

Exercise 2.35 – Evidence for energy levels

Q235-01 The 1st ionisation energy of boron is slightly less than that of beryllium. This is best explained by which of the following?

- A. The electron lost from the boron atom is in a 'p' orbital
- B. The electron lost from the boron atom is repelled by other electrons
- C. The electron lost from a boron atom is only attracted by five protons in the nucleus
- D. The electron lost from a boron atom is highly energetic

Q235-02 The first seven ionization energies of an element are 1010, 1900, 2900, 5000, 6300, 21 300 and 25 400 kJ/mole respectively. In which group of the Periodic Table is the element?

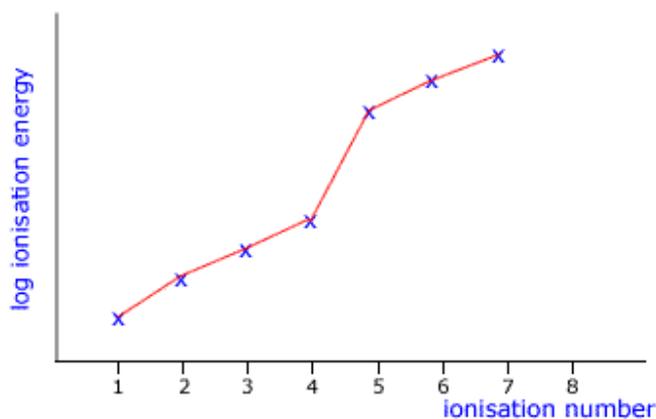
- A. 4
- B. 5
- C. 6
- D. 7

Q235-03 From which of the following can the value for the ionisation energy of hydrogen be calculated:

- I - The value of Planck's constant in $\text{kJ mol}^{-1} \text{s}$
- II - The value of Avogadro's constant
- III - The frequency of the convergence limit of the lines in the ultraviolet emission spectrum of hydrogen

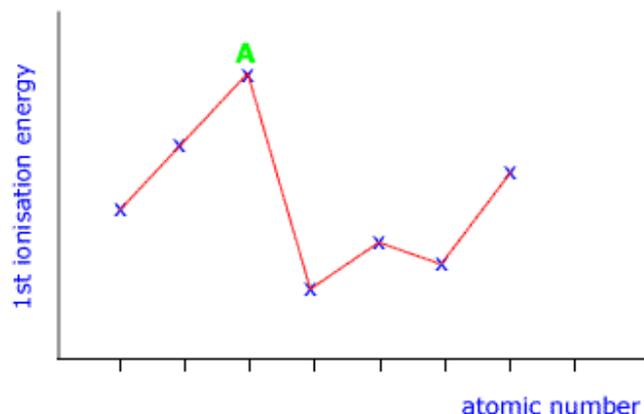
- A. I only
- B. I and II only
- C. I and III only
- D. I, II and III

Q235-04 The following graph of log ionisation energy against ionisation number is likely to be of an element in which group?



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Q235-05 The following diagram shows a section of the graph of 1st ionisation energy against atomic number. In which group of the periodic table is the element labelled A?



Q235-06 In the graph of 1st ionisation energy against atomic number, why is there a general trend towards higher ionisation energy moving across a period?

Q235-07 On which two factors does the magnitude of the electrostatic attraction between opposite charges depend?

Q235-08 Why is the energy required to remove an electron from an oxygen atom less than that required to remove an electron from a nitrogen atom?

Q235-09 Why is the 1st ionisation energy of potassium less than that of sodium?

Q235-10 Why is the first ionisation energy of the 1st row transition elements fairly constant?
