

S.3 CHEMISTRY:

INDICATORS:

These are substances which show colour change depending on the acidity or alkalinity of the solution to which it is added.

The following are the indicators which are commonly used and their colour changes.

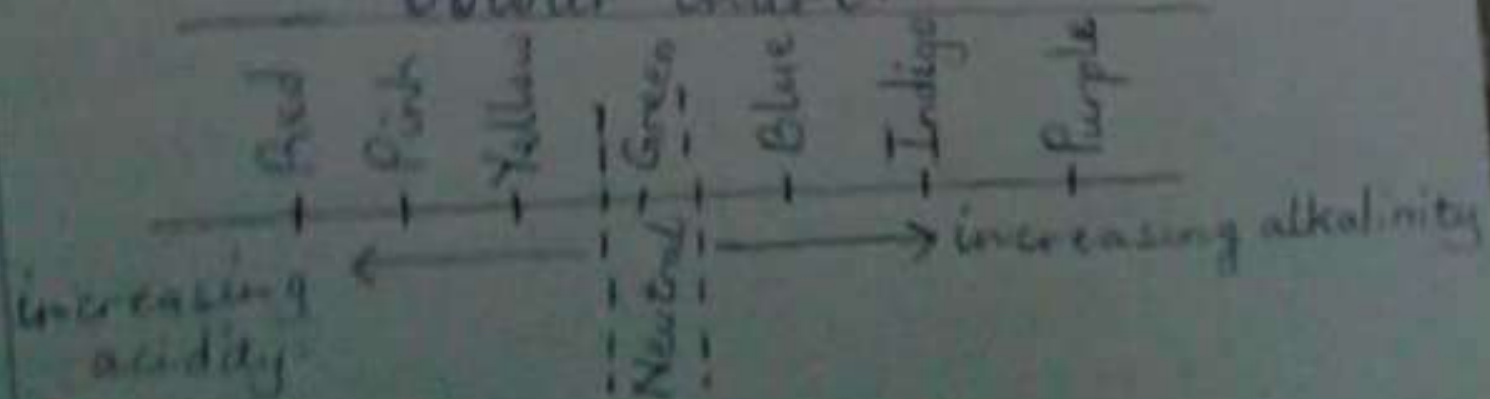
<u>Indicator</u>	<u>colour in acid</u>	<u>colour in alkali</u>
Phenolphthalein	Colourless	pink
Methyl orange	Red	Yellow
Litmus	Red	Blue

UNIVERSAL INDICATOR:

Universal indicator is made by mixing a number of simple indicators.

It is an indicator which was made to show a wide range of colour changes depending on how acidic or alkaline a substance is.

Colour chart:

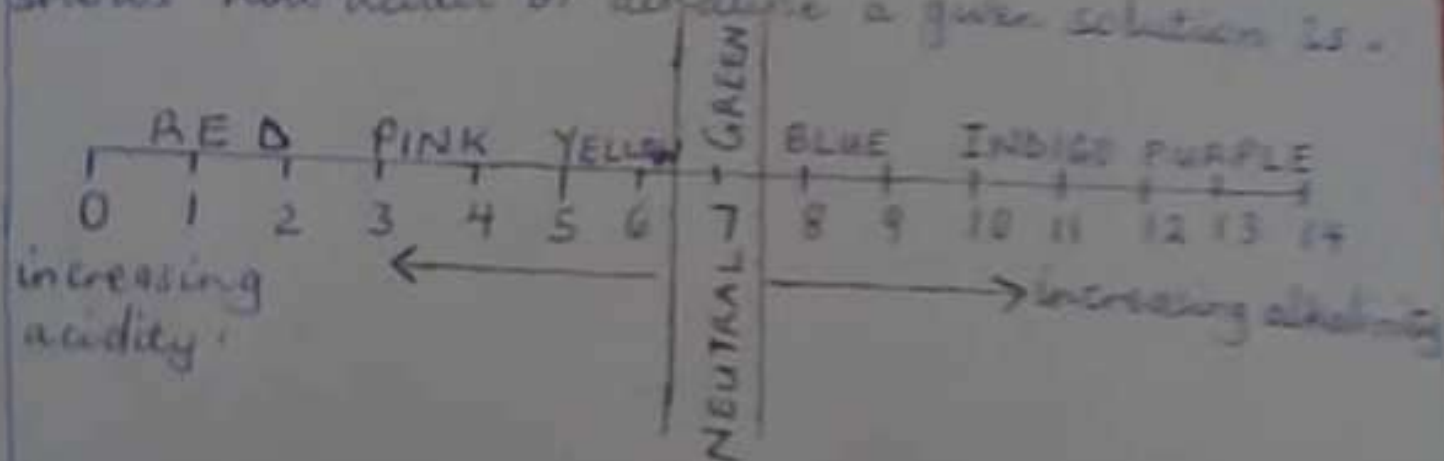


Colours on the right hand side of green are shown by bases/alkalis. Blue means a weak base, Indigo means a base of moderate strength and purple means a strong base.

Colours on the left hand side of green are shown by acids. Red means a strong acid, pink means acid of moderate strength and yellow means a weak acid.

pH SCALE

pH scale is a numerical scale from 0-14 which shows how acidic or alkaline a given solution is.



$\text{pH} = 7$ means that the solution is neutral i.e. neither acidic nor alkaline. It will show a green colour with universal indicator.

pH greater than 7 shows a series of colour changes according to the strength of the solution. $\text{pH} = 8$ will show a blue colour and the solution is a weak alkali.

pH = 11 will show indigo colour while pH = 13-14 will show a purple colour with universal indicator which means a strong base or strong alkali.

pH values below 7 show a series of colours according to the acidic strength of the solution.

pH = 6 will show a yellow colour and the solution is a weak acid. pH = 4 will show a pink colour and the acid is of moderate strength. pH = 1-2 will show a red colour and the solution is a strong acid.

Acidic solutions have pH less than 7 while basic/alkaline solutions have a pH greater than 7.

ACTIVITY

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A student carried out experiments using samples labelled A, B, C, D, E and F.

The following results were obtained.

Sample	A	B	C	D	E	F
pH value	5	13	7	2	6	9

- (i) Which sample is likely to be distilled water?
- (ii) Which sample(s) is/are alkaline?
- (iii) Which sample is a strong acid?
- (iv) Which sample is likely to give a blue colour with universal indicator?
- (v) Which sample will have no effect on litmus paper?
- (vi) Which sample will turn universal indicator purple?
- (ix) Which sample(s) contains a substance that undergoes partial ionisation to produce hydrogen ions?
- (x) Which sample undergoes complete ionisation to produce hydroxide ions?