



# **KS3 Science**

## **Periodic Table**

### **Mark Scheme**

**Time available: 41 minutes**

**Marks available: 48 marks**

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## Mark schemes

1.

(a) steel

*do **not** accept 'stainless steel'*  
*do **not** accept 'carbon'*

1 (L5)

(b) • brass

• solder

*answers may be in either order*  
*both answers are required for the mark*

1 (L5)

(c) 80

*accept '100 – 20'*

1 (L5)

(d) (i) it does not contain iron

*accept 'it does not contain steel'*

*accept 'only iron rusts' **or** 'only steel rusts'*

*accept 'it is made of tin, copper and zinc'*

1 (L6)

(ii) oxygen

*accept 'O<sub>2</sub>'*

1 (L6)

[5]

2.

(a) hydrogen

1 (L6)

(b) (i) region 3

1 (L6)

(ii) region 1

1 (L6)

(iii) region 2

1 (L6)

(c) any **one** from

- it is a compound
- it is not an element
- it is made up of more than one element

*do **not** accept 'it is **not** a single substance'*

1 (L5)

- (d) (i) copper + iron sulphate  
*answers may be in either order*  
**both** are required for the mark  
 1 (L6)
- (ii) the nail becomes brown **or** pink **or** copper coloured  
*accept 'it is covered in copper'*  
*accept 'it is rust coloured'*  
*do **not** accept 'it goes rusty'*  
 1 (L6)

[7]

3.

- (a) (i) calcium hydroxide  
 1
- (ii) alkaline  
*accept 'strongly alkaline'*  
 1
- (b) (i) any **one** from
- because bond strength is less than that of HBr  
**or** less than 366 kJ/mol  
*accept 'the bond is not strong enough'*
  - the bond strength is not enough to keep the atoms together  
*accept 'the thermal energy is greater than the bond strength'*
  - bond strength decreases as you go down the group  
**or** as the period increases
  - the compounds become increasingly unstable as you go down the group  
*accept 'it is unstable'*  
*accept 'iodine is formed'*
- 1
- (ii) any **one** from
- it decreases from HF to HI **or** down the group
  - it increases from HI to HF **or** up the group  
*accept 'as the period goes up the strength goes down'*
- 1
- (iii) hydrogen fluoride **or** HF  
 1

[5]

4.

- (a) the three columns on the left hand side  
*accept 'the first three columns' **or** 'on the left'*  
 1 (L7)

- (b) Na 1 (L7)
- Cl 1 (L7)
- (c) magnesium sulphide  
*do not accept 'magnesium sulphite'*  
*or 'magnesium sulphate'* 1 (L7)
- (d) any **one** from
- hydrogen
  - nitrogen
  - oxygen
  - fluorine
  - chlorine
- do not accept symbols* 1 (L7)

[5]

5.

- (a) any **two** from:
- react with water **or** very reactive
  - (react with water) releasing gas / hydrogen / fizzing
  - (react with water) to form an alkaline / hydroxide solution
  - form ions with a 1+ charge  
*allow lose one electron from the outer shell*  
*ignore other references to electronic structure*  
*ignore physical properties*

2

(b) any **three** from:

- some boxes contain two elements  
*allow specific examples:  
Co, Ni or Ce, La or Di, Mo or Ro, Ru or Ba, V or Pt, Ir*
- groups / columns contain elements with different properties  
*allow groups / columns contain both metals and non-metals  
ignore examples*
- Newlands not a well-known / respected scientist  
*ignore references to sugar factory*
- new idea (not readily accepted by other scientists)  
*allow musical scales thought to be silly by some scientists*

3

(c) one for improvement **and** one for explanation from:

- left gaps (for undiscovered elements) (1)
  - so that elements were in their correct group (1)  
*allow so the elements fitted the pattern of properties*
- or**
- did not always follow order of relative atomic weights / masses (1)  
*ignore references to atomic number / electronic structure*
  - so that elements were in their correct group (1)  
*allow so the elements fitted the pattern of properties*

2

[7]

6.

(a) groups

1

(b) it is a non-metal

*allow it is not a metal*

1

(c) to the right of column 7 / Group 7

*accept in Group 0*

*ignore Group 8 / noble gases*

1

(d) (atomic) number

*allow proton number*

1

[4]

**7.**

- (a) (i) E 1
- (ii) B 1
- (iii) C 1
- (iv) A 1
- (b) (i) quickly melted  
*allow melts in contact with water,*  
*allow bp 100 °C (of water) shows mp is low*  
*ignore one other piece of information* 1
- (ii) easily cut  
*ignore one other piece of information* 1
- (iii) effervescence / fizzing / bubbling  
*ignore named gas*  
*ignore one other piece of information* 1

**[7]**

**8.**

- (a) Mendeleev 1
- (b) groups 1
- (c) undiscovered 1
- (d) compound 1

**[4]**

9.

(a) **answers should convey the idea that fertilisers are needed to replace the nutrients used up by the plants**

any **one** from

- as the plant grows, nutrients are used up
- to replace the nutrients **or** minerals used by the plant  
*do **not** accept 'soil in the pot contains a limited amount of nutrients'*

1

(b) (i) P: phosphorus

1

K: potassium

1

(ii) K

*do **not** accept 'potassium'*

1

**[4]**