Mark schemes

Q1.

(a) $CuFeS_2 + \mathbf{4O_2} \rightarrow CuSO_4 + FeSO_4$

allow multiples

*allow O_2 for **1** mark*

2

(b) (M_r = 63.5 + 56 + (2 x 32) =) 183.5

1

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

allow correct use of incorrectly determined M_r

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

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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) Na^+ : 0.003 mol/dm^3 Cl^- : 0.003 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]