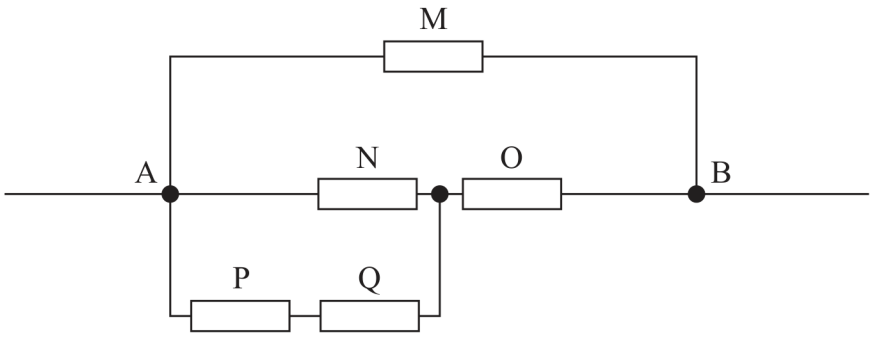
**15** (a) Two resistors of resistance $R_1$ and $R_2$ are connected in parallel in a circuit.

Derive a formula for the total resistance $R_T$ of the combination.

**(3)**

(b) The diagram shows a combination of five resistors, M, N, O, P and Q. Each resistor has a resistance of 5.0 Ω.




(i) Show that the resistance between points A and B is about 3 Ω.

**(3)**

(ii) A student is told to modify the combination of resistors so that the combined resistance between A and B is greater than 5.0 Ω. She cannot change the arrangement of the resistors, but she can replace one of the 5.0 Ω resistors with a 20.0 Ω resistor.

Explain, without further calculations, which of the five resistors should be replaced.

**(2)**

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**(Total for Question 15 = 8 marks)**