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VCE Chemistry ½
Covalent Molecules [1.6]
Homework

Homework Outline:

Compulsory Questions	Pg 2 – Pg 9
Supplementary Questions	Pg 10 – Pg 17



Section A: Compulsory Questions (47 Marks)

Sub-Section: Draw Lewis Structures of Atoms & Covalent Molecules



Question 1 (6 marks)



a. Draw the Lewis Structure for each of the following atoms:

i. Sulphur. (1 mark)

ii. Boron. (1 mark)

b. Define what a covalent bond is and why atoms go through covalent bonding. (2 marks)

c. What is the maximum number of covalent bonds an atom of carbon will form? Explain your answer. (2 marks)


Question 2 (8 marks)

Draw the Lewis Structure for each of the following molecules:

a. Water, H_2O . (2 marks)

b. Carbon Dioxide, CO_2 . (2 marks)

c. Cl_2 . (2 marks)

d. H_2S . (2 marks)


Question 3 (8 marks)

For the following, draw their Lewis Structures.

a. CH_3Br . (2 marks)

b. CF_4 . (2 marks)

c. NO_2 . (2 marks)

d. CS_2 . (2 marks)



**Sub-Section: Identify The Geometries (Parent & Molecular)
of Molecules, With Reference To VSEPR Theory**

Question 4 (4 marks)



For the following, state their molecular geometry.

a. CH_4 . (1 mark)

b. H_2O . (1 mark)

c. HCl . (1 mark)

d. O_2 . (1 mark)

Question 5 (4 marks)


For the following, state their molecular geometry.

a. CH_2BrCl . (1 mark)

b. HOBr . (1 mark)

c. Draw the Lewis Structure for CO_2 , state its parent geometry and molecular geometry. (2 marks)

Question 6 (6 marks)


Classify the parent and molecular geometry of the following molecules.

a. OCSe . (2 marks)

b. NOBr . (2 marks)

c. CH_2O . (2 marks)

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Sub-Section: The 'Final Boss'

Question 7 (11 marks)



Certain molecules are similar to each other in formula but can be very different in real life.

a. For the following molecules, draw their Lewis Structures.

i. SO_2 . (2 marks)

ii. SiO_2 . (2 marks)

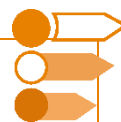
b. Now, compare their molecular geometries with each other. (3 marks)

- c. In real life, there are molecules of SO, SO₂ that exist. Explain whether SO₃ exist as a compound, and if so draw its Lewis Structure and state its geometry around the sulphur. (4 marks)

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Section B: Supplementary Questions (50 Marks)

Sub-Section: Draw Lewis Structures of Atoms & Covalent Molecules



Question 8 (4 marks)



State how many covalent bonds the following molecules can form.

a. Silicon. (1 mark)

b. Iodine. (1 mark)

c. Phosphorus. (1 mark)

d. Krypton. (1 mark)

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Question 9 (5 marks)


a. Draw the Lewis Structure for the following.

i. Selenium. (1 mark)

ii. Fluorine. (1 mark)

b. What is the likely formula of the molecule formed between Carbon and Sulphur? Explain. (3 marks)

Question 10 (6 marks)


For the following, draw their Lewis Structures.

a. C_2H_4 . (2 marks)

b. Sulphur Dioxide, SO_2 . (2 marks)

c. NH_3 . (2 marks)

Question 11 (7 marks)



Consider the atom of Nitrogen.

a. Explain how a Nitrogen molecule will be formed using covalent bonds. (3 marks)

b. Draw the Lewis Structure for Nitrogen. (1 mark)

c. Now, draw the Lewis Structure for the molecule that is likely to form between Nitrogen and Oxygen. (3 marks)

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**Sub-Section: Identify The Geometries (Parent & Molecular)
of Molecules, With Reference To VSEPR Theory**

Question 12 (8 marks)



Draw the Lewis Structures of the following and state their molecular geometry.

a. CCl_4 . (2 marks)

b. CH_4 . (2 marks)

c. H_2S . (2 marks)

d. PCl_3 . (2 marks)

Question 13 (4 marks)


a. For the following, state their molecular geometry.

i. BF_3 . (1 mark)

ii. H_2Se . (1 mark)

b. Draw the Lewis Structure for CH_2O and state its molecular and parent geometry. (2 marks)

Question 14 (5 marks)


Answer the following questions regarding the VSEPR theory.

a. Briefly explain the VSEPR theory. (2 marks)

- b.** Explain why a trigonal planar molecular geometry for a molecule with 4 total electron pairs is not possible. (3 marks)

Question 15 (8 marks)



A chemist is designing new molecules for an environmentally friendly refrigerant.

- a.** One of the proposed compounds is CCl_4 . Draw its Lewis Structure and state its molecular geometry. (2 marks)

- b.** Another molecule CH_3OH is also investigated. State its geometry around the carbon. (2 marks)

- c.** What is the main similarity between the two compounds? (1 mark)

d. Explain which molecule you would say has a more even distribution of valence electrons. (3 marks)

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