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PSC Quiz #8

Name: Shannon

Date:

1. The following table provides the turning points of four different indicators:

Indicator	Colour change	Turning Point
A	red - yellow	0.2 - 1.8
B	red - yellow	1.2 - 2.8
C	yellow - blue	3.0 - 4.6
D	red - orange	3.1 - 4.4
E	blue - red	3.0 - 5.0
F	red - yellow	4.2 - 6.3
G	colourless - yellow	5.6 - 7.6
H	yellow - blue	6.0 - 7.6
I	yellow - red	6.8 - 8.4
J	colurless - red	8.3 - 10.0
K	blue - yellow	10.8 - 12.0

pH > 1.8

Adding indicator A to an unknown solution will turn the solution yellow. Indicator C will turn the solution blue. Indicator G will turn the solution colorless, while indicator I will turn the solution yellow.

Based on these results and the data in the above table, determine the pH range of the unknown solution. Your answer must include the possible pH values of the solution for each indicator.

Answer:

Unknown solution

Indicator	Colour of solution	Possible pH values
A	yellow	pH > 1.8
C	blue	pH > 4.6
G	colourless	pH < 5.6
I	yellow	pH < 6.8

pH range of the unknown solution: 4.6 - 5.6

2. The following table provides the turning points of four different indicators:

Indicator	Colour change	Turning Point
A	red - yellow	0.2 - 1.8
B	red - yellow	1.2 - 2.8
C	yellow - blue	3.0 - 4.6
D	red - orange	3.1 - 4.4
E	blue - red	3.0 - 5.0
F	red - yellow	4.2 - 6.3
G	colourless - yellow	5.6 - 7.6
H	yellow - blue	6.0 - 7.6
I	yellow - red	6.8 - 8.4
J	colurless - red	8.3 - 10.0
K	blue - yellow	10.8 - 12.0

Adding indicator B to an unknown solution will turn the solution yellow. Indicator D will turn the solution orange. Indicator H will turn the solution blue, while indicator J will turn the solution red.

Based on these results and the data in the above table, determine the pH range of the unknown solution. Your answer must include the possible pH values of the solution for each indicator.

Answer: **Unknown solution**

Indicator	Colour of solution	Possible pH values
B	yellow	pH > 2.8
D	orange	pH > 4.4
H	blue	pH > 7.6
J	red	pH > 10

pH range of the unknown solution: pH > 10

3. The following table provides the turning points of four different indicators:

Indicator	Colour change	Turning Point
A	red - yellow	0.2 - 1.8
B	red - yellow	1.2 - 2.8
C	yellow - blue	3.0 - 4.6
D	red - orange	3.1 - 4.4
E	blue - red	3.0 - 5.0
F	red - yellow	4.2 - 6.3
G	colourless - yellow	5.6 - 7.6
H	yellow - blue	6.0 - 7.6
I	yellow - red	6.8 - 8.4
J	colurless - red	8.3 - 10.0
K	blue - yellow	10.8 - 12.0

Adding indicator C to an unknown solution will turn the solution yellow. Indicator E will turn the solution blue. Indicator F will turn the solution red, while indicator K will turn the solution blue.

Based on these results and the data in the above table, determine the pH range of the unknown solution. Your answer must include the possible pH values of the solution for each indicator.

Answer:

Unknown solution

Indicator	Colour of solution	Possible pH values
C	yellow	pH < 3
E	blue	pH < 3
F	red	pH < 4.2
K	blue	pH < 10.8

pH range of the unknown solution: pH < 3

4. Write the balanced chemical equations for the following reactions:

a) When isopropanol (C_3H_8O) burns it reacts with oxygen (O_2), to produce carbon dioxide (CO_2), and water (H_2O).

$$C_3H_8O + 4.5O_2 \rightarrow 3CO_2 + 4H_2O$$

$$2C_3H_8O + 9O_2 \rightarrow 6CO_2 + 8H_2O$$

b) 2,2-dimethylpropane (C_4H_{10}) combines with oxygen gas (O_2) to produce carbon dioxide and water.

$$C_4H_{10} + 6.5O_2 \rightarrow 4CO_2 + 5H_2O$$

$$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$$

c) Aqueous sodium hydroxide (NaOH) and carbon dioxide gas (CO_2) yields sodium carbonate solution (Na_2CO_3) and liquid water (H_2O).

$$2NaOH + CO_2 \rightarrow Na_2CO_3 + H_2O$$