

33- Xenon gas can be modeled by the hard sphere equation of state $P_{hs}(V-nb) = nRT$. For 1.0 mol of xenon at 25°C and 1.0 L, how does the pressure differ from that of an ideal gas (P_{ideal})?

- a - $P_{ideal} = P_{hs}$ b - $P_{ideal} > P_{hs}$ c - $P_{ideal} < P_{hs}$
 d - There is not enough information to compare the two pressures.

34- Which statement is true if the reaction shown is spontaneous under standard conditions as written?



- a - K_c is smaller than 1, ΔG° is positive, and E° is negative.
 b - K_c is smaller than 1, ΔG° is negative, and E° is positive.
 c - K_c is larger than 1, ΔG° is negative, and E° is positive.
 d - K_c is larger than 1, ΔG° is negative, and E° is negative.

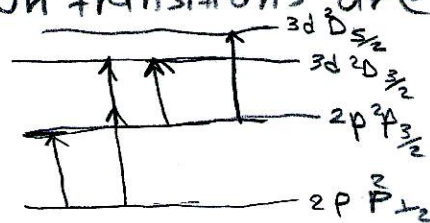
35- For the reaction

$\text{cis-1,2-dichloroethene} \rightleftharpoons \text{trans-1,2-dichloroethene}$, $K_p = 8.2$ at 25°C.
 If the initial pressure of each isomer is 1 bar, then the partial pressures at equilibrium are

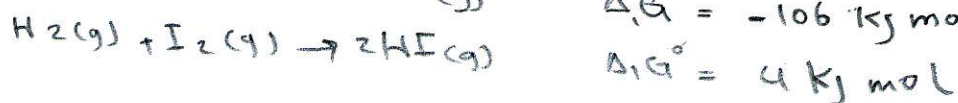
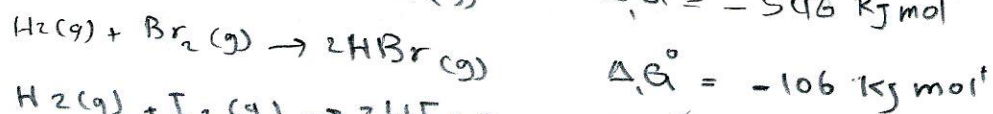
- a - $P_{trans} = 8.2 P_{cis}$ b - $P_{cis} = 8.2 P_{trans}$
 c - equal d - zero

36- Excited electronic states of atomic hydrogen, including spin-orbit coupling, are shown. How many of the shown transitions are allowed?

- a - 1 b - 2 c - 3 d - 4



36 - An excess of H_2 is placed in sealed vessel containing an equimolar mixture of F_2 , Cl_2 , Br_2 and I_2 . Using the data provided, which product is present in the largest concentration at equilibrium?



a - HF b - HCl c - HBr d - HI

37 - For the mechanism



What is the rate expression for the change in $[O_3]$?

a - $\frac{d[O_3]}{dt} = -k_1 [O_3] + k_{-1} [O_2][O'] - k_2 [O_3][O']$

b - $\frac{d[O_3]}{dt} = k_1 [O_3] - k_{-1} [O_2][O'] + k_2 [O_3][O']$

c - $\frac{d[O_3]}{dt} = k_{-1} [O_2][O']$

d - $\frac{d[O_3]}{dt} = -k_2 [O_3][O']$

38 - which energy level diagram does **not** represent a laser system?

