This print-out should have 6 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

**LDE Bond Order 005**

001 10.0 points

All of the species below have the same bond order except for one. Which is it?

1. $F_2^+$
2. $Li_2^-$ correct
3. $N_2^+$
4. $C_2^+$
5. $B_2^-$

Explaination:

All of the species have a bond order of 1.5 except for $Li_2^-$, whose bond order is 0.5.

**LDE Ideal Gas Reaction 003**

004 10.0 points

Consider the reaction below. If one mole of carbonic acid ($H_2CO_3$) decomposes completely and the resulting gas is collected in a 0.2 L vessel, what will the pressure be inside that vessel at standard temperature?

$$H_2CO_3(aq) \rightarrow H_2O(l) + CO_2(g)$$

1. 22.4 atm
2. 11,348 atm
3. 2,270 atm
4. 112 atm correct

Explaination:

One mole of carbonic acid would decompose to produce one mole of carbon dioxide.

$$PV = nRT$$

$$P = \frac{nRT}{V} = \frac{1 \times 0.0821 \times 273}{0.2} = 112 \text{ atm}$$
A sample of gas has a volume of 4.40 L at STP. What will the volume be if the temperature is raised to 546 K and the pressure is lowered to 0.5 atm?

1. 8.80 L
2. 17.60 L
3. 4.40 L correct
4. 1.10 L
5. 2.20 L

Explanation:
The increase in temperature will double the volume, but the decreased in pressure will halve the volume. There will no net change in volume.

If every assumption of kinetic molecular theory were true, which of the statements below would be a consequence?

1. Diffusion would happen as rapidly as a gas' velocity.
2. None of these would be a consequence.
3. Diatomic gases would not exist.
4. Liquids and solids would not exist. correct

Explanation:
If gases were infinitely small and did not attract or repel each other, they would never condense into liquids or solids. The fact that gases have non-zero volumes and attractive forces results in condensation and freezing in a temperature-dependent manner.