

TOSS-UP

1) CHEMISTRY *Short Answer* Which element has the highest electronegativity?

ANSWER: Fluorine

BONUS

1) CHEMISTRY *Short Answer* Which element has the lowest electronegativity?

ANSWER: Cesium

TOSS-UP

2) EARTH AND SPACE *Multiple Choice* What mineral is termed 10 on the Moh's hardness scale?

W) Diamond

X) Quartz

Y) Granite

Z) Plastic

ANSWER: W) Diamond

BONUS

2) EARTH AND SPACE *Short Answer* What value is given to Apatite on the Moh's hardness scale?

ANSWER: 5

TOSS-UP

3) MATH *Short Answer* What is the sum of the first 10 positive odd integers?

ANSWER: 100

BONUS

3) MATH *Short Answer* Jeffrey rolls 2 dice. What is the probability he rolls a sum of 11?

ANSWER: $\frac{1}{18}$

TOSS-UP

4) PHYSICS *Short Answer* Richard walks 30 feet north, 53 feet west, 42 feet south, and 69 feet east. What is the magnitude of his displacement, in yards, to the nearest whole number?

ANSWER: 7

BONUS

4) PHYSICS *Multiple Choice* Devin falls off of a 50 kilometer high cliff. Approximately how long does it take him to fall to the ground?

W) 100 seconds

X) 500 seconds

Y) 700 seconds

Z) 10 minutes

ANSWER: W) 100 seconds

TOSS-UP

5) BIOLOGY *Multiple Choice* A typical human inherits how many chromosomes from each parent?

W) 21

X) 23

Y) 24

Z) 46

ANSWER: X) 23

BONUS

5) BIOLOGY *Multiple Choice* What term describes the complete set of chromosomes in an individual organism?

W) Genotype

X) Phenotype

Y) Karyotype

Z) Ploidy

ANSWER: Y) Karyotype

TOSS-UP

6) CHEMISTRY *Short Answer* What is the name of a substance with a pH higher than 7?

ANSWER: Base

BONUS

6) CHEMISTRY *Multiple Choice* Which of the following does not affect equilibrium concentrations?

- W) Catalyst
- X) Temperature
- Y) Addition of Products
- Z) Pressure

ANSWER: W) Catalyst

TOSS-UP

7) EARTH AND SPACE *Multiple Choice* What planet is closest in size to Earth?

- W) Venus
- X) Mars
- Y) Mercury
- Z) Neptune

ANSWER: W) Venus

BONUS

7) EARTH AND SPACE *Short Answer* Which of the Jovian planets is closest to earth?

ANSWER: Jupiter

TOSS-UP

8) MATH *Short Answer* A triangle has angles of measures 34° , 45° , and x° . Compute x .

ANSWER: 101°

BONUS

8) MATH *Multiple Choice* Which of the following sequences starts with 0 and 1 with each subsequent term being computed by adding the sum of the previous two numbers:

- W) Euler Sequence
- X) Euclid Sequence
- Y) Fibonacci Sequence
- Z) Gauss Sequence

ANSWER: Y) Fibonacci Sequence

TOSS-UP

9) PHYSICS *Multiple Choice* Assuming a g of 10 meters per second squared, what is the impact velocity of an object that falls from a height of 5 meters?

W) 1 m/s (READ AS: meter per second)

X) 5 m/s

Y) 10 m/s

Z) 20 m/s

ANSWER: Y) 10 m/s

BONUS

9) PHYSICS *Short Answer* Jean-Jacques Rousseau is standing on a platform 100 meters above the ground. He throws a ball with a velocity of 20 m/s (read as: meters per second) at an angle of 45 degrees from the platform. Assuming that g is 10 m/s^2 (read as: meters per second squared), in how many seconds, to the nearest second, does the ball land?

ANSWER: 7 seconds

TOSS-UP

10) BIOLOGY *Multiple Choice* If a cell is placed into a hypertonic solution, which of the following will happen to the cell?

W) The cell will lyse

X) The cell will shrivel

Y) The cell will stay the same

Z) The cell will absorb solutes

ANSWER: X) The cell will shrivel

BONUS

10) BIOLOGY *Short Answer* What is the scientific word for the process in which plant cell membrane separates from the cell wall?

ANSWER: Plasmolysis

TOSS-UP

11) CHEMISTRY *Short Answer* What law states that if pressure is constant, the volume and temperature are directly proportional?

ANSWER: Charles' Law

BONUS

11) CHEMISTRY *Short Answer* At most how many bonds can one carbon atom form?

ANSWER: 4

TOSS-UP

12) EARTH AND SPACE *Multiple Choice* Which of the following layers of the atmosphere is farthest from the surface?

W) Mesosphere

X) Troposphere

Y) Stratosphere

Z) Exosphere

ANSWER: Z) Exosphere

BONUS

12) EARTH AND SPACE *Short Answer* What type of radiation has the shortest wavelength?

ANSWER: Gamma Rays

TOSS-UP

13) MATH *Short Answer* The 25-member Lexington High School DOE Team was to meet Thursday, but only Derik and Aiyappa showed up. What percentage of the team did not show up to the meeting?

ANSWER: 92%

BONUS

13) MATH *Short Answer* The 25-member Lexington High School DOE Team has Disney movie marathons together. If the team has 5 distinct Disney movies they can watch, how many distinct orders of 5 movies can be made?

ANSWER: 120

TOSS-UP

14) PHYSICS *Short Answer* A horse starts at rest and then accelerates at a constant rate of 4 m/s^2 . After 5 seconds, how many meters has the horse travelled from the starting point?

ANSWER: 50

BONUS

14) PHYSICS *Multiple Choice* Which of the following particles has a negative charge?

W) Neutron

X) Photon

Y) Muon

Z) Gluon

ANSWER: Y) Muon

TOSS-UP

15) BIOLOGY *Short Answer* What protein carries oxygen in the blood?

ANSWER: Hemoglobin

BONUS

15) BIOLOGY *Multiple Choice* In what organelle do the Krebs cycle and Electron Transport Chain of cellular respiration take place?

W) Mitochondria

X) Cytoplasm

Y) Nucleus

Z) Lysosome

ANSWER: W) Mitochondria

TOSS-UP

16) CHEMISTRY *Short Answer* Which Russian chemist formulated the Periodic Law and drafted the first periodic table of elements?

ANSWER: Dmitri Mendeleev

BONUS

16) CHEMISTRY *Multiple Choice* In Mendeleev's periodic table models, he predicted the identities of elements not yet discovered. What element known today was known to Mendeleev as eka-aluminum?

- W) Silicon
- X) Potassium
- Y) Calcium
- Z) Gallium

ANSWER: Z) Gallium

TOSS-UP

7) EARTH AND SPACE *Multiple Choice* What type of rock is formed when lava from a volcano cools?

- W) Metamorphic rock
- X) Igneous rock
- Y) Sedimentary rock
- Z) Pebbles

ANSWER: X) Igneous rock

BONUS

7) EARTH AND SPACE *Multiple Choice* What percent of the Earth atmosphere is carbon dioxide?

- W) 0.007%
- X) 0.04%
- Y) 1%
- Z) 9%

ANSWER: X) 0.04%

TOSS-UP

18) EARTH AND SPACE *Multiple Choice* What type of rock is formed when lava from a volcano cools?

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ANSWER: X) Igneous rock

BONUS

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Y) 1%

Z) 9%

ANSWER: X) 0.04%

TOSS-UP

19) PHYSICS *Short Answer* The isotopes of an element differ in numbers of what subatomic particle?

ANSWER: Neutron

BONUS

19) PHYSICS *Multiple Choice* What fissile isotope of uranium is often used in nuclear power generation?

W. Uranium 234

X. Uranium 235

Y. Uranium 238

Z. Uranium 241

ANSWER: X (Uranium 235)

TOSS-UP

20) BIOLOGY *Short Answer* What genus do domestic cats belong to?

ANSWER: Felis

BONUS

20) BIOLOGY *Short Answer* By name or number, order the following from least to most specific:

1. Order
2. Class
3. Species
4. Kingdom
5. Family

ANSWER: 4, 2, 1, 5, 3

TOSS-UP

21) CHEMISTRY *Short Answer* By name or number, order the following three liquids by increasing density

1. Oil
2. Water
3. Glycerin

ANSWER: 1, 2, 3

BONUS

21) CHEMISTRY *Multiple Choice* Which of the following statements best explains why ice is less dense than liquid water?

- W) Solids are always less dense than their corresponding liquids
- X) Ice's lattice structure spaces out the molecules more than that of water
- Y) Ice is not affected by gravity as much as liquid water
- Z) Ice is more reflective than liquid water

ANSWER: X) Ice's lattice structure spaces out the molecules more than that of water

TOSS-UP

22) EARTH AND SPACE SCIENCE *Multiple Choice* What type of rocks are associated with volcanoes?

- W) Sedimentary Rock
- X) Igneous Rock
- Y) Metamorphic Rock
- Z) Pebbles

ANSWER: X) Igneous Rock

BONUS

22) EARTH AND SPACE SCIENCE *Short Answer* What rock comprises most of Earth's continental crust?

ANSWER: Granite

TOSS-UP

23) MATH *Multiple Choice* $x=1$ is a solution to the equation $x^2-9000x+8999 = 0$. Which of the following is the other solution?

W) 0

X) 4499

Y) 8999

Z) 17999

ANSWER: X) 8999

BONUS

23) MATH *Short Answer* The price of a dinner before tax and tip was \$30. If tax is 10% and the tip is 15%, how much does the dinner cost after tax and tip? Round your answer to the nearest whole dollar.

ANSWER: \$38

TOSS-UP

24) PHYSICS *Multiple Choice* Which of the following colors do NOT exist in the visible portion of the electromagnetic spectrum?

W) Cyan

X) Magenta

Y) Pink

Z) Red

ANSWER: Y) Pink

BONUS

24) PHYSICS *Short Answer* The phenomenon of an object changing direction due to the crossing of the border between two media (plural of medium) with a non-perpendicular angle of incidence is called?

ANSWER: Refraction

TOSS-UP

25) **BIOLOGY** *Short Answer* To what phylum to all vertebrates belong to?

ANSWER: Chordata

BONUS

25) **BIOLOGY** *Short Answer* What is the term for the study of insects?

ANSWER: Entomology
