

Name key print Name _____ sign _____

For long answer type questions, you must show all work for partial credit. Please write legibly. (I cannot grade what I cannot read.) Please print your name on the top back of the quiz so that I can return the quiz in a self serve fashion. (1 pts. for writing name on the back & front)

NA = Not attempted

Long Answer. Write your answer in the space provided. Please show work for full credit and to receive partial credit for incorrect final answers. (write legibly please)

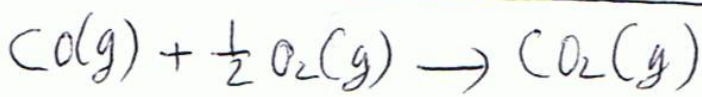
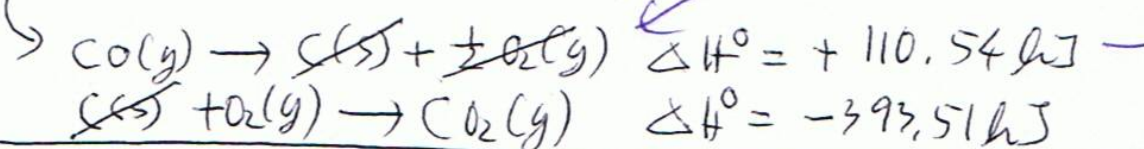
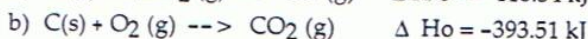
1) Write the equation for the ΔH° for the following reaction using the symbols for ΔH°_f for the reactants and 6pt. products. $4 \text{ FeO (s)} + \text{O}_2 \text{ (g)} \rightarrow 2 \text{ Fe}_2\text{O}_3 \text{ (s)}$

$\Delta H^\circ = \sum n \Delta H^\circ_f(\text{products}) - \sum n \Delta H^\circ_f(\text{reactants})$

$2 \Delta H^\circ_f(\text{Fe}_2\text{O}_3 \text{ (s)}) - \{ 4 \Delta H^\circ_f[\text{FeO (s)}] + 1 \Delta H^\circ_f[\text{O}_2 \text{ (g)}] \}$

$\Delta H^\circ_f[\text{O}_2 \text{ (g)}] = 0$ because it is most stable form of the element oxygen reversed -2

2) For the following reaction use Hess' law to calculate the enthalpy for the final reaction given the lettered reactions. You should set up the calculation for the ΔH° so that I can easily see what you are doing but do not come up with the final numbered answer. 6pt



$\Delta H^\circ = +110.54 \text{ kJ} - 393.51 \text{ kJ}$

did not show RYN -2

did not invert sign -1

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Show work if the question requires some work to come up with the final answer. (4 pts each)

3) For principal quantum number $n = 5$ what are the possible angular quantum number 0, 1, 2, 3, 4
 $l = 0 \text{ to } (n-1) \rightarrow 0, 1, 2, 3, 4$ (left off -1, or 2)

4) The s subshell has 1 orbitals and can hold a maximum of 2 electrons 1/2 pt each

5) Which of the following is a violation of Hund's rule (Circle one of the two letters by the orbital diagrams shown below) My mistake either OK

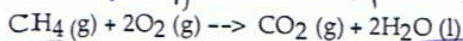
(a) $\uparrow \uparrow \uparrow$ (b) $\uparrow \downarrow \uparrow \uparrow$ violates Hund's mistake on this (meant to do)

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Long Answer. Write your answer in the space provided. NA = not attempted Please show work for full credit and to receive partial credit for incorrect final answers. (write legibly please)

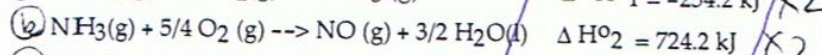
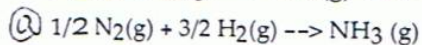
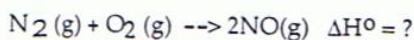
1) Write the equation for the ΔH° for the following reaction using the symbols for ΔH°_f for the reactants and products. gave this -2 reversed -2

$$\Delta H^\circ = \sum n \Delta H^\circ_f(\text{products}) - \sum n \Delta H^\circ_f(\text{reactants})$$


$$\Delta H^\circ = 1 \Delta H^\circ_f[\text{CO}_2(\text{g})] + 2 \Delta H^\circ_f[\text{H}_2\text{O}(\text{l})] - \{ 1 \Delta H^\circ_f[\text{CH}_4(\text{g})] + 2 \Delta H^\circ_f[\text{O}_2(\text{g})] \}$$

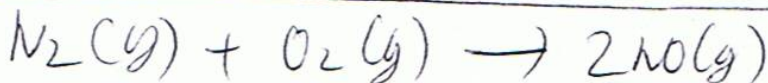
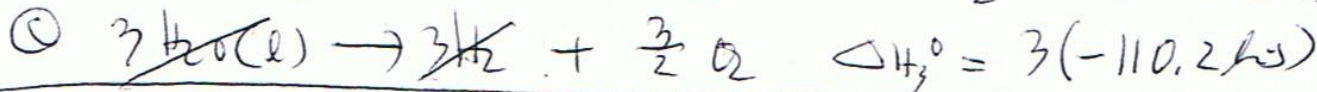
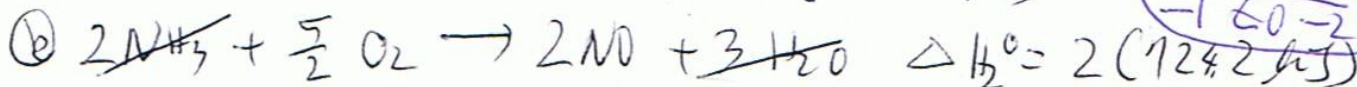
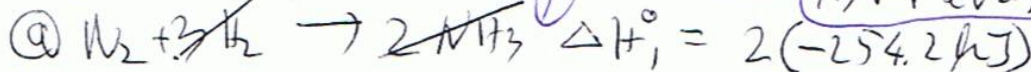
also $\Delta H^\circ_f[\text{O}_2]$ equals zero bc

2) For the following reaction use Hess' law to calculate the enthalpy for the final reaction given the lettered reactions. You should set up the calculation for the ΔH° so that I can easily see what you are doing but do not come up with the final numbered answer. did not show rxn -2



$\text{O}_2(\text{g})$ is most stable form of element 0

did not do -1 to -2



$\Delta H^\circ = 2(-254.2 \text{ kJ}) + 2(724.2 \text{ kJ}) + 3(-110.2 \text{ kJ})$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Show work if the question requires some work to come up with the final answer. 3pt each

3) For principal quantum number $n=2$ what are the possible angular quantum number

$l = 0, 1$

left off 1 -1 1/2

4) The f subshell has 7 orbitals and can hold a maximum of 14 electrons

4) 1 1/2 pt each

5) Which of the following is a violation of Pauli exclusion principal (Circle one of the two letters by the orbital diagrams shown below)

a) 1k (b) 11 violates Pauli

5) _____

Name Kay print _____ Name _____ sign _____

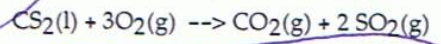
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NA = not attempted

Long Answer. Write your answer in the space provided. Please show work for full credit and to receive partial credit for incorrect final answers. (write legibly please)

2
reversed

1) Write the equation for the ΔH° for the following reaction using the symbols for ΔH°_f for the reactants and products.



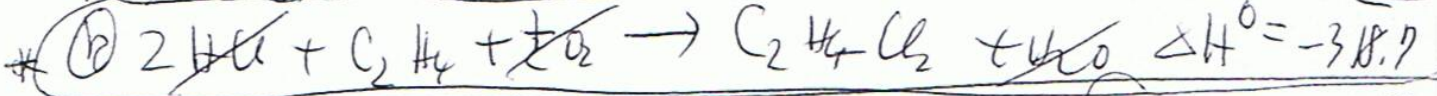
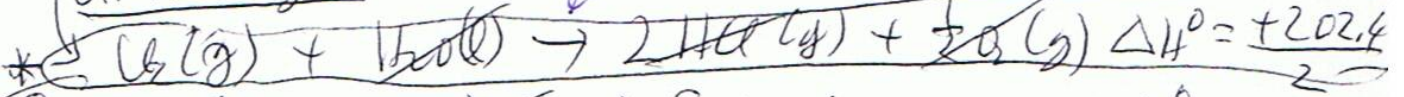
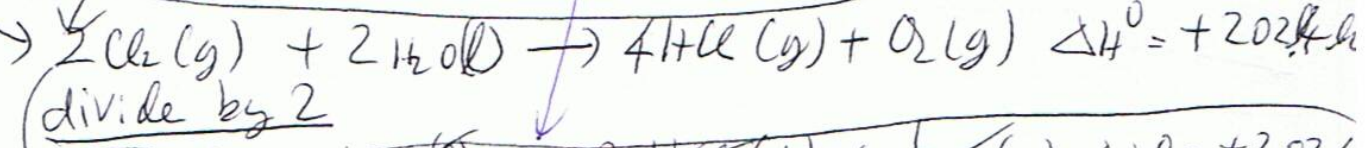
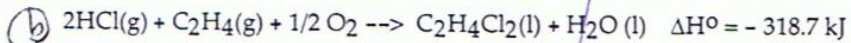
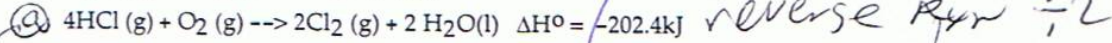
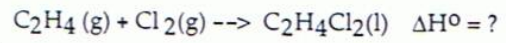
gave this -2
on the
$$\Delta H^\circ = \sum n \Delta H^\circ_f(\text{products}) - \sum n \Delta H^\circ_f(\text{reactants})$$

$$\Delta H^\circ = 1 \Delta H^\circ_f[CO_2(g)] + 2 \Delta H^\circ_f[SO_2(g)] - \{ 1 \Delta H^\circ_f[CS_2(l)] + 3 \Delta H^\circ_f[O_2(g)] \}$$

$\Delta H^\circ_f[O_2(g)] = 0$ because $O_2(g)$ is most stable form of element oxygen

2) For the following reaction use Hess' law to calculate the enthalpy for the final reaction given the lettered reactions. You should set up the calculation for the ΔH° so that I can easily see what you are doing but do not come up with the final numbered answer.

did not show rxn -2



$C_2H_4 + Cl_2 \rightarrow C_2H_4Cl_2 \quad \Delta H^\circ = \left[\frac{+202.4}{2} - 318.7 \right] \text{ kJ}$
-1 incorrect but did add

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Show work if the question requires some work to come up with the final answer.

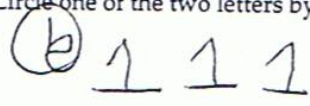
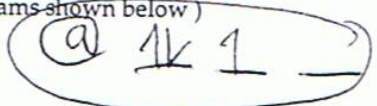
3) For principal quantum number $n = 4$ what are the possible angular quantum number
 $l = 0 \text{ to } n-1 \rightarrow 0, 1, 2, 3$

3) left off
-1, -2

4) The p subshell has 3 orbitals and can hold a maximum of 6 electrons

4) 1 1/2 pt each

5) Which of the following is a violation of Hunds rule (Circle one of the two letters by the orbital diagrams shown below)



5) _____

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NA = not attempted

Long Answer. Write your answer in the space provided. Please show work for full credit and to receive partial credit for incorrect final answers. (write legibly please)

1) Write the equation for the ΔH° for the following reaction using the symbols for ΔH°_f for the reactants and products. 6 pt.

reversed
2

this only -2
$$\Delta H^\circ = \sum n \Delta H^\circ_f(\text{product}) - \sum n \Delta H^\circ_f(\text{reactant})$$

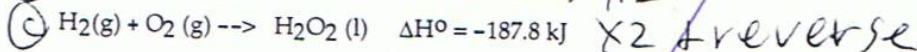
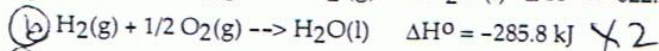
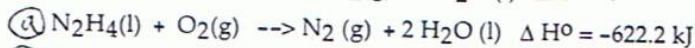
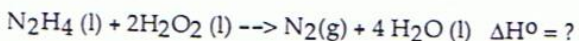


$2 \Delta H^\circ_f[\text{ZnO}(s)] + 2 \Delta H^\circ_f[\text{SO}_2(g)] - \{ 2 \Delta H^\circ_f[\text{ZnS}(s)]$

$+ 3 \Delta H^\circ_f[\text{O}_2(g)] \}$ \rightarrow also $\Delta H^\circ_f[\text{O}_2(g)] = 0$

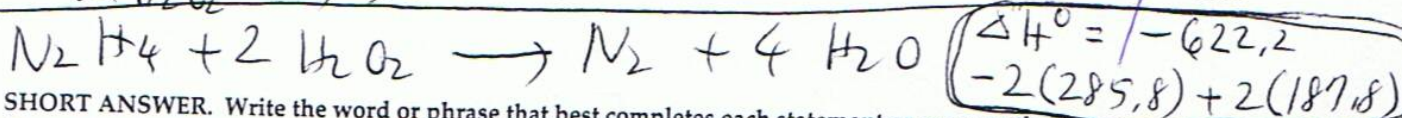
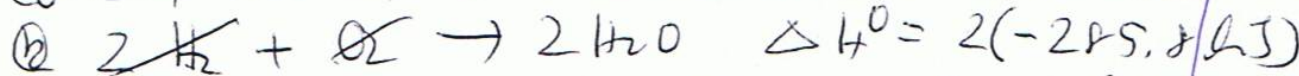
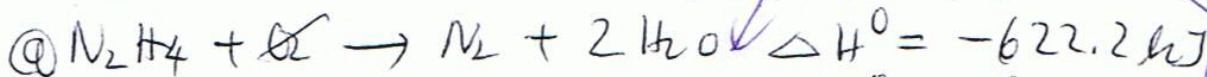
because $\text{O}_2(g)$ is the most stable form of the element oxygen

2) For the following reaction use Hess' law to calculate the enthalpy for the final reaction given the lettered reactions. You should set up the calculation for the ΔH° so that I can easily see what you are doing but do not come up with the final numbered answer. 6 pt.



did not show rxn -2

did add but wrong -1



SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Show work if the question requires some work to come up with the final answer. (4 pt each)

3) For principal quantum number $n = 3$ what are the possible angular quantum number

$l = 0 \text{ to } (n-1) \rightarrow l = 0, 1, 2$

4) The d subshell has 5 orbitals and can hold a maximum of 10 electrons

5) Which of the following is a violation of Pauli exclusion principal (Circle one of the two letters by the orbital diagrams shown below)

3) left off -1 each

4) 12 pt each

(a) 11

(b) 1L

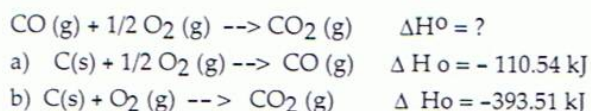
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1) Write the equation for the ΔH° for the following reaction using the symbols for ΔH°_f for the reactants and products. $4 \text{ Fe O (s)} + \text{O}_2 \text{ (g)} \rightarrow 2 \text{ Fe}_2\text{O}_3 \text{ (s)}$

2) For the following reaction use Hess' law to calculate the enthalpy for the final reaction given the lettered reactions. You should set up the calculation for the ΔH° so that I can easily see what you are doing but do not come up with the final numbered answer.



SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Show work if the question requires some work to come up with the final answer.

3) For principal quantum number $n=5$ what are the possible angular quantum number 3) _____

4) The s subshell has _____ orbitals and can hold a maximum of _____ electrons 4) _____

5) Which of the following is a violation of Hunds rule (Circle one of the two letters by the orbital diagrams shown below) 5) _____

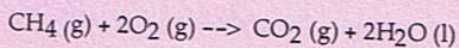


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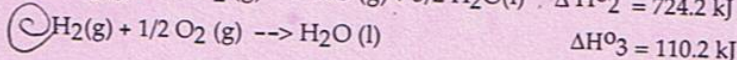
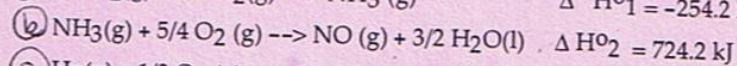
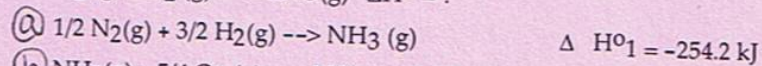
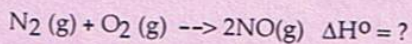
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- 1) Write the equation for the ΔH° for the following reaction using the symbols for ΔH°_f for the reactants and products.



- 2) For the following reaction use Hess' law to calculate the enthalpy for the final reaction given the lettered reactions. You should set up the calculation for the ΔH° so that I can easily see what you are doing but do not come up with the final numbered answer.



SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Show work if the question requires some work to come up with the final answer.

- 3) For principal quantum number $n=2$ what are the possible angular quantum number 3) _____

- 4) The f subshell has _____ orbitals and can hold a maximum of _____ electrons 4) _____

- 5) Which of the following is a violation of Pauli exclusion principal (Circle one of the two letters by the orbital diagrams shown below) 5) _____

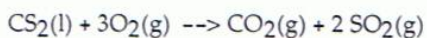


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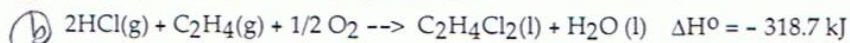
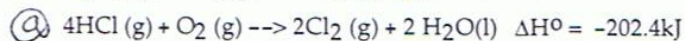
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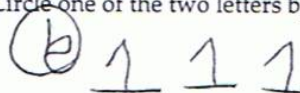
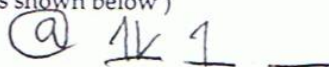


SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Show work if the question requires some work to come up with the final answer.

3) For principal quantum number $n = 4$ what are the possible angular quantum number 3) _____

4) The p subshell has _____ orbitals and can hold a maximum of _____ electrons 4) _____

5) Which of the following is a violation of Hunds rule (Circle one of the two letters by the orbital diagrams shown below) 5) _____

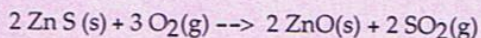


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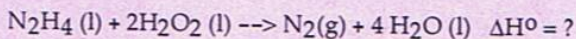
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- 1) Write the equation for the ΔH° for the following reaction using the symbols for ΔH°_f for the reactants and products.



- 2) For the following reaction use Hess' law to calculate the enthalpy for the final reaction given the lettered reactions. You should set up the calculation for the ΔH° so that I can easily see what you are doing but do not come up with the final numbered answer.



- (a) $\text{N}_2\text{H}_4(l) + \text{O}_2(g) \rightarrow \text{N}_2(g) + 2 \text{H}_2\text{O}(l) \quad \Delta H^\circ = -622.2 \text{ kJ}$
 (b) $\text{H}_2(g) + 1/2 \text{O}_2(g) \rightarrow \text{H}_2\text{O}(l) \quad \Delta H^\circ = -285.8 \text{ kJ}$
 (c) $\text{H}_2(g) + \text{O}_2(g) \rightarrow \text{H}_2\text{O}_2(l) \quad \Delta H^\circ = -187.8 \text{ kJ}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Show work if the question requires some work to come up with the final answer.

- 3) For principal quantum number $n = 3$ what are the possible angular quantum number 3) _____
 4) The d subshell has _____ orbitals and can hold a maximum of _____ electrons 4) _____
 5) Which of the following is a violation of Pauli exclusion principal (Circle one of the two letters by the orbital diagrams shown below) 5) _____

(a) 11

(b) 1L