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**SELECTED AND CONSTRUCTED RESPONSE ITEMS C 2.2C**

Explain changes in pressure, volume, and temperature for gases using the kinetic molecular model.

Selected/Constructed Response Items for States of Matter

C2.2C Explain changes in pressure, volume, and temperature for gases using the kinetic molecular model.

1. A gas system has an initial temperature of 81.8oC with the volume unknown. When the temperature changes to 196.0K the volume is found to be 2.96L what was the initial volume in mL?

a) 5416.5 mL

b) 23493.5 mL

c) 5360.0 mL

d) 5360 mL

2. A balloon had a volume of 75L at 25o C. To what does the temperature need to rise in order for the balloon to have a volume of 100L at the same pressure?

1. 124 °C
2. 397 °C
3. 1190°C
4. 1463°C

3. When pressure is kept constant volume of a given gas is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the absolute temperature.

1. Inversely proportional
2. constant
3. directly proportional
4. has no relation

4. 2.00 L of a gas is at 740.0 mmHg pressure. What is its volume at standard pressure?

1. 1.947 L
2. 2L
3. 2.0L
4. 1.95L

5. Boyle's Law deals what quantities?

1. pressure/temperature
2. pressure/volume
3. volume/temperature
4. volume /temperature/pressure

Teacher Companion Notes for Constructed Response Items for States of Matter

**C 2.2c**

**Question 1:**

**Correct answer d,** medium, most *students should be able to answer.*

*V₁ = V₂ T₁ = 81.8 °C + 273.15 = 354.95 °K*

*T₁ T₂*

*V₁ = 2.96 L = 5360mL*

*3.54.95 K 196 ° K*

Distracter a, didn’t convert temperature to Kelvin’s.

Distracter b, didn’t convert L to ml.

Distracter c, incorrect placement of decimal.

**Question 2:**

**Correct answer: a***, difficult some students will answer correctly.*

Vi = 75L                                 Vf = 100L

Ti = 25oC = 25 + 273 = 298K     Tf =? (K)

Vi/Ti = Vf/Tf

75/298 = 100/Tf

0.2517 = 100/Tf

Tf = 100/0.2517 = 397K (397-273 = 124oC)

**Question 3:**

**Correct answer: c*,*** *if the temperature (K) is doubled, the volume of gas is also doubled.*

Distracter a, incorrect correlation with Charles’ Law

Distracter b, incorrect correlation with Charles’ Law

Distracter d, incorrect correlation with Charles’ Law

**Question 4:**

**Correct answer: d**, t*his problem is solved by inserting values into P1V1 = P2V2*

(740.0 mmHg) (2.00 L) = (760.0 mmHg) (x)

Distracter a, incorrect configuration of significant figures.

Distracter b, incorrect configuration of significant figures.

Distracter c, incorrect configuration of significant figures.

**Question 5:**

**Correct answer: b,** *Boyle’s Law P1V1 = P2V2*

Distracter a, incorrect association with Gay Lussac’s Gas Law.

Distracter c, incorrect association with Charles’ Gas Law.

Distracter d, incorrect association with combined Gas Law.