

Question 20 (4 marks)

- (a) Identify ONE common household base. 1

..... *cleaning detergent* .....

- (b) A student used indicators to determine whether three colourless solutions were acidic or basic. The indicators used are shown in the table. 3

Indicator	Colour change	pH range
Methyl orange	red to yellow	3.2–4.4
Methyl red	red to yellow	4.8–6.0
Thymol blue	yellow to blue	8.0–9.6
Alizarin	red to purple	11.0–12.4

*acidic.*  
*close to neutral.*  
*acidic basic.*  
*basic.*

Samples of each solution were tested with the indicators. The colours of the resulting solutions are shown in the table.

Indicator added	Colour of solution A	Colour of solution B	Colour of solution C
Methyl orange	yellow	yellow	yellow
Methyl red	yellow	yellow	yellow
Thymol blue	blue	blue	yellow
Alizarin	purple	red	red

The student concluded that each of the three solutions tested was basic. Assess the validity of this conclusion.

..... *Assessing the validity of the student's conclusion suggest that his conclusion "each of the three solution tested was basic" is incorrect. As we can see that the indicator methyl orange, gives a yellow colour for each solution, who's pH range is 3.2 - 4.4. This clearly shows that solutions must be acidic as they all have a low pH. For the second indicator, methyl red, the colour is yellow corresponding to the pH being 6.0 (close to neutral). For the indicator Thymol blue, and Alizarin, his result are correct, i.e they are basic.* .....