

ROUND 11

TOSS-UP

1) LIFE SCIENCE *Multiple Choice* Which of the following terms is MOST commonly used to refer to the copying of DNA during the cell cycle:

- W) duplication
- X) replication
- Y) translation
- Z) complementation

ANSWER: X) REPLICATION

BONUS

1) LIFE SCIENCE *Short Answer* What is the most common term for a random change in the nucleotide base sequence in DNA?

ANSWER: MUTATION

TOSS-UP

2) PHYSICAL SCIENCE *Multiple Choice* Which of the following is a simple instrument often used to demonstrate electrostatic induction:

- W) electroscope
- X) voltmeter
- Y) electrometer
- Z) spectrometer

ANSWER: W) ELECTROSCOPE

BONUS

2) PHYSICAL SCIENCE *Short Answer* What is the most common term for the form of radio telecommunications that broadcasts electromagnetic information by varying the wave frequency?

ANSWER: FREQUENCY MODULATION (ACCEPT: FM)

TOSS-UP

3) EARTH SCIENCE *Multiple Choice* Meanders are typically associated with:

- W) turbulent rivers
- X) low-gradient streams
- Y) V-shaped valleys
- Z) alluvial fans

ANSWER: X) LOW-GRADIENT STREAMS

BONUS

3) EARTH SCIENCE *Short Answer* Of the 3 main parts of the continental margin, which one is considered the flooded part of the continent?

ANSWER: CONTINENTAL SHELF (ACCEPT: SHELF)

TOSS-UP

4) MATH *Short Answer* Find the mean and median, respectively, of the following set of 6 numbers: 10, 10, 10, 11, 11, 11

ANSWER: MEAN = 10.5; MEDIAN = 10.5 (ACCEPT: BOTH 10.5)

BONUS

4) MATH *Short Answer* Consider a line that contains the points ABCD in order from left to right. If $AB = 10$, $BC = 26$, and $AD = 56$, find CD:

ANSWER: 20

TOSS-UP

5) GENERAL SCIENCE *Multiple Choice* Which of the following would be most useful for separating blood into its component parts:

- W) cross matching
- X) precipitation
- Y) centrifugation
- Z) atomization

ANSWER: Y) CENTRIFUGATION

BONUS

5) GENERAL SCIENCE *Multiple Choice* Which of the following is closest to the diameter of a standard compact disc or DVD:

- W) 3 centimeters
- X) 12 centimeters
- Y) 20 millimeters
- Z) 1500 millimeters

ANSWER: X) 12 CENTIMETERS

TOSS-UP

6) LIFE SCIENCE *Multiple Choice* Which of the following is the most common long-term storage form of energy for vertebrate animals:

- W) nucleic acids
- X) proteins
- Y) starch
- Z) lipids

ANSWER: Z) LIPIDS

BONUS

6) LIFE SCIENCE *Short Answer* What is the name for the structures in plants that regulate air entering the plant through stems and leaves?

ANSWER: STOMATA (ACCEPT: STOMA)

TOSS-UP

7) PHYSICAL SCIENCE *Multiple Choice* Which of the following is LEAST accurate regarding the element helium:

- W) it is the second most abundant element in the universe
- X) it is constantly escaping from Earth's atmosphere into space
- Y) it is toxic to humans even in very low concentrations
- Z) it is a noble gas

ANSWER: Y) IT IS TOXIC TO HUMANS EVEN IN VERY LOW CONCENTRATIONS

BONUS

7) PHYSICAL SCIENCE *Multiple Choice* Which of the following substances when pure typically contains ONLY carbon atoms:

- W) isopropyl alcohol
- X) glass
- Y) graphite
- Z) natural gas

ANSWER: Y) GRAPHITE

TOSS-UP

8) GENERAL SCIENCE *Short Answer* What parasitic disease is one of the most common infectious diseases in the world and got its name because it was thought to be caused by or associated with bad air?

ANSWER: MALARIA

BONUS

8) GENERAL SCIENCE *Multiple Choice* Which of the following contains the FEWEST calories:

- W) 1 large, fresh apple
- X) 1 large, baked potato
- Y) 1 cup raw spinach
- Z) 1 tablespoon extra virgin olive oil

ANSWER: Y) 1 CUP RAW SPINACH

(Solution: apple ~ 125; potato ~ 220; spinach ~ 10; oil ~ 125)

TOSS-UP

9) EARTH SCIENCE *Multiple Choice* The presence of which of the following most clearly indicates that much of the U.S. was covered by shallow seas for millions of years:

- W) limestone
- X) breccia
- Y) basalt
- Z) coal

ANSWER: W) LIMESTONE

BONUS

9) EARTH SCIENCE *Multiple Choice* In which of the following locations would a preponderance of actively-produced pillow lavas be found:

- W) Mount Saint Helens
- X) mid-Atlantic ridge
- Y) Mount Vesuvius, Italy
- Z) Yellowstone Caldera

ANSWER: X) MID-ATLANTIC RIDGE

TOSS-UP

10) MATH *Short Answer* Simplify the following expression, combining like terms:
 $2x - 3y - (5x - 4y)$

ANSWER: $-3x + y$ (ACCEPT: $y - 3x$)

BONUS

10) MATH *Short Answer* A scale drawing of a tractor is drawn as 1 inch equal to 4 feet. If the width of the bucket is drawn as five-eighths of an inch, what is the actual width of the bucket, in feet to the first decimal place?

ANSWER: 2.5

(Solution: $(1 \text{ in} / 4 \text{ ft})(5/8 \text{ in}/x)$; $x = 2.5 \text{ ft}$)

TOSS-UP

11) LIFE SCIENCE *Multiple Choice* Which of the following is a general term widely used by scientists to indicate artificial growth of cells in the laboratory:

- W) culture
- X) monocell
- Y) attenuate
- Z) decoction

ANSWER: W) CULTURE

BONUS

11) LIFE SCIENCE *Multiple Choice* Which of the following is the most common term biologists use for the molecule that an enzyme will act on:

- W) substrate
- X) product
- Y) producer
- Z) catalyst

ANSWER: W) SUBSTRATE

TOSS-UP

12) PHYSICAL SCIENCE *Multiple Choice* Which of the following is NOT true:

- W) the freezing point of pure water is 0°C at sea level
- X) when pure water freezes, it reaches its maximum density at 0°C
- Y) adding salt to ice will lower its melting point
- Z) when pure maple syrup is cooled below 0°C, pure water ice separates out

ANSWER: X) WHEN PURE WATER FREEZES, IT REACHES ITS MAXIMUM DENSITY AT 0°C

(Solution: max density at ~4°C)

BONUS

12) PHYSICAL SCIENCE *Short Answer* Name all of the following 4 processes where energy is released: water melts; water freezes; evaporation; condensation

ANSWER: CONDENSATION; WATER FREEZES

TOSS-UP

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

- W) global sea levels have generally risen over the past 18,000 years
- X) the Mississippi River Delta in Louisiana has one of the highest rates of wetland loss in the U.S.
- Y) tide stations measure local sea levels
- Z) most of Earth's groundwater comes from glacial meltwater

ANSWER: Z) MOST OF EARTH'S GROUNDWATER COMES FROM GLACIAL MELTWATER

BONUS

13) EARTH SCIENCE *Multiple Choice* The primary process in the mechanical weathering of rocks worldwide is:

- W) exfoliation
- X) abrasion
- Y) thermal expansion
- Z) thermal contraction

ANSWER: X) ABRASION

TOSS-UP

14) MATH *Short Answer* Subtract $2\sqrt{7}$ from $5\sqrt{7}$, giving your answer in its simplest radical form:

ANSWER: $3\sqrt{7}$

BONUS

14) MATH *Short Answer* If on average 2 out of 7 students prefer vegetarian sandwiches over non-vegetarian sandwiches, how many vegetarian sandwiches should be ordered for 1400 students?

ANSWER: 400

(Solution: $2/7 = x/1400, x = 400$)

TOSS-UP

15) GENERAL SCIENCE *Multiple Choice* Chickenpox is a disease caused by a:

- W) bacteria
- X) fungus
- Y) virus
- Z) protozoan

ANSWER: Y) VIRUS

BONUS

15) GENERAL SCIENCE *Multiple Choice* Which of the following is an autoimmune disease:

- W) Lupus
- X) spina bifida
- Y) scabies
- Z) yellow fever

ANSWER: W) LUPUS

TOSS-UP

16) LIFE SCIENCE *Multiple Choice* Which of the following is a protein:

- W) glycerol
- X) trypsin
- Y) cholesterol
- Z) tyrosine

ANSWER: X) TRYPSIN

BONUS

16) LIFE SCIENCE *Short Answer* Name all of the following 4 cells of a human that are typically haploid: skin cell; mature ovum; sperm; lymphocyte

ANSWER: MATURE OVUM; SPERM

TOSS-UP

17) PHYSICAL SCIENCE *Short Answer* Giving the proper charges, what are the chemical formulas for the major ions present in a aqueous solution of sodium hydroxide, or NaOH?

ANSWER: Na⁺ AND OH⁻ (in any order)

BONUS

17) PHYSICAL SCIENCE *Short Answer* Arrange the following 3 pure substances in order of INCREASING melting points at 1 atmosphere of pressure: iron; oxygen; water

ANSWER: OXYGEN; WATER; IRON

TOSS-UP

18) EARTH SCIENCE *Multiple Choice* Which of the following is a greenhouse gas that primarily comes from landfills, coal mines, oil and natural gas operations, and agriculture:

- W) ozone
- X) sulfur dioxide
- Y) nitric oxide
- Z) methane

ANSWER: Z) METHANE

BONUS

18) EARTH SCIENCE *Multiple Choice* Mammoths and mastodons became extinct around the end of the:

- W) Cretaceous
- X) Jurassic
- Y) Triassic
- Z) Pleistocene

ANSWER: Z) PLEISTOCENE

TOSS-UP

19) MATH *Short Answer* For the equation, $-3x + 4y = 16$, find y when $x = 0$:

ANSWER: 4

BONUS

19) MATH *Short Answer* If the point on a graph with coordinates (3, 2) is translated 1 unit to the left and 3 units down, and then another 3 units to the left and 2 units up, what are the new coordinates?

ANSWER: (-1, 1)

TOSS-UP

20) GENERAL SCIENCE *Short Answer* The Pleiades is an open cluster whose stars all formed from the same interstellar cloud. What basic force holds this cluster together?

ANSWER: GRAVITY

BONUS

20) GENERAL SCIENCE *Multiple Choice* If we were to use human developmental stages for the age of our Sun, in which of the following stages of life would our Sun be considered:

- W) infant
- X) teenager
- Y) middle age
- Z) elderly

ANSWER: Y) MIDDLE AGE

TOSS-UP

21) LIFE SCIENCE *Short Answer* Tell whether the medusa and polyp stages of hydrozoans are haploid or diploid, respectively?

ANSWER: BOTH ARE DIPLOID (ACCEPT: DIPLOID AND DIPLOID)

BONUS

21) LIFE SCIENCE *Short Answer* Name all of the following 4 choices that are most commonly associated with asexual reproduction in organisms: meiosis; budding; binary fission; fragmentation

ANSWER: BUDDING; BINARY FISSION; FRAGMENTATION
(ACCEPT: ALL BUT MEIOSIS)

TOSS-UP

22) PHYSICAL SCIENCE *Short Answer* As what color will a red object appear when illuminated by a blue light?

ANSWER: BLACK

BONUS

22) PHYSICAL SCIENCE *Short Answer* What is the wavelength, in meters, of a sound wave that has a frequency of 4 kilohertz and a speed in a medium of 400 meters per second?

ANSWER: 0.1

(Solution: wavelength = speed/f = 400/4000 = 0.1 m)

TOSS-UP

23) EARTH SCIENCE *Multiple Choice* The impact crater located beneath the Yucatan Peninsula in Mexico is implicated in causing an extinction event that happened between which of the following two periods:

- W) Permian and Triassic
- X) Cretaceous and Tertiary
- Y) Cambrian and Ordovician
- Z) Devonian and Carboniferous

ANSWER: X) CRETACEOUS AND TERTIARY

BONUS

23) EARTH SCIENCE *Short Answer* What is the name for the Era that began after the extinction event that occurred at the end of the Cretaceous Period?

ANSWER: CENOZOIC

TOSS-UP

24) MATH *Short Answer* Expand the following expression, giving your answer in standard form:
 $(x + 10)^2$

ANSWER: $x^2 + 20x + 100$

BONUS

24) MATH *Short Answer* Find the following product, giving your answer in standard form:
 $(2x + y)(x + y)$

ANSWER: $2x^2 + 3xy + y^2$

TOSS-UP

25) GENERAL SCIENCE *Short Answer* What fraction of the celestial sphere can be seen from the Earth's South Pole?

ANSWER: $\frac{1}{2}$

BONUS

25) GENERAL SCIENCE *Short Answer* Name all of the following states of matter through which sound can travel: solid; liquid; gas; plasma

ANSWER: ALL