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Science Bowl Round (12 Questions)   
  
Toss-up   
  
1) BIOLOGY Short Answer: Which of the following 3 are modified plant stems?   
1) Tubers  
2) Stolons  
3) Rhizomes  
ANSWER: all  
  
BONUS   
  
BIOLOGY Multiple Choice: Which clade isn’t a vertebrate?

W) Petramyzontida  
X) Mammalia   
Y) Actinista   
Z) Cephalachordata  
  
ANSWER: Z  
  
Toss-up  
  
2) Math Short Answer: What is the arc length of a 60 degree arc in a circle with a diameter of 6?   
  
ANSWER: pi  
  
BONUS   
  
Math Short Answer: What is the indefinite integral of 3 cscx / (cotxcscx)?   
  
ANSWER: -3 cscx squared + C  
  
Toss-up  
  
3) CHEMISTRY Short Answer: What is the electron configuration of the fluroride ion (F 1-)?   
ANSWER: 1 s2 2 s2 2 p 6  
  
BONUS  
  
CHEMISTRY Short Answer: NH3 has what type of molecular geometry?   
ANSWER: Trigonal pyramidal   
  
Toss-up   
  
4)  PHYSICS Multiple Choice: A ball is being spun in circles with a string. What happens to centripetal acceleration when the length of the string is doubled?   
W) quadrupled  
X) doubled  
Y) unchanged  
Z)  halved  
  
ANSWER: Z  
  
BONUS  
  
PHYSICS Short Answer: 1 kg of cold water is added to 5 kg hot water at 65 degrees Celsius. What is the final temperature of the mixed water at thermal equilibrium?  
ANSWER: 55 degrees Celsius  
  
Toss-up  
  
5) EARTH/ ASTRO multiple choice: Magma that is at 680 degrees Celsius is most likely  
  
W) Felsic  
X) ultramafic  
Y) mafic  
Z) intermediate  
  
ANSWER: w  
  
BONUS  
  
EARTH/ ASTRO Multiple Choice: Compared to oceanic crust, crust is which of the following?   
  
W) Thicker and denser  
X) Thicker and less dense  
Y) Thinner and denser  
Z) Thinner and less dense  
  
ANSWER: x

Toss-up   
  
6) ENERGY Multiple Choice: In 2009, most of the United States’ biomass came from  
  
W) wood and wood waste  
X) biofuels  
Y) garbage and landfills waste  
Z) just ethanol  
  
ANSWER: w  
  
BONUS   
  
ENERGY Multiple Choice: Nitrogen is approximately what percent of the gases in Earth’s atmosphere?  
  
W) 1%  
X) 23%  
Y) 59%  
Z) 78%  
  
ANSWER: z  
  
Toss-up   
  
7) BIOLOGY Short Answer: What is name of the lateral meristem that adds secondary phloem and xylem?   
ANSWER: vascular cambium   
  
BONUS  
  
BIOLOGY Short Answer: Name the following plant partitions of a tree from innermost to outermost: cork cambium, periderm, primary xylem, secondary phloem  
  
ANSWER: primary xylem, secondary phloem, cork cambium, periderm (3,4,1,2)

TOSS-UP  
  
8) MATH Short Answer: How many distinct diagonals are in a decagon?

ANSWER: 35

BONUS  
  
Math Short Answer: Vector a is <3,4> and vector b is <4,5>. What is the scalar projection of b onto a? Give your answer as a fraction.   
  
ANSWER: 32/5  
  
TOSS-UP  
  
9) CHEMISTRY Mult Choice: In the chemical reaction A + B equilibrium arrow C + D, A, B, C and D are gases. Increasing the pressure causes which of the following in this reaction?  
W) equilibrium shifts to the left  
X) equilibrium shifts to the right  
Y) No change  
Z) the reaction stops occurring  
  
ANSWER: Y   
  
BONUS   
  
CHEMISTRY Mult Choice Which of the following has the longest bond?

W) H-F  
X) H-I  
Y) H-Cl  
Z) H-Br  
  
ANSWER: x  
  
TOSS-UP  
  
10) PHYSICS  Short Answer: Which of the following 3 exemplify simple harmonic motion?   
1) Pendulum  
2) moving Mass attached to string  
3) a ball bouncing up and down in a perfect frictionless surface  
ANSWER: 2  
  
BONUS  
  
PHYSICS Short Answer: A person is trying to tune a piano with a tuning fork that sounds with frequency 300 Hz. The tuning fork strikes the piano key and plays a frequency of 150 Hz. What frequency does the person hear?  
  
ANSWER: 150 Hz  
  
TOSS-UP   
  
11) EARTH/ ASTRO Multiple Choice: Which lava forms from basaltic lava?   
  
W) a’a  
X) pahoehoe  
Y) block lava  
Z) lava dome  
  
ANSWER: x  
  
BONUS   
  
EARTH/ ASTRO Short Answer: Name all of the following 4 which fall under the category tephra.   
1) volcanic ash   
2) lapilli  
3) volcanic bomb  
4) volcanic block  
  
ANSWER: all

TOSS-UP

12) ENERGY Short Answer: By name or number, order the following countries from those that consume the least energy to those that consume the most.   
  
1) Australia  
2) Taiwan  
3) Mexico  
4) Germany  
  
ANSWER: 3, 4, 2, 1 (Mexico, Germany, Taiwan, Australia)  
  
BONUS   
  
ENERGY Short Answer: The average cost of the kilowatt-hour is 12 cents. If you read for five hours with a 100-W light bulb, how much does it cost?   
  
ANSWER: 6 cents