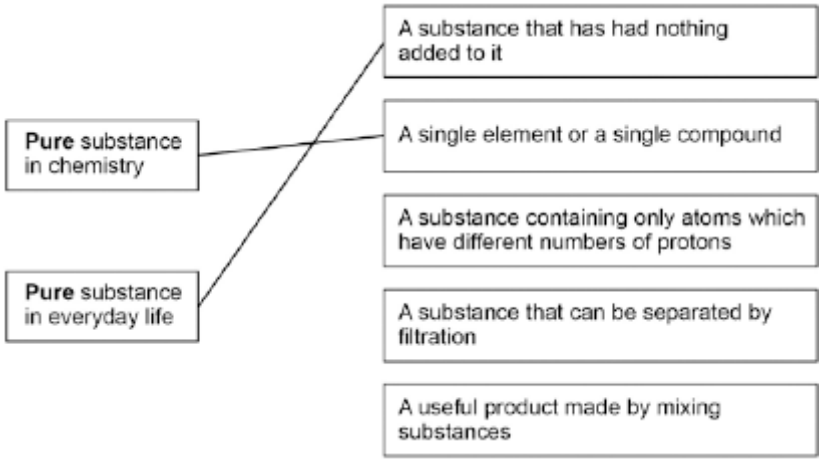
M1.(a) Air

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:

different sized / bigger atoms

1

so there are no layers / rows / lines (to slide)

accept converse

1

(c) any **two** from:

ignore references to bend and mould

- cost
- toxicity
- strength
- *appearance of brace*
- *unreactive **or** resistant to corrosion / saliva*

allow rusting as alternative to corrosion

2

(d) crosslinks

allow lines / bonds between the rows / chains

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

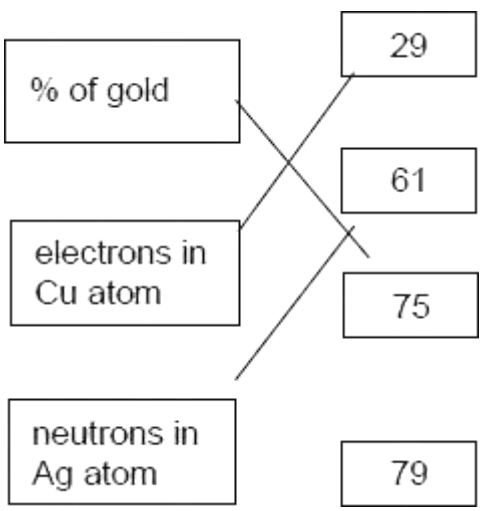
(c) soft

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) <u>volume/percentage</u> / <u>amount</u> 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]