Chemistry

This sample test paper has been prepared as part of the Pearson suite of resources for the Year 11, Unit 1, ATAR Chemistry Course prescribed by the Western Australian School Curriculum and Standards Authority.

Unit 1

Area of Study 2 Test:

Combining elements

Time allowed

Reading time: 5 minutes Working time: 40 minutes

Materials required

An approved non-programmable calculator.

Chemistry Data Booklet. This may be downloaded from the SCSA website.

Structure of this paper

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Section | Number of questions available | Number of questions to be answered | Suggested working time (minutes) | Marks available | Percentage  of total test |
| Section 1: Multiple choice | 5 | 5 | 12 | 10 | 29 |
| Section 2:  Short answer | 4 | 4 | 28 | 24 | 71 |
| Total | | | 40 | 34 | 100 |

Section 1: Multiple choice 29% (10 marks)

This section has 5 questions. Answer all questions by circling the correct option. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Suggested working time: 12 minutes

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1 Which one of the following statements about ionic bonding is not correct?

A When molten, ionic compounds are conductors of electricity.

B An ionic lattice contains both cations and anions in fixed positions.

C Ionic bonding involves the sharing of electrons between two different atoms.

D Compounds held together by ionic bonding generally have high melting temperatures.

2 Which one of the following samples contains the same number of ions as in 1 mole of Na3PO4?

A 1.5 moles of K2SO4

B 0.5 moles of Ca3(PO4)2

C 2 moles of NaOH

D 1 mole of BaCl2

3 Element X is in group 3 of the periodic table. Element Y is in group 16. Which of the following is the most likely formula for a compound between X and Y?

A X3Y2

B XY

C XY2

D X2Y3

4 The formula for sulfur dioxide is SO2. The number of non-bonding electrons in this molecule is

A 6.

B 12.

C 18.

D 8.

5 Which of the following lists species that contain only covalent bonds?

A Na2CO3(s), SO2(g), P4(s)

B CO32–(aq), SO42–(aq), HCl(g)

C Al(s), SnSO4(s), N2O4(g)

D Mg(s), HCl(g), NH4NO3(s)

End of section 1

Section 2: Short answer 71% (24 marks)

This section has 4 questions. Answer all questions. Write your answers in the space provided. When calculating numerical answers, show your working or reasoning clearly. Express numerical answers to the appropriate number of significant figures and include appropriate units where applicable.

Do not use abbreviations, such as ‘nr’ for ‘no reaction’, without first defining them.

Suggested working time: 28 minutes

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Question 6 (11 marks)

Write the corresponding name or formula for the substances listed below. (4 marks)

a Formula of sodium sulfate: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b Formula of calcium phosphate: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c Name of (NH4)2CO3: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d Name of P2O7: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e Draw electron dot diagrams for the substances listed below, showing all valence electrons. Electron pairs may be shown as : or –. (7 marks)

|  |  |
| --- | --- |
| PH3 |  |
| OCl2 |  |
| Ba(NO3)2 |  |

Question 7 (7 marks)

Explain the following properties of calcium chloride.

a Calcium chloride solid is brittle and breaks apart easily when struck with a hammer.

(3 marks)

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b Solid calcium chloride crystals do not conduct electricity. (2 marks)

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c Molten calcium chloride does conduct electricity. (2 marks)

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Question 8 (2 marks)

The melting temperature of ice (solid H2O) is 0°C but a temperature of over 1000°C is needed to decompose water molecules to hydrogen and oxygen. Explain why.

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Question 9 (4 marks)

Solutions of sugar (C6H12O6) and table salt (NaCl) can be distinguished using their electrical conductivity. Explain this statement.

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End of questions