Lewis Dot Structures

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

For these neutral molecules, H contributes one valence electron, C contributes four, N contributes five, O contributes six, and Cl contributes seven. One bond line represents two shared electrons. Show lone pairs as dots.

1 How many valence electrons must appear in the Lewis structure of H_2O?

(1) 6

(2) 8

(3) 10

(4) 12

2 Draw a Lewis structure for H_2O. Show both bonds and all lone pairs. [1]

Draw your model

3 How many lone pairs are on each Cl atom in the Lewis structure of Cl_2?

(1) 1

(2) 2

(3) 3

(4) 4

4 In a Lewis structure for CH_4 with four C–H single bonds, explain why no lone pairs are shown on C. [1]

Answer and work

Checking Models of Ammonia

Use the information below to answer questions 5–8.

Ammonia (NH_3) contains one N atom bonded to three H atoms. A student proposes three single bonds and leaves the remaining dots off the diagram. Each neutral N atom contributes five valence electrons and each H contributes one.

5 How many electrons are shown by the three N–H bonds in the student's model?

(1) 3

(2) 6

(3) 8

(4) 10

6 Draw a complete Lewis structure for NH_3. Show all bonds and lone pairs. [1]

Draw your model

7 A student proposes drawing the missing pair of electrons on one H atom. Explain why the pair belongs on N. [1]

Answer and work

8 Two nitrogen atoms form N_2. A model shows N≡N with one lone pair on each N. How many total valence electrons does the model show?

(1) 5

(2) 6

(3) 8

(4) 10