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## 1. Biology

### Toss Up: Multiple Choice

Which of the following is a retrovirus?

- W) HIV
- X) Hepatitis B virus
- Y) Poliovirus
- Z) Influenza A virus

Toss Up Answer: W

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### Bonus: Short Answer

Where do DNA viruses usually replicate?

Bonus Answer: In the nucleus.

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## 2. Physics

### Toss Up: Short Answer

Two forces that have magnitudes of 11 newtons and 5 newtons are applied to an object. What's the maximum net force that can act upon the object?

Toss Up Answer: 16 N

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### Bonus: Short Answer

A toy train moves in a circle of 8 meters radius with a speed of 4 meters per second. What is the magnitude of the acceleration of the train?

Bonus Answer:  $2 \text{ m/s}^2$

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## 3. Biology

### Toss Up: Multiple Choice

Global warming has been linked to a decrease in

- W) the size of polar icecaps
- X) temperature of Earth
- Y) rate of species extinction
- Z) rate of carbon dioxide production

Toss Up Answer: W

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### Bonus: Multiple Choice

Why is a mushroom a heterotroph?

- W) it manufactures its own food
- X) It divides by mitosis
- Y) It transforms light energy into chemical energy
- Z) It obtains nutrients from the environment

Bonus Answer: Z

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## 4. Mathematics

### Toss Up: Short Answer

What is the quadratic formula?

Toss Up Answer:  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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### Bonus: Short Answer

Solve for y if  $x = \frac{5}{6}y + \frac{116}{3}y + \frac{4}{2}$  in terms of x

Bonus Answer:  $y = \frac{(x-2)}{78}$

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## 5. Chemistry

### Toss Up: Short Answer

What term describes the process when a solid phase changes directly to the gas phase?

Toss Up Answer: Sublimation

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### Bonus: Short Answer

The angle between any two boron-hydrogen bonds in a boron trihydride molecule is how many degrees?

Bonus Answer: 120 degrees

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## 6. Energy

### Toss Up: Multiple Choice

In a typical power plant used to generate electricity in the U.S., the percentage of energy in the fuel that is converted to electricity is about:

W) 60%

X) 90%

Y) 20%

Z) 35%

Toss Up Answer: Z

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### Bonus: Short Answer

The Nuclear Waste Policy Act of 1982 and amendments require what

Federal agency to site, construct and operate a geologic repository for disposal of high-level nuclear waste?

Bonus Answer: U.S. Department of Energy

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## 7. Mathematics

### Toss Up: Multiple Choice

Which of the following types of symmetry does  $x^2 + (y-1)^2 = 36$  have?

W) Y-axis symmetry, only

X) X-axis symmetry, only

Y) Both x and y axis symmetry

Z) Neither x nor y axis symmetry

Toss Up Answer: W

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### Bonus: Multiple Choice

Which of the following types of symmetry does  $x^2 - y^2 = 36$  have?

W) Y-axis symmetry, only

- X) X-axis symmetry, only
- Y) Both x and y axis symmetry
- Z) Neither x nor y axis symmetry

Bonus Answer: Y

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## 8. Earth and Space Science

Toss Up: Short Answer

In what location is the majority of Earth's freshwater "locked up"?

Toss Up Answer: Antarctica

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Bonus: Short Answer

What are the four terrestrial planets?

Bonus Answer: Earth, Mars, Mercury, Venus

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## 9. Mathematics

Toss Up: Multiple Choice

What is the square root of 2 (to the nearest tenths)?

W) 1.7

X) 1.5

Y) 1.3

Z) 1.4

Toss Up Answer: Z

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Bonus: Short Answer

What is the equation of a circle with circumference  $6\pi$  that is positioned 3 points above the x axis and 4 points before the y axis?

Bonus Answer:  $(x-4)^2 + (y+3)^2 = 9$

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## 10. Chemistry

Toss Up: Multiple Choice

How many moles of nitrogen are in 35 grams of nitrogen?

W) 3

X) 3.5

Y) 4

Z) 2.5

Toss Up Answer: Z

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Bonus: Short Answer

What periodic group is Magnesium a part of?

Bonus Answer: Alkaline Earth Metals

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## 11. Biology

Toss Up: Multiple Choice

Which of these is not an accepted domain of life?

W) Archea

X) Bacteria

Y) Eukarya

Z) Protista

**Toss Up Answer: Z**

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**Bonus: Short Answer**

What is the causative agent of Scrapie?

**Bonus Answer: prion**

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## 12. Physics

**Toss Up: Short Answer**

A bulldozer does 30,000 joules of work to push another boulder a distance of 20 meters. How much force is applied to push the boulder?

**Toss Up Answer: 1,500 N**

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**Bonus: Short Answer**

A 450-newton gymnast jumps upward a distance of 0.50 meters to reach the uneven parallel bars. How much work, in joules, did she do before she even began her routine ?

**Bonus Answer: 225**

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## 13. Earth and Space Science

**Toss Up: Multiple Choice**

Which is not a type of rock?

W) sedimentary

X) metamorphic

Y) igneous

Z) elementary

**Toss Up Answer: Z**

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**Bonus: Short Answer**

Which type of rock is formed from magma?

**Bonus Answer: igneous rock**

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## 14. Chemistry

**Toss Up: Short Answer**

What is the word that describes a substance that reacts with both strong acids and strong bases?

**Toss Up Answer: Amphoteric**

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**Bonus: Multiple Choice**

The triple bond between the carbon atoms causes acetylene, C<sub>2</sub>H<sub>2</sub>, to have which of the following shapes?

W) Trigonal planar (pron: try-gon-al)

X) Linear

Y) Tetrahedral

Z) Trigonal bipyramidal

**Bonus Answer: X**

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## 15. Biology

### Toss Up: Multiple Choice

Protein digestion in humans begins in the

W) mouth

X) stomach

Y) small intestine

Z) large intestine

Toss Up Answer: X

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### Bonus: Short Answer

Which protein is responsible for protein digestion in the stomach?

Bonus Answer: pepsin (DO NOT accept: pepsinogen)

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## 16. Physics

### Toss Up: Short Answer

What is the name of the first American physicist to win two Nobel prizes? (very random lol)

Toss Up Answer: John Bardeen (can accept just last name?)

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### Bonus: Multiple Choice

If the resultant force acting on a body of constant mass is zero, the body's momentum is:

W) constant

X) 0

Y) increasing

Z) decreasing

Bonus Answer: W

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## 17. Chemistry

### Toss Up: Short Answer

Is HCL a strong acid?

Toss Up Answer: Yes

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### Bonus: Short Answer

Is NAOH a strong base?

Bonus Answer: Yes

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## 18. Physics

### Toss Up: Multiple Choice

How long is a meter stick?

W) 36 inches

X) 100 mm

Y) 10 cm

Z) 1 m

Toss Up Answer: Z

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**Bonus: Multiple Choice**

Which combination of the following statements is wrong?

- W) A body can have a constant speed but a varying velocity
- X) A body can have a constant velocity but a varying speed
- Y) A body can have a zero velocity and finite acceleration.
- Z) A body can have zero acceleration and constant speed

Bonus Answer: X

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## 19. Mathematics

**Toss Up: Short Answer**

What is the solution for square root of the quantity  $x+5$  equals  $x+3$

Toss Up Answer: -1      \*(do not except: [-1 and -4] or [-3])

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**Bonus: Short Answer**

In a certain language of a certain people of a certain world, to frack a number is to find the average of the number and its square. For example, the frack of 2 is 3 since it is the average of 2 and 2 squared. what is the frack of 100?

Bonus Answer: 5050

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## 20. Earth and Space Science

**Toss Up: Multiple Choice**

Which of the following is a sedimentary rock?

- W) slate
- X) marble
- Y) basalt
- Z) sandstone

Toss Up Answer: Z

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**Bonus: Short Answer**

What is the name for the outer shadow cast during eclipses, which gives rise to a partial eclipse?

Bonus Answer: Penumbra

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## 21. Chemistry

**Toss Up: Short Answer**

At room temperature, what is the only metal that is in liquid form?

Toss Up Answer: Mercury (Hg)

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**Bonus: Multiple Choice**

What is the third most common gas found in the air in the atmosphere?

- W) Argon
- X) Hydrogen
- Y) Oxygen
- Z) Helium

Bonus Answer: W

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## 22. Mathematics

Toss Up: Short Answer

Find how many different 4-digit numbers can be formed from the digits 1, 3, 5, 6, 8 and 9 if each digit may be used only once.

Toss Up Answer: 360

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Bonus: Short Answer

A true or false test has six questions. If a person guesses the answers, how many different ways are there to answer the test?

Bonus Answer: 64

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## 23. Biology

Toss Up: Short Answer

The broad climatic zones that Earth's environments are organized into are called

Toss Up Answer: BIOMES

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Bonus: Short Answer

What biome makes up the majority of NY State?

Bonus Answer: temperate forest biome

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## 24. Earth and Space Science

Toss Up: Multiple Choice

What is the driving force present in a supernova explosion?

W) electromagnetic force

X) strong nuclear force

Y) gravitational force

Z) weak nuclear force

Toss Up Answer: Y

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Bonus: Short Answer

What gas is the Mars atmosphere primarily made up of?

Bonus Answer: Carbon dioxide

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## 25. Physics

Toss Up: Short Answer

A baseball is thrown straight upward. What is the velocity at the highest point?

Toss Up Answer: 0

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Bonus: Multiple Choice

A rock is dropped off a cliff and strikes the ground with an impact velocity of 30 m/s. How high was the cliff?

W) 15 m

X) 30 m

Y) 45 m

Z) 60 m

Bonus Answer: Y

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