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1/21/13 Questions

TOSS-UP *Biology* Multiple Choice: Which of the following is the name of the type of chlorophyll in photosystem II of the light reactions in photosynthesis?

W. P575

X. P680

Y. P700  
 Z. P720

ANSWER: X

BONUS *Biology* Short Answer: In the beginning of the Calvin Cycle, three molecules of carbon dioxide are attached to three molecules of what five-carbon sugar?

ANSWER: Ribulose Biphosphate (RuBP)

TOSS-UP *Biology* Short Answer: The oxygen given off from photosynthesis reactions is derived from what molecule?

ANSWER: Water

BONUS *Biology* Multiple Choice: In C4 plants, what enzyme combines carbon dioxide with phosphoenolpyruvate, to form the four-carbon product oxaloacetate?

W. Rubisco

Y. G3P carboxylase

Y. Amylase

Z. PEP carboxylase

ANSWER: Z

TOSS-UP *Math* Multiple Choice: Which best describes the end behavior of the equation -4x4+7x3-2?

W. As x🡪-∞, y🡪∞, and as x🡪∞, y🡪∞ .

X. As x🡪-∞, y🡪-∞, and as x🡪∞, y🡪-∞.

Y. As x🡪-∞, y🡪-∞, and as x🡪∞, y🡪∞.

Z. As x🡪-∞, y🡪∞, and as x🡪∞, y🡪-∞.

ANSWER: X

BONUS *Math* Short Answer: 7 students receive the following test scores: 65/70, 54/70, 69/70, 60/70, 65/70, 30/70, and 70/70. Calculate the average percentage of the scores to the nearest percentage.

ANSWER: 84%

TOSS-UP *Math* Short Answer: How many ways can a group of 4 people be chosen from17 people?

ANSWER: 2380

BONUS *Math* Short Answer: Suppose there is large box that is 5 m x 6 m x 10 m from the outside, with a wall that is 1.5 m thick. What is the volume of the open air inside?

ANSWER: 42 cubic meters.

TOSS-UP *Chemistry* Multiple Choice: What kind of shape does sulfur hexafluoride (SF6) have?

W. Tetrahedral

X. Trigonal bipyramidal

Y. Seesaw

Z. Octahedral

ANSWER: Z

BONUS *Chemistr*y Multiple Choice: Which of the following is not true of valence-shell electron pair repulsion models?

W. Regions of high electron concentration move as far away from each other as possible, while still maintaining an equal distance from the central atom, to minimize repulsion.

X. Lone pairs and bonds have the same repelling effect on each other.

Y. Single bonds and multiple bonds behave in the same way to determine the shape of the molecule.

Z. Lone pairs and bonds both help determine electronic arrangement, but only the positions of atoms are taken to account when determining the shape of the molecule.

ANSWER: X

TOSS-UP *Chemistry* Short Answer: In a molecule, an equatorial lone pair lies perpendicular to what axis?

ANSWER: The molecular axis.

BONUS *Chemistry* Short Answer: Describe the polarity of carbon dioxide.

ANSWER: It is non-polar.

TOSS-UP *Earth and Space Science* Multiple Choice: Approximately how much of the Earth’s atmosphere is composed of nitrogen?

W. 40%

X. 60%

Y. 80%

Z. 100%

ANSWER: Y

BONUS *Earth and Space Science* Pseudo Multiple Choice: By name or number, arrange the following layers of Earth’s atmosphere from lowest altitude to highest altitude.

1. Mesosphere
2. Stratosphere
3. Thermosphere
4. Troposphere

ANSWER: 4, 1, 2, 3

TOSS-UP *Earth and Space Science* Short Answer: What gas takes up most of Venus’s atmosphere?

ANSWER: Carbon dioxide

BONUS *Earth and Space Science* Short Answer: What is the name of the region where atoms and molecules shoot off into space?

ANSWER: Exosphere

TOSS-UP *Physics* Multiple Choice: Billy wants to push a 200 kg ball until it travels 2 m/s. He can apply a maximum force of 40 N to the ball. How long does it take Billy for the ball to reach a speed of 2 m/s? Answer in seconds.

W. 5 s

X. 10 s

Y. 15 s

Z. 20 s

ANSWER: X

BONUS *Physics* Short Answer: How quickly does light travel through a certain medium if its index of refraction is 2.00? Answer in meters per second.

ANSWER: 1.50 x 108 m/s

TOSS-UP *Physics* Short Answer: A 20 N force is applied to a 5 kg, stationary ball. How long will it take for the ball to travel 20 m/s? Express your answer in seconds.

ANSWER: 5 seconds.

BONUS *Physics* Short Answer: What is the terminal velocity of a sphere with a mass of 10 kg, a surface area of 2 m2, a drag coefficient of 0.5, falling through air with a density of 1 kg/m3? Assume that the acceleration due to gravity is 10 m/s2. Answer in m/s.

ANSWER: 10 √ 2 m/s.