Thermo test answers

Multiple Choice

1. B 2) A 3) B 4) D 5) C 6) D 7) A 8) C 9) D 10) B 11) E 12) D 13) B 14) D

AP Questions

A a) 72.1gNO x 1mole NO x 114.2kJ = 137.18kJ

30.01g NO 2moleNO

B i) ∆G = -RTlnK

-70.4 = -(8.314)(1kJ/1000J)(298)lnK

28.41 = lnK

e28.41 = elnK

2.18x1012 = K

ii) the ∆G will become less negative because increasing the temperature causes an increase in the reaction rate for the endothermic reaction which is the reverse reaction making the forward reaction less likely

or

∆G = ∆H-T∆S and increasing the temperature makes the T∆S more negative since ∆S is negative which will make ∆G more positive.

c) ∆So = ∆Soprod - ∆So react

-146.5 = 2(240.1) – [2(210.8) + O2)

-146.5 = 480.1 – (421.6 + O2)

626.6 = 421.6 + O2

∆SoO2 = 205J/molK

B a) ∆H will increase because evaporation is endothermic

∆Swill increase because vapor is more randomized (has more microstates) then the liquid form

∆G will decrease because it is spontaneous

∆T will decrease because it is endothermic and will cause the temperature in the room to decrease

b) ∆H will decrease because dissolving is endothermic since the water lost energy

∆Swill increase because ions is more randomized (has more microstates) then the solid

∆G will decrease because it is spontaneous

c) The solubility will increase since the dissolving is endothermic and raising the temperature will make the rate of dissolving increase.

D a) C2H4O + 2.5O2 → 2CO2 + 2H2O

∆H = ∆Hf products - ∆Hf reactants

-1300.5kJ = 2(-283.3) + 2 (-395.5) - ∆Hf C2H4O

∆Hf = -53.1kJ/mol

b) 30g C2H4O x 1mole C2H4O x -1300.5kJ = -887kJ

44g C2H4O 1mole C2H4O

+887000 = +(8000g)(4.184)(Tf  - 25)

Tf = 51.5oC

SA

1. ∆G = 0 at phase change ∆H = T∆S

47 = T (0.121)

T = 388.4K

1. ∆G = -RTlnK K = (0.48)2 = 0.2304 K = 43886

(0.021)(0.063)3 (0.021)(2.5x10-4)

∆G = -(8.314J x 1kJ/1000J)(800)(ln43886)

∆G = -71.1kJ

1. +2967.3

-2857

-1225.6

505.2

-610.1kJ

1. The white since it already lost 17.6kJ wo convert to the red, the red phosphorous has less energy to give.