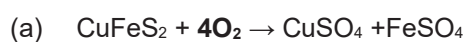


## Mark schemes

**Q1.***allow multiples**allow O<sub>2</sub> for 1 mark*

2

(b)  $(M_r = 63.5 + 56 + (2 \times 32) =) 183.5$

1

$$(\% \text{ of copper} =) \frac{63.5}{183.5} \times 100$$

*allow correct use of incorrectly determined M<sub>r</sub>*

1

$$= 34.6 (\%)$$

*allow 34.60490 correctly rounded to at least 2 significant figures*

1

(c) (test) (add) sodium hydroxide (solution)

1

(result) blue precipitate

**OR**

(test) flame test (1)

(result) green (flame) (1)

*allow blue-green (flame)*

1

*MP2 is dependent upon MP1 being awarded*

(d) (the use of) bacteria

1

to produce leachate solutions (that contain metal / copper compounds)

1

**[9]**

**Q2.**

- (a) screening  
**or**  
 grit removal  
*allow filtering to remove (large) solids* 1
- sedimentation (to produce sewage sludge and effluent) 1
- anaerobic digestion of (solid sewage) sludge 1
- aerobic biological treatment of (liquid) effluent  
*allow aerobic digestion of effluent* 1  
*allow a description of each process*
- (b)  $\text{Na}^+ : 0.003 \text{ mol/dm}^3$   $\text{Cl}^- : 0.003 \text{ mol/dm}^3$  1
- (c) the ions pass through the filter  
*allow the ions are not trapped / removed by the filter* 1
- (because) the ions are in solution  
*allow (because) the ions are smaller than the filter pores* 1
- (d) (the ground water) contains microbes which are harmful (to health) 1
- (so) the water is sterilised  
**or**  
 (so) the microbes are destroyed 1
- (e) (the water is) unadulterated  
**or**  
 (the water is) in its natural state  
*allow nothing is added (to the water)*  
*allow (the water) contains no microbes* 1
- (f) (use) damp litmus paper 1
- (the paper) is bleached  
**or**  
 (the paper) turns white  
*ignore paper turns red* 1  
*MP2 is dependent upon MP1*

**[12]**