Name	AP Chemistry	
Chapter 16 HW 2: Due 3/4/16. Complete all free label all final free response answers. #YOTAPCO		graded. Show all work. Box and clearly
<ol> <li>Nitrogen monoxide, NO(g), and carbon monoxide under suitable conditions these two gases could react (a) Write a balanced equation for the reaction describing the reaction. Justify your answer.</li> <li>Write the expression for the equilibrium constant (c) Consider the following thermodynamic data.</li> </ol>	It to form $N_2(g)$ and $CO_2(g)$ , which a bed above. Indicate whether the carb t, $K_p$ , for the reaction.	re components of unpolluted air.  con in CO is oxidized or whether it is reduced
NO	CO	CO <sub>2</sub>
at 298 K. Include units with your answer	K is $-746$ kJ per mole of $N_2(g)$ form	ed, calculate the value of $\Delta S^{\circ}$ for the reaction
(d) For the reaction at 298 K, the value of $K_p$ is 3.3 x x $10^{-7}$ atm, $P_{CO} = 5.0 \times 10^{-5}$ atm, $P_{N2} = 0.781$ atm, and	$\times 10^{120}$ . In an urban area, typical presend $P_{\rm CO2} = 3.1 \times 10^{-4}$ atm.	ssures of the gases in the reaction are $P_{NO} = 5.0$
(i) Calculate the value of $\Delta G$ for the reactio (ii) In which direction (to the right or to the	on at 298 K when the gases are at the	partial pressures given above.
Explain.	<b>①</b>	
a. 2NO +2CO -> 2CO	)2 + N2 (0)	s oxidized because it
D (p(02) (pN2)	losese	0 0
(bro) (bro)	TO Y	
Cà DG = [2(-394.36) +0]	-[7(86.55)+2(	-137.151-
DG= -788.72- [-	101.23 (1	AG=NH-TDS
@ TAG = -687.5 KJ	-683	248PS - 0002PF = 002F
(3.1×10×4)2 (0.75	(18	DS = -0.196 KJ/K)@
di Q = (5.0x107)(5.0)	×10-5)2 (= 1.	20 × 10 14
MG= BG + RT ONC	2	
-687500 DG = -6875	00 1(8.3145) 299	8 In 1.20 x 10")

DG = -687500 + 80324

(2) [AG = -607KJ)

Dis Expendence in the forward (Right) direction.

The data in the table to the right were determined at 25°C.

- (a) Calculate  $\Delta G^{\circ}$  for the reaction above at 25°C.
- (b) Calculate  $K_{eq}$  for the reaction above at 25°C.
- (c) Calculate  $\Delta S^{\circ}$  for the reaction above at 25°C.

(c) Calculate 25 for the reaction above at 25 C.
(d) In the table above, there is no data for $H_2$ . What are the values of $\Delta H_f^{\circ}$ , $\Delta G_f^{\circ}$ , and of the absolute
entropy Co for H at 25°C2

entropy, S°, for $H_2$ at 25°C?
a. DG=[-166.2]-[-137.3]=[-18.9K]
b. DG = -RT ONK
-28900 = (-8.3145)(298) lnk
Dnk=11.66
[K > 1.16 × 105]
DG = AH = FDG
C, -28.9 = -128.1 - 29885
99.2 29845
DS=-0.333KJ/K or -333J/K
d. OH, (H) = Ø
NGCHO = Ø

Substance  $\Delta H_f^{\circ}$  (kJ mol<sup>-1</sup>)

CO(g)

CH<sub>3</sub>OH(l)

-110.5

-238.6

 $\Delta G_f^{\circ}$  (kJ mol<sup>-1</sup>)

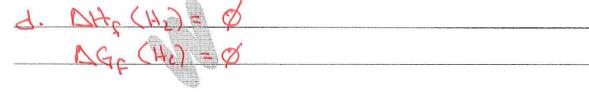
-137.3

-166.2

S° (J mol<sup>-1</sup> K<sup>-1</sup>)

+197.9

+126.8



DS = 80 - 25 m	
-333 = [126.8] - [197.9 + Zx]	
- Hra 8 197 a - 7 -	