**TOSS-UP**

1) BIOLOGY *Multiple Choice* The common cold is an infection caused by which of the following?

W) Virus  
X) Bacteria  
Y) Fungi  
Z) Protist

ANSWER: W) Virus

**BONUS**

1) BIOLOGY *Short Answer* A mammalian cell is enucleated, what is the most likely identity of this cell?

ANSWER: Erythrocyte

**TOSS-UP**

2) MATH *Short Answer* Anka is creating an outfit out of hats and scarves. If she has 4 different hats and 5 different scarves, how many outfits can she make if she must choose one hat and one scarf?

ANSWER: 20

**BONUS**

2) MATH *Short Answer* What is the sum of all odd integers between 1 and 11, inclusive?

ANSWER: 36

**TOSS-UP**

3) PHYSICS *Multiple Choice* What force perpendicular to a surface is responsible for keeping objects on the surface?

W) Friction  
X) Normal Force  
Y) Gravity  
Z) Buoyancy

ANSWER: X) Normal force

**BONUS**

3) PHYSICS *Short Answer* A 10 kilogram ball is rolled along a frictionless surface at a constant velocity of 6 meters per second. What is the linear momentum of the ball?

ANSWER: 60 kilograms meters per second

**TOSS-UP**

4) CHEMISTRY *Short Answer* What is the atomic number of oxygen?

ANSWER: 8

**BONUS**

4) CHEMISTRY *Multiple Choice* Which of the following particles is not found in a carbon atom?

W) Photon  
X) Neutron  
Y) Proton  
Z) Electron

ANSWER: W) Photon

**TOSS-UP**

5) EARTH AND SPACE *Multiple Choice* Plate tectonics is driven by which of the following?

W) Convection under the Earth’s surface  
X) Conduction under the Earth’s surface  
Y) Radiation under the Earth’s surface  
Z) Advection under the Earth’s surface

ANSWER: W) Convection under the Earth’s surface

**BONUS**

5) EARTH AND SPACE *Multiple Choice* What type of rock is sandstone?

W) Igneous  
X) Sedimentary  
Y) Metamorphic  
Z) Mineral

ANSWER: X) Sedimentary

**TOSS-UP**

6) BIOLOGY *Short Answer* What organelle is responsible for the creation of proteins?

ANSWER: Ribosome

**BONUS**

6) BIOLOGY *Multiple Choice* If you mark a tree at 20 ft, and subsequently the tree grows 15 ft, how high is the original mark?

W) 20 ft  
X) 25 ft  
Y) 30 ft  
Z) 35 ft

ANSWER: W) 20 ft

**TOSS-UP**

7) MATH *Short Answer* Evaluate the following: 2(4+2)2

ANSWER: 72

**BONUS**

7) MATH *Short Answer* Evaluate the following: 2cos(x)+7 when x=90॰

ANSWER: 9

**TOSS-UP**

8) PHYSICS *Short Answer* What type of heat transfer is the only type that cannot occur between solid objects?

ANSWER: Convection

**BONUS**

8) PHYSICS *Multiple Choice* What is the work done by lifting a 2 kilogram mass up by 6 meters? Assume that g = 10 m/s^2

W) 12 joules  
X) 60 joules  
Y) 120 joules  
Z) 600 joules

ANSWER: Y) 120 joules

**TOSS-UP**

9) CHEMISTRY *Multiple Choice* Which of the following elements is a liquid at room temperature?

W) Oxygen  
X) Carbon  
Y) Gold  
Z) Mercury

ANSWER: Z) Mercury

**BONUS**

9) CHEMISTRY *Short Answer* How many atoms are in a single molecule of fluorine gas?

ANSWER: 2

**TOSS-UP**

10) EARTH AND SPACE *Multiple Choice* Which of the following is a type of precipitation where chunks of ice fall out the sky in solid form, often with multiple layers from intense updrafts in thunderstorms?

W) Rain  
X) Sleet  
Y) Glaze  
Z) Hail

ANSWER: Z) Hail

**BONUS**

10) EARTH AND SPACE *Short Answer* Order the following sediments in terms of grain size, from smallest to largest:

1. Silt
2. Clay
3. Sand

ANSWER: II, I, III

**TOSS-UP**

11) BIOLOGY *Multiple Choice* What type of bacteria is circular shaped?

W) Bacillus  
X) Spirillum  
Y) Coccus  
Z) Icosahedral

ANSWER: Y) Coccus

**BONUS**

11) BIOLOGY *Multiple Choice* Which part of the flower produces pollen

W) Filament  
X) Anther  
Y) Stigma  
Z) Ovary

ANSWER: X) Anther

**TOSS-UP**

12) MATH *Short Answer* What is the slope of the following line: 3x+4y=12

ANSWER: -3/4

**BONUS**

12) MATH *Multiple Choice* Which of the following lines is perpendicular to 5x+2y=10?

W) y=(2x/5)+7  
X) y=(-2x/5)+9  
Y) y=(5x/2)+11  
Z) y=(-5x/2)+13

ANSWER: W) y=(2x/5)+7

**TOSS-UP**

13) PHYSICS *Short Answer* The existence of the nucleus was shown by the bombardment of gold atoms with what particles?

ANSWER: Alpha particles

**BONUS**

13) PHYSICS *Multiple Choice* Consider a circuit with resistors of equal resistance in parallel. What is the effect on the total resistance of the circuit if another equivalent resistor is added?

W) Increase  
X) Decrease  
Y) No change  
Z) Depends on the resistance

ANSWER: X) Decrease

**TOSS-UP**

14) CHEMISTRY *Short Answer* How many times more acidic is a pH of 4 than a pH of 6?

ANSWER: 100

**BONUS**

14) CHEMISTRY *Short Answer* What is the charge of the phosphate ion?

ANSWER: -3

**TOSS-UP**

15) EARTH AND SPACE *Multiple Choice* The Coriolis effect is caused by which of the following?

W) Earth’s revolution  
X) Earth’s rotation  
Y) Earth’s tilt  
Z) The Moon

ANSWER: X) Earth’s rotation

**BONUS**

15) EARTH AND SPACE *Multiple Choice* Which of the following would increase air pressure?

W) Increasing temperature  
X) Decreasing altitude  
Y) Increasing humidity  
Z) Decreasing gravity

ANSWER: X) Decreasing altitude

**TOSS-UP**

16) BIOLOGY *Multiple Choice* From what organ does insulin come?

W) Liver  
X) Pancreas  
Y) Heart   
Z) Lungs

ANSWER: X) Pancreas

**BONUS**

16) BIOLOGY *Short Answer* What molecule, consisting of a modified adenine nucleotide and three phosphates, is used as an energy source by all organisms?

ANSWER: ATP (Adenosine triphosphate)

**TOSS-UP**

17) MATH *Short Answer* How many different ways are there to arrange four distinct people around a circle?

ANSWER: 6

**BONUS**

17) MATH *Short Answer* What is the probability that of the first two cards drawn out of a standard deck, at least one of the cards drawn is red?

ANSWER: 23/26

**TOSS-UP**

18) PHYSICS *Short Answer* What quantity is conserved in elastic collisions that makes them unique from inelastic collisions?

ANSWER: Kinetic energy

**BONUS**

18) PHYSICS *Short Answer* Arrange the following three substances in order of increasing refractive index.

1. Water
2. Air
3. Vacuum

ANSWER: 3, 2, 1

**TOSS-UP**

19) CHEMISTRY *Multiple Choice* Which of the following species is an acid?

W) N2  
X) CH4  
Y) CaCO3  
Z) H2SO4

ANSWER: Z) H2SO4

**BONUS**

19) CHEMISTRY *Short Answer* Ionization involves the removal of what fundamental particle from an atom?

ANSWER: Electron

**TOSS-UP**

20) EARTH AND SPACE *Multiple Choice* Which of the following ocean currents is warm?

W) California Current  
X) North Pacific Current  
Y) Antarctic Circumpolar Current  
Z) Gulf Stream

ANSWER: Z) Gulf Stream

**BONUS**

20) EARTH AND SPACE *Short Answer* Name which of the following three options are minerals:

1. Topaz
2. Basalt
3. Diamond

ANSWER: I, III

**TOSS-UP**

21) BIOLOGY *Multiple Choice* During what phase of mitosis does the replicating cell begin to separate sister chromatids?

W) Prophase  
X) Metaphase  
Y) Anaphase  
Z) Telophase

ANSWER: Y) Anaphase

**BONUS**

21) BIOLOGY *Short Answer* After mitosis occurs, what process ultimately splits the two daughter cells into two individual cells?

ANSWER: Cytokinesis

**TOSS-UP**

22) MATH *Short Answer* In terms of pi, what is the area of a circle with a diameter of 10?

ANSWER: 25pi

**BONUS**

22) MATH *Short Answer* What is the most common sum from rolling four number cubes?

ANSWER: 14

**TOSS-UP**

23) PHYSICS *Short Answer* If a force of 8 Newtons is applied to a 4 kg block for 6 seconds, what is the change in the block’s momentum?

ANSWER: 48 (Kg m/s)

**BONUS**

23) PHYSICS *Short Answer* A 100 kilogram truck at an initial velocity of 5 meters per second and a constant acceleration of 2 meters per second squared slams into a wall and decelerates to rest in t seconds. What is the value of t?

ANSWER: 2.5

**TOSS-UP**

24) CHEMISTRY *Multiple Choice* Which of the following is a chemical property of a substance?

W) Melting point  
X) Density  
Y) Color  
Z) Flammability

ANSWER: Z) Flammability

**BONUS**

24) CHEMISTRY *Short Answer* Propane is a gas with formula C3H8. What are the products of the combustion of propane in oxygen gas?

ANSWER: Carbon dioxide and water

**TOSS-UP**

25) EARTH AND SPACE *Multiple Choice* While you conduct a survey of the surrounding area after a volcanic eruption, which of the following rocks would you most likely encounter?

W) Shale  
X) Slate  
Y) Obsidian  
Z) Lignite

ANSWER: Y) Obsidian

**BONUS**

25) EARTH AND SPACE *Multiple Choice* While surveying the area, you noticed that the top of the volcano has collapsed, forming a large crater with a minimum diameter of 1 km. What would this crater be called?

W) Caldera  
X) Cirque  
Y) Fumarole  
Z) Playa

ANSWER: W) Caldera