

ROUND 3

TOSS-UP

1) LIFE SCIENCE *Short Answer* During which phase of mitosis [*my-TOH-sis*] do chromosomes line up along the center of the cell nucleus?

ANSWER: METAPHASE

BONUS

1) LIFE SCIENCE *Multiple Choice* Old growth forests and ancient cypress swamps would be examples of which of the following?

- W) Primary successive species
- X) Secondary successive species
- Y) Climax communities
- Z) Commensalism

ANSWER: Y) CLIMAX COMMUNITIES

TOSS-UP

2) PHYSICAL SCIENCE *Multiple Choice* Which of the following kinds of solutions is a mixture in which the solvent has dissolved all the solute it can at a given temperature?

- W) Saturated
- X) Unsaturated
- Y) Supersaturated
- Z) Concentrated

ANSWER: W) SATURATED

BONUS

2) PHYSICAL SCIENCE *Multiple Choice* When calculating the equilibrium constant for a reaction, the concentration of which of the following is generally included?

- W) Pure liquids
- X) Pure solids
- Y) Solvents
- Z) Solutes

ANSWER: Z) SOLUTES

TOSS-UP

3) GENERAL SCIENCE *Multiple Choice* Which of the following is a pyrimidine [*py-RIM-i-deen*]?

- W) Guanine [*GWAH-neen*]
- X) Thymine
- Y) Adenine [*AD-n-eeen*]
- Z) Xanthine [*ZAN-theen*]

ANSWER: X) THYMINE

BONUS

3) GENERAL SCIENCE *Short Answer* To a very good approximation, a golf club hitting a ball is an example of what kind of collision?

ANSWER: ELASTIC

TOSS-UP

4) EARTH AND SPACE *Short Answer* What mountain chain composes the majority of the Western Continental Divide in North America?

ANSWER: THE ROCKY MOUNTAINS

BONUS

4) EARTH AND SPACE *Multiple Choice* Which of the following is NOT a characteristic of estuaries?

- W) Bottom dominated by coarse sands
- X) Physical connection to the ocean
- Y) Physical connection with a freshwater source
- Z) Lower average water salinity than ocean water

ANSWER: W) BOTTOM DOMINATED BY COARSE SANDS

TOSS-UP

5) MATH *Short Answer* Nick's car costs \$450 per month for car payment and insurance, and 25 cents per mile driven. What is the total monthly cost in dollars in terms of m , the miles driven?

ANSWER: $0.25m + 450$ (ACCEPT: $m/4 + 450$)

BONUS

5) MATH *Short Answer* A rectangular field has an area of 300 square meters and a perimeter of 80 meters. What are the dimensions of the field in meters?

ANSWER: 30 AND 10

TOSS-UP

6) ENERGY *Short Answer* Environmentalists are most concerned about the environmental impact of hydroelectric plants on what group of organisms?

ANSWER: FISH

BONUS

6) ENERGY *Multiple Choice* Which of the following areas of the United States accounts for approximately half of the total hydroelectric power generation in the United States?

- W) Northeast
- X) Northwest
- Y) Southeast
- Z) Southwest

ANSWER: X) NORTHWEST

TOSS-UP

7) LIFE SCIENCE *Multiple Choice* Organisms of the same class would also share which of the following?

- W) Genus
- X) Family
- Y) Phylum **[FY-luhm]**
- Z) Order

ANSWER: Y) PHYLUM

BONUS

7) LIFE SCIENCE *Multiple Choice* Scientists are using genetic engineering to develop a wheat crop that is resistant to a particular kind of moth. How would they determine if the plants are moth resistant?

- W) Determine the length of the moth reproductive cycle in normal wheat
- X) Monitor moth populations in separate fields planted with control and experimental wheat crops
- Y) Monitor numbers of moth species infesting normal wheat
- Z) Determine whether moths in test wheat can be controlled with chemical sprays

ANSWER: X) MONITOR MOTH POPULATIONS IN SEPARATE FIELDS PLANTED WITH CONTROL AND EXPERIMENTAL WHEAT CROPS

TOSS-UP

8) PHYSICAL SCIENCE *Short Answer* What is the name for the individual repeating units of polymers?

ANSWER: MONOMERS

BONUS

8) PHYSICAL SCIENCE *Short Answer* Identify by number all of the following that are related to the origin of the name of the Large Hadron Collider (LHC) located at CERN: 1) composite particles made from quarks, 2) particle beams of protons that the LHC was built to collide, 3) lead nuclei that the LHC was built to collide, 4) a famous physicist.

ANSWER: 1, 2 AND 3

TOSS-UP

9) GENERAL SCIENCE *Short Answer* What is the term for the tendency for an object to resist change in its motion?

ANSWER: INERTIA

BONUS

9) GENERAL SCIENCE *Short Answer* Identify all of the following four choices which are possible examples of fossils: 1) seeds, 2) footprints, 3) teeth, 4) cave drawings.

ANSWER: 1, 2, 3 (ACCEPT: SEEDS, FOOTPRINTS, TEETH)

TOSS-UP

10) EARTH AND SPACE *Short Answer* What adjective describes an air parcel when it reaches a relative humidity of 100%?

ANSWER: SATURATED

BONUS

10) EARTH AND SPACE *Short Answer* In fluvial systems, what is the name of the crescent-shaped lake that is formed when a meander of a river is cut off from the main channel?

ANSWER: OXBOW LAKE (ACCEPT: OXBOW, HORSESHOE LAKE)

TOSS-UP

11) MATH *Short Answer* If $|200 - x| = 10$ [**the absolute value of the quantity 200 minus x equals 10**], what are the possible values for x ?

ANSWER: 190 AND 210

BONUS

11) MATH *Short Answer* Solve the inequality $-5 + |p + 2| \geq 0$ [**negative 5 plus the absolute value of the quantity p plus 2 is greater than or equal to 0**].

ANSWER: $p \leq -7$ OR $p \geq 3$ (MUST GIVE BOTH ANSWERS)

TOSS-UP

12) ENERGY *Multiple Choice* Which of the following is NOT an example of a biomass energy source?

- W) Coal
- X) Wood
- Y) Grain
- Z) Sugar

ANSWER: W) COAL

BONUS

12) ENERGY *Multiple Choice* In the summer, why is it best to do high energy consumption tasks, such as laundry and dishwashing, after 8 pm?

- W) It will increase the reliability and accessibility of electricity for critical needs in the electrical grid
- X) It takes more energy to run a dishwasher during the day
- Y) More energy is produced at night
- Z) Hot water heaters are programmed to operate at maximum efficiency after 8 pm

ANSWER: W) IT WILL INCREASE THE RELIABILITY AND ACCESSIBILITY OF ELECTRICITY FOR CRITICAL NEEDS IN THE ELECTRICAL GRID

TOSS-UP

13) LIFE SCIENCE *Multiple Choice* Of the following habitats, which is the most likely to have the highest amount of biodiversity?

- W) Desert
- X) Tropical rainforest
- Y) Deciduous forest [*di-SIJ-oo-uhs*]
- Z) Prairie

ANSWER: X) TROPICAL RAINFOREST

BONUS

13) LIFE SCIENCE *Multiple Choice* Which of the following cats is the largest?

- W) African lion
- X) Snow leopard
- Y) Siberian tiger
- Z) King cheetah

ANSWER: Y) SIBERIAN TIGER

TOSS-UP

14) MATH *Short Answer* An isosceles triangle has a perimeter of 62 inches. If the base of the triangle is 18 inches, what is the length of each of the congruent legs?

ANSWER: 22

BONUS

14) MATH *Short Answer* What is the standard form of the equation of the line that passes through (-2, 4) and is parallel to $y = (-3/2)x + 3$?

ANSWER: $3x + 2y = 2$ (DO NOT ACCEPT: $-(3/2)x + 1$)

TOSS-UP

15) LIFE SCIENCE *Multiple Choice* Which of the following is the least likely to be a characteristic of an invasive species?

- W) It will outcompete native species
- X) It will only survive under a narrow range of environmental conditions
- Y) It will have a longer reproductive cycle than native species
- Z) It will do economic and/or environmental harm in a new environment

ANSWER: X) IT WILL ONLY SURVIVE UNDER A NARROW RANGE OF ENVIRONMENTAL CONDITIONS

BONUS

15) LIFE SCIENCE *Multiple Choice* Which of the following is an example of a jawless fish?

- W) Sea horse
- X) Lamprey
- Y) Shark
- Z) Lungfish

ANSWER: X) LAMPREY

TOSS-UP

16) PHYSICAL SCIENCE *Multiple Choice* Einstein concluded that $E = mc^2$, where m is mass and c is speed of light. According to this formula, which of the following statements is true?

- W) All objects have energy only if they are moving at the speed of light
- X) An object at rest cannot possess an amount of energy due to its mass
- Y) All objects have energy of being, or rest mass energy
- Z) Small relativistic objects all propagate at the speed of light

ANSWER: Y) ALL OBJECTS HAVE ENERGY OF BEING, OR REST MASS ENERGY

BONUS

16) PHYSICAL SCIENCE *Short Answer* When the force on a falling object is equal to the force of air friction on that object, it will fall at a constant rate. What is this rate called?

ANSWER: TERMINAL VELOCITY

TOSS-UP

17) GENERAL SCIENCE *Short Answer* What is the name of the warm water event originally recognized by anchovy fishermen off the coast of Peru that sometimes occurs near Christmas?

ANSWER: EL NIÑO

BONUS

17) GENERAL SCIENCE *Multiple Choice* By crushing a tablet of medicine before you take it, you are changing the reaction rate by changing which of the following characteristics of the tablet?

- W) Surface area
- X) Amount of reactants
- Y) Activation energy
- Z) Km of the reaction

ANSWER: W) SURFACE AREA

TOSS-UP

18) EARTH AND SPACE *Multiple Choice* The spring 2011 earthquake in Japan occurred because Japan is located on which of the following?

- W) A spreading center
- X) A rift zone
- Y) A subduction zone
- Z) A mantle plume

ANSWER: Y) A SUBDUCTION ZONE

BONUS

18) EARTH AND SPACE *Short Answer* It is common for roads in mid latitudes to develop severe potholes after the spring thaw. What form of mechanical weathering is responsible?

ANSWER: FREEZING AND THAWING (ACCEPT: FROST ACTION; FROST WEDGING; ICE WEDGING)

TOSS-UP

19) MATH *Short Answer* Evaluate $\frac{12y}{5x}$ [**the fraction with numerator 12 y and denominator 5 x**] when $y = 2$ and $x = 0$.

ANSWER: UNDEFINED

BONUS

19) MATH *Multiple Choice* Between which of the following two whole numbers does $\sqrt[3]{515}$ [**the cube root of 515**] fall?

- W) 5 and 6
- X) 6 and 7
- Y) 7 and 8
- Z) 8 and 9

ANSWER: Z) 8 AND 9

TOSS-UP

20) ENERGY *Multiple Choice* Which of the following did NOT come from a once-living organism?

- W) Gasohol
- X) Crude oil
- Y) Uranium
- Z) Charcoal

ANSWER: Y) URANIUM

BONUS

20) ENERGY *Multiple Choice* Which of the following statements best describes a benefit of using alternative energy resources?

- W) It reduces the amount of fossil fuels that must be used
- X) It repairs the ozone layer
- Y) It reduces the amount of renewable resources used
- Z) It reduces the costs of producing energy

ANSWER: W) IT REDUCES THE AMOUNT OF FOSSIL FUELS THAT MUST BE USED

TOSS-UP

21) LIFE SCIENCE *Multiple Choice* Which of the following is NOT a source of food for polar bears in the wild?

- W) Emperor penguins
- X) Beluga whales
- Y) Walruses
- Z) Ringed seals

ANSWER: W) EMPEROR PENGUINS

BONUS

21) LIFE SCIENCE *Short Answer* What is the name of the organ found in birds and some invertebrates which is used to temporarily store food but also aids in preliminary digestion?

ANSWER: CROP

TOSS-UP

22) PHYSICAL SCIENCE *Short Answer* A substance with a pH of 2 has what pOH?

ANSWER: 12

BONUS

22) PHYSICAL SCIENCE *Multiple Choice* Should oxygen-17 undergo alpha decay, the resulting atom would have which of the following masses in amu?

- W) 11
- X) 13
- Y) 15
- Z) 17

ANSWER: X) 13

TOSS-UP

23) GENERAL SCIENCE *Short Answer* What is the term for the part of the eye that contains various colored pigments?

ANSWER: IRIS

BONUS

23) GENERAL SCIENCE *Multiple Choice* A material with which of the following specific heats in joules per kilogram Kelvin will require the least heat to change its temperature?

- W) 10
- X) 50
- Y) 100
- Z) 1000

ANSWER: W) 10

TOSS-UP

24) EARTH AND SPACE *Multiple Choice* Which of the following is the name for the hills made from glacial drift and deposited by meltwater from retreating glaciers?

- W) Kettle
- X) Drumlin
- Y) Kame
- Z) Esker

ANSWER: Y) KAME

BONUS

24) EARTH AND SPACE *Short Answer* Disappearing streams, dolines, sink holes, and caves are distinctive features in northern Florida, central Tennessee, and south-central Kentucky and, are indicative of what kind of topography?

ANSWER: KARST

TOSS-UP

25) MATH *Short Answer* What is twenty and 55 hundredths expressed as a decimal, a mixed number in simplest form, and a percent?

ANSWER: 20.55, 20 11/20, 2055%

BONUS

25) MATH *Multiple Choice* For positive values of x , the function $f(x) = \frac{x^6 - x^3}{x^2}$ [**the fraction with numerator x to the sixth minus x cubed and denominator x squared**] is which of the following types?

- W) Quartic
- X) Cubic
- Y) Hyperbolic
- Z) Parabolic

ANSWER: W) QUARTIC