

3 The particles in the different states of matter behave differently.

(a) Draw a straight line linking each state of matter with the description of its particles.

(2)

**state of matter**

solid ●

liquid ●

gas ●

**description of particles**

● close together, moving about and  
can slide past one another

● far apart, moving quickly and at  
random

● close together, vibrating about  
fixed positions

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(b) Ethyne is a substance that is a gas at room temperature.

At a temperature of  $-81^{\circ}\text{C}$ , ethyne can exist as a solid, a liquid or a gas.

This temperature is called the triple point of ethyne.

(i) Complete the table by giving the missing temperatures.

(2)

	Temperature in $^{\circ}\text{C}$	Temperature in kelvin
room temperature		291
triple point of ethyne	$-81$	

(ii) State what happens to the average kinetic energy of the gas molecules as the temperature is lowered from room temperature to the triple point of ethyne.

(1)

(iii) State what happens to the volume of an ethyne molecule when the gas changes to a solid at the triple point.

(1)

(Total for Question 3 = 6 marks)

