

PERCENTAGE BY MASS

- 1** Tin is a metallic element in Group IV. Its main ore is cassiterite which is an impure form of tin(IV) oxide, SnO_2 .
Tin also occurs in stannite, $\text{Cu}_2\text{FeSnS}_4$.

(a) Calculate the relative formula mass, M_r , of $\text{Cu}_2\text{FeSnS}_4$.

M_r of $\text{Cu}_2\text{FeSnS}_4$ = [1]

(b) The M_r of SnO_2 is 151.

Calculate the percentage of tin by mass in SnO_2 .

percentage of tin by mass in SnO_2 = [1]

(c) The percentage of tin by mass in $\text{Cu}_2\text{FeSnS}_4$ is 27.6%.

Use this information and your answer to (b) to suggest whether it would be better to extract tin from SnO_2 or $\text{Cu}_2\text{FeSnS}_4$.
Explain your answer.

.....
..... [1]

(d) Tin can be extracted by heating tin(IV) oxide with carbon. Carbon monoxide is the other product.

Write a chemical equation for this reaction.

..... [2]

MARKING SCHEME:

(a)	$[(64 \times 2) + 56 + 119 + (32 \times 4)] =]$ 431	1
(b)	$[(119 / 151) \times 100 =]$ 78.8 (%)	1
(c)	SnO ₂ because the percentage of tin is larger in SnO ₂ or answer to (b) > 27.6 %	1
(d)	SnO ₂ + 2C → Sn + 2CO M1 all formulae correct M2 equation fully correct	2