

ROUND 5

TOSS-UP

1) GENERAL SCIENCE *Multiple Choice* You are asked to measure the length of an object with a foot-ruler and you get the following 3 results: 2.99 inches, 3.00 inches, and 3.01 inches. If the object's actual length is 3.28 inches, then the data is:

- W) precise but not accurate
- X) accurate but not precise
- Y) both accurate and precise
- Z) neither accurate nor precise

ANSWER: W) PRECISE BUT NOT ACCURATE

BONUS

1) GENERAL SCIENCE *Short Answer* Giving your answer in liters and rounded to the first decimal place, what volume of fluid results after adding 3,400 milliliters of solution A and 34 deciliters of solution B to 5.2 liters of water?

ANSWER: 12.0

TOSS-UP

2) LIFE SCIENCE *Multiple Choice* Which of the following is a reptile:

- W) blue poison arrow frog
- X) sea lamprey
- Y) snapping turtle
- Z) salamander

ANSWER: Y) SNAPPING TURTLE

BONUS

2) LIFE SCIENCE *Short Answer* Which one of the following 5 organisms is LEAST related to the others: mites; spiders; scorpions; fleas; ticks

ANSWER: FLEAS

TOSS-UP

3) PHYSICAL SCIENCE *Short Answer* What is the mass, in grams, of 1 cubic centimeter of water at standard temperature and pressure?

ANSWER: 1

BONUS

3) PHYSICAL SCIENCE *Multiple Choice* Which of the following would MOST likely occur to a sample of water if it underwent an increase in atmospheric pressure from 1 atmosphere to 5 atmospheres:

- W) its mass would increase and its temperature would rise by about 5°C
- X) its mass would increase and its volume would decrease by about 5%
- Y) its mass would decrease and its volume would decrease by about 25%
- Z) its mass would remain the same and its volume would remain the same

ANSWER: Z) ITS MASS WOULD REMAIN THE SAME AND ITS VOLUME WOULD REMAIN THE SAME

TOSS-UP

4) EARTH SCIENCE *Short Answer* Eras on the Geological Time Scale are directly subdivided into what time units?

ANSWER: PERIODS

BONUS

4) EARTH SCIENCE *Multiple Choice* Which of the following is a period on the Geological Time Scale that is part of the Paleozoic Era:

- W) Devonian
- X) Cretaceous
- Y) Tertiary
- Z) Quaternary

ANSWER: W) DEVONIAN

TOSS-UP

5) MATH *Short Answer* How many 4 ounce containers can be packed from 1200 pounds of dry tea leaves?

ANSWER: 4,800

(Solution: $4 \times 1200 = 4800$)

BONUS

5) MATH *Short Answer* Evaluate the following expression: $6 + 2(5 + 4 - 1)$ (read as: 6 + 2, open parenthesis, 5 plus 4 minus 1, close parenthesis)

ANSWER: 22

TOSS-UP

6) GENERAL SCIENCE *Multiple Choice* At which of the following locations would you find the intersection of 0° longitude and 0° latitude:

- W) where the International Date Line crosses the equator
- X) where the prime meridian crosses the equator
- Y) along the 180^{th} meridian
- Z) at the North and South Poles

ANSWER: X) WHERE THE PRIME MERIDIAN CROSSES THE EQUATOR

BONUS

6) GENERAL SCIENCE *Short Answer* Giving your answer in grams, add 2,000 milligrams to 0.04 kilograms:

ANSWER: 42

(Solution: $2000 \text{ mg} = 2\text{g}$; $0.04\text{kg} = 40\text{g}$; $2\text{g} + 40\text{g} = 42 \text{ grams}$)

TOSS-UP

7) LIFE SCIENCE *Multiple Choice* Which of the following is a rasp-like feeding structure found in many mollusks:

- W) gonad
- X) nephridium (read as: nef-RID-ee-um)
- Y) radula
- Z) mantle

ANSWER: Y) RADULA

BONUS

7) LIFE SCIENCE *Multiple Choice* Which of the following is the BEST description for the location in the human body of the esophagus:

- W) behind the trachea connecting the mouth to the lungs
- X) behind the trachea connecting the mouth to the stomach
- Y) in front of the trachea connecting the mouth to the stomach
- Z) in front of the trachea connecting the mouth with the lungs

ANSWER: X) BEHIND THE TRACHEA CONNECTING THE MOUTH TO THE STOMACH

TOSS-UP

8) PHYSICAL SCIENCE *Short Answer* What is the most common term used to describe why astronauts orbiting the Earth experience apparent weightlessness?

ANSWER: FREE FALL

BONUS

8) PHYSICAL SCIENCE *Short Answer* What is the most common term for the maximum downward speed an object can attain, considering air resistance, when it is in free fall from a few miles up in the atmosphere?

ANSWER: TERMINAL VELOCITY

TOSS-UP

9) EARTH SCIENCE *Multiple Choice* Which of the following is NOT true of tornados in the U.S.:

- W) the funnel cloud typically develops out of a nimbostratus cloud
- X) their strength is measured with Fujita Scale
- Y) supercells are the most dangerous and violent tornadoes in the U.S.
- Z) wind speeds can reach an excess of 200 mph

ANSWER: W) THE FUNNEL CLOUD TYPICALLY DEVELOPS OUT OF A NIMBOSTRATUS CLOUD

BONUS

9) EARTH SCIENCE *Multiple Choice* Which of the following is closest to average barometric pressure at sea level, in inches:

- W) 1013
- X) 10.13
- Y) 29.92
- Z) 27.72

ANSWER: Y) 29.92

TOSS-UP

10) MATH *Multiple Choice* Which of the following numbers is evenly divisible by 4:

- W) 174
- X) 414
- Y) 636
- Z) 1,126

ANSWER: Y) 636

(Solution: 36, the last 2 digits, is a multiple of 4)

BONUS

10) MATH *Short Answer* If it takes a hiker 2 hours to make a descent from 10,500 feet to 7,500 feet, what is his average rate of decent, in feet per minute?

ANSWER: 25

(Solution: $(10,500 - 7,500)/(120 - 0) = 25$ ft/min)

TOSS-UP

11) GENERAL SCIENCE *Multiple Choice* Which of the following types of scientists would MOST likely use agar in their experiments:

- W) biochemist
- X) microbiologist
- Y) geologist
- Z) physicist

ANSWER: X) MICROBIOLOGIST

BONUS

11) GENERAL SCIENCE *Multiple Choice* Which of the following is NOT proper laboratory procedure:

- W) always read the upper edges of a meniscus when determining volume of water in a flask
- X) the abbreviation TD on a pipette means ‘to deliver’
- Y) a borosilicate beaker is a better choice for heating a solution than one made of soda-lime
- Z) an analytical balance is more precise than a triple-beam balance

ANSWER: W) ALWAYS READ THE UPPER EDGES OF A MENISCUS WHEN DETERMINING VOLUME OF WATER IN A FLASK

(Solution: always read the bottom of the meniscus for nearly all solutions)

TOSS-UP

12) LIFE SCIENCE *Short Answer* What is the general name for the twenty or so different building blocks from which most proteins are made?

ANSWER: AMINO ACIDS

BONUS

12) LIFE SCIENCE *Short Answer* What specific type of nucleic acid carries an amino acid to a growing protein?

ANSWER: TRANSFER RNA (ACCEPT: tRNA)

TOSS-UP

13) PHYSICAL SCIENCE *Multiple Choice* Which of the following is NOT an element:

- W) tin
- X) lead
- Y) radon
- Z) sulfate

ANSWER: Z) SULFATE

BONUS

13) PHYSICAL SCIENCE *Short Answer* If 50 grams of one reactant chemically combines with 25 grams of another reactant to form a product, what is the total mass, in grams, of the product?

ANSWER: 75

TOSS-UP

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

- W) the Milky Way is an elliptical galaxy
- X) our Sun will become a red giant in the far distant future
- Y) constellations are patterns of stars in the night sky
- Z) the average sunspot cycle is 11 years

ANSWER: W) THE MILKY WAY IS AN ELLIPTICAL GALAXY

BONUS

14) EARTH SCIENCE *Short Answer* What is the name for the highest mountain on any planet in the Solar System?

ANSWER: OLYMPUS (ACCEPT: OLYMPUS MONS OR MT. OLYMPUS)

TOSS-UP

15) MATH *Short Answer* What was the net gain or loss in yardage for a football team that in four straight plays gained 12 yards, then lost 9 yards, gained 3 yards, and finally lost 23 yards?

ANSWER: LOSS OF 17

BONUS

15) MATH *Short Answer* Consider an isosceles triangle whose 2 sides of equal length meet to form a vertex angle of 96° . What is the degree measure of each base angle?

ANSWER: 42

(Solution: $2x + 96 = 180$; $x = 42^\circ$)

TOSS-UP

16) GENERAL SCIENCE *Multiple Choice* If you were told you were anemic and had to increase your dietary iron uptake, which of the following foods would provide the most iron:

- W) green beans
- X) spinach
- Y) beef spleen
- Z) broiled chicken thighs

ANSWER: Y) BEEF SPLEEN

BONUS

16) GENERAL SCIENCE *Short Answer* Which one of the following 5 grains feeds more people, accounting for the core food of about one-half of all humans on Earth: corn; barley; wheat; rice; sorghum

ANSWER: RICE

TOSS-UP

17) LIFE SCIENCE *Short Answer* What structure is exterior to the plasma membrane of a plant cell that is absent from an animal cell?

ANSWER: CELL WALL (ACCEPT: WALL)

BONUS

17) LIFE SCIENCE *Short Answer* Plant cell walls are made primarily of microfibers of what common polysaccharide?

ANSWER: CELLULOSE

TOSS-UP

18) PHYSICAL SCIENCE *Multiple Choice* Potential energy is most synonymous with:

- W) kinetic energy
- X) mechanical energy
- Y) work energy
- Z) stored energy

ANSWER: Z) STORED ENERGY

BONUS

18) PHYSICAL SCIENCE *Short Answer* If sodium has an atomic mass of 23 and an atomic number of 11, what is the mass, in grams, of 3 moles of sodium?

ANSWER: 69

TOSS-UP

19) EARTH SCIENCE *Short Answer* The bulk of the thermal energy at the Earth's surface is stored in what major reservoir?

ANSWER: OCEANS (ACCEPT: SEAS) (DO NOT ACCEPT: WATER)

BONUS

19) EARTH SCIENCE *Multiple Choice* Which of the following is NOT true about volcanoes:

- W) magma that flows out of a volcano is called lava
- X) the Ring of Fire borders the entire edge of the Pacific Ocean Basin
- Y) shield volcanoes are associated with hot spots
- Z) the vast majority of volcanoes are found along the mid-oceanic ridge

ANSWER: Z) THE VAST MAJORITY OF VOLCANOES ARE FOUND ALONG THE MID-OCEANIC RIDGE

TOSS-UP

20) MATH *Short Answer* If one of 2 complementary angles is 32° greater than the other, how many degrees is the larger angle?

ANSWER: 61

BONUS

20) MATH *Short Answer* Find the area of a triangle, in meters squared, given a base of 10 meters and height of 5 meters:

ANSWER: 25

(Solution: $A = \frac{1}{2}(b)(h) = \frac{1}{2} (10)(5) = 25 \text{ m}^2$)

TOSS-UP

21) GENERAL SCIENCE *Multiple Choice* In which of the following biomes are you MOST likely to find permafrost:

- W) taiga
- X) deciduous forest
- Y) tundra
- Z) chaparral

ANSWER: Y) TUNDRA

BONUS

21) GENERAL SCIENCE *Multiple Choice* Which of the following materials is the STRONGEST in terms of tensile strength per mass:

- W) steel
- X) a spider's web
- Y) cotton fibers
- Z) nylon fibers

ANSWER: X) A SPIDER'S WEB

TOSS-UP

22) LIFE SCIENCE *Multiple Choice* What structures on the outside of bacteria are MOST typically associated with the ability of bacteria to control their movement:

- W) flagella
- X) cilia
- Y) pseudopodia
- Z) spirillus

ANSWER: W) FLAGELLA

BONUS

22) LIFE SCIENCE *Short Answer* Order the following 4 human ear structures from the OUTERMOST to the INNERMOST: anvil; stapes; hammer; oval window

ANSWER: HAMMER; ANVIL; STAPES; OVAL WINDOW

TOSS-UP

23) PHYSICAL SCIENCE *Short Answer* What is the ideal mechanical advantage of a lever where the effort force is one-quarter that needed to lift a resistance force?

ANSWER: 4

BONUS

23) PHYSICAL SCIENCE *Short Answer* What is the frequency of a 50-hertz wave, in cycles per second, if the wave has an amplitude of 2 meters?

ANSWER: 50

TOSS-UP

24) EARTH SCIENCE *Short Answer* Which one of the following 5 choices is a metamorphic rock: tuff; obsidian; slate; gabbro; peridotite

ANSWER: SLATE

BONUS

24) EARTH SCIENCE *Multiple Choice* Which of the following is NOT true about rocks:

- W) layering is characteristic of sedimentary rock
- X) during metamorphosis, limestone becomes marble
- Y) chalk is primarily made up of microscopic shells
- Z) quartz reacts with dilute hydrochloric acid to give off carbon dioxide

ANSWER: Z) QUARTZ REACTS WITH DILUTE HYDROCHLORIC ACID TO GIVE OFF CARBON DIOXIDE

TOSS-UP

25) MATH *Multiple Choice* Which of the following is NOT true about polygons:

W) the sum of the exterior angles of any polygon equals 720°

X) a regular polygon is always equilateral

Y) a square is not a regular polygon

Z) a regular pentagon is a polygon with 5 congruent angles and 5 congruent sides

ANSWER: Y) A SQUARE IS NOT A REGULAR POLYGON

BONUS

25) MATH *Short Answer* What three consecutive numbers add up to 192?

ANSWER: 63, 64, 65