2.1 Atomic Structure and the Periodic Table: 10-minute Pack

Total Marks

AQA 8462 · Calculator allowed · about 10 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 An atom of carbon has 6 protons and 6 neutrons.

(a) Calculate the mass number of this carbon atom. **(1)**

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(b) State how many electrons a neutral carbon atom has. **(1)**

(Total for Question 1 is 2 marks)

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2 A silicon atom has atomic number 14. Its electrons are arranged in shells as 2,8,4 (2 electrons in the first shell, 8 in the second shell and 4 in the third shell, with no further shells).

(a) State whether the 4 electrons in the third shell of this silicon atom are in the outermost shell. **(1)**

(b) Give one reason why electrons are shown in shells in simple models of atoms. **(1)**

(Total for Question 2 is 2 marks)

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3 Chlorine is in Group 7 (also called Group 17 in some numbering) and is a non-metal.

(a) State how many electrons chlorine has in its outer shell. **(1)**

(b) Explain why chlorine tends to form negative ions with a charge of -1. **(2)**

(Total for Question 3 is 3 marks)

4 Argon is another noble gas. Its relative atomic mass on the periodic table is approximately 40.

(a) Calculate the number of neutrons in the most common argon isotope, using atomic number 18 and a mass number of 40. **(2)**

(Total for Question 4 is 2 marks)

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Mark scheme · 2.1 Atomic Structure and the Periodic Table: 10-minute Pack

Question 1

(a) mass number = protons + neutrons, so 6 + 6 = 12 cao **B1**

(a) Answer: 12

(b) 6 electrons (in a neutral atom the number of electrons equals the number of protons) cao **B1**

(b) Answer: 6

Question 2

(a) yes, the third shell is the outermost shell, because there are no electrons in a fourth shell (2+8+4 = 14 accounts for all the electrons) cao **B1**

(a) Answer: Yes, the third shell is the outermost shell.

(b) to show the arrangement of electrons around the nucleus or to show energy levels, oe **B1**

(b) Answer: To show the arrangement of electrons or energy levels

Question 3

(a) 7 electrons in the outer shell for Group 7 element cao **B1**

(a) Answer: 7

(b) states that chlorine gains one electron to complete its outer shell **M1**

(b) forms Cl^- with charge -1 cao **A1**

(b) Answer: Chlorine gains one electron to complete its outer shell, forming Cl^-

Question 4

(a) uses neutron = mass number - atomic number, so 40 - 18 **M1**

(a) 22 neutrons cao **A1**

(a) Answer: 22 neutrons

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