**5.4 HONORS CLASS WORKSHEET – ACID-BASE INDICATORS**

An acid-base indicator is a weak acid which dissociates to give an anion with a color which is different from the original acid:

HA  H+ + A-

Color 1 Color 2

State and explain which color the indicator will show at high pH Color: ………………………………….

Reason: ……………………………………………………………………………………………………………………………………….

State and explain which color the indicator will show at low pH Color: ………………………………….

Reason: ……………………………………………………………………………………………………………………………………….

The pH at which the indicator changes color is called the …………………………….. of the indicator.

It varies from indicator to indicator. It depends on: …………………………………………………………………….

Some common acid-base indicators are:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Indicator | Color 1 | Color 2 | pH at which color changes | color during transitional pH range |
| methyl orange | pink | yellow | 3.1 – 4.4 |  |
| methyl red | red | yellow | 4.4 – 6.3 |  |
| bromothymol blue | yellow | blue | 6.0 – 7.7 |  |
| phenolphthalein | colorless | purple | 8.3 – 10.0 |  |

Within the pH range over which the color changes, the indicator may appear as a third color as both colors are present in significant quantities.

Predict the color of each of the above indicators at the given pH value:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| pH | methyl orange | methyl red | bromothymol blue | phenolphthalein | Mixture of all indicators |
| 2.0 |  |  |  |  |  |
| 3.5 |  |  |  |  |  |
| 5.0 |  |  |  |  |  |
| 6.5 |  |  |  |  |  |
| 8.0 |  |  |  |  |  |
| 9.5 |  |  |  |  |  |
| 11.0 |  |  |  |  |  |