

Round 12

1. PHYSICS

Toss Up: Short Answer

The speedometer in your car tells you what

Bonus Answer: instantaneous speed

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'.

2. PHYSICS

Toss Up: Short Answer

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

Bonus Answer: inertia

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

3. PHYSICS

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

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

4. PHYSICS

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

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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5. PHYSICS

Toss Up: Short Answer

A step-down transformer has a turns ratio less than

Bonus Answer: One

Bonus: Multiple Choice

By design, wires with the highest resistance are built into

W) Clocks

X) Toasters

Y) Telephones

Z) Stereo Speakers

Bonus Answer: X

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6. MATHEMATICS

Toss Up: Short Answer

What is the full name of the French mathematician who invented the Cartesian coordinate plane?

Bonus Answer: Rene Descartes (You may also accept Descartes Rene, but do not accept Descartes or Rene)

Bonus: Short Answer

What is the name of the value of x in the ordered pair (x,y)

Bonus Answer: Abscissa

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7. MATHEMATICS

Toss Up: Multiple Choice

Which three numbers satisfy the Pythagorean Theorem?

W) 1, 1, and sqrt3

X) 3, 4, and 5.01

Y) pi/3, pi/4, pi/5

Z) 1/3, 1/4, 5/12

Toss Up Answer: Z

Bonus: Short Answer

Triangle ABC has side lengths of 10, 10, and $10\sqrt{2}$. State all distinct median lengths of the triangle in increasing value.

Bonus Answer: $5\sqrt{2}$, $5\sqrt{5}$ (only accept the numbers said in that order).

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8. MATHEMATICS

Toss Up: Short Answer

Find the product of all primes less than 11.

Bonus Answer: 210

Bonus: Multiple Choice

Find the number of triangular numbers less than 2016.

W) 58

X) 60

Y) 62

Z) 64

Bonus Answer: Y

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9. MATHEMATICS

Toss Up: Short Answer

Compute $100^2 - 98 \cdot 102$

Bonus Answer: 4

Bonus: Multiple Choice

The absolute value of $n^2 - (n+x)(n-x)$, where n and x are positive integers, is always:

W) $-(x^2)$

X) n^2

Y) $2 \cdot x \cdot n$

Z) x^2

Bonus Answer: Z

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10. BIOLOGY

Toss Up: Multiple Choice

Which of the following is not an anabolic steroid?

W) Fenestrane

X) Stanozolol

Y) Fortesta

Z) Deca-Durabolin

Toss Up Answer: W

Bonus: Short Answer

Which scientist became known as the founder of molecular biology due to their discovery of the spiral structure of proteins?

Bonus Answer: Linus Pauling

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11. BIOLOGY

Toss Up: Multiple Choice

Which of the following conditions causes an autoimmune response to eating glucose?

W) Anaplasmosis

X) Anisakiasis

Y) celiac disease

Z) Candidiasis

Toss Up Answer: Y

Bonus: Multiple Choice

What is colony collapse disorder characterized by?

W) The disappearance of many male worker bees

X) The death of the queen bee

Y) The destruction of the honey produced by bees

Z) The destruction of the structure of a bee hive

Bonus Answer: W

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12. BIOLOGY

Toss Up: Multiple Choice

Which of the following is the most common organic compound on Earth?

- W) chitin
- X) glucose
- Y) phospholipids
- Z) cellulose

Toss Up Answer: Z

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Bonus: Multiple Choice

Which of the following syndrome occurs in women born with only 1 X chromosome?

- W) Marfan Syndrome
- X) Turner Syndrome
- Y) Prader-Willi syndrome
- Z) Porphyria

Bonus Answer: X

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13. BIOLOGY

Toss Up: Multiple Choice

Which gland releases the antidiuretic hormone?

- W) pituitary
- X) hypothalamus
- Y) pancreas
- Z) testes

Toss Up Answer: X

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Bonus: Multiple Choice

Which part of the heart functions as a pacemaker?

- W) AV node
- X) S node
- Y) SA node
- Z) SA pacemaker

Bonus Answer: Y

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14. BIOLOGY

Toss Up: Multiple Choice

Which of the following correctly states the composition of blood?

- W) 45 % RBC, 55% Plasma
- X) 65 % RBC, 25% Plasma
- Y) 85 % RBC, 15% Plasma
- Z) 35% RBC, 65% Plasma

Toss Up Answer: W

Bonus: Multiple Choice

What is the function of basophils?

- W) to engulf pathogens through phagocytosis
- X) to stimulate inflammation by releasing histamine
- Y) to kill RBCs
- Z) to remove pathogens from RBCs

Bonus Answer: X

15. BIOLOGY

Toss Up: Short Answer

Nitrogenous base that occurs in RNA but not in DNA?

Bonus Answer: Uracil

Bonus: Short Answer

Which of the following correctly explains how a favorable genetic trait can increase in frequency in a population?

Bonus Answer: Natural Selection

16. BIOLOGY

Toss Up: Short Answer

Nitrogen fixation refers to the direct conversion of atmospheric nitrogen gas into:

Bonus Answer: ammonia

Bonus: Short Answer

The transformation of nitrates to gaseous nitrogen is accomplished by microorganisms in a series of biochemical reactions. The process is known as:

Bonus Answer: denitrification

17. CHEMISTRY

Toss Up: Multiple Choice

How many electrons occupy the bonding molecular orbitals of a CN triple bond?

- W) 2
- X) 4
- Y) 6
- Z) 8

Toss Up Answer: Y

Bonus: Multiple Choice

Which of the following compounds would have the highest boiling point?

- W) CH₃CH₂CH₂CH₃
- X) CH₃NH₂
- Y) CH₂F₂
- Z) CH₃OH

Bonus Answer: Z

18. CHEMISTRY

Toss Up: Multiple Choice

What type of bond is formed between two atoms with an electronegativity difference of 1.0?

- W) Polar Covalent
- X) Nonpolar Covalent
- Y) Ionic
- Z) Hydrogen

Toss Up Answer: W

Bonus: Short Answer

Of the following, which increase with atomic number in group 5 of the periodic table? 1) Atomic Radius 2) Atomic mass 3) First Ionization Energy

Bonus Answer: 1 and 2

19. CHEMISTRY

Toss Up: Multiple Choice

How many carbon atoms and hydrogen atoms are present in one molecule of hexane?

- W) 6 hydrogen, 14 carbon
- X) 6 carbon, 14 hydrogen
- Y) 6 carbon, 12 hydrogen
- Z) 6 carbon, 10 hydrogen

Toss Up Answer: X

Bonus: Short Answer

Identify which of the following statements about carbon dioxide are true: 1) It has a molar mass of approximately 44 g/mol 2) It is a polar molecule 3) It has two double bonds

Bonus Answer: 1 and 3

20. CHEMISTRY

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

Bonus: Short Answer

Calculate the pOH of a solution given the H⁺ concentration is 1.0×10^{-5}

Bonus Answer: 9

21. CHEMISTRY

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

Bonus: Short Answer

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

Bonus Answer: Lead

22. CHEMISTRY

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

Bonus: Short Answer

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

Bonus Answer: Ethyl ethanoate and water

23. EARTH and SPACE

Toss Up: Short Answer

What is the speed of light in km/hr, in scientific notation, to 2 decimal places?

Bonus Answer: 1.08×10^9

Bonus: Multiple Choice

How many sub levels does Cesium have?

- W) 9
- X) 10
- Y) 11
- Z) 12

Bonus Answer: Z

24. EARTH and SPACE

Toss Up: Short Answer

What is the closest star to the solar system, 4.25 light years away from the sun?

Bonus Answer: Proxima Centauri

Bonus: Short Answer

On approximately which two days of the Gregorian calendar do full moons appear?

Bonus Answer: 15th and 16th of each month

25. EARTH and SPACE

Toss Up: Short Answer

what is a front?

Bonus Answer: boundary between two air masses

Bonus: Short Answer

How does a cold front form?

Bonus Answer: w. drop in temperature

x. cold air moves in and replaces warm air

y. warm air moves in and replaces cold air

z. cold and warm air mix :)
