

M1.(a) electrons transferred from potassium to sulfur 1

two potassium atoms each lose one electron 1

forming K^+ / 1+ ions 1

sulfur atoms gain 2 electrons 1

forming S^{2-} / 2- ions 1

(b) there are no gaps / sticks between the potassium ions and sulfide ions 1

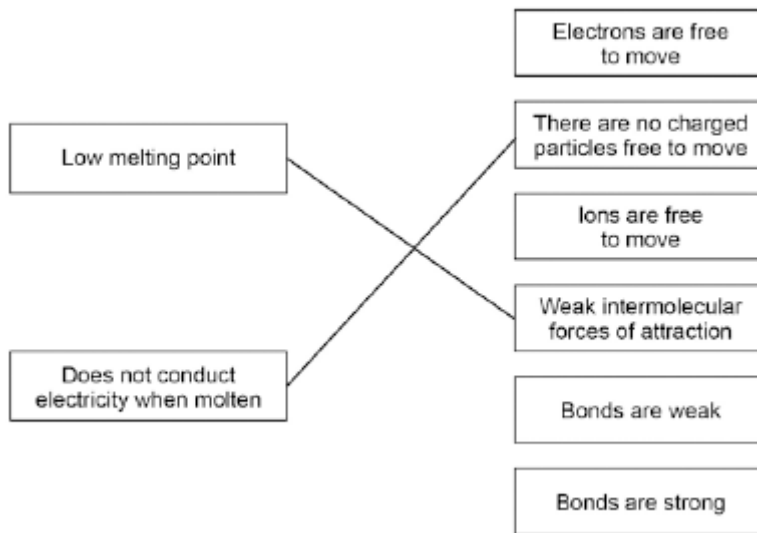
(c) (two) shared pairs between H and S 1

rest correct - no additional hydrogen electrons and two non-bonding pairs on sulfur
second mark dependent on first 1

(d) 342 2

allow 1 mark for evidence of $(2 \times 27) + 3[32 + (16 \times 4)]$

(e) **Property** **Explanation of property**



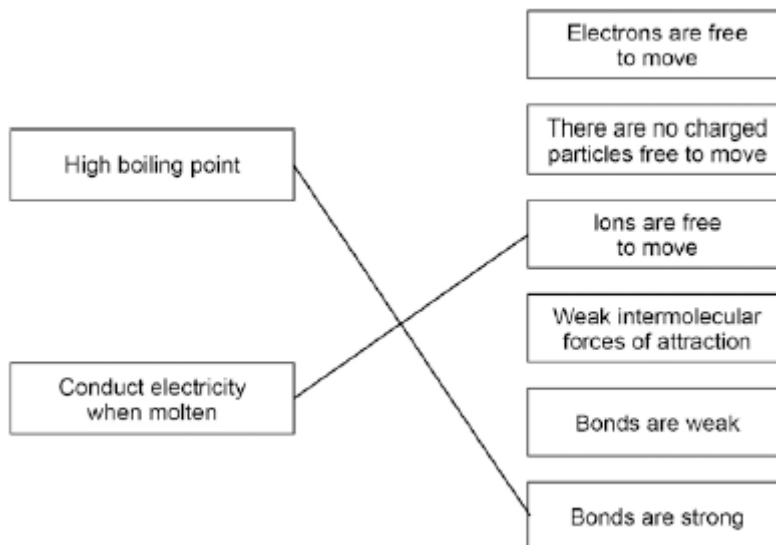
more than one line drawn from a variable negates the mark

2

(f)

Property

Explanation of property



more than one line drawn from a variable negates the mark

2

[14]

M2.(a) The forces between iodine molecules are stronger 1

(b) anything in range +30 to +120 1

(c) Brown 1

(d) $2 \text{I}^- + \text{Cl}_2 \rightarrow \text{I}_2 + 2 \text{Cl}^-$ 1

(e) It contains ions which can move 1

(f) hydrogen iodine 1

[6]

- M3.(a)** giant structure / lattice / layers / close packed
first 3 marks can be obtained from a suitably labelled diagram
incorrect structure or bonding or particle = max 3 1
- made up of atoms / positive ions 1
- with delocalized / free electrons 1
- so electrons can move / flow through the metal
accept so electrons can carry charge through the metal
accept so electrons can form a current 1
- (b) an alloy (is a metal which) has different types / sizes of atoms
accept converse for pure metal throughout
both marks can be obtained from suitable diagrams
allow made of different metals
allow mixture of metals / atoms / elements
ignore particles
ignore properties
*do **not** accept compound* 1
- alloy has distorted layers
allow layers are unable to slide 1
- (c) (i) can return to its original shape
accept shape memory alloy
accept smart alloy
ignore other properties 1
- (ii) (pure copper is too) soft
accept converse
accept malleable or bends
accept copper is running out
ignore references to strength and weakness 1

(iii) aluminium oxide

accept alumina

accept Al_2O_3

ignore bauxite / aluminium ore

1

(iv) any **one** from:

- different conditions

- different catalyst

- different pressure

allow different concentration

- different temperature.

*do **not** accept different monomers*

1

(d) any **two** from:

- accurate

- sensitive

- rapid

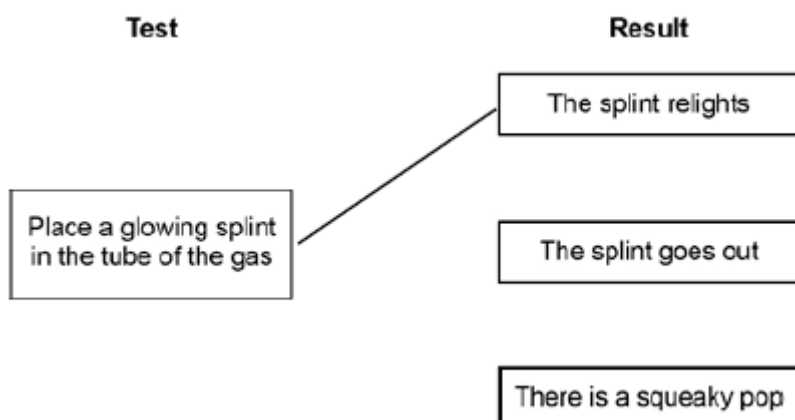
- small sample.

both needed for 1 mark

1

[11]

M4.(a)



more than one line from test negates the mark

1

(b) (i) place a lighted splint at the mouth of the tube

1

there is a squeaky pop
dependent on correct test

1

(ii) hydrogen is less reactive than magnesium
accept converse
accept magnesium is too reactive

1

(c) (i) any **one** from:

- to improve appearance or make it look nice
- to prevent corrosion
- to make it more durable
- cheaper than solid silver

1

(ii) solution must be silver nitrate **or** contain silver ions

1

otherwise copper will be deposited **or** silver will not be deposited

1

spoon must be the negative electrode / cathode

1

because silver ions have a positive charge **or** go to negative electrode **or** are discharged at the negative electrode.

1

(iii) because (plastic is an) insulator **or** does not conduct electricity
accept does not contain mobile electrons

1

[10]

M5.(a) (Chromium =) 20

in correct order

1

(Nickel =) 8

accept Chromium = 8 and Nickel = 20 for 1 mark

1

(b) (i) (because iron is made up of only) one type of atom

1

(ii) not strong

allow too soft or too flexible

accept it rusts / corrodes or that it could wear away

accept could change shape / bend

accept layers / atoms could slide (over each other)

1

(iii) structure is different / distorted / disrupted

accept not in layers or not regular

1

so it is difficult for layers / atoms / particles to slip / slide (over each other)

accept layers cannot slip / slide

1

[6]

M6. (a) (i) covalent
two different answers indicated gains 0 marks 1

(ii) carbon
two different answers indicated gains 0 marks 1

(iii) 3
two different answers indicated gains 0 marks 1

(b) layers can slide / slip 1

because there are no bonds between layers
accept because weak forces / bonds between layers

or so (pieces of) graphite rubs / breaks off

or graphite left on the paper 1

[5]

- M7.** (a) • made of layers / rows (atoms / ions / particles)
ignore free / delocalised electrons 1
- which can slide / slip (over each other)
reference to incorrect particles / covalency / intermolecular forces
= max 1
- or**
- particles / ions / atoms can slide over each other
ignore malleable / ductile / weak bonds 1
- (b) (i) sulfuric
accept sulphuric
ignore formula
ignore hydrogen sulfate 1
- (ii) any **two** from:
list principle applies for incorrect observations
- (hydrogen) gas produced (or any indication of a gas such as bubbles etc.)
ignore just hydrogen produced
ignore cloudiness / colour changes
 - magnesium / solid disappears / goes into solution
accept magnesium / magnesium sulfate / solid / it dissolves
accept forms a liquid / solution
 - gets hot
allow exothermic
ignore floats 2

(iii) crystallisation

accept detailed answers such as: evaporate to half volume and then allow the solution to crystallise.

or

evaporation / heating / boiling / cooling

ignore any references to filter

1

[6]