Unit 3 Quiz

145 /15 Wow!

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Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. A balanced chemical reaction that includes the heat change (evolved or absorbed ΔH) during the reaction is called the thermochemical reaction. For exothermic and endothermic reactions, the value of enthalpy change respectively is
   a. $\Delta H > 0, \Delta H < 0$
   b. $\Delta H > 0, \Delta H = 0$
   c. $\Delta H = 0, \Delta H < 0$
   (d.) $\Delta H < 0, \Delta H > 0$ ✓
   e. $\Delta H = 0, \Delta H = 0$

2. 100 g of a liquid is 25 °C and is heated to raise the temperature of the liquid to 50.0 °C. The thermal energy gained by the liquid is 6100 J. The specific heat of the liquid is
   a. 0.82 J/g °C
   (b.) 2.44 J/g °C
   c. 2.06 J/g °C
   d. 2.02 J/g °C
   e. 2.00 J/g °C

   ✓ $6100 = 100 \cdot c \cdot 25$

Short Answer

1. *Use the following information to answer the next question.*

Phosphorus reacts with liquid bromine to form $PBr_3(g)$. The chemical reaction is given as $2P(s) + 3Br_2(g) \rightarrow 2PBr_3(g)$ $\quad \Delta H = -121.5$ kJ

Calculate the heat released when 10.32 g of phosphorus reacts with an excess of bromine. /2

$n_P = \frac{m}{M}$

$= \frac{10.32\ g}{30.97\ g/mol}$

$n_P = 0.3332\ldots\ mol$ ✓

$\Delta H = \frac{q}{n}$

Mole Ratio

$2\ mol\ P : -121.5\ kJ$

$0.3332\ mol\ P : ?$

$x = -121.5 \div \frac{2}{0.332}$

$x = -20.24346\ J$ ✓

∴ Heat released = 20.24 J.

2. If standard enthalpies of formation of $C_3H_7OH(l)$, $CO_2(g)$, $H_2O(g)$ are –255.22, –393.51, –285.83 kJ/mol respectively, Calculate the enthalpy change for the combustion of propanol. /2

$C_3H_7OH_{(l)} + \frac{9}{2}O_{2(g)} \rightarrow 4H_2O_{(g)} + 3CO_{2(g)}$

$\Delta H^\circ_{rxn} = (\Sigma n H^\circ_f \text{ products}) - (\Sigma n H^\circ_f \text{ reactants})$ ✓

$= (4 \cdot -285.83 + 3 \cdot -393.51) - (-255.22)$

$\Delta H^\circ_{rxn} = -2068.63\ kJ$ ✓