

**AS Level Chemistry A**  
**H032/01 Breadth in chemistry**

**Question Set 13**

1. This question is about elements from the p-block of the periodic table.

(a) Silicon exists as a mixture of three isotopes,  $^{28}\text{Si}$ ,  $^{29}\text{Si}$  and  $^{30}\text{Si}$ .

(i) Complete the table to show the atomic structure of  $^{30}\text{Si}$ .

	Protons	Neutrons	Electrons
$^{30}\text{Si}$	.....	.....	.....

[1]

(ii) A sample of silicon is analysed by mass spectrometry.

The mass spectrum shows peaks with the relative abundances below.

- $^{28}\text{Si}$  92.23%
- $^{29}\text{Si}$  4.68%
- $^{30}\text{Si}$  3.09%

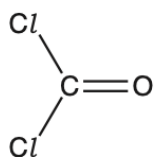
Calculate the relative atomic mass of silicon in the sample.

Give your answer to **two** decimal places.

[2]

(b) Phosgene,  $\text{COCl}_2$ , exists as simple molecules.

The displayed formula of a phosgene molecule is shown below.



(i) Draw a 'dot-and-cross' diagram of a phosgene molecule.

Show outer electrons only.

[1]

(ii) Name the shape of a phosgene molecule and explain why it has this shape.

[3]

(c) Why are silicon, carbon, oxygen and chlorine all classified as p-block elements?

[1]

**Total Marks for Question Set 13: 8**

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