

## Acid-Base Indicators Answer Key

1. *Answers appear in italics.*

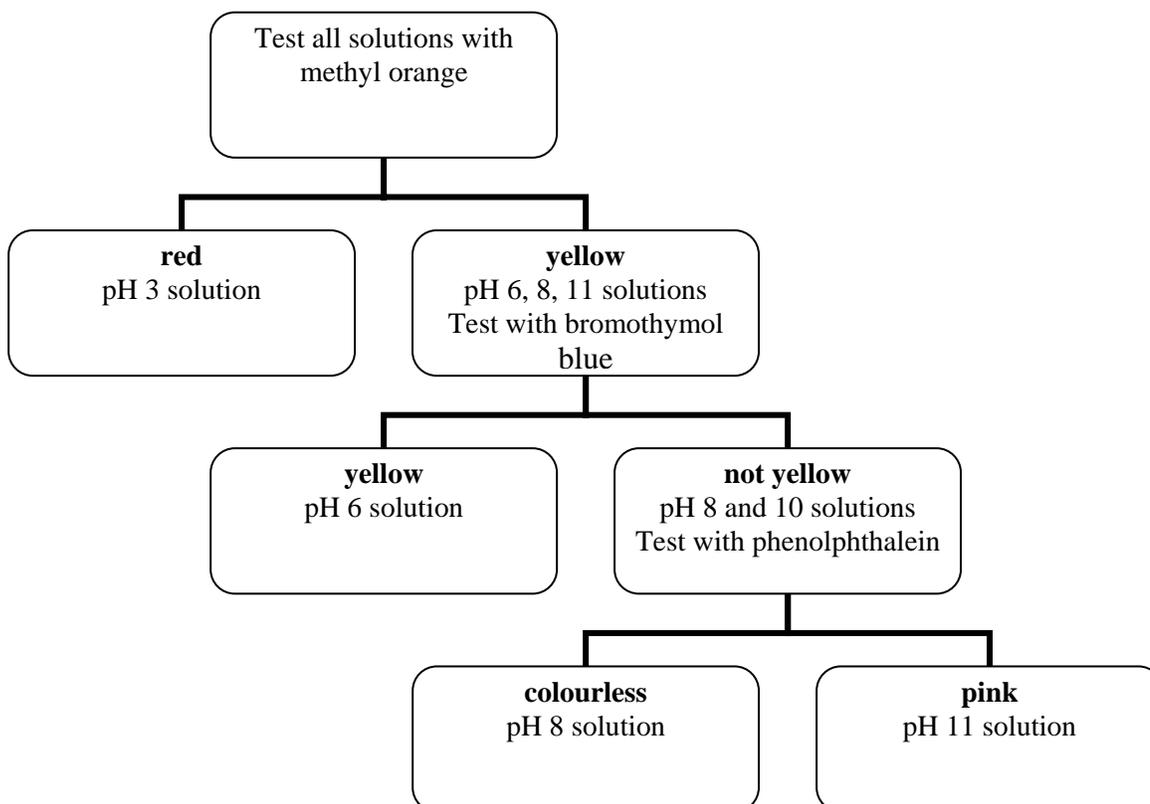
pH	colour of orange IV	colour of bromocresol green	colour of bromothymol blue	colour of phenol red
1.0	<i>red</i>	<i>yellow</i>	<i>yellow</i>	<i>yellow</i>
4.2	<i>yellow</i>	<i>green</i>	<i>yellow</i>	<i>yellow</i>
5.8	<i>yellow</i>	<i>blue</i>	<i>yellow</i>	<i>yellow</i>
9.0	<i>yellow</i>	<i>blue</i>	<i>blue</i>	<i>red</i>

2.

Solution	colour of bromocresol green	colour of bromothymol blue	colour of phenolphthalein	pH
A	yellow	yellow	colourless	< 3.8
B	blue	blue	pink	> 10.0
C	blue	blue	colourless	7.6 – 10.0
D	green	yellow	colourless	3.9 – 5.3

3. Phenolphthalein could be used to distinguish between a pH 8 and a pH 11 solution.

4.



# Acid-Base Indicators Answer Key (continued)

$$5. \quad M_{\text{HCl}} = 1.01 \frac{\text{g}}{\text{mol}} + 35.45 \frac{\text{g}}{\text{mol}} = 36.46 \frac{\text{g}}{\text{mol}}$$

$$n = \frac{m}{M}$$

$$n_{\text{HCl}} = \frac{4.3 \text{ g}}{36.46 \frac{\text{g}}{\text{mol}}}$$

$$n_{\text{HCl}} = 0.11794 \text{ mol}$$

$$c = \frac{n}{V}$$

$$c_{\text{HCl}} = \frac{0.11794 \text{ mol}}{20 \text{ L}}$$

$$c_{\text{HCl}} = 5.897 \times 10^{-3} \frac{\text{mol}}{\text{L}}$$

$$\text{Ratio of } \frac{\text{H}_3\text{O}^+}{\text{HCl}} = \frac{1}{1}$$

$$c_{\text{H}_3\text{O}^+} = 5.897 \times 10^{-3} \frac{\text{mol}}{\text{L}}$$

$$\text{pH} = -\log[\text{H}_3\text{O}^+]$$

$$\text{pH} = -\log\left(5.897 \times 10^{-3} \frac{\text{mol}}{\text{L}}\right)$$

$$\text{pH} = 2.23$$

At pH 2.23, bromocresol green would be yellow.