Chemistry 12
ACID BASE PART II Lesson # 17
INDICATORS

An INDICATOR is a mixture of a _____ and _____ _____.

To simplify matters we will use the FORMULA _____ to represent the _____ and _____ to represent the _____.

For a list of INDICATORS refer to page _____ in your DATA BOOKLET or pg 335 in your HEBDEN text book.

Because an indicator is a weak acid in water the generic chemical reaction is:

For the INDICATOR -> Chlorophenol Red
The colour of **HIn** is _____ while the colour of **In-** is_____.

In the presence of an ACID (_____) the above reaction is going to shift to the _____ and the colour that predominates will be _____.

In the presence of a BASE (_____)
the above reaction is going to shift to the _____ and the colour that predominates will be _____.

Some important terminology:
END POINT/ TRANSITION POINT- _____
_____.

EQUIVALENCE POINT - _____
_____.

If the indicator is chosen correctly, the indicator should change colour at (or very close to) the equivalence point.

Example 1. Calculate the END POINT for the indicator Chlorophenol Red.

At the END POINT of an indicator the [HIn] = [In-]. Therefore we can use this relationship to calcalate the indicator's **Ka** using the MIDPOINT of the indicator's COLOUR CHANGE.

Indicator equation:

Ka expression:

Conclusion:

$$\text{If } Ka = [H_3O^+]$$
$$\text{then } -\log (Ka) = - \log [H_3O^+]$$
$$pKa = pH$$

Conclusion:

Example 2. Ethyl Orange is RED at pH < 3.4 and YELLOW at pH > 4.8. What is the approxmate value of the K_a for Ethyl Orange?

Example 3. Given that an indicator has a K_a value of 2.5×10^{-5} , what is the transition point of the indicator? Identify the indicator.

Example 4. Alzarin Yellow R changes from yellow to red at pH = 11.0. If Aliz- ion is RED, what colour is Alzarin Yellow R in 1.0×10^{-5} M NaOH?

SEATWORK/HOMEWORK: Exercises 108-114 pgs 162-163 in HEBDEN
PLO's : O1-O5