

23. When this reaction comes to equilibrium, will the concentrations of the reactants or products be greater? Does the answer to this question depend on the initial concentrations of the reactants and products?



27. This reaction has an equilibrium constant of  $K_p = 2.26 \times 10^4$  at 298 K:



Calculate  $K_p$  for each reaction and predict whether reactants or products will be favored at equilibrium:

- $CH_3OH(g) \rightleftharpoons CO(g) + 2 H_2(g) \quad 1/2.26e4 = 4.42e-5$
- $\frac{1}{2} CO(g) + H_2(g) \rightleftharpoons \frac{1}{2} CH_3OH(g) \quad (2.26e4)^{1/2} = 150.33$
- $2 CH_3OH(g) \rightleftharpoons 2 CO(g) + 4 H_2(g) \quad 1/(2.26e4)^2 = 6.65e-3$

33. Write an equilibrium expression for each chemical equation involving one or more solid or liquid reactants or products.

- $CO_3^{2-}(aq) + H_2O(l) \rightleftharpoons HCO_3^-(aq) + OH^-(aq) \quad K = \frac{[HCO_3^-][OH^-]}{[CO_3^{2-}]}$
- $2 KClO_3(s) \rightleftharpoons 2 KCl(s) + 3 O_2(g) \quad K = [O_2]^3$
- $HF(aq) + H_2O(l) \rightleftharpoons H_3O^+(aq) + F^-(aq) \quad K = \frac{[H^+][F^-]}{[HF]}$
- $NH_3(aq) + H_2O(l) \rightleftharpoons NH_4^+(aq) + OH^-(aq) \quad K = \frac{[NH_4^+][OH^-]}{[NH_3]}$

35. Consider the reaction:



$$K = \frac{[CH_3OH]}{[CO][H_2]^2} = \frac{(0.185)}{(0.105)(0.105)^2} = 136$$

An equilibrium mixture of this reaction at a certain temperature has  $[CO] = 0.105 M$ ,  $[H_2] = 0.114 M$ , and  $[CH_3OH] = 0.185 M$ . What is the value of the equilibrium constant ( $K_c$ ) at this temperature?

# Mastering Chemistry Exercise Answers Ch 15

**Tom Cole**



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aug 8 2020 1 answer sorted by 1 you can think of the first quadrant operation as being a buck converter down from the supply to the motor you can think of the second quadrant as being a boost converter from the motor s generated low voltage up to the supply voltage

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put simply the four quadrants that the controller can work in are 1 motor going clockwise controller applying clockwise drive 2 motor going anti clockwise controller applying anti clockwise drive 3 motor going clockwise controller applying anti clockwise drive 4 motor going anti clockwise controller applying clockwise drive

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controllers such as expert system fuzzy logic self tuning fuzzy 10 11 12 13 14 15 16 neural network as well as anfis but this paper focused only on the circuit operation of generator mode

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four quadrant operation of dc motor means that the machine operates in four quadrants they are forward braking forward motoring reverse motoring and reverse braking a motor operates in two modes motoring and braking

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1 to observe the four quadrant operation of a dc motor 2 to control a motor under torque control 3 to couple the speed control motor and torque controlled motor and observe the effect of a stepped torque 6 2 four quadrant operation of a dc motor the four quadrant operation is performed by giving an alternating reference speed command to

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aug 16 2021 the four quadrant operation of the motor can be described as follows quadrant i in the first quadrant the developed power by the motor is positive thus the motor operates in motoring mode and converts electrical energy into mechanical energy therefore the operation of the motor in first quadrant is called forward motoring quadrant ii

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