

6 (a) Thin-layer and gas/liquid chromatography can be used to separate mixtures into their individual components.

(i) Define the following terms used in chromatography.

$R_f$  value .....

.....

retention time .....

.....

[2]

(ii) Each type of chromatography makes use of a stationary phase and a mobile phase.

Complete Table 6.1 with a description of each of these.

Table 6.1

	stationary phase	mobile phase
thin-layer chromatography	X	
gas/liquid chromatography		X

[1]

(b) A mixture of two substances **A** and **B** is analysed by thin-layer chromatography.

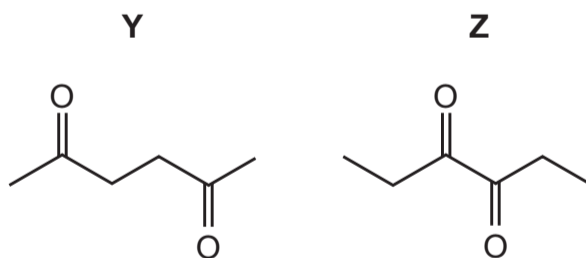
The  $R_f$  value of substance **A** is larger than that of substance **B**.

Suggest why substance **A** has a larger  $R_f$  value.

.....

..... [1]

(c) The two isomeric compounds **Y** and **Z** are analysed by proton ( $^1\text{H}$ ) NMR spectroscopy.



(i) Complete Table 6.2 to predict the number of peaks observed in the proton ( $^1\text{H}$ ) NMR spectra for **Y** and **Z**.

Table 6.2

compound	number of peaks observed
<b>Y</b>	
<b>Z</b>	

[1]

(ii) Name **all** the different splitting patterns observed in the proton ( $^1\text{H}$ ) NMR spectra for **Y** and **Z**.

**Y** .....

**Z** .....

[2]

[Total: 7]