

## Round 44

### 1. ENERGY

Writer: Olivia Gallager

Toss Up: Short Answer

Which of the following, by name or number, are not considered to be a greenhouse gas: Nitrous Oxide, Water Vapor, Methane, and Nitrogen gas.

Bonus Answer: Nitrogen Gas, 4

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Bonus: Short Answer

What are the two most used fuels for nuclear reactors?

Bonus Answer: Plutonium and Uranium

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### 2. EARTH and SPACE

Writer: Andrew Chen (Senior)

Toss Up: Multiple Choice

What is the name of the igneous rock that is a porous volcanic glass formed by rapidly cooling lava?

W) Obsidian

X) Gabbro

Y) Basalt

Z) Pumice

Toss Up Answer: Z

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Bonus: Short Answer

What are the three general types of magma?

Bonus Answer: Basaltic magma, Andesitic magma, and Rhyolitic magma

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### 3. ENERGY

Writer: Ivan Zhang

Toss Up: Multiple Choice

Which of the following outputs the most energy?

W) Coal

X) Natural Gas

Y) Petroleum

Z) Surface Oil

Toss Up Answer: W

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Bonus: Short Answer

What is the powerhouse of the cell?

Bonus Answer: Mitochondria

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### 4. PHYSICS

Writer: Raafiul Hossain

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? I. A body can have a constant speed but a varying velocity. II. A body can have a constant velocity but a varying speed. III. A body can have a zero velocity and finite acceleration.

- W) I
- X) II
- Y) III
- Z) NONE

**Bonus Answer: Z**

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**5. ENERGY**

**Writer: Andrew Chen**

**Toss Up: Short Answer**

As of December 2016, name any country that has achieved carbon neutrality.

**Bonus Answer: vatican city or bhutan**

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**Bonus: Multiple Choice**

Which of the following appliances uses energy the fastest?

- W) a microwave
- X) a vacuum cleaner
- Y) a desktop computer
- Z) a refrigerator

**Bonus Answer: Z**

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**6. PHYSICS**

**Writer: Raafiul Hossain**

**Toss Up: Multiple Choice**

In the absence of air resistance, the magnitude of the vertical component of a projectile's acceleration

- W) is constant until the projectile hits the ground.
- X) always decreases with time until the projectile hits the ground.
- Y) is equal to the magnitude of the horizontal component of the projectile's acceleration.
- Z) increases and/or decreases with time, depending on the projectile's velocity.

**Toss Up Answer: W**

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**Bonus: Multiple Choice**

In the laboratory, the speed of sound is measured to be 344 meters per second, different from the actual value of 343 meters per second. What is the percent error in the measurement?

- W) 1%
- X) 1%
- Y) 10%
- Z) 0.30%

**Bonus Answer: Z**

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**7. EARTH and SPACE**

**Writer: Andrew Chen (Senior)**

**Toss Up: Multiple Choice**

The San Andreas fault is what specific type of fault line?

- W) Transform plate boundary
- X) Normal fault
- Y) Reverse fault
- Z) Strike slip fault

**Toss Up Answer: Z**

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**Bonus: Short Answer**

There are different types of seismic waves, body waves and surface waves. Name the two different types of body waves.

**Bonus Answer: P waves and S waves**

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**8. PHYSICS**

**Writer: Raafiul Hossain**

**Toss Up: Short Answer**

The speedometer in your car tells you what

**Bonus Answer: instantaneous speed**

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**Bonus: Short Answer**

Projectile 'A' is fired at an angle of 50° above the horizontal; projectile 'B' is fired with the same speed at an angle of 40° above the horizontal. Assuming level ground and negligible air resistance, what is true about range and height of both objects?

**Bonus Answer: A' will reach a smaller height and have a greater range than 'B'.**

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**9. BIOLOGY**

**Writer: Jason Mohabir**

**Toss Up: Short Answer**

What is considered the most unifying concept in biology?

**Bonus Answer: Evolution**

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**Bonus: Multiple Choice**

You capture a Pikachu and make it hold a Light Ball. You breed this Pikachu and the resulting Pokemon inherits the move Volt Tackle. This phenomenon of inheriting traits due to the actions of individuals reflects what theory:

- W) Darwinian Natural Selection
- X) Lamarckian Inheritance
- Y) Oak-azaki Fragments
- Z) Parental Mimicry

**Bonus Answer: X**

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**10. PHYSICS**

**Writer: Raafiul Hossain**

**Toss Up: Short Answer**

The property of a moving object to continue moving is what Galileo called

**Bonus Answer: inertia**

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**Bonus: Multiple Choice**

If an object is moving, then the magnitude of its \_\_\_\_ cannot be zero

- W) speed
- X) velocity
- Y) acceleration
- Z) W,X

**Bonus Answer: Z**

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## 11. BIOLOGY

**Writer: Jason Mohabir**

**Toss Up: Multiple Choice**

Which were the investigators lived at the same time?

- W) Koch and Pasteur
- X) Darwin and Woese
- Y) Van Leeuwenhoek and Ricketts
- Z) Berg and Hooke

**Toss Up Answer: W**

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**Bonus: Short Answer**

The third founder of microbiology, Ferdinand Cohn, classified bacteria by shape. This system is still used today. Name three shapes of bacteria.

**Bonus Answer: Three of these: sphericals, short rods [rod], threads, and spirals**

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## 12. EARTH and SPACE

**Writer: Andrew Chen (Senior)**

**Toss Up: Multiple Choice**

Which type of weather front is represented by alternating purple spikes and semicircles?

- W) Cold front
- X) Warm front
- Y) Occluded front
- Z) Stationary front

**Toss Up Answer: Y**

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**Bonus: Short Answer**

What weather front is formed as a cold air mass pushes under a warm air mass?

**Bonus Answer: Cold front**

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## 13. PHYSICS

**Writer: Shantanu Jha**

**Toss Up: Multiple Choice**

Who did not have a unit of electrical measurement named after him?

- W) Voltaire
- X) Georg Ohm
- Y) Andre Ampere
- Z) Charles Coulomb

**Toss Up Answer: W**

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**Bonus: Short Answer**

It converts electrical energy into electromagnetic radiation and vice versa. Name this device designed to transmit and receive radio waves.

**Bonus Answer: Antenna**

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## 14. EARTH and SPACE

Writer: Ashneel Das

Toss Up: Short Answer

What is the term for the reflection of radiation off Earth's surface?

Bonus Answer: Albedo

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Bonus: Short Answer

Which planet is most similar to Earth in size?

Bonus Answer: Venus

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## 15. CHEMISTRY

Writer: Ashneel Das

Toss Up: Short Answer

How many mL of 0.5 M Barium Hydroxide are needed to neutralize 500 mL of 1 M Hydrochloric Acid completely?

Bonus Answer: 500 mL

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Bonus: Short Answer

Calculate the pOH of a solution given the H<sup>+</sup> concentration is  $1.0 \times 10^{-5}$

Bonus Answer: 9

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## 16. BIOLOGY

Writer: Jason Mohabir

Toss Up: Multiple Choice

The phospholipids present in cytoplasm membrane of the archaeo-bacteria is:

- W) phosphoglycerides
- X) polyisoprenoid
- Y) polyisoprenoid branched chain lipids
- Z) none of the above

Toss Up Answer: Y

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Bonus: Multiple Choice

The phospholipids present in cytoplasm membrane of eubacteria is mainly:

- W) phosphoglycerides
- X) polyisoprenoid
- Y) phospholipoprotein
- Z) none of these

Bonus Answer: W

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## 17. CHEMISTRY

Writer: Nicholas Adit

Toss Up: Multiple Choice

What is the fourth most abundant element on Earth?

- W) Oxygen
- X) Carbon
- Y) Sulfur
- Z) Argon

Toss Up Answer: X

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**Bonus: Short Answer**

What metal forms compounds that give a grayish-white color?

**Bonus Answer: Lead**

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**18. BIOLOGY**

**Writer: Jason Mohabir**

**Toss Up: Multiple Choice**

A person with phenylketonuria cannot convert:

- W) phenylalanine to tyrosine
- X) phenylalanine to isoleucine
- Y) phenol into ketones
- Z) phenylalanine to lysine

**Toss Up Answer: W**

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**Bonus: Short Answer**

In the normal breakdown of phenylalanine, it is initially degraded to:

**Bonus Answer: Tyrosine**

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**19. CHEMISTRY**

**Writer: Nicholas Adit**

**Toss Up: Multiple Choice**

Which of these compounds is not a saturated compound?

- W) ethane
- X) propanol
- Y) butanal
- Z) acetylene

**Toss Up Answer: Z**

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**Bonus: Short Answer**

What are the two compounds formed when ethanoic acid and ethanol react?

**Bonus Answer: Ethyl ethanoate and water**

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**20. PHYSICS**

**Writer: Shantanu Jha**

**Toss Up: Multiple Choice**

The circuit breaker in a typical household light circuit is rated for how many amps?

- W) 2
- X) 20
- Y) 200
- Z) 2000

**Toss Up Answer: X**

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**Bonus: Short Answer**

Most power lines carry high voltages. Before the electricity is fed into your home, it must be put through what device that lowers the voltage to 110 volts?

**Bonus Answer: Transformer**

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**21. EARTH and SPACE**

**Writer: Andrew Chen**

**Toss Up: Short Answer**

What is the name of the tectonic plate that is currently undergoing subduction under the South American plate, responsible for the Andes mountains?

**Bonus Answer: Nazca**

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**Bonus: Multiple Choice**

Which of the following has the highest number of cleavage planes?

- W) Muscovite
- X) Halite
- Y) Fluorite
- Z) Mica

**Bonus Answer: Y**

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## 22. BIOLOGY

**Writer: Jason Mohabir**

**Toss Up: Multiple Choice**

Stabilization of the unique coiled structure of an alpha helix in a protein is primarily attributed to:

- W) disulfide bridges between cysteine side chains
- X) carbohydrate moieties attached to polar amino acids
- Y) peptide linkages that covalently bond amino acids
- Z) an abundance of amino acids with electrically charged side chains

**Toss Up Answer: Z**

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**Bonus: Multiple Choice**

Histidine is degraded to  $\alpha$ -ketoglutarate and is described as a:

- W) gluco amino acid
- X) glucogenic amino acid
- Y) ketogenic amino acid
- Z) keto-gluco amino acid

**Bonus Answer: X**

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## 23. BIOLOGY

**Writer: Matthew Lee**

**Toss Up: Short Answer**

Which of the following are classified as Type III hypersensitivity? (Note more than one answer may apply.)

- I. Systemic Lupus Erythematosus
- II. Farmer's lung
- III. Erythroblastosis fetalis
- IV. Glomerulonephritis

**Bonus Answer: I, II, and IV**

**Accept: Systemic Lupus Erythematosus, Erythroblastosis fetalis, Glomerulonephritis**

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**Bonus: Multiple Choice**

Erythroblastosis fetalis can kill the baby in any pregnancy of the mother but the first. This fatal condition occurs when

- W) The mother is Rh(-) and the fetus from her first pregnancy is Rh(-)

- X) The mother is Rh(-) and the fetus from her first pregnancy is Rh(+)  
Y) The mother is Rh(+) and the fetus from her first pregnancy is Rh(-)  
Z) The mother is Rh(+) and the fetus from her first pregnancy is Rh(+)

**Bonus Answer: X**

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## 24. BIOLOGY

**Writer: Matthew Lee**

**Toss Up: Multiple Choice**

Which of the following is a bacteriostatic antibiotic that works by disrupting protein synthesis?

- W) Erythromycin  
X) Penicillin  
Y) Trimethoprim  
Z) Nalidixic acid

**Toss Up Answer: W**

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**Bonus: Multiple Choice**

In India, during a cholera epidemic of 1926, European men poured a treatment for cholera into village wells unbeknownst to the villagers. What was the treatment?

- W) Alcohol  
X) antibiotics  
Y) Phages  
Z) Iodine

**Bonus Answer: Y**

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## 25. BIOLOGY

**Writer: Matthew Lee**

**Toss Up: Multiple Choice**

One day you see the headline on a tabloid and it says: "BACTERIA ARE EATING MY FACE." The species of bacteria that most commonly causes the condition (necrotizing fasciitis) sensationalized above is:

- W) Staphylococcus aureus  
X) Streptococcus agalactiae  
Y) Staphylococcus epidermis  
Z) Streptococcus pyogenes

**Toss Up Answer: Z**

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**Bonus: Short Answer**

Staphylococcus aureus produces many enzymes that contribute to its virulence. It produces an enzyme that breaks down an acid crucial to the structural integrity of tissues. This acid is:

**Bonus Answer: Hyaluronic acid (accept: Hyaluronic)**

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