

Problem of the Day 10 **CHEM 1252**

1. The following question deals with two molecules, iodine monochloride, ICl, and bromine, Br₂.

a) Draw the Lewis Structure and determine the polarity for each molecule.

ICl	Br ₂
polarity _____	polarity _____
<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; text-align: center; line-height: 20px;">6</div>	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; text-align: center; line-height: 20px;">6</div>

b) List the intermolecular forces that each of the molecules experience.

ICl	Br ₂
<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; text-align: center; line-height: 20px;">3</div>	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; text-align: center; line-height: 20px;">3</div>

c) Rationalize the difference in respective normal boiling points of ICl (97°C) and Br₂ (59°C).

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2. The normal boiling point of SO₂ is -10°C and that of NH₃ is -33°C. At -40 °C which would you predict has the greater vapor pressure? You must justify your answer.

<p><i>(Circle one)</i></p> <p>SO₂</p> <p>NH₃</p> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; text-align: center; line-height: 20px; margin-top: 10px;">2</div>	<p><i>Justification:</i></p> <div style="border: 1px solid black; width: 100%; height: 100%;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block; text-align: center; line-height: 20px; margin-top: 10px;">4</div>
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3. Use the kinetic-molecular theory of gases to predict whether the pressure would increase, decrease, or stay the same if the temperature increased while the volume decreased of a closed sample of a gas. *You must explain your answer according to the kinetic-molecular theory of gases.*

<p><i>Pressure would ...</i> <i>(circle one)</i></p> <p>increase</p> <p>decrease</p> <p>stay the same</p>	<p><i>Explanation:</i></p>
<input type="text" value="2"/>	<input type="text" value="4"/>

4. A 10.0 L flask contains a mixture of 0.0250 mol of argon and 0.0350 mol of neon at a temperature of 20.0°C.

a) Calculate the total pressure in the flask.

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b) Calculate the mole fraction of argon.

<input type="text" value="3"/>

c) Calculate the partial pressure of argon.

<input type="text" value="4"/>