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### TOSS-UP

- Matitute Mark is 198 Marithus Mark 18 180 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: Implitute 教教教·後然 Inhihih 新春 · 養 序。 modified the state of the state
- X) replication
  Y) transfer

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- Z) complementation

ANSWER: X) REPLICATION

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### **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 Timhiling ## # # 18 PM THINININ STATE OF STA THINITURE THE STREET used to demonstrate electrostatic induction:
- W) electroscope
- X) voltmeter
- Y) electrometer
- Z) spectrometer

ANSWER: W) ELECTROSCOPE

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### **BONUS**

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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)

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- 3) EARTH SCIENCE *Multiple Choice* Meanders are typically associated with:
- W) turbulent rivers
- X) low-gradient streams
- Y) V-shaped valleys
- Z) alluvial fans

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ANSWER: X) LOW-GRADIENT STREAMS

### **BONUS**

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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)

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### **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:

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ANSWER: 20

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- 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

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- z) centrifugation Z) atomization Y) centrifugation

ANSWER: Y) CENTRIFUGATION

### **BONUS**

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- 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

- 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

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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) Millinin 教教教學 Militate At 18 18

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- 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: contains ONLY carbon atoms:
  - W) isopropyl alcohol
  - X) glass

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- zaphite Z) natural gas

ANSWER: Y) GRAPHITE

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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:

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- 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)

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- 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) basa Z) coal

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ANSWER: W) LIMESTONE

### **BONUS**

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- 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
- Z) Yellowstone Caldera Y) Mount Vesuvius, Italy

ANSWER: X) MID-ATLANTIC RIDGE

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-eights of an inch, what is the actual width of the bucket, in feet to the first decimal place? Myilith How At 13 192 Militate Market 18 182 Whiting the the 13 18

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ANSWER: 2.5 (Solution: (1 in /4 ft)(5/8 in/x); x = 2.5 ft)

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- 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
- Z) decoction

ANSWER: W) CULTURE

### **BONUS**

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- 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

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ANSWER: W) SUBSTRATE

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

  W) the freezing point of a
- 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  $0^{\circ}C$ 

(Solution: max density at ~4°C) Marithia Mark 13

### **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

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- 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

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- Z) thermal contraction Y) thermal expansion

ANSWER: X) ABRASION

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**

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Military # 18 14) MATH Short Answer If on average 2 out 7 students prefer vegetarian sandwiches over nonvegetarian sandwiches, how many vegetarian sandwiches should be ordered for 1400 students?

ANSWER: 400

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

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

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

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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:

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- 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 Myithin Make 18 18 Withite How He is the Britists Mark & PR haploid: skin cell; mature ovum; sperm; lymphocyte

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ANSWER: MATURE OVUM; SPERM

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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<sup>+</sup> AND OH<sup>-</sup> (in any order)

# BONUS 1/2 1/4

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: Maritanto 新春 株 淺 序

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- 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: Maritalle Aft At '8 PR Mylitule A A 18 18 Militate Market 18 182 Molitule Mark if the

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- W) Cretaceous
- X) Jurassic A
- Y) Triassic

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Z) Pleistocene

Millate Mark 18 1982 ANSWER: Z) PLEISTOCENE Activity of the second

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

ANSWER: 4

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### **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. 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:

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

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ANSWER: Y) MIDDLE AGE

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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)

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

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

### **TOSS-UP**

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

ANSWER: BLACK

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### **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?

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ANSWER: 0.1

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

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- 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

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- Y) Cambrian and Ordovician
  Z) Devonian and C

  - Z) Devonian and Carboniferous

ANSWER: X) CRETACEOUS AND TERTIARY

## BONUS 1/2

23) EARTH SCIENCE Short Answer What is the name for the Era that began after the extinction event that occured 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:  $(x+10)^2$ Marithus 教育 林 · 漢 序》 myliute ## # 13 PR

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

### **BONUS**

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

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Matinta Mar No. 18 PR. 25) GENERAL SCIENCE Short Answer What fraction of the celestial sphere can be seen from the Earth's South Pole?

ANSWER: 1/2

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### **BONUS**

Mylithe Mar hat 's PR 25) GENERAL SCIENCE Short Answer Name all of the following states of matter through which sound can travel: solid; liquid; gas; plasma

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