

**Question 33****(7 marks)**

A barium hydroxide solution is titrated against an ammonium chloride solution to produce barium chloride, ammonia and water.

(a) Write a balanced ionic equation for this reaction.

**(2 marks)**

Consider the following indicators

Indicator	pH change range	Colour change
Methyl orange	3.1–4.4	Red to yellow
Bromothymol blue	6.2–7.6	Yellow to blue
Phenolphthalein	8.3–10.0	Colourless to pink

(b) Identify the most appropriate indicator for this titration and justify your choice, using an equation to support your answer. **(5 marks)**