3 There is a link between the properties of the oxides of the Period 3 elements and their structure and bonding. The table below shows the melting points of the oxides of some Period 3 elements.

	Na_2O	SiO_2	P_4O_{10}
T_m / K	1548	1883	573

3 (a) In terms of crystal structure and bonding, explain in each case why the melting points of sodium oxide and silicon dioxide are high.

Na_2O .....

.....

.....

SiO_2 .....

.....

.....

(4 marks)

3 (b) Predict whether the melting point of lithium oxide is higher than, the same as, or lower than the melting point of sodium oxide and explain your prediction.

Prediction.....

Explanation.....

.....

.....

(3 marks)

3 (c) Phosphorus(V) oxide has a lower melting point than sodium oxide.

3 (c) (i) State the structure of and bonding in phosphorus(V) oxide.

.....

.....

.....

(2 marks)

3 (c) (ii) Explain why the melting point of phosphorus(V) oxide is low.

.....

.....

(1 mark)

3 (d) Separate samples of phosphorus(V) oxide and sodium oxide were reacted with water. In each case, predict the pH of the solution formed and write an equation for the reaction.

pH with P_4O_{10} .....

Equation .....

pH with Na_2O.....

Equation .....

(4 marks)

3 (e) Write an equation for the reaction between Na_2O and P_4O_{10}
State the general type of reaction illustrated by this example.

Equation .....

Reaction type .....

(2 marks)

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Turn over for the next question