3.0 9 1 Do yourself a solid.

3.091 Introduction to Solid State Chemistry Fall Term 2018

Quiz 4 (A) 10/11/2018

1) Carbonic acid, H_2CO_3 , is a product of CO_2 and H_2O and has contributed to ocean
acidification. Please answer the following questions.

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a)	Draw the Lewis dot structure, with correct molecular geometry, that carbonic acid forms. (1 pt)
b)	What geometry does the carbon in carbonic acid adopt according to VSEPR? (1 pt)
c)	Will all the lone pairs lie in the same plane when the molecule is in the lowest energy state? (1 pt)
d)	Where is the largest angle in the molecular structure? Please give your answer as X-Y-Z, where Y is the atom the angle is formed (i.e., the vertex). For example, H-O-H or O-Fe-O. (1 pt)
e)	Look at the 3D molecular model you built from last Wednesday's <i>Goodie Bag #4: VSEPR</i> for the molecule H_3Si-SF_2-CN . What is the smallest angle in your structure? (1 pt)

2)		Draw two possible resonance structures for CH ₃ NCO. (4 pts)
	b)	Which of your two resonance structure contributes more to the resonance hybrid? Explain in one sentence. (1 pt)

VSEPR Geometries							
Steric No.	Basic Geometry 0 Ione pair	1 lone pair	2 Ione pairs	3 Ione pairs	4 lone pairs		
2	X—E—X						
3	X 120° X	X = X × < 120°					
4	Trigonal Planar X X////// X//// X Tetrahedral	Sent or Angular XIIII E X < 109° Trigonal Pyramid	X E X << 109° Bent or Angular				
5	X 90° 120° E X X I X X Trigonal Bipyramid	< 90° X X////// < 120° E X X Sawhorse or Seesaw	X Y X T-shape	X 180° X Linear			
6	X 90° X Mm. E MM X X X Octahedral	Square Pyramid	90° Earli X X Square Planar	X	X 180° X X Linear		

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