2.3 Periodic Table: Organisation and Predicting Properties: Test Pack

EDEXCEL 4CH1 · Calculator allowed · about 15 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Describe how elements are arranged in the modern periodic table, stating the main ordering principle used.

(Total for Question 1 is 1 mark)

2 A designer needs an electrical contact that carries current. An unfamiliar solid element S is in group 2, period 3. State the electrical property expected from its position that would help it perform this job.

(Total for Question 2 is 1 mark)

3 A catalogue describes a solid element U in group 1, period 3 as brittle when hammered. Give the typical metal property that should replace brittle in this description.

(Total for Question 3 is 1 mark)

4 A data table lists three consecutive period 3 elements: sodium, atomic radius 186 pm; magnesium, atomic radius 160 pm; aluminium, atomic radius 143 pm. Calculate the decrease in radius from sodium to magnesium and from magnesium to aluminium. State which of these two steps has the greater decrease.

(Total for Question 4 is 3 marks)

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5 Predict the period number for an element with proton number 16, and give a one line justification referring to electron shells.

(Total for Question 5 is 2 marks)

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6 A reference table states that solid magnesium is a group 2 metal and conducts electricity; graphite is a form of the group 4 non-metal carbon and conducts electricity. An unknown solid element conducts electricity. Use these data to explain why conductivity alone establishes neither whether it is a metal nor its group number. State one further piece of element information that would uniquely fix its periodic table position.

(Total for Question 6 is 3 marks)

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7 Deduce the likely chemical property that elements in group 0 (noble gases) share, referring to outer-shell electron configuration. Do not state specific reactions, just the general propensity.

(Total for Question 7 is 2 marks)

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Mark scheme · 2.3 Periodic Table: Organisation and Predicting Properties: Test Pack

Question 1

arranged in order of increasing atomic number (number of protons) **B1**

Answer: Elements are arranged in order of increasing atomic number

Question 2

good electrical conductivity; allow conducts electricity **B1**

Answer: S is expected to be a good electrical conductor.

Question 3

malleable; allow can be hammered into shape or sheets without breaking **B1**

Answer: Malleable: it can be hammered into shape without breaking.

Question 4

sodium to magnesium: 26 pm **B1**

magnesium to aluminium: 17 pm **B1**

sodium to magnesium has the greater decrease **B1**

Answer: Sodium to magnesium: 26 pm. Magnesium to aluminium: 17 pm. The greater decrease is from sodium to magnesium.

Question 5

recognises electron configuration fills shells until 16 electrons accounted for: 2,8,6 **M1**

period 3 cao **A1**

Answer: Period 3, because proton number 16 gives electron configuration 2,8,6 so there are three shells

Question 6

both a metal and a non-metal in the table conduct, so conductivity does not distinguish the two classifications **B1**

elements in different groups, 2 and 4, both conduct, so conductivity cannot establish one group **B1**

atomic number or proton number; allow an unambiguous element name or symbol, a complete electron arrangement, group and period together, or any other information sufficient to locate the element uniquely **B1**

Answer: Both metallic magnesium and non-metallic graphite conduct, so conductivity cannot establish metal classification. Conductors occur in groups 2 and 4, so conductivity cannot establish a unique group. The atomic number would uniquely fix the position.

Question 7

they have full outer shells **B1**

so they are generally unreactive/chemically stable **B1**

Answer: They have full outer shells and so are generally unreactive or chemically stable

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