<table>
<thead>
<tr>
<th>Statement</th>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>The substance is a gas</td>
<td><img src="image1.png" alt="" /></td>
</tr>
<tr>
<td>The substance is a liquid</td>
<td><img src="image2.png" alt="" /></td>
</tr>
<tr>
<td>The substance is ionic</td>
<td><img src="image3.png" alt="" /></td>
</tr>
<tr>
<td>The substance is a solid metal</td>
<td><img src="image4.png" alt="" /></td>
</tr>
</tbody>
</table>

more than one line drawn from a variable negates the mark

(b) Carbon

1

(c) It has delocalised electrons

1

(d) the atoms / particles / ions are different sizes

*do not accept molecules*

1

so there are no rows / layers to slide

*accept the layers are disrupted*

1
(e) \( \frac{2}{27} \times 100 \) 

7.4% 

allow 7.4% with no working shown for 2 marks

(f) Mixture
M2. (a) (i) C
   (ii) B
   (iii) A
   (iv) D

(b) (i) SO$_2$
   (ii) shared
   (iii) covalent

[7]
M3. (a) sodium loses (electron)  

\[ \text{sharing / covalent / metallic} = \text{max} \, 2 \]  

chlorine gains (electron)  

1 or an (electron)  

(b) (i) Have no overall electric charge  

(ii) Should iodine be added to salt?  

reason  
any one from:  
• cannot be done by experiment  
  accept difficult to get / not enough evidence  
• based on opinion / view  
  allow must be done by survey  
• ethical or economic issue.  

(c) (i) nitric (acid)  

(ii) an alkali  

(iii) indicator  
  accept any named acid base indicator  

(d) (i) Crystallisation  

(ii) fertiliser  
  allow to help crops grow
(iii) any one from:
  • pressure
    allow concentration
  • temperature
    ignore heat
  • catalyst.
M4. (a) any one from:

- protection / improve lifespan
- improve appearance.

(b) (i) Bleach

(ii) Hydrogen is less reactive than sodium

(iii) 1 bonding pair of electrons 6 unbonded electrons on Cl
- accept dot, cross or e or – or any combination

(iv) Covalent

(v) Hydrogen chloride has a low boiling point.

Hydrogen chloride is made of simple molecules.

(c) (i) oxygen
- accept carbon dioxide

(ii) aluminium ions are positive

so are attracted (to the negative electrode)
- allow opposites attract

(iii) Reduction

(iv) slide
- allow move

(d) (i) C
(ii) strong covalent bonds
(a) (i) high
(ii) hundred

(b) hard

(c) (i) carbon
(ii) four
(iii) covalent
(iv) all

[7]
M6. (a) four

covalent

(b) because it has a high melting point
accept it won’t melt
accept it won’t decompose or react
allow withstand high temperatures
ignore boiling point

(c) thin
M7. (a) **layers**

which have weak forces / attractions / bonds between them

*second mark must be linked to layers*

or

which can slide over each other or separate

*ignore references to rubbing*

(b) **covalent**