

ROUND 2

TOSS-UP

1) CHEMISTRY *Short Answer* What is the scientific term for the ratio between the density of a given substance to that of water when both are at the same temperature?

ANSWER: SPECIFIC GRAVITY (ACCEPT: RELATIVE DENSITY)

BONUS

1) CHEMISTRY *Multiple Choice* Which of the following pure substances has the highest melting point at 1 atmosphere of pressure:

- W) magnesium oxide
- X) diamond
- Y) sodium chloride
- Z) cesium chloride

ANSWER: X) DIAMOND

(Solution: MgO = 2800°C; diamond = 3550°C; NaCl = 801°C; Cs = 645°C)

TOSS-UP

2) BIOLOGY *Short Answer* What is the MOST common anatomical synonym for ventral, when locating a part of the human body in relation to another part?

ANSWER: ANTERIOR

BONUS

2) BIOLOGY *Short Answer* What are the names for the pyrimidine bases found in DNA?

ANSWER: CYTOSINE; THYMINE

TOSS-UP

3) PHYSICS *Short Answer* According to one of the most common color triangles, if blue and green are primary colors, what is the third primary color?

ANSWER: RED

BONUS

3) PHYSICS *Short Answer* What is the most common name for the pattern of light and dark lines produced when coherent light is passed through two horizontal slits in a thin opaque sheet, causing superposition of waves projected on a wall?

ANSWER: INTERFERENCE PATTERN (ACCEPT: INTERFERENCE)

TOSS-UP

4) MATH *Short Answer* What is the smaller of two integers whose sum is 19 and whose product is 48?

ANSWER: 3

(Solution: $16 + 3 = 19$; $16 \times 3 = 48$)

BONUS

4) MATH *Multiple Choice* Which of the following numbers is evenly divisible by both 11 and 3:

W) 7791

X) 7553

Y) 5181

Z) 8769

ANSWER: Y) 5181

TOSS-UP

5) EARTH SCIENCE *Multiple Choice* Which of the following is best classified as a plutonic intrusive rock:

- W) obsidian
- X) granite
- Y) basalt
- Z) pumice

ANSWER: X) GRANITE

BONUS

5) EARTH SCIENCE *Multiple Choice* The principle constituent of most granites is:

- W) feldspar
- X) muscovite
- Y) calcite
- Z) dolomite

ANSWER: W) FELDSPAR

TOSS-UP

6) GENERAL SCIENCE *Multiple Choice* The related quantities charted on a line graph are most often called:

- W) results
- X) lines
- Y) sets
- Z) variables

ANSWER: Z) VARIABLES

BONUS

6) GENERAL SCIENCE *Short Answer* How many grams of sodium chloride is in 2,000 milliliters of 0.9% NaCl solution?

ANSWER: 18

(Solution: $0.9\text{g}/100\text{ mL} \times 2000\text{ mL} = 18.0\text{ g}$)

TOSS-UP

7) ASTRONOMY *Short Answer* What basic force of the universe is most responsible for holding the planets of our solar system in their orbits?

ANSWER: GRAVITY

BONUS

7) ASTRONOMY *Short Answer* What are the proper names of the 5 celestial bodies called wanderers by Greek astronomers because they had unusual paths in the sky throughout the year?

ANSWER: MERCURY; VENUS; MARS; JUPITER; SATURN (in any order)

TOSS-UP

8) CHEMISTRY *Multiple Choice* Group 1 cations and group 7 anions combine to form:

- W) metal alloys
- X) alkali halides
- Y) alkaloids
- Z) organometallic compounds

ANSWER: X) ALKALI HALIDES

BONUS

8) CHEMISTRY *Short Answer* Give the chemical name for the compound formed when pure iron and pure sulfur are mixed together and heated:

ANSWER: IRON SULFIDE (ACCEPT: IRON(II) SULFIDE or FERROUS SULFIDE)

TOSS-UP

9) **BIOLOGY** *Short Answer* From what chamber of the human heart does blood carried by the left pulmonary artery leave?

ANSWER: RIGHT VENTRICLE

BONUS

9) **BIOLOGY** *Short Answer* What human gland or organ produces tri-iodothyronine (read as: TRY- I-OH-doh-THY-row-neen)?

ANSWER: THYROID

TOSS-UP

10) **PHYSICS** *Short Answer* A white-colored object illuminated by a green light will appear as what color to the human eye?

ANSWER: GREEN

BONUS

10) **PHYSICS** *Multiple Choice* A child learns that mixing approximately equal amounts of the paint colors orange and green produces brown. This is an example of:

- W) additive color mixing
- X) summative color generation
- Y) subtractive color synthesis
- Z) neutral coloration

ANSWER: Y) SUBTRACTIVE COLOR SYNTHESIS

TOSS-UP

11) MATH *Multiple Choice* One-fifth of 0.04% is equal to:

- W) 8×10^{-2}
- X) 8×10^{-3}
- Y) 8×10^{-4}
- Z) 8×10^{-5}

ANSWER: Z) 8×10^{-5}

(Solution: $(0.2)(0.0004) = 0.00008$)

BONUS

11) MATH *Short Answer* Find the prime factorization of 240:

ANSWER: $2 \times 2 \times 2 \times 2 \times 3 \times 5$ (ACCEPT: $2^4 \times 3 \times 5$)

TOSS-UP

12) EARTH SCIENCE *Multiple Choice* When spreading centers reach above the ocean's surface, they typically form which of the following types of volcanoes:

- W) shield
- X) composite
- Y) stratovolcano
- Z) cinder cone

ANSWER: W) SHIELD

BONUS

12) EARTH SCIENCE *Multiple Choice* Mount Vesuvius in Italy is a typical:

- W) mud volcano
- X) caldera
- Y) cinder cone
- Z) composite volcano

ANSWER: Z) COMPOSITE VOLCANO

TOSS-UP

13) GENERAL SCIENCE *Short Answer* The fertilizer potash provides plants with what element necessary for healthy growth and which is also the seventh most abundant element on Earth?

ANSWER: POTASSIUM (ACCEPT: K)

BONUS

13) GENERAL SCIENCE *Short Answer* From what protein is gelatin, which is used as a food additive, most commonly derived?

ANSWER: COLLAGEN

TOSS-UP

14) ASTRONOMY *Short Answer* First proposed by Georges Lemaitre, what is the name, most likely coined by Fred Hoyle, for the theory that the universe originated at a finite time many eons ago from an extremely compressed hot state?

ANSWER: BIG BANG

BONUS

14) ASTRONOMY *Short Answer* In what constellation is the star Polaris found?

ANSWER: URSA MINOR (DO NOT ACCEPT: LITTLE DIPPER)

TOSS-UP

15) CHEMISTRY *Short Answer* What is the pH of a solution with a pOH of 6.8 at 25°C?

ANSWER: 7.2

BONUS

15) CHEMISTRY *Multiple Choice* Which of the following substances is water soluble:

- W) ethanol
- X) dichloro-methane
- Y) chloroform
- Z) benzene

ANSWER: W) ETHANOL

TOSS-UP

16) BIOLOGY *Short Answer* *Yersinia*, *Drosophila* and *Homo* are all what taxonomical category?

ANSWER: GENUS (ACCEPT: GENERA)

BONUS

16) BIOLOGY *Short Answer* From what monosaccharide is cellulose primarily composed?

ANSWER: GLUCOSE (ACCEPT: B-D-GLUCOPYRANOSYL or D-GLUCOSE)

TOSS-UP

17) PHYSICS *Short Answer* Although in many respects difficult to define, what term is MOST often described as a push or a pull that can cause an object to accelerate?

ANSWER: FORCE

BONUS

17) PHYSICS *Short Answer* What is the MOST common term for the inwardly directed force exerted on an object to keep the object moving in a circle?

ANSWER: CENTRIPETAL (ACCEPT: CENTRIPETAL FORCE)

TOSS-UP

18) MATH *Short Answer* Giving your answer in centimeters, what is the length of a side of a square whose diagonal measures $12\sqrt{2}$ centimeters?

ANSWER: 12

BONUS

18) MATH *Short Answer* Multiply the following 4 numbers and give your answer in scientific notation: $30,000 \times 3,000 \times 30 \times 0.1$

ANSWER: 2.7×10^8

TOSS-UP

19) EARTH SCIENCE *Short Answer* What is the oldest Eon on the Geological Time Scale within which the first organisms appeared between 550 million and 3.4 billion years ago?

ANSWER: PRECAMBRIAN

BONUS

19) EARTH SCIENCE *Short Answer* *Homo sapiens* evolved during which geological era of the Geological Time Scale?

ANSWER: CENOZOIC

TOSS-UP

20) GENERAL SCIENCE *Multiple Choice* Anthropogenic means:

- W) generated by humans
- X) created many years ago
- Y) carried in primate genes
- Z) harmful to elderly people

ANSWER: W) GENERATED BY HUMANS

BONUS

20) GENERAL SCIENCE *Short Answer* The primary anthropogenic cause of acid rain is the emission of what 2 gases?

ANSWER: SULFUR OXIDES; NITROGEN OXIDES (in any order)
(ACCEPT: SULFUR DIOXIDE or SO₂ AND NITROGEN DIOXIDE or NO₂)
(DO NOT ACCEPT: SULFURIC ACID or NITRIC ACID)

TOSS-UP

21) ASTRONOMY *Short Answer* What is the primary elemental product of stellar hydrogen fusion?

ANSWER: HELIUM

BONUS

21) ASTRONOMY *Short Answer* In the equatorial celestial coordinate system, what terms are synonymous with longitude and latitude, respectively?

ANSWER: LONGITUDE = RIGHT ASCENSION; LATITUDE = DECLINATION

TOSS-UP

22) CHEMISTRY *Short Answer* What is the atomic number for the ground state element with the following electron configuration: $1s^2 2s^2 2p^5$ (read as: 1, s, 2; 2, s, 2; 2, p, 5)

ANSWER: 9

BONUS

22) CHEMISTRY *Short Answer* How many grams of KCl, with a molar mass of 75, are needed to make 1 liter of a 3 molar solution?

ANSWER: 225

(Solution: $1 \text{ L} \times (3.0 \text{ mol/L})(75 \text{ g/mol}) = 225 \text{ g}$)

TOSS-UP

23) MATH *Short Answer* Giving your answer in standard form, what is the last term in the binomial expansion of the following: $(x + y)^6$

ANSWER: y^6

BONUS

23) MATH *Short Answer* Simplify the following expression by combining like terms:
 $12.03A - 4.03B - 0.03(A - 40)$

ANSWER: $12A - 4.03B + 1.2$

TOSS-UP

24) PHYSICS *Short Answer* What specific law of motion most directly implies that every action has an equal and opposite reaction?

ANSWER: NEWTON'S THIRD LAW (ACCEPT: THIRD LAW)

BONUS

24) PHYSICS *Multiple Choice* Jay walks to his car and drives to the store. The trip takes 20 minutes. Jay figures how far he traveled on foot and by car and divides the distance by how long the trip took. Which of the following BEST describes what Jay has computed:

- W) total velocity
- X) average acceleration
- Y) average speed
- Z) instantaneous velocity

ANSWER: Y) AVERAGE SPEED

TOSS-UP

25) **BIOLOGY** *Short Answer* The sinoatrial (read as: sine-oh-AYE-tree-al) node is located in what human organ?

ANSWER: HEART

BONUS

25) **BIOLOGY** *Short Answer* In what chamber of the human heart is the sinoatrial (read as: sine-oh-AYE-tree-al) node located?

ANSWER: RIGHT ATRIUM