Quarter 3 Cumulative Review

Question 1

- According to the Kinetic Molecular Theory, gas particles ____

a. Exert strong attractive and repulsive forces on each other

b. Have inelastic collisions

c. All move in the same direction

d. Have the same average kinetic energy if at the same temperature

Mar 28-7:01 AM

Quarter 3 Cumulative Review

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Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 2

- How many moles of carbon dioxide would you have in a 5.00 L container at 35.0°C and 1.22 atm?

a. 0.241 mol

b. 4.15 mol

c. 6.75 mol

d. 10.6 mol

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 2

(handwritten:) $1.22 \cdot 5 = n \cdot 0.0821 \cdot 308$

$6.1 = n \cdot 25.3$ $n = .24 \, mol$

$\dfrac{6.1}{25.3} = \dfrac{n \cdot 25.3}{25.3}$

- How many moles of carbon dioxide would you have in a 5.00 L container at 35.0°C and 1.22 atm?

a. 0.241 mol

b. 4.15 mol

c. 6.75 mol

d. 10.6 mol

(handwritten:)
$PV = nRT$

$P = 1.22 \, atm$

$V = 5.00 \, L$

$n = ? \, mol$

$R = 0.0821 \, \dfrac{L \cdot atm}{mol \cdot K}$

$T = 35°C + 273 = 308 K$

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 3

- How much heat is required when 85.0 g of lead is heated from 10.0°C to 200.0°C? (specific heat of lead = 0.129 J/g °C)

a. 17.3 J

b. 2.08 x 10³ J

c. 2.30 x 10³ J

d. 1.25 x 10⁵ J

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 3

(handwritten:) $\Delta T = T_f - T_i$ c

- How much heat is required when 85.0 g of lead is heated from 10.0°C to 200.0°C? (specific heat of lead = 0.129 J/g °C)

a. 17.3 J

b. 2.08 x 10³ J

c. 2.30 x 10³ J

d. 1.25 x 10⁵ J

(handwritten:)
$q = mc\Delta T$ $q = 85 \cdot 0.129 \cdot 190$

$m = 65.0 \, g$

$c = 0.129 \, J/g \cdot °C$

$\Delta T = 190°C$

Mar 28-7:01 AM

1

Quarter 3 Cumulative Review

Question 4

- Using standard heats of formation given in the table, calculate ΔH for the following reaction:
  $4HCl(g) + O_2(g) \longrightarrow 2Cl_2(g) + 2H_2O(g)$

a. -334.1 kJ

b. -149.5 kJ

c. -114.4 kJ

d. 114.4 kJ

Compound	ΔH$_f$° (kJ/mol)
HCl(g) .	-92.3
H$_2$O(g)	-241.8

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 4 $\left[2(-241.8\,kJ)\right] - \left[4(-92.3\,kJ)\right]$

- Using standard heats of formation given in the table, calculate ΔH for the following reaction:
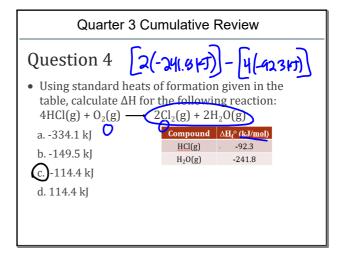 $4HCl(g) + O_2(g) \longrightarrow 2Cl_2(g) + 2H_2O(g)$ 0

a. -334.1 kJ   0

b. -149.5 kJ

c. -114.4 kJ

d. 114.4 kJ

Compound	ΔH$_f$° (kJ/mol)
HCl(g) .	-92.3
H$_2$O(g)	-241.8

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 5

- A *decrease* in entropy is seen when

a. NaCl (s) is dissolved in water

b. CaCO$_3$ (s) forms CaO (s) and CO$_2$ (g)

c. Hydrogen gas and oxygen gas form liquid water

d. Water evaporates

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 5   ΔS -disorder

- A *decrease* in entropy is seen when

a. NaCl (s) is dissolved in water $+\Delta S$

b. CaCO$_3$ (s) forms CaO (s) and CO$_2$ (g) $+\Delta S$

c. Hydrogen gas and oxygen gas form liquid water $-\Delta S$

d. Water evaporates $+\Delta S$ $\ell \to g$

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 6

- What is the molarity of a solution made with 2.50 g of sodium chloride dissolved in 125 mL of water?

a. 20.0 M

b. 0.342 M

c. 0.0200 M

d. 3.42 x 10^{-4} M

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 6 $M = \dfrac{mol}{L}$

- What is the molarity of a solution made with 2.50 g of sodium chloride dissolved in 125 mL of water?

a. 20.0 M

b. 0.342 M

c. 0.0200 M

d. 3.42 x 10^{-4} M

$2.50g \times \dfrac{1\,mol\ NaCl}{58g\ NaCl} = 0.048\ mol$

$125\,mL \times \dfrac{1\,L}{1000\,mL} = 0.125L$

$= 0.342$

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 7

- How many milliliters of 12.0 M HCl are needed to make 500. mL of 2.50 M HCl?

  a. 2400 mL

  b. 104 mL

  c. 16.7 mL

  d. 0.0600 mL

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 7

- How many milliliters of 12.0 M HCl are needed to make 500. mL of 2.50 M HCl?

  a. 2400 mL

  (b.) 104 mL

  c. 16.7 mL

  d. 0.0600 mL

$$M_1 V_1 = M_2 V_2$$
$$M_1 = 12.0M \quad 12 \cdot V_1 = 2.5 \cdot 500$$
$$V_1 = ?mL$$
$$V_1 = 104$$
$$M_2 = 2.50M$$
$$V_2 = 500$$

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 8

- What would be the percent by mass of 35.0 g of CCl_4 dissolved in 500. g of benzene, C_6H_6?

  a. 6.54 %

  b. 7.00 %

  c. 14.3 %

  d. 15.3 %

Mar 28-7:01 AM

Quarter 3 Cumulative Review

Question 8

- What would be the percent by mass of 35.0 g of CCl_4 dissolved in 500. g of benzene, C_6H_6?

  (a.) 6.54 %

  b. 7.00 %

  c. 14.3 %

  d. 15.3 %

$$\frac{35\,g}{535\,g} \times 100 = 6.54\%$$

Mar 28-7:01 AM