Directions for Section 2

This section has FOUR parts

- Part A Questions 51–60 (10 marks)
- Part B Questions 61–62 (11 marks)
- Part C Questions 63–64 (14 marks)
- Part D Questions 65–66 (15 marks)

- Complete your answers to Section 2 Part A in the boxes provided on the separate answer sheet
- Complete your answers to Section 2 Parts B–D on the lines provided on pages 29 to 37
- Write your Centre Number and Student Number at the top of pages 29, 31 and 35

Instructions for answering questions in Section 2 Part A

- Completing the boxes
  
  Write firmly and clearly. Your answer must be written from left to right. Use block letters for words. Numbers must be used for numerical answers. Decimal points and negative signs must be clearly shown in separate boxes. Do NOT let any part of the letter or number touch the sides of the answer boxes.

  **Sample 1:** \( -7 \div 2 = \boxed{-3.5} \)

  **Sample 2:** How many days are in a week? \( \boxed{7} \) days

  **Sample 3:** What is the fifth month? \( \boxed{MAY} \)

  If you think you have made a mistake, put a line through the incorrect answer and write the correct one above the box.

  \( \boxed{MAY} \)

  \( \boxed{JUNE} \)
PART A

Complete your answers to Questions 51–60 on the Section 2 Part A Answer Sheet.

51 Complete the following chemical equation:

\[ \text{copper oxide } \xrightarrow{\text{heat}} \text{ copper } + \text{............................................} \]

52 Name the type of chemical reaction represented by the equation in Question 51.

53 What is the name of the tube through which sperm leave the male human body?

54 Consider the three examples below.

• Car exhaust can make breathing difficult.
• Litter from a beach party makes the area untidy.
• Suds from washing machines are carried into rivers and oceans.

What is ONE word that describes the exhaust, litter and suds in these examples?

55 Name the scientist who proposed the relationship:

\[ \text{force} = \text{mass} \times \text{acceleration} \]

56 Use ONE word to complete this sentence:

All waves are carriers of ........................................

57 What feature of a wave is represented by the distance between \( P \) and \( Q \) in the diagram?

\[ \text{Diagram with points } P \text{ and } Q \]
58 What type of electromagnetic radiation is detected as heat?

59 An electrical circuit is set up so that when one light in the circuit stops working, the other lights stay on. What type of electrical circuit is this?

60 Use ONE word to complete this sentence:

The movement of crustal plates on Earth’s surface is explained by the Theory of Plate .........................

End of Section 2 Part A

Go on to Part B
Question 61 (3 marks)

Outline the theory of evolution by natural selection.

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Marks

3
**Question 62 (8 marks)**

Scientific investigations can be carried out individually or in groups (teams).

Describe TWO advantages of each approach.

**Individual approach**

(i) ...........................................................................................................................................  
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(ii) ...........................................................................................................................................  
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**Group approach**

(i) ...........................................................................................................................................  
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(ii) ...........................................................................................................................................  
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End of Section 2 Part B

Go on to Part C
PART C

• Write your Centre Number and Student Number at the top of this page.

• Complete your answers in this booklet.

Part C continues on page 32
Question 63 (7 marks)

Table 1 shows the average distance from the Sun and the average orbital speed of some of the planets in our solar system. Table 2 shows the five largest asteroids and their average distances from the Sun.

<table>
<thead>
<tr>
<th>Planet</th>
<th>Average distance from Sun in astronomical units (AU)</th>
<th>Average orbital speed (km/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>0.4</td>
<td>48.0</td>
</tr>
<tr>
<td>Venus</td>
<td>0.7</td>
<td>35.0</td>
</tr>
<tr>
<td>Earth</td>
<td>1.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Mars</td>
<td>1.5</td>
<td>24.0</td>
</tr>
<tr>
<td>Jupiter</td>
<td>5.2</td>
<td>13.0</td>
</tr>
<tr>
<td>Saturn</td>
<td>9.6</td>
<td>10.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asteroid</th>
<th>Average distance from Sun (AU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vesta</td>
<td>2.4</td>
</tr>
<tr>
<td>Juno</td>
<td>2.7</td>
</tr>
<tr>
<td>Ceres</td>
<td>2.8</td>
</tr>
<tr>
<td>Pallas</td>
<td>2.8</td>
</tr>
<tr>
<td>Hygeia</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Question 63 continues on page 33
Question 63 (continued)

(a) On the grid provided, draw a line graph of the average distance from the Sun and the average orbital speed for the planets listed.  

(b) Use the graph to predict the range of orbital speeds for the asteroids listed in Table 2.

Please turn over
Question 64 (7 marks)

A student wants to test the idea that strawberry plants grow better in soil at 10°C than in soil at 20°C.

Design an investigation to test this idea.

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End of Section 2 Part C

Go on to Part D
PART D

• Write your Centre Number and Student Number at the top of this page.

• Complete your answers in this booklet.

Part D continues on page 36
Question 65 (8 marks)

Colonies of fire ants have been discovered in towns in northern New South Wales. Fire ants can be poisoned using a pesticide.

Some scientists suggested spraying pesticide on infested areas. Environmental scientists are worried about the effects the pesticide might have on the environment.

(a) Outline TWO concerns the environmental scientists might have.

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Use the Periodic Table on page 38 to answer Question 66.

**Question 66** (7 marks)

(a) (i) Name the element with atomic number 52.  
...................................................................................................................  

(ii) What is the symbol for the element with mass number 19.00?  
...................................................................................................................  

(b) The diagram indicates that the mass of one oxygen atom is sixteen times greater than the mass of one hydrogen atom.  

Approximately how many helium atoms have the same mass as ONE sulfur atom? Justify your answer by showing your working.  
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(c) Explain how the elements are grouped in the Periodic Table.  
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Please turn over
Use the Periodic Table to answer the question on page 37.

<table>
<thead>
<tr>
<th>Symbol of element</th>
<th>Atomic Number</th>
<th>Name of element</th>
<th>Mass Number</th>
<th>Periodic Table Entry</th>
</tr>
</thead>
</table>
| H | 1 | Hydrogen | 1.008 | 1
| Li | 3 | Lithium | 6.941 | 2 |
| Be | 4 | Beryllium | 9.012 | 3 |
| B | 5 | Boron | 10.81 | 4 |
| C | 6 | Carbon | 12.01 | 5 |
| N | 7 | Nitrogen | 14.01 | 6 |
| O | 8 | Oxygen | 16.00 | 7 |
| F | 9 | Fluorine | 19.00 | 8 |
| Ne | 10 | Neon | 20.18 | 9 |
| Na | 11 | Sodium | 22.99 | 10 |
| Mg | 12 | Magnesium | 24.31 | 11 |
| Al | 13 | Aluminium | 26.98 | 12 |
| Si | 14 | Silicon | 28.09 | 13 |
| P | 15 | Phosphorus | 30.97 | 14 |
| S | 16 | Sulphur | 32.07 | 15 |
| Cl | 17 | Chlorine | 35.45 | 16 |
| Ar | 18 | Argon | 39.95 | 17 |
| K | 19 | Potassium | 39.10 | 18 |
| Ca | 20 | Calcium | 40.08 | 19 |
| Sc | 21 | Scandium | 44.96 | 20 |
| Ti | 22 | Titanium | 47.87 | 21 |
| V | 23 | Vanadium | 50.94 | 22 |
| Cr | 24 | Chromium | 52.00 | 23 |
| Mn | 25 | Manganese | 54.94 | 24 |
| Fe | 26 | Iron | 55.85 | 25 |
| Co | 27 | Cobalt | 58.93 | 26 |
| Ni | 28 | Nickel | 58.69 | 27 |
| Cu | 29 | Copper | 63.55 | 28 |
| Zn | 30 | Zinc | 65.39 | 29 |
| Ga | 31 | Gallium | 69.72 | 30 |
| Ge | 32 | Germanium | 72.61 | 31 |
| As | 33 | Arsenic | 74.92 | 32 |
| Se | 34 | Selenium | 78.96 | 33 |
| Br | 35 | Bromine | 79.90 | 34 |
| Kr | 36 | Krypton | 83.80 | 35 |
| Rb | 37 | Rubidium | 85.47 | 36 |
| Sr | 38 | Strontium | 87.62 | 37 |
| Y | 39 | Yttrium | 88.91 | 38 |
| Zr | 40 | Zirconium | 91.22 | 39 |
| Nb | 41 | Niobium | 92.91 | 40 |
| Mo | 42 | Molybdenum | 95.94 | 41 |
| Tc | 43 | Technetium | 98.91 | 42 |
| Ru | 44 | Ruthenium | 101.1 | 43 |
| Rh | 45 | Rhodium | 102.9 | 44 |
| Pd | 46 | Palladium | 106.4 | 45 |
| Ag | 47 | Silver | 107.9 | 46 |
| Cd | 48 | Cadmium | 112.4 | 47 |
| In | 49 | Indium | 114.8 | 48 |
| Sn | 50 | Tin | 118.7 | 49 |
| Sb | 51 | Antimony | 121.8 | 50 |
| Te | 52 | Tellurium | 127.6 | 51 |
| I | 53 | Iodine | 126.9 | 52 |
| Xe | 54 | Xenon | 131.3 | 53 |
| Cs | 55 | Cesium | 132.9 | 54 |
| Ba | 56 | Barium | 137.3 | 55 |
| La | 57–71 | Lanthanides | 178.5 | 56 |
| Hf | 72 | Hafnium | 178.5 | 57 |
| Ta | 73 | Tantalum | 180.9 | 58 |
| W | 74 | Wolfram | 183.8 | 59 |
| Re | 75 | Rhenium | 186.2 | 60 |
| Os | 76 | Osmium | 190.2 | 61 |
| Ir | 77 | Iridium | 192.2 | 62 |
| Pt | 78 | Platinum | 195.1 | 63 |
| Au | 79 | Gold | 197.0 | 64 |
| Hg | 80 | Mercury | 200.6 | 65 |
| Th | 81 | Thorium | 240.4 | 66 |
| U | 82 | Uranium | 207.2 | 67 |
| Pb | 83 | Lead | 209.0 | 68 |
| Bi | 84 | Bismuth | 210.0 | 69 |
| Po | 85 | Polonium | 212.0 | 70 |
| At | 86 | Astatine | [214.0] | 71 |
| Rn | 87 | Radon | [220.0] | 72 |
| Fr | 88 | Francium | 223.0 | 73 |
| Ra | 89–103 | Actinides | 226.0 | 74 |
| Ra | 89 | Radium | 226.0 | 75 |
| Ac | 89 | Actinium | 227.0 | 76 |
| Th | 90 | Thorium | 229.0 | 77 |
| Pa | 91 | Protactinium | 231.0 | 78 |
| U | 92 | Uranium | 238.0 | 79 |
| Np | 93 | Neptunium | 237.0 | 80 |
| Pu | 94 | Plutonium | 244.0 | 81 |
| Am | 95 | Americium | 243.0 | 82 |
| Cm | 96 | Curium | 247.0 | 83 |
| Bk | 97 | Berkelium | 247.0 | 84 |
| Cf | 98 | Californium | 251.0 | 85 |
| Es | 99 | Einsteinium | 252.0 | 86 |
| Fm | 100 | Fermium | 257.0 | 87 |
| Md | 101 | Mendelevium | 258.0 | 88 |
| No | 102 | Nihonium | 260.0 | 89 |
| Lr | 103 | Lawrencium | 262.0 | 90 |
| Rf | 104 | Rutherfordium | 267.0 | 91 |
| Db | 105 | Dubnium | 268.0 | 92 |
| Sg | 106 | Seaborgium | 277.0 | 93 |
| Bh | 107 | Bohrium | 278.0 | 94 |
| Hs | 108 | Meitnerium | 281.0 | 95 |
| Mt | 109 | Ununnilium | 282.0 | 96 |
| Ds | 110 | Ununseaborgium | 284.0 | 97 |
| Rg | 111 | Roentgenium | 293.0 | 98 |
| Cn | 112 | Nihonium | 294.0 | 99 |
| Bf | 113 | Lautaro | 296.0 | 100 |
| Es | 114 | Eka-aluminium | 303.0 | 101 |
| Fm | 115 | Eka-silicon | 308.0 | 102 |
| Md | 116 | Eka-phosphorus | 313.0 | 103 |
| Lr | 117 | Eka-silicon | 317.0 | 104 |
| Rf | 118 | Ununnilium | 326.0 | 105 |
| Db | 119 | Ununseaborgium | 328.0 | 106 |

End of test