

## SINGLE ELIMINATION ROUND 2

### TOSS-UP

1) **PHYSICAL SCIENCE** *Multiple Choice* Which of the following components corresponds to the pitch of a sound wave:

- W) wavelength
- X) frequency
- Y) amplitude
- Z) speed

ANSWER: X) FREQUENCY

### BONUS

1) **PHYSICAL SCIENCE** *Multiple Choice* In a closed container, if a gas is heated, which of the following occurs:

- W) molecular motion will decrease
- X) the gas will condense on the inner walls of the container
- Y) the chemical properties will change
- Z) the pressure will increase

ANSWER: Z) THE PRESSURE WILL INCREASE

### TOSS-UP

\*2) **LIFE SCIENCE** *Multiple Choice* Which of the following is NOT true:

- W) all the DNA in a eukaryotic cell is contained in the nucleus
- X) chiasma are a method of genetic interchromosomal exchange
- Y) in deuterostomes, the blastopore forms the anus
- Z) in lower plants the sporophyte is parasitic upon the gametophyte

ANSWER: W) ALL THE DNA IN A EUKARYOTIC CELL IS CONTAINED IN THE NUCLEUS

### BONUS

2) **LIFE SCIENCE** *Short Answer* What is the name of the layer of cells that are produced by the phellogen and, as they mature and die, their cell walls are encrusted with suberin?

ANSWER: CORK

### TOSS-UP

3) **LIFE SCIENCE** *Multiple Choice* Which of the following is the correct botanical term for the stem of a flower:

- W) peduncle (pronounced: pea-done-kle)
- X) stolon
- Y) rhizome
- Z) tuber

ANSWER: W) PEDUNCLE

### BONUS

\*3) **LIFE SCIENCE** *Multiple Choice* When reading the level of a fluid in a graduated cylinder, what part of the meniscus is lined up with the graduations to give an accurate reading of the volume?

- W) the top of the meniscus
- X) the bottom of the meniscus
- Y) the middle of the meniscus
- Z) the side of the meniscus

ANSWER: X) THE BOTTOM OF THE MENISCUS

### TOSS-UP

4) **EARTH SCIENCE** *Multiple Choice* The Arctic Circle lies at which of the following latitudes:

- W)  $66\frac{1}{2}^{\circ}$  North
- X)  $90^{\circ}$  North
- Y)  $66\frac{1}{2}^{\circ}$  South
- Z)  $90^{\circ}$  South

ANSWER: W)  $66\frac{1}{2}^{\circ}$  NORTH

### BONUS

4) **EARTH SCIENCE** *Short Answer* What is the only common mineral to be strongly magnetic other than magnetite:

ANSWER: PYRRHOTITE (ACCEPT: FeS OR IRON SULFIDE)

**TOSS-UP**

5) **MATH** *Multiple Choice* A graph of a stationary object graphed with position on the vertical axis and time on the horizontal axis is:

- W) a horizontal line
- X) a vertical line
- Y) a curved line
- Z) a line at 45 degrees

ANSWER: W) A HORIZONTAL LINE

**BONUS**

5) **MATH** *Short Answer* Combine the terms in the following expression:  $5 + 3x - 2y - 10$

ANSWER:  $3x - 2y - 5$  (ACCEPT:  $-5 + 3x - 2y$ )

**TOSS-UP**

\*6) **GENERAL SCIENCE** *Multiple Choice* Which of the following would typically be the most accurate for measuring exactly 1 liter of water:

- W) a pyrex 1 liter graduated cylinder
- X) a pyrex 1 liter beaker
- Y) a pyrex 2 liter beaker
- Z) a pyrex 1 liter Erlenmyer flask

ANSWER: W) a pyrex 1 liter graduated cylinder

**BONUS**

\*6) **GENERAL SCIENCE** *Multiple Choice* Pavlov is noted to have developed what is called classical conditioning. Which of the following is the best example of this?

- W) a dog hears its owner opening a can of food and the dog salivates
- X) a young boy looks forward to getting his allowance
- Y) a bird flies south when winter approaches
- Z) a monkey is trained to play ping pong through a series of rewards and punishments

ANSWER: W) A DOG HEARS ITS OWNER OPENING A CAN OF FOOD AND THE DOG SALIVATES

### TOSS-UP

\*7) **GENERAL SCIENCE** *Multiple Choice* Which of the following is the most effective means of preventing the spread of infections in hospitals?

- W) antibiotic treatment
- X) proper sterilization of all materials
- Y) washing hands frequently
- Z) wearing surgical masks

ANSWER: Y) WASHING HANDS FREQUENTLY

### BONUS

\*7) **GENERAL SCIENCE** *Multiple Choice* Which of the following best describes what most experts believe about *Homo sapiens*?

- W) they arose out of Africa less than 200,000 years ago
- X) they arose from Neanderthals about 1 million years ago
- Y) they arose from apes about 20 million years ago
- Z) they arose from China about 2 million years ago

ANSWER: W) THEY AROSE OUT OF AFRICA LESS THAN 200,000 YEARS AGO

### TOSS-UP

8) **EARTH SCIENCE** *Multiple Choice* An increase in chlorine in the stratosphere is believed to be the cause of which of the following:

- W) the Antarctic ozone hole
- X) increased photolysis of oxygen
- Y) decreased photolysis of oxygen
- Z) loss of atmospheric nitrogen

ANSWER: W) THE ANTARCTIC OZONE HOLE

### BONUS

8) **EARTH SCIENCE** *Short Answer* Order the following minerals from the hardest to the softest: Calcite; Talc; Quartz; Diamond

ANSWER: DIAMOND; QUARTZ; CALCITE; TALC

### TOSS-UP

9) **PHYSICAL SCIENCE** *Multiple Choice* At which temperature would water most likely boil on Mount McKinley:

- W) 90°C
- X) 100°C
- Y) 110°C
- Z) 120°C

ANSWER: W) 90°C

### BONUS

9) **PHYSICAL SCIENCE** *Multiple Choice* If one holds a piece of notebook paper vertically in front of and below the mouth and blows strongly over the paper, the paper rises in the direction that the air is flowing. This illustrates what principle of physics:

- W) Archimedes' Principle
- X) Bernoulli's Law
- Y) Pascal's Law
- Z) Charles' Law

ANSWER: X) BERNOULLI'S LAW

### TOSS-UP

10) **MATH** *Short Answer* In the following set of numbers, which is NOT a prime number:  
3, 5, 11, 17, 25, 29

ANSWER: 25

### BONUS

10) **MATH** *Short Answer* A farmer wants to make a square fenced-in area for his cows, with an area of 1600 square feet. He wants to have a fence post every 10 feet on the perimeter. How many fence posts will he need?

ANSWER: 12

(Solution: square is 40 feet on a side; 3 posts per side (don't count corners twice))

**TOSS-UP**

11) **PHYSICAL SCIENCE** *Multiple Choice* The property of water which permits an insect to “walk” on water is:

- W) viscosity
- X) surface tension
- Y) tensile strength
- Z) turgor pressure

ANSWER: X) SURFACE TENSION

**BONUS**

11) **PHYSICAL SCIENCE** *Multiple Choice* Molecules that have the same chemical formula but have different shapes or geometric arrangements are called:

- W) isomers
- X) twins
- Y) gluons
- Z) isotopes

ANSWER: W) ISOMERS

**TOSS-UP**

\*12) **EARTH SCIENCE** *Multiple Choice* Which of the following is NOT true regarding the far side of the moon:

- W) it contains no large maria
- X) it contains numerous craters and highlands
- Y) it has been surveyed by spacecraft
- Z) it is always dark

ANSWER: Z) IT IS ALWAYS DARK

**BONUS**

12) **EARTH SCIENCE** *Multiple Choice* The Fujita Scale is used to classify intensities of:

- W) hurricanes
- X) tornadoes
- Y) earthquakes
- Z) volcanic eruptions

ANSWER: X) TORNADOES

**TOSS-UP**

13) **MATH** *Multiple Choice* Continuing up the number sequence of natural numbers, prime numbers become which of the following:

- W) non-existent at a certain point
- X) all even after a certain point
- Y) less and less frequent
- Z) more frequent

ANSWER: Y) LESS AND LESS FREQUENT

**BONUS**

13) **MATH** *Short Answer* If you begin with 1 and double it 12 times, what will the total be?

ANSWER: 4,096

**TOSS-UP**

14) **EARTH SCIENCE** *Multiple Choice* Most of the rain that reaches the ground is from which of the following clouds?

- W) cumulus
- X) cirrus
- Y) nimbus
- Z) lenticular

ANSWER: Y) NIMBUS

**BONUS**

14) **EARTH SCIENCE** *Multiple Choice* A tropical storm will be declared a hurricane when:

- W) it moves out of the tropics
- X) wind speeds reach 34 mph
- Y) tornadoes are observed
- Z) there is evidence of eye formation and sustained wind speeds of 74 mph

ANSWER: Z) THERE IS EVIDENCE OF EYE FORMATION AND SUSTAINED WIND SPEEDS OF 74 MPH

### TOSS-UP

15) **LIFE SCIENCE** *Multiple Choice* Which of the following is the most specific place where the subunits of ribosomes are made in eukaryotes?

- W) nucleus
- X) endoplasmic reticulum
- Y) mitochondria
- Z) nucleolus

ANSWER: Z) NUCLEOLUS

### BONUS

\*15) **LIFE SCIENCE** *Multiple Choice* Which of the following is NOT characteristic of mitosis:

- W) chromosomes line up on an equatorial plate
- X) occurs in somatic cells
- Y) crossing over
- Z) preceded by the disappearance of the nuclear membrane

ANSWER: Y) CROSSING OVER

### TOSS-UP

\*16) **GENERAL SCIENCE** *Short Answer* What substance, because of its ability to dissolve so many different things, is usually considered the “universal solvent”?:

ANSWER: Water

### BONUS

\*16) **GENERAL SCIENCE** *Multiple Choice* In typical U.S. household wiring, which of the following colored wires is properly matched to its description?

- W) white for “hot”
- X) black for neutral
- Y) white for ground
- Z) green for ground

ANSWER: Z) GREEN FOR GROUND

**TOSS-UP**

\*17) **EARTH SCIENCE** *Multiple Choice* Which of the following occurs during a lunar eclipse?

- W) the moon passes between the Earth and the Sun
- X) the Earth passes between the Sun and the Moon
- Y) the Sun passes between the Earth and the Moon
- Z) Solar flares increase in intensity

ANSWER: X) THE EARTH PASSES BETWEEN THE SUN AND THE MOON

**BONUS**

17) **EARTH SCIENCE** *Short Answer* Magnetite is composed of what two elements?

ANSWER: IRON AND OXYGEN

**TOSS-UP**

\*18) **PHYSICAL SCIENCE** *Short Answer* By passing current through a wire wrapped around an iron rod, William Sturgeon invented the:

ANSWER: ELECTROMAGNET

**BONUS**

18) **PHYSICAL SCIENCE** *Short Answer* In pursuit of an insect, a lizard, braced against a rock, accelerates with a horizontal magnitude of 15 meters per second squared. How much horizontal force, in newtons, must the lizard exert on the rock to produce this acceleration if the lizard has a mass of 3 kilograms?

ANSWER: 45 NEWTONS (ACCEPT: 45)

(Solution:  $F=MA$ ;  $F=3 \times 15$ ;  $F=45$ )

### TOSS-UP

19) **MATH** *Multiple Choice* The equation  $y(5+2y) = y \times 5 + y \times 2y$  (read as: y times, parentheses, five plus two y, close parentheses, equals y times five plus y times two y) is an example of which algebraic property:

- W) commutative property of addition
- X) associative property of addition
- Y) distributive property
- Z) additive identity property

ANSWER: Y) DISTRIBUTIVE PROPERTY

### BONUS

19) **MATH** *Short Answer* Combine the terms in the following expression:  $12xy - 4x + 6y - 20yx$

ANSWER:  $-10xy - 4x + 6y$  (ACCEPT:  $-4x + 6y - 10xy$ )

### TOSS-UP

\*20) **GENERAL SCIENCE** *Multiple Choice* Barney and Fred are looking at a star chart listing the brightness of stars to observers on Earth. Which of the following heavenly bodies would most likely match with a magnitude value of negative 13?

- W) the Moon
- X) the Sun
- Y) Jupiter
- Z) Pluto

ANSWER: W) THE MOON

### BONUS

20) **GENERAL SCIENCE** *Short Answer* Which two of the following 5 elements are named after famous female scientists? Berkelium, Lawrencium, Meitnerium, Curium, Osmium

ANSWER: MEITNERIUM, CURIUM

**TOSS-UP**

\*21) **GENERAL SCIENCE** *Multiple Choice* Where will you most likely absorb the most ionizing radiation?

- W) in a space shuttle 30 miles above the earth
- X) working in an assembly line packing nuclear reactor fuel rods with uranium pellets
- Y) working in a coal mine
- Z) working in a control room at a nuclear power plant

ANSWER: W) IN A SPACE SHUTTLE 30 MILES ABOVE THE EARTH

**BONUS**

21) **GENERAL SCIENCE** *Short Answer* Rounded to the nearest hundred, what is the temperature in Fahrenheit of a substance at 1000°C ?

ANSWER: 1800

**TOSS-UP**

22) **LIFE SCIENCE** *Multiple Choice* The presence of which of the following is what makes rough endoplasmic reticulum appear rough and not smooth?

- W) ribosomes
- X) globular proteins
- Y) glycolipids
- Z) growing proteins

ANSWER: W) RIBOSOMES

**BONUS**

22) **LIFE SCIENCE** *Short Answer* A lack of the neurotransmitter dopamine in the brain of humans causes what disease that afflicts thousands of US people including Michael J. Fox and Janet Reno:

ANSWER: PARKINSON'S

**TOSS-UP**

23) **MATH** *Short Answer* The price of a postage stamp changes from 33 cents to 34 cents. What is the percent increase in price?

ANSWER: 3 (ACCEPT: 3.03)

**BONUS**

23) **MATH** *Short Answer* Simplify the following equation:  $\frac{7x^2}{x^3}$

ANSWER:  $\frac{7}{x}$  (ACCEPT:  $7(x)^{-1}$ )

**TOSS-UP**

24) **LIFE SCIENCE** *Multiple Choice* Which of the following is NOT a protist?

- W) Paramecium
- X) Euglena
- Y) Amoeba
- Z) Anabaena ( AN-ah-BEEN-ah)

ANSWER: Z) ANABAENA

**BONUS**

24) **LIFE SCIENCE** *Short Answer* Give the respective common name for the following tissues: hepatic, cardiac, epidermis.

ANSWER: LIVER, HEART, SKIN

### TOSS-UP

25) **PHYSICAL SCIENCE** *Short Answer* The ability of a semiconductor to carry a current is increased by a process called:

ANSWER: DOPING

### BONUS

25) **PHYSICAL SCIENCE** *Short Answer* Order the following from the LOWEST to the HIGHEST temperature: water boils, iron melts, ammonia boils, tin melts

ANSWER: AMMONIA BOILS, WATER BOILS, TIN MELTS, IRON MELTS