

ROUND 6A

TOSS-UP

1) GENERAL SCIENCE *Multiple Choice* Which of the following is true?

- W) Meiosis [*my-OH-sis*] results in two daughter cells
- X) Meiosis results in identical daughter cells
- Y) Mitosis [*my-TOH-sis*] results in four daughter cells
- Z) Mitosis results in identical daughter cells

ANSWER: Z) MITOSIS RESULTS IN IDENTICAL DAUGHTER CELLS

BONUS

1) GENERAL SCIENCE *Short Answer* What is the smallest of the world's five oceans?

ANSWER: ARCTIC

TOSS-UP

2) MATH *Multiple Choice* What type of quadrilateral has only one set of parallel sides with congruent non-parallel sides and congruent diagonals?

- W) Rhombus
- X) Kite
- Y) Isosceles trapezoid
- Z) Right trapezoid

ANSWER: Y) ISOSCELES TRAPEZOID

BONUS

2) MATH *Short Answer* What is the probability that an integer chosen at random from the set of all positive integers less than 100 is a multiple of 5?

ANSWER: $\frac{19}{99}$

TOSS-UP

3) PHYSICAL SCIENCE *Multiple Choice* Which of the following wave types has the longest wavelength?

- W) Radio
- X) Gamma
- Y) Ultraviolet
- Z) Microwave

ANSWER: W) RADIO

BONUS

3) PHYSICAL SCIENCE *Short Answer* What is the momentum, in newton seconds, of an object with a mass of 25 kilograms moving at a velocity of 25 meters per second?

ANSWER: 625

TOSS-UP

4) LIFE SCIENCE *Multiple Choice* Which of these organisms get energy directly from the Sun?

- W) Methanogens [*me-THAN-uh-jens*]
- X) Thermophiles
- Y) Cyanobacteria [*sy-uh-noh-bak-TEER-ee-uh*]
- Z) Lithotrophs

ANSWER: Y) CYANOBACTERIA

BONUS

4) LIFE SCIENCE *Short Answer* Which division of the nervous system contains axons of sensory and motor neurons bundled together as nerves?

ANSWER: PERIPHERAL NERVOUS SYSTEM (ACCEPT: PNS)

TOSS-UP

5) EARTH AND SPACE *Short Answer* The Cascade Mountains and the Andes Mountains are part of what is called the Ring of Fire. All of the volcanoes in the Ring of Fire are formed by magmatic processes at what kind of plate boundary?

ANSWER: SUBDUCTION ZONE (ACCEPT: CONVERGENT BOUNDARY)

BONUS

5) EARTH AND SPACE *Multiple Choice* The ocean crust is composed mostly of which of the following rock types?

- W) Basalt
- X) Granite
- Y) Tonalite
- Z) Gneiss **[NYS]**

ANSWER: W) BASALT

TOSS-UP

6) GENERAL SCIENCE *Short Answer* What is the layer just below the canopy in the vertical stratification of a forest?

ANSWER: UNDERSTORY (ACCEPT: UNDERBRUSH)

BONUS

6) GENERAL SCIENCE *Multiple Choice* Which of the following gives the primary components of the Earth's mass in order from largest percentage to smallest?

- W) Crust, mantle, core
- X) Core, mantle, crust
- Y) Mantle, core, crust
- Z) Core, crust, mantle

ANSWER: Y) MANTLE, CORE, CRUST

TOSS-UP

7) MATH *Multiple Choice* Which of the following is an example of a linear equation?

W) $7x - 5/y = 0$ [**7 x minus 5 over y equals 0**]

X) $3x^2 + 4y^3 = 9$ [**3 x squared plus 4 y cubed equals 9**]

Y) $7x + 11y - 4 = 9x + 22y$

Z) $3xy = 12$ [**3 x y equals 12**]

ANSWER: Y) $7x + 11y - 4 = 9x + 22y$

BONUS

7) MATH *Short Answer* You earn two extra credit points on a test that is graded on a 25 point scale. If you had an 88% before the extra credit, what is your final score, expressed as a percentage?

ANSWER: 96

TOSS-UP

8) ENERGY *Multiple Choice* As the spring constant (k) of a spring increases, what happens to its energy storage potential?

W) It increases exponentially

X) It increases linearly

Y) It stays the same

Z) It decreases

ANSWER: X) IT INCREASES LINEARLY

BONUS

8) ENERGY *Multiple Choice* To prevent lithium ion batteries from catching fire and exploding, which of the following devices is utilized?

W) Fuse disconnecting device

X) Monitoring circuit

Y) Charge controller

Z) Voltage charger

ANSWER: X) MONITORING CIRCUIT

TOSS-UP

9) PHYSICAL SCIENCE *Multiple Choice* A sound wave hits a wall, causing a reflection. Which of the following statements about this reflection is NOT correct?

- W) The wave will bounce off the wall
- X) The speed of the wave may change
- Y) The frequency of the wave will not change
- Z) The amplitude of the wave may change

ANSWER: X) THE SPEED OF THE WAVE MAY CHANGE

BONUS

9) PHYSICAL SCIENCE *Multiple Choice* Which of the following scientists did NOT study electricity and its properties?

- W) André-Marie Ampère
- X) Alessandro Volta
- Y) Benjamin Franklin
- Z) John Dalton

ANSWER: Z) JOHN DALTON

TOSS-UP

10) LIFE SCIENCE *Short Answer* What is the name of the barrier that surrounds all cells and regulates what may enter and exit the cell?

ANSWER: PLASMA MEMBRANE (ACCEPT: CELL MEMBRANE; DO NOT ACCEPT: MEMBRANE)

BONUS

10) LIFE SCIENCE *Multiple Choice* When two species compete for the same resources and one species is eliminated, the outcome is referred to as which of the following?

- W) Resource partitioning
- X) Intraspecific competition
- Y) Commensalism
- Z) Competitive exclusion

ANSWER: Z) COMPETITIVE EXCLUSION

TOSS-UP

11) EARTH AND SPACE *Multiple Choice* Which of the following is a characteristic mound-like structure that represents trace fossils of photosynthesizing microbes? Living relatives of these organisms can be found in Shark Bay, Australia.

- W) Stromatolite [*stroh-MAT-l-yt*]
- X) Oncolite
- Y) Oncoid
- Z) Dendrite

ANSWER: W) STROMATOLITE

BONUS

11) EARTH AND SPACE *Short Answer* Water ice is a significant constituent of the outer planets and moons of the solar system and can manifest itself in at least 15 different crystalline forms. Other than crystal structure, what is the physical difference between these various types of water ice?

ANSWER: DENSITY

TOSS-UP

12) GENERAL SCIENCE *Short Answer* The base represented by the letter "T" in DNA is replaced by which base in RNA?

ANSWER: URACIL (ACCEPT: U)

BONUS

12) GENERAL SCIENCE *Multiple Choice* What digestive organ has parts including the fundus, cardiac region, body, and pyloric region?

- W) Small intestine
- X) Liver
- Y) Pancreas
- Z) Stomach

ANSWER: Z) STOMACH

TOSS-UP

13) MATH *Multiple Choice* Which of the following is a rational number?

W) π [**pi**]

X) The base of a right isosceles triangle with hypotenuse 7

Y) The radius of a circle with circumference 2π

Z) e^2 [**e raised to the second power**]

ANSWER: Y) THE RADIUS OF A CIRCLE WITH CIRCUMFERENCE 2π

BONUS

13) MATH *Multiple Choice* The graph of a line passes through the points with coordinates (a, b) and $(c, -b)$. The slope of the line is $\frac{1}{2}$. What is $a - c$ in terms of b ?

W) $4b$

X) b

Y) $-b$

Z) $-4b$

ANSWER: W) $4b$

TOSS-UP

14) PHYSICAL SCIENCE *Short Answer* Providing your answer to two significant figures, what is the density, in grams per milliliter, of a 0.60 kilogram sample that has a volume of 300 cubic centimeters?

ANSWER: 2.0

BONUS

14) PHYSICAL SCIENCE *Multiple Choice* An object traveling from Earth to Venus experiences equal gravitational pull by Earth and Venus when which of the following occurs?

W) It is closer to Earth's surface

X) It is closer to Venus's surface

Y) It is exactly halfway between Earth and Venus

Z) Earth always pulls more strongly

ANSWER: X) IT IS CLOSER TO VENUS'S SURFACE

TOSS-UP

15) LIFE SCIENCE *Short Answer* What is the term for the rapid, automatic response to stimuli in which a particular stimulus always causes the same motor response?

ANSWER: REFLEX

BONUS

15) LIFE SCIENCE *Multiple Choice* Which of the following traits would you expect an ornithomimid **[AWR-nuh-thuh-pod]** dinosaur to have?

- W) Feathers
- X) Bird-like feet
- Y) Webbed feet
- Z) Fused pelvis

ANSWER: X) BIRD-LIKE FEET

TOSS-UP

16) EARTH AND SPACE *Short Answer* What are the three most common cementing agents of sedimentary rocks?

ANSWER: CALCITE, SILICA (ACCEPT: QUARTZ), IRON OXIDE (ACCEPT: HEMATITE)

BONUS

16) EARTH AND SPACE *Multiple Choice* Radiometric dating is a method of obtaining the age for a rock. This method utilizes which of the following?

- W) The presence of fossils
- X) Cross-cutting relationships
- Y) Spontaneous decay of radioactive elements
- Z) Superposition of strata

ANSWER: Y) SPONTANEOUS DECAY OF RADIOACTIVE ELEMENTS

TOSS-UP

17) ENERGY *Short Answer* What is the lowest point of land in the United States, where pure water does not boil until temperatures exceed 100°C?

ANSWER: DEATH VALLEY

BONUS

17) ENERGY *Short Answer* To date, most of the shale gas production has taken place in which U.S. state?

ANSWER: TEXAS

TOSS-UP

18) GENERAL SCIENCE *Multiple Choice* Which of the following types of cloud are associated with supercell thunderstorms?

- W) Cumulonimbus [*kyoo-myuh-loh-NIM-buhs*]
- X) Cumulus
- Y) Stratus
- Z) Cirrus

ANSWER: W) CUMULONIMBUS

BONUS

18) GENERAL SCIENCE *Short Answer* What marsupial is native to the United States and Canada?

ANSWER: OPOSSUM

TOSS-UP

19) MATH *Short Answer* The diameters of two circular gears of Ben's bicycle are in the ratio of 3 to 1. If the larger gear has a diameter of 24 inches, what is the circumference, in inches, of the smaller gear, in terms of pi?

ANSWER: 8π

BONUS

19) MATH *Multiple Choice* Which of the following values of c provides an integer value for the expression $0.3c + 4.2$?

- W) 2
- X) 3
- Y) 5
- Z) 6

ANSWER: Z) 6

TOSS-UP

20) PHYSICAL SCIENCE *Multiple Choice* The acceleration of a stone thrown upwards is which of the following?

- W) Greater than that of a stone thrown downward
- X) The same as that of a stone thrown downward
- Y) Less than that of a stone thrown downward
- Z) Zero until it reaches the highest point

ANSWER: X) THE SAME AS THAT OF A STONE THROWN DOWNWARD

BONUS

20) PHYSICAL SCIENCE *Short Answer* Identify all of the following four materials that are good insulators: 1) copper, 2) glass, 3) mica [**MY-kuh**], 4) quartz.

ANSWER: 2, 3, 4 (ACCEPT: GLASS, MICA, QUARTZ)

TOSS-UP

21) ENERGY *Short Answer* Carbon Capture and Sequestration (CCS) in deep ocean is no longer considered a promising alternative to releasing large quantities of carbon dioxide into the atmosphere. This is due to what chemical change that is believed to result from excess CO₂ in the ocean?

ANSWER: ACIDIFICATION

BONUS

21) ENERGY *Multiple Choice* With regard to water heaters, which of the following options presents energy savings of up to 30%?

- W) Replacing the tank water heater by an on-demand water heater
- X) Insulating pipe lines up to 6ft away from the heater
- Y) Using heat pump water heaters
- Z) Insulating the surroundings of the water heater

ANSWER: W) REPLACING THE TANK WATER HEATER BY AN ON-DEMAND WATER HEATER

TOSS-UP

22) LIFE SCIENCE *Short Answer* Mixotrophic organisms, such as dinoflagellates [*din-uh-FLAJ-uh-layts*], are able to live by phototrophy and what other process?

ANSWER: HETEROTROPHY (ACCEPT: INGESTING NUTRIENTS; EATING OTHER ORGANISMS)

BONUS

22) LIFE SCIENCE *Short Answer* What is the ancient type of Archaeal [*ahr-KEE-uhn*] metabolism that uses molecular hydrogen as an energy source and produces methane?

ANSWER: METHANOGENESIS (ACCEPT: BIOMETHANATION)

TOSS-UP

23) EARTH AND SPACE *Multiple Choice* Many cities on the U.S. east coast are at greater risk from rising sea levels than cities on the west coast of the U.S. What is the most plausible explanation for this occurrence?

- W) Cities on the west coast are typically built higher
- X) The sea level will rise more on the east coast than on the west coast
- Y) West coast cities are newer and, therefore, stronger
- Z) East coast cities are on unstable ground and are sinking slightly

ANSWER: X) THE SEA LEVEL WILL RISE MORE ON THE EAST COAST THAN ON THE WEST COAST

BONUS

23) EARTH AND SPACE *Short Answer* What is the term for the underwater equivalent of hypsometry [*hip-SOM-i-tree*]?

ANSWER: BATHYMETRY