



**RADLEY**

Scholarship Examination

**CHEMISTRY**

March 2016

Time allowed – 90 minutes for all three science papers

You should spend roughly the same amount of time on each question. You should leave between 5 and 10 minutes at the end for checking your work carefully.

1. The table below shows how the solubility of sodium nitrate ( $\text{NaNO}_3$ ) changes with temperature.

Temperature ( $^{\circ}\text{C}$ )	0	10	20	30	40	60	80	100
Solubility (g per 100 g of water)	74	80	86	94	102	122	148	180

1) On a piece of graph paper, plot a graph of solubility against temperature (temperature will be on the horizontal axis, the x axis). [5]

2) Describe how solubility changes with temperature. [1]

3) What is the solubility of sodium nitrate at  $50^{\circ}\text{C}$ ? [1]

4) What is the solubility of sodium nitrate at  $90^{\circ}\text{C}$ ? [1]

5) At what temperature does 130 g of sodium nitrate dissolve in 100 g of water? [1]

6) a) What mass of sodium nitrate dissolves in 100 g of water at  $70^{\circ}\text{C}$ ? [3]

b) What is the total mass of this solution? [1]

7) What mass of sodium nitrate would dissolve in 50 g of water  $40^{\circ}\text{C}$ ? [3]

8) a) What mass of sodium nitrate dissolves in 1000 g of water at  $25^{\circ}\text{C}$ ? [3]

b) What is the total mass of this solution? [1]

9) At what temperature does 80 g of sodium nitrate dissolve in 50 g of water? [2]

10) If you had a solution of 148 g of sodium nitrate dissolved in 100 g of water at 80°C, what do you think might happen if the solution cooled down to room temperature at 20°C? [3]

Total marks: 25