ARGON, CARBON DIOXIDE)

TOSS-UP

18) EARTH AND SPACE *Short Answer* The Martian surface is red because iron contained in Martian rocks has reacted with what element?

ANSWER: OXYGEN

BONUS

18) EARTH AND SPACE *Short Answer* Interactions between the magnetic field and charged particles from the Sun produce what phenomenon in the southern hemisphere?

ANSWER: AURORA AUSTRALIS (ACCEPT: SOUTHERN LIGHTS, AURORA)

TOSS-UP

19) LIFE SCIENCE *Multiple Choice* Plants are important to our ecosystem because they convert solar energy into which of the following forms of energy?

- W) Mechanical
- X) Electromagnetic
- Y) Chemical
- Z) Heat

ANSWER: Y) CHEMICAL

BONUS

19) LIFE SCIENCE *Multiple Choice* Pasteur advanced the understanding of disease through which of the following?

- W) Collecting data indicating that viruses can cause disease
- X) Collecting data indicating that bacteria can cause disease
- Y) Predicting that bacteria causes smallpox
- Z) Providing a method to identify pathogens

ANSWER: X) COLLECTING DATA INDICATING THAT BACTERIA CAN CAUSE DISEASE

TOSS-UP

20) ENERGY *Multiple Choice* Most residential energy is used for which of the following?

- W) Cooking
- X) Water heating
- Y) Space heating
- Z) Powering computers

ANSWER: Y) SPACE HEATING

BONUS

20) ENERGY *Multiple Choice* Cadmium and boron are used for control rods in a nuclear power plant because they do which of the following?

- W) Split neutrons
- X) Deflect neutrons
- Y) Absorb neutrons
- Z) Exude neutrons

ANSWER: Y) ABSORB NEUTRONS

TOSS-UP

21) GENERAL SCIENCE *Multiple Choice* A large amount of an unknown substance is broken down into its individual atoms, and the ratio of each of these atoms is determined. Which of the following tests could be used to definitively determine the substance's empirical formula?

- W) Mass spectrometry
- X) Infrared spectroscopy
- Y) Nuclear magnetic resonance
- Z) Gas chromatography

ANSWER: W) MASS SPECTROMETRY

BONUS

21) GENERAL SCIENCE *Multiple Choice* Which of the following descriptions is most accurate regarding the differences between oceanic and continental crust?

- W) Oceanic crust is both thicker and denser than continental crust
- X) Continental crust is both thicker and denser than oceanic crust
- Y) Continental crust is denser but thinner than oceanic crust
- Z) Oceanic crust is denser but thinner than continental crust

ANSWER: Z) OCEANIC CRUST IS DENSER BUT THINNER THAN CONTINENTAL CRUST

TOSS-UP

22) MATH *Short Answer* Providing your answer in terms of pi, what is the volume in cubic meters of a sphere that has a radius of 1 meter?

ANSWER: $4/3\pi$

BONUS

22) MATH *Short Answer* One pair of corresponding sides of two similar polygons has lengths of 12 centimeters and 18 centimeters, respectively. If the perimeter of the smaller polygon is 100 centimeters, what is the perimeter in centimeters of the larger one?

ANSWER: 150

TOSS-UP

23) PHYSICAL SCIENCE *Short Answer* The difference in potential energy per unit of charge between two electrodes is measured in what unit?

ANSWER: VOLTS

BONUS

23) PHYSICAL SCIENCE *Multiple Choice* Which of the following best describes static electricity?

- W) Any interaction between a person and a metal object
- X) The charging of a neutral object by an electrically charged object
- Y) The net accumulation of electric charges on an object
- Z) The movement of electrons through a conducting material

ANSWER: Y) THE NET ACCUMULATION OF ELECTRIC CHARGES ON AN OBJECT

TOSS-UP

24) EARTH AND SPACE *Multiple Choice* Which of the following types of tectonic plate boundary is NOT associated with magma formation?

- W) Convergent
- X) Divergent
- Y) Transform
- Z) Subvergent

ANSWER: Y) TRANSFORM

BONUS

24) EARTH AND SPACE *Multiple Choice* Which of the following best describes the way an air mass would flow?

- W) From an area of high to an area of low pressure
- X) From an area of low to an area of high pressure
- Y) Perpendicular to a line drawn between a maximum and minimum pressure
- Z) Independently of pressure

ANSWER: W) FROM AN AREA OF HIGH TO AN AREA OF LOW PRESSURE

TOSS-UP

25) LIFE SCIENCE *Multiple Choice* A geneticist studying fruit flies notices that flies with short wings also tend to have red eyes. She concludes that the genes for wing length and eye color may be which of the following?

- W) Linked
- X) Homologous [*huh-MOL-uh-guhs*]
- Y) Dominant
- Z) Assorted

ANSWER: W) LINKED

BONUS

25) LIFE SCIENCE *Multiple Choice* Which of the following statements is NOT true about emphysema?

- W) Emphysema makes people progressively shorter of breath
- X) Smoking is the leading cause of emphysema
- Y) Pulmonary rehabilitation can reverse the damage from emphysema
- Z) Pneumothorax [*noo-muh-THOHR-aks*] is a possible complication of emphysema

ANSWER: Y) PULMONARY REHABILITATION CAN REVERSE THE DAMAGE FROM EMPHYSEMA