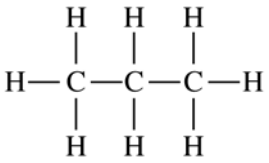
8. Use principles of atomic structure, bonding, and intermolecular forces to answer the following questions. Your responses must include specific information about all substances referred to in each part.

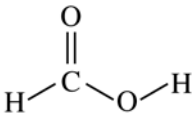
(a) Draw a complete Lewis electron-dot structure for the CS_2 molecule. Include all valence electrons in your structure.

(b) The carbon-to-sulfur bond length in CS_2 is 160 picometers. Is the carbon-to-selenium bond length in CSe_2 expected to be greater than, less than, or equal to this value? Justify your answer.

(c) The bond energy of the carbon-to-sulfur bond in CS_2 is 577 kJ mol^{-1}. Is the bond energy of the carbon-to-selenium bond in CSe_2 expected to be greater than, less than, or equal to this value? Justify your answer.



Propane



Methanoic Acid

(d) The complete structural formulas of propane, C_3H_8, and methanoic acid, HCOOH, are shown above. In the table below, write the type(s) of intermolecular attractive force(s) that occur in each substance.

Substance	Boiling Point	Intermolecular Attractive Force(s)
Propane	229 K	
Methanoic acid	374 K	

(e) Use principles of intermolecular attractive forces to explain why methanoic acid has a higher boiling point than propane.

END OF EXAM