
Tossup

1) Math Multiple Choice: which of the following fractions is the correct difference when 1/4 is subtracted from 1/3?
w) 1/7
X) 1/12
y) 7/12
Z) ⅜
Answer: X) 1/12

Bonus

1) Math Short Answer: What is the average of the 5 numbers: 2,4,6,8 and 10?
Answer: 6

Tossup

2) Physics Short Answer: How far does a car travel if it goes 30 mph for 2 hours?
Answer: 60 miles

Bonus

2) Physics: A particle starts at x=0, moves to x=17, and back to x=0. What are its displacement and distance traveled respectively?
Answer: 0 and 34

Tossup

3) Chemistry Multiple Choice: which of the following elements is the lightest noble gas?
w) Argon
X) Helium
Y) Xenon
Z) krypton
Answer: X

Bonus

3) Chemistry Short Answer: Which orbital is fully filled in a ground state helium atom?

Answer: 1s orbital

Tossup

4) Biology Short Answer: by what process do human somatic cells divide to form two daughter cells?
answer: Mitosis

Bonus

4) Biology Multiple Choice: Which of the following correctly describes the difference between mitosis and meiosis?
w) mitosis produces haploid cells while meiosis produces diploid cells
X) mitosis produces four daughter cells while meiosis produces two daughter cells
y) mitosis produces two identical cells while meiosis produces four non-identical cells
Z) the phases in mitosis are labeled with Roman numerals while those in meiosis are not
Answer: y

Tossup

5) Energy Short Answer: Scientists at Ames National lab are studying high heat resistant materials made of two or more metals. What is the term for a mix of two or more metals?
Answer: Alloy

Bonus

5) Energy Multiple Choice: which of the following correctly gives the two metals that make up the alloy brass?
w) copper and tin
X) copper and zinc
y) carbon and iron
Z) iron and tin
Answer: X

Tossup

6) Earth and Space Short Answer: How many astronomic units are between the Earth and Sun?
Answer: 1

Bonus

6) Earth and Space Short Answer: order the following planets in increasing order by their distance from the sun in AU: 1) Jupiter 2) Uranus 3)Neptune 4) mars
Answer: 4,1,2,3

Tossup

7) Math Short Answer: Short Answer: What number is 150% of 20?
Answer: 30

Bonus

7) Math Short Answer: What is the probability that a prime number is rolled on a fair 6-sided die?
Answer: 1/2

Tossup

8) Physics- Short Answer: What fundamental force is responsible for the formation of planets?
Answer: Gravity

Bonus

8) Physics- Short Answer: How many up and down quarks respectively make up a proton?
Answer: two up and one down

Tossup

9) Chemistry- Multiple Choice: Which of the following would describe an atom which has more electrons than protons?

w) Cation
x) isotope
y) anion
z) isomer

Answer: y) anion

Bonus

9) Chemistry Short Answer: What is the term for a chemical process in which Oxygen is used to burn organic material, resulting in carbon dioxide and water?
Answer: Combustion

Tossup

10) Biology- Short Answer: What is the term for an organism that has two different alleles for one gene?
Answer: Heterozygous

Bonus

10) Biology- Short Answer: When two heterozygous individuals are crossed, what percent of their offspring will exhibit the recessive phenotype?
Answer: 25%

Tossup

11) Energy- Short answer: All matter is defined to have what two properties?
Answer: Mass and Volume

Bonus

11) Energy- Short Answer: Albert Einstein won the Nobel Prize in physics for the discovery of what phenomenon which describes the energy of photons?

Answer: Photoelectric Effect

Tossup

12) Earth and Space- Short Answer: The San Andreas Fault is an example of what kind of fault?

Answer: Strike Slip (do not accept Transform)

Bonus

12) Earth and Space- Short Answer: What specific type of plate boundary creates continental volcanic arcs such as the Cascade mountain range?

Answer: Ocean-Continent Convergent (DO NOT ACCEPT: CONVERGENT)

Tossup

13) Math- Short Answer: If Ashwin buys 1 1/4 pounds of fruit and 1/4 pound of vegetables, how much food did he buy in total?
Answer: 1.5 lbs or 1 1/2

Bonus

13) Math- Short Answer: Dougherty Valley High School is 78.9% Asian. If there are 3000 students at Dougherty Valley High School, how many students are at Dougherty Valley High School are Asian?
Answer: 2,367

Tossup

14) Physics- Short Answer: Which scientist published a book on the laws of motion based on his interactions with an apple?
Answer: Newton

Bonus

14) Physics- Short Answer: A person is standing stationary on the floor of a classroom. What force balances gravity to keep his body at rest?

Answer: Normal Force

Tossup

15) Chemistry- Short Answer: What is the term for a substance that has a pH less than 7?
Answer: Acid

Bonus

15) Chemistry- Short Answer: If the pH of a solution is 2, what is the pOH?
Answer: 12

Tossup

16) Biology- Short Answer: What is the term for the diffusion of water through a membrane?

Answer: Osmosis

Bonus

16) Biology- Multiple Choice: Which of the following would describe what happens when an animal cell is placed in a hypotonic solution?

w) it will shrivel
x) it will plasmolyze
y) it will become turgid
z) it will burst

Answer: z) it will burst

Tossup

17) Energy: Short Answer: Scientists at Oak Ridge National Lab are researching alternative fuels such as E15. By definition, E15 fuels contain 15% of what compound?

Answer: Ethanol

Bonus

17) Energy Short Answer: Most ethanol in the US is produced from which crop?
Answer: Corn

Tossup

18) Earth and Space- Short Answer: What gas is the most abundant in the Earth's atmosphere?
Answer: Nitrogen

Bonus

18) Earth and Space Short Answer: Order the following layers of the atmosphere from bottom to top: 1) mesosphere 2) stratosphere 3) troposphere 4) thermosphere

Answer: 3, 2, 1, 4

Tossup

19) Math- Multiple Choice: Which of the following is the correct range for the function f(x)=$|x|$(read as absolute value of x)

w) all real numbers
x) all real numbers greater than 0
y) all real numbers greater than or equal to 0
z) no solution

Answer: y) all real numbers greater than or equal to 0

Bonus

19) Math- What is the equation in slope intercept form of a line that passes through the points (2,4) and (3,5)?

Answer: y=x+2

Tossup

20) Physics- Short Answer: What is the frequency of a wave with a period of 10 seconds?

Answer: 0.1 Hertz or 1/10

Bonus

20) Physics- Short Answer: Of the following types of waves identify all that are considered transverse waves: 1) sound 2) electromagnetic 3) P-waves

Answer: 2 only

Tossup

21) Chemistry Multiple Choice: Which of the following is a chemical change

w) cracking an egg
x) melting ice

y) crushing a can
z) fireworks exploding
Answer: z) fireworks exploding

Bonus

21) Chemistry Short Answer: Identify the following 3 properties as chemical or physical, respectively. 1) flammability 2) density 3) hardness

Answer: 1) chemical 2) physical 3) physical

Tossup

22) Biology- Short Answer: what terrestrial biome has the highest net primary productivity?
Answer: Tropical Rainforest

Bonus

22) Biology- Short Answer: In the tundra biome, what is the term for the layer of the ground that is frozen year round?

Answer: Permafrost

Tossup

23) Energy- Short Answer: What is the term for the energy required to remove an electron from an atom?
Answer: Ionization Energy

Bonus

23) Energy- Short Answer: Fermi Lab is the host to DUNE, an underground facility which will paint a picture of the universe and how it works. DUNE is designed to detect which ghostly particles?
Answer: Neutrinos