

Indicators

			H ⁺ In violet 2.3-4.4	In ⁻ red 3.5	
HF	methyl violet blue >1.6	Thymol blue orange 1.8	Benzopurpurine-48 violet <2.3	Congo Red blue <3.0	Chlorophenol Red yellow <5.2
acetic acid	blue >1.6	yellow 2.8-8.0	purple 3.5	blue <3.0	yellow <5.2
nitric acid	green 0.8	red <1.2	violet <2.3	blue <3.0	yellow <5.2
hydrocyanic acid	blue >1.6	yellow 2.8-8.0	red >4.4	red >5.0	yellow <5.2
methanoic acid	blue >1.6	orange 1.8	purple 3.5	blue <3.0	yellow <5.2
hydrochloric	green 0.8	red <1.2	violet <2.3	blue <3.0	yellow <5.2

HF $1.6 < pH < 2.3 \approx 1.8$ thymol blue.

HC₂H₃O₂ $2.8 < pH < 3.0$

HNO₃ $0 < pH < 1.2 \approx 0.8$ methyl violet

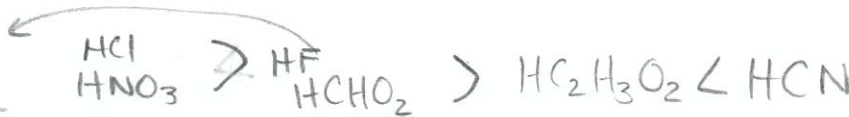
HCN $5.0 < pH < 5.2$ Congo red / chlorophenol red

HCHO₂ $1.6 < pH < 3.0 \approx 1.8$ thymol blue

HCl $0 < pH < 1.2 \approx 0.8$ methyl violet

*the higher the K_a value, the more acidic the solⁿ will be
therefor ranked by their K_a value

need another indicator to determine exact acids



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Sol.ⁿ A

methyl violet

methyl orange

methyl red

phenolphthalein

blue

yellow

red

colourless

> 1.6

> 4.4

< 4.8

< 6

Since methyl orange is yellow indicating a pH > 4.4
and methyl red is red indicating a pH < 4.8

$$4.4 < \text{pH} < 4.8$$

Sol.ⁿ B

indigo carmin

phenol red

bromocresol green

methyl red

blue

yellow

blue

yellow

< 11.4

< 6.6

> 4.7

> 6.0

Since methyl red is yellow this indicates a pH > 6.0
Since phenol red is yellow this suggests a pH < 6.6

therefore

$$6.0 < \text{pH} < 6.6$$