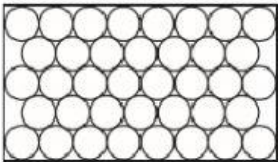
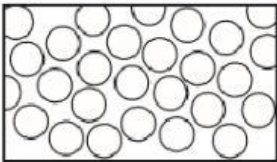
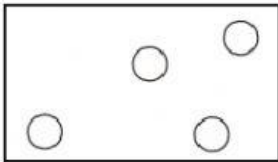


1.1 States of Matter

Multiple Choice Questions

1.	<p>In which changes do the particles move further apart?</p> $\text{gas} \begin{matrix} \xrightarrow{W} \\ \xleftarrow{Y} \end{matrix} \text{liquid} \begin{matrix} \xrightarrow{X} \\ \xleftarrow{Z} \end{matrix} \text{solid}$ <p>A. W and X B. W and Z C. X and Y D. Y and Z</p>
2.	<p>Diagrams X, Y and Z represent the three states of matter.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>X</p>  </div> <div style="text-align: center;"> <p>Y</p>  </div> <div style="text-align: center;"> <p>Z</p>  </div> </div> <p>Which change occurs during boiling?</p> <p>A. X to Y B. Y to Z C. Z to X D. Z to Y</p>
3.	<p>Which change of state takes place during evaporation?</p> <p>A. gas to liquid B. liquid to gas C. liquid to solid D. solid to gas</p>
4.	<p>In which process do particles move closer together but remain in motion?</p> <p>A. condensation B. diffusion C. evaporation D. freezing</p>
5.	<p>The changes that occur when a substance changes state are shown below.</p> $\text{gas} \begin{matrix} \xrightarrow{W} \\ \xleftarrow{Y} \end{matrix} \text{liquid} \begin{matrix} \xrightarrow{X} \\ \xleftarrow{Z} \end{matrix} \text{solid}$ <p>Which process, W, X, Y or Z, is occurring in the following four situations?</p> <ol style="list-style-type: none"> Butter melts on a warm day. Water condenses on a cold surface. The volume of liquid ethanol in an open beaker reduces. Ice forms inside a freezer.

		1	2	3	4
A		W	X	Y	Z
B		W	Y	X	Z
C		X	Y	Z	W
D		X	Z	Y	W

6. An attempt was made to compress gas and a solid using the apparatus shown.

Which substance would be compressed and what is the reason for this?

	substance	reason
A	gas	the gas particles are close together
B	gas	the gas particles are far apart
C	solid	the solid particles are close together
D	solid	the solid particles are far apart

7. The diagram shows a cup of tea.

Which row describes the water particles in the air right above the cup compared with the water particles in the cup?

	moving faster	closer together
A	✓	✓
B	✓	x
C	x	✓
D	x	x

8. What are the processes W, X, Y and Z in the following diagram?

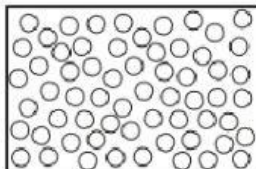
$$\begin{array}{ccccc}
 & W & & X & \\
 \text{solid} & \rightleftharpoons & \text{liquid} & \rightleftharpoons & \text{gas} \\
 & Y & & Z &
 \end{array}$$

	W	X	Y	Z
A	condensing	boiling	freezing	melting
B	condensing	freezing	melting	boiling
C	melting	boiling	freezing	condensing
D	melting	freezing	condensing	boiling

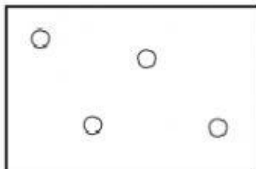
9. In which substance are the particles close together and slowly moving past each other?

A. air
B. ice
C. steam
D. water

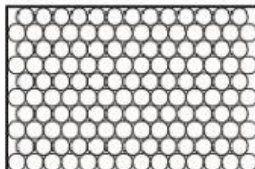
10. The diagrams show the arrangement of particles in three different physical states of substance X.



state 1



state 2



state 3

Which statement about the physical states of substance X is correct?

A. Particles in state 1 vibrate about fixed positions.
B. State 1 changes to state 2 by diffusion.
C. State 2 changes directly to state 3 by condensation.
D. The substance in stage 3 has a fixed volume.

Answer:

1		6	
2		7	
3		8	
4		9	
5		10	

Theory

1. (E) Kinetic theory explains the properties of matter in terms of the arrangement and movement of particles.

(a) Nitrogen is a gas at room temperature. Nitrogen molecules, N_2 , are spread far apart and move in a random manner at high speed.

(i) Compare the movement and arrangement of the molecules in solid nitrogen to those in nitrogen gas. [3]

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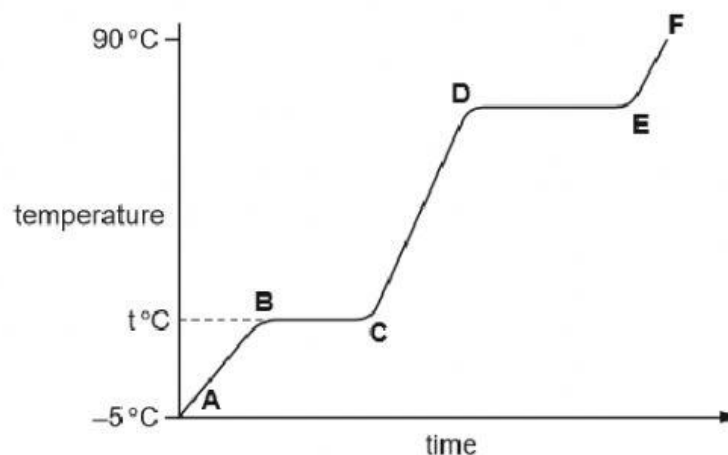
(b) A sealed container contains nitrogen gas. The pressure of the gas is due to the molecules of the gas hitting the walls of the container.

Use the kinetic theory to explain why the pressure inside the container increases when the temperature is increased. [2]

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2. Compound X is a colourless liquid at room temperature.

a) A sample of pure X was slowly heated from -5.0°C , which is below its melting point, to 90°C , which is above its boiling point. Its temperature is measured every minute and the results are represented on the graph.



(i) Complete the equation for the equilibrium present in the region BC.
 $X(s) \leftrightarrow \dots\dots\dots$ [1]

(ii) What is the significance of temperature $t^\circ\text{C}$?

..... [1]

	<p>(iii) What is the physical state of compound X in the region EF? [1]</p> <p>(iv) What would be the difference in the region BC if an impure sample of X had been used? [1]</p>
3.	<p>The diagram shows a heating curve for a sample of compound X.</p> <p>a) Is X a solid, a liquid or a gas at room temperature, 20 °C? [1]</p> <p>b) Write an equation for the equilibrium which exists in region BC. [2]</p> <p>c) Name the change of state which occurs in region DE. [1]</p> <p>d) Explain how the curve shows that a pure sample of compound X was used. [2]</p>