Oxford Cambridge and RSA

GCSE Chemistry B (Twenty First Century Science)

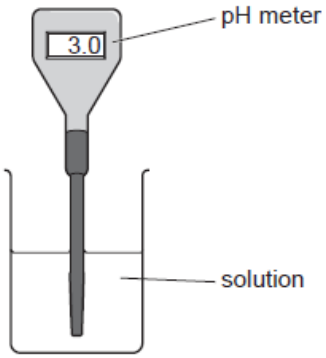
J258/04 Depth in chemistry (Higher Tier)

Question Set 29

1 Nina tests three different pH meters to find out which pH meter gives the most accurate pH readings.

She prepares six solutions, **A**, **B**, **C**, **D**, **E** and **F**. Each solution has a different concentration of hydrogen ions, H^+.

She dips the pH meters into each solution and takes a reading.



The table shows her results.

Solution	Concentration of H^+ ions (mol/dm^3)	actual pH	Reading from pH meter 1	Reading from pH meter 2	Reading from pH meter 3
A	1.0×10^{-3}	3.0	2.9	3.3	2.6
B	1.0×10^{-5}	5.0	4.9	5.4	4.4
C	1.0×10^{-2}	2.0	2.1	2.2	2.7
D	1.0×10^{-1}	1.0	0.9	1.3	1.5
E	1.0×10^{-9}	9.0	9.1	9.2	8.4
F	1.0×10^{-7}	7.0	7.1	7.3	7.5

(a) Identify one neutral solution and one alkali solution from the table. **[1]**

(b) Predict the actual pH of a solution with a concentration of 1.0×10^{-4} mol / dm^3 of hydrogen ions.

[1]

pH = ...

(c) What is the trend in the relationship between concentration of hydrogen ions and pH? **[1]**

(d) What conclusions can you make about the relative accuracy of each pH meter? Explain each conclusion.

[3]

(e) Nina thinks that she has contaminated her solutions during the experiment.

What should Nina do to make sure that her solutions do not become contaminated during the experiment?

[1]

Total Marks for Question Set 29: 7