1. Use Table 6.1 to predict the ΔHo (in kJ/mol) of the proposed reactions below. In each case indicate whether the reaction is exothermic or endothermic. (Show work)

ΔHo (kJ/mol) exo or endothermic ?

1. H2 + CH3CH2-OH 🡪 CH3CH3 + H2O \_\_\_-92\_\_\_\_\_\_\_ \_\_\_\_exo\_\_\_\_\_

Bond breaking Bond making

CH3CH2-OH 381 kJ/mol CH3CH2-H -410 kJ/mol

H-H 435 kJ/mol H-OH -498

1. CH3CH2-CH3 + HF 🡪 CH3CH3 + CH3F \_\_\_+101\_\_\_\_\_\_ \_\_\_endo\_\_\_\_\_\_

Bond breaking Bond making

CH3CH2-CH3  356 kJ/mol CH3-CH3 -368 kJ/mol

H-F 569 kJ/mol CH3-F -456 kJ/mol



\_\_\_-29\_\_\_\_\_\_ \_\_\_\_exo\_\_\_\_\_\_\_

(hint: estimate bond energies using the CH3CH2- Y data available in table 6.1)

Bond breaking Bond making

CH3CH2O-H 435 kJ/mol CH3CH2-OH -381 kJ/mol

CH3CH2-Br 285 kJ/mol H-Br -368 kJ/mol

1. Decide whether the reactions below involve negative, positive or ~ no entropy change, ΔS:
2. HCl + H2C=CH2 🡪 H3C-CH2Cl ΔS \_\_\_\_\_\_\_<0\_\_\_\_\_\_\_\_
3. CH­3CH2Br + HCl🡪 CH3CH2Cl + HBr ΔS \_\_\_\_\_\_\_~0\_\_\_\_\_\_\_\_



ΔS\_\_\_\_\_\_\_\_<0\_\_\_\_\_\_\_\_

1. 2C8H18 + 25O2🡪 16CO2 + 18H2O ΔS\_\_\_\_\_\_\_\_>0\_\_\_\_\_\_\_\_
2. Given that K = [P]/[R] for a simple conversion of R🡪P , compute the ~ %product P formed assuming the ΔG below and assuming RT=2.500 kJ/mol (T~ room temperature, 300 K).

Recall that K= e-ΔG/RT and % P = 100\*K/(1+K)

%P

1. ΔG=-8 kJ/mol ~96 (96.1)
2. ΔG=-1 kJ/mol ~60 (59.9)
3. ΔG=+8 kJ/mol ~ 4 (3.9)
4. Problem 6.26a B & D

Problem 6.26c C has larger Eact

Problem 6.26f D

Problem 6.26 g A,B

Problem 6.26h C