

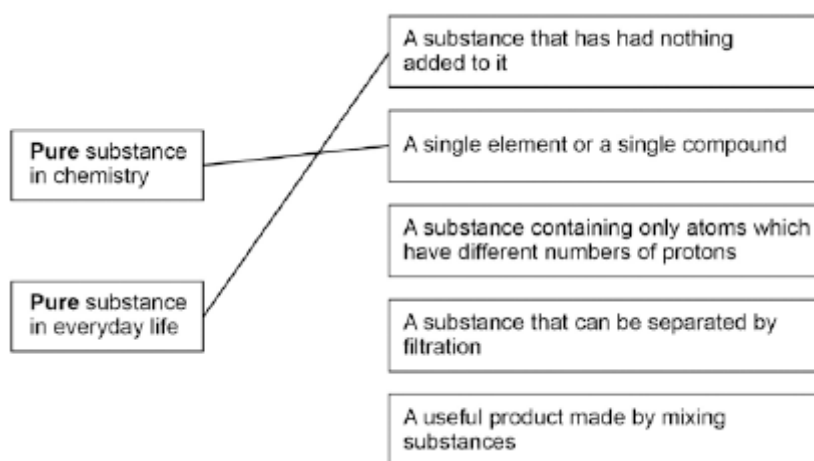
M1.(a) Air

2

Steel

1

(b)



Allow 1 mark for the correct meanings linked to context but incorrect way around

1

1

(c) Damp litmus paper turns white

1

(d) Iron(III)

1

[6]

M2.(a) 50

1

(b) 5%

1

(c) any **two** from:

- cost (9 carat is cheaper)
- pure gold is soft
- **or**  
24 carat gold is soft
- **or**  
9 carat gold is harder  
*allow 9 carat gold is stronger*  
*allow gold is an alloy in 9 carat gold*
- can change the colour

2

[4]

M3.(a) sodium loses (electron)

*sharing / covalent / metallic = max 2*

1

chlorine gains (electron)

1

1 **or** an (electron)

1

(b) (i) Have no overall electric charge

1

(ii) Should iodine be added to salt?

1

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.

1

(c) (i) nitric (acid)

1

(ii) an alkali

1

(iii) indicator

*accept any named acid base indicator*

1

(d) (i) Crystallisation

1

(ii) fertiliser

*allow to help crops grow*

1

- (iii) any **one** from:
- pressure  
*allow concentration*
  - temperature  
*ignore heat*
  - catalyst.

1  
[12]

M4.(a)	alloy		1
	(b)	in mixture:	
		<i>different sized / bigger atoms</i>	1
		<i>so there are no layers / rows / lines (to slide)</i>	
		<i>accept converse</i>	1
	(c)	any <b>two</b> from:	
		<i>ignore references to bend and mould</i>	
		<ul style="list-style-type: none"> <li>• cost</li> <li>• toxicity</li> <li>• strength</li> <li>• <i>appearance of brace</i></li> <li>• <i>unreactive <b>or</b> resistant to corrosion / saliva</i></li> </ul>	
		<i>allow rusting as alternative to corrosion</i>	2
	(d)	crosslinks	
		<i>allow lines / bonds between the rows / chains</i>	1

[6]

M5.(a) (i) an alloy

1

(ii) harder

1

(b) (i) 162.5

*correct answer with or without working gains 2 marks*

*if no answer or incorrect answer then evidence of correct working*

*[56 + (3x35.5)] gains 1 mark*

2

(ii) 34.46

*accept rounding from 34 - 34.5*

*correct answer with or without working gains 2 marks*

*accept ecf from (b)(i) correctly calculated for 2 marks*

*if no answer or incorrect answer then evidence of 56 / 162.5 or 56*

*/ answer to (b)(i) gains*

*1 mark*

2

[6]

M6. (a) +1/+

do **not** accept 1 without the +

1

electron

allow phonetic spelling

1

(b) (i) elements

1

(ii) non-metal

1

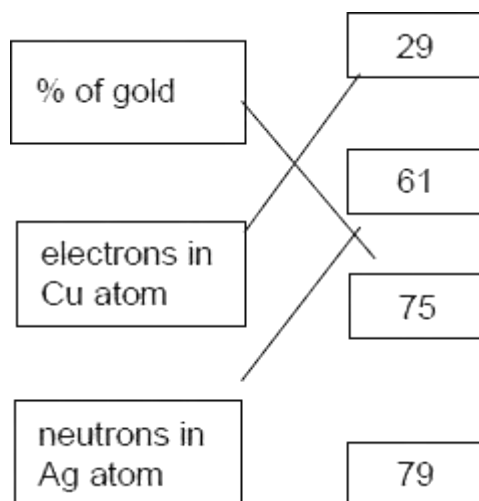
(c) soft

1

an alloy

1

(d)



***one** mark for each correct link  
extra lines lose the mark*

**3**

**[9]**



- M7.** (a) (i) 2.5(kg)  
*ignore units* 1
- (ii) 40% (cement) **and** Test 3  
*ignore units* 1
- because it is anomalous or because it is much lower than the other two readings  
*accept value not used to calculate mean*  
*ignore outlier* 1
- (iii) as the percentage of cement increases the mass needed to break the sleeper increases  
*allow 'strength' for 'mass needed'*  
*allow correct relationship using percentage of sand* 1
- (iv) volume/percentage / amount of water  
*accept temperature* 1
- (b) any **two** from:
- availability (of the raw materials)
  - cost of the raw materials
  - purity (of the raw materials)
- 2

[7]

M8. (a) 79 1

79 1

(b) hundred 1

(c) (i) electron(s) 1

(ii) three 1

(d) changes rate of reaction  
*accept lowers activation energy*  
**or**  
speeds up / slows down reaction  
*accept reduces costs* 1

(e) (i) melt 1

(ii) crosslinking  
*allow answers on diagram*

**or**

(covalent) bonds between polymers / chains

*allow bonds between layers*

*do **not** allow intermolecular*

1

[8]