

# IB HA/owe'en Test

This test is about Aluminium

1 State the numbers of protons, electrons and neutrons present in  $^{27}\text{Al}$  [1]

2 State the *full* electron configuration of Al [1]

3 State the *full* electron configuration of  $\text{Al}^{3+}$  [1]

4 State the *condensed* electron configuration of Al [1]

5 Draw an orbital diagram for Al showing electrons in boxes [1]

6 A line in the electronic spectrum of aluminium occurs at 396 nm  
(a) Explain how a line in the spectrum arises [2]

(b) Calculate the energy of the photons emitted to produce this line [2]

7 The first five successive ionization energies of aluminium are shown in the following table:

	1st	2nd	3rd	4th	5th
Ionization energy / $\text{kJ mol}^{-1}$	577	1820	2740	11600	14800

(a) Write an equation for the *second* ionization energy of aluminium. [2]

(b) Explain why the difference between the 3<sup>rd</sup> and 4<sup>th</sup> ionization energies is much greater than the difference between any two other successive values. [3]

Turn over

8 This question is about first ionization energies.

(a) Explain why the first ionization of aluminium is lower than that of silicon [2]

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(b) Explain why the first ionization of aluminium is lower than that of magnesium [2]

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(c) Explain why the first ionization of aluminium is lower than that of boron [2]

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