

Marking Scheme for  
**ACIDS AND BASES**

Maximum = 10

(2) **DATA TABLE**

Indicator	HCl	NaOH	Neutral	A	B	C	D	E	F	G
Neutral Litmus	pale pink	purple	Purple-red	Red-purple	Pale pink	Purple red	Pale pink	purple	Pale pink	purple
Methyl red	pink	yellow	yellow	yellow	Pink-orange	yellow	orange yellow	yellow	pink	yellow
Bromothymol blue	yellow	blue	green	blue	yellow	green	Green-yellow	blue	yellow	
Phenolphthalein	clear	pink	clear	clear	clear	clear	clear	pink	clear	Pale pink
Universal Indicator	red	purple	Yellow green	green	orange	Yellow green	yellow	Blue purple	red	blue
pH	4	10	7	8	5	7	6	10	4	9

**DISCUSSION QUESTIONS**

- 1. What colour is each of neutral litmus, methyl red, bromothymol blue, phenolphthalein and universal indicator in**

(1/2) **(a) an acidic solution?**  
Neut lit = pink; meth red = pink; bromthym blue = yellow; pheno = clear; universal = red

(1/2) **(b) a basic solution?**  
Neut lit = purple; meth red = yellow; bromthym blue = blue; pheno = pink; universal = purple

(1/2) **(c) a neutral solution?**  
Neut lit = purple; meth red = yellow; bromthym blue = green; pheno = clear; universal = green
- (1) **2. Which of neutral litmus, methyl red, bromothymol blue, phenolphthalein and universal indicator allow you to tell whether a solution is neutral (as opposed to being acidic or basic)?**  
Both bromthymol blue and universal indicator allow you to tell whether a solution is neutral.
- (1) **3. Which of the unknown solutions (A to G) are acids, which are neutral and which are basic?**  
B, D and F are acidic; C is neutral; A, E and G are basic
- (1/2) **4. What is the pH of a neutral solution?**  
A neutral solution has a pH of 7
- (1) **5. Only ONE pH is "NEUTRAL"; all other pH's refer to acidic or basic solutions.**

(a) **Look at ALL the substances in your Data Table that bromothymol blue indicated are acids. According to your data, ACIDIC solutions are in what pH range?**  
Acidic solutions have a pH of less than 7.

(1/2) (b) **Look at ALL the substances in your Data Table that bromothymol blue indicated are bases. According to your data, BASIC solutions are in what pH range?**  
Basic solutions have a pH greater than 7.
- (1 1/2) **6. Which of the following solutions are acidic, which are neutral and which are basic?**

Solution	pH of Solution	Is the Solution Acidic, Neutral or Basic?
P	9.5	basic
Q	5.5	acidic
R	10.5	basic
S	7.0	neutral
T	4.5	acidic

- (1) 7. **If you had to decide whether a solution was acidic, basic or neutral, and could only use one indicator, which of the indicators in this lab would you use? Justify your answer with a well reasoned statement using complete sentences.**

Bromthymol blue. It is yellow in acids, green in neutral solutions and blue in bases OR  
Universal indicator. It is red, orange or yellow in acids, yellow-green in neutral solutions and green, blue or purple in bases.