Entropy

Activity 1: Two Truths and a Lie

Question Group 1

Question 1

For synthesis reactions in which elements combine to form more complex compounds, the entropy decreases.
A system in which the components are highly-dispersed or randomly scattered is a low-entropy system.
A gas has a higher entropy than the liquid from which it was formed.

Question 2

The change of a system from a highly-structured state to a highly-disordered represents a decrease in entropy.
A system in which the components are highly-dispersed or randomly scattered is a high-entropy system.
A liquid has a higher entropy than the solid from which it was formed.

Question 3

The dissolving of a solid represents an increase in entropy since the components of the solid become dispersed about the solution.
A gas has a higher entropy than the liquid from which it was formed.
The change of a system from a highly-disordered state to a highly-structured state represents an increase in entropy.

Question Group 2

Question 4

A system in which the components are highly-ordered or structured is a low-entropy system.
A system that changes from a highly-structured state to a highly-disordered state has a positive entropy change.
A process in which the system has a positive entropy change value will always occur.

Question 5

A system that changes from a highly-structured state to a highly-disordered state has a positive entropy change.
A process in which the system has a negative entropy change value will never occur.
A gas has a higher entropy than the liquid from which it was formed.

Question 6

A process in which the entropy of the system decreases can never occur.
The mixing of two separate gases represents an increase in entropy.
A system in which the components are highly-dispersed or randomly scattered is a high-entropy system.

Question Group 3

Question 7

An increase in the temperature of a gas will increase the entropy of the system.
The mixing of two separate gas represents an increase in entropy.
Solids have zero entropy because their particles do not move.

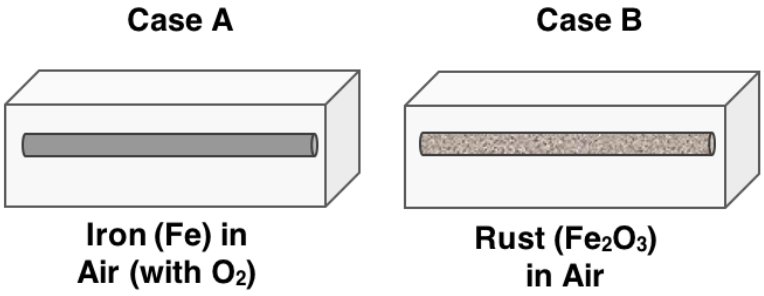
Question 8

Entropy is just a fancy chemistry term for energy; they are essentially the same thing.
For synthesis reactions in which elements combine to form more complex compounds, the entropy decreases.
A system in which the components are highly-dispersed or randomly scattered is a high-entropy system.

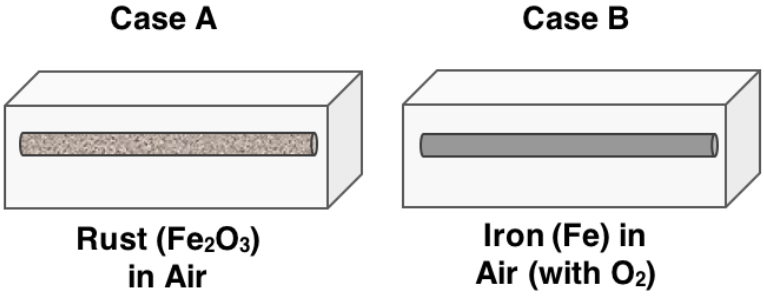
Question 9

A gas has a higher entropy than the liquid from which it was formed.
Entropy is just a fancy chemistry term for energy; they are essentially the same thing.
A system in which the components are highly-ordered or structured is a low-entropy system.

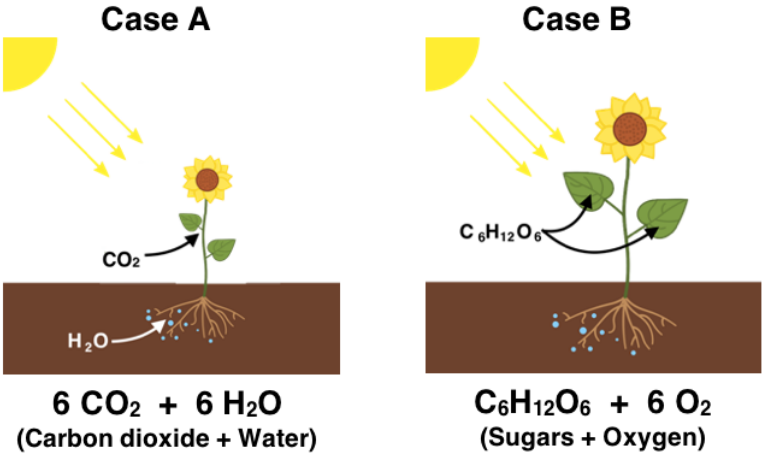
Activity 2: Case Studies
Question Group 4
Question 10
Consider the two systems described below. Which case -A or B -has the greatest entropy?



Question 11
Consider the two systems described below. Which case -A or B -has the greatest entropy?



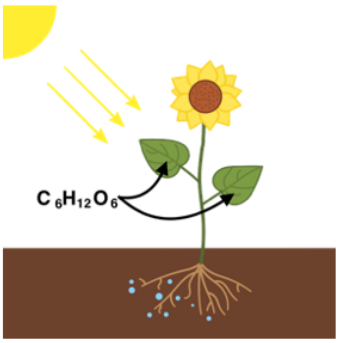
Question 12
Consider the two systems described below. Which case -A or B -has the greatest entropy?



Question 13

Consider the two systems described below. Which case -A or B -has the greatest entropy?

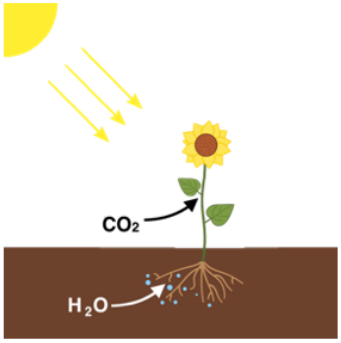
Case A



$C_6H_{12}O_6 + 6\ O_2$

(Sugars + Oxygen)

Case B



$6\ CO_2 + 6\ H_2O$

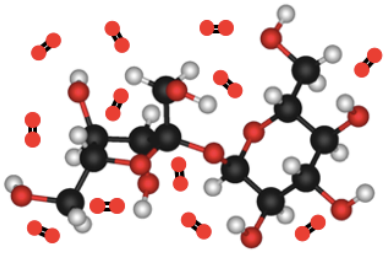
(Carbon dioxide + Water)

Question Group 5

Question 14

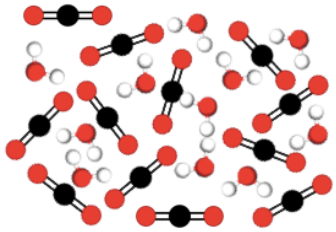
Consider the two systems described below. Which case -A or B -has the greatest entropy?

Case A



$C_{12}H_{22}O_{11} + 12\ O_2$

Case B

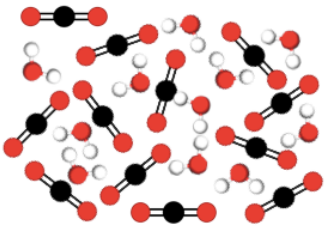


$12\ CO_2 + 11\ H_2O$

Question 15

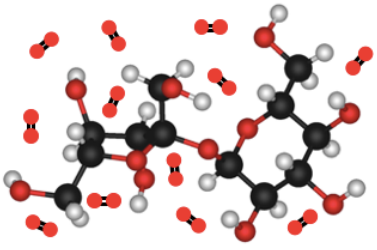
Consider the two systems described below. Which case -A or B -has the greatest entropy?

Case A



$12\ CO_2 + 11\ H_2O$

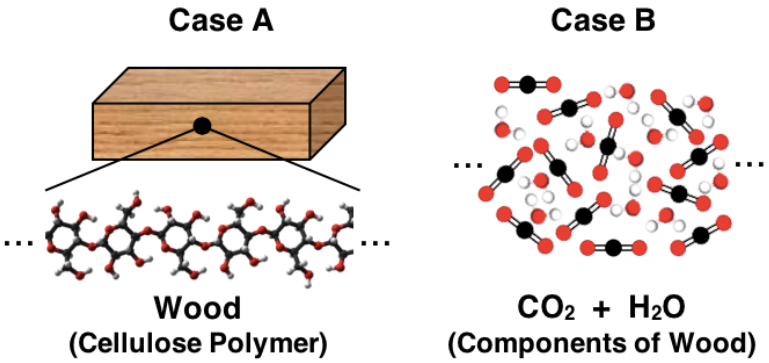
Case B



$C_{12}H_{22}O_{11} + 12\ O_2$

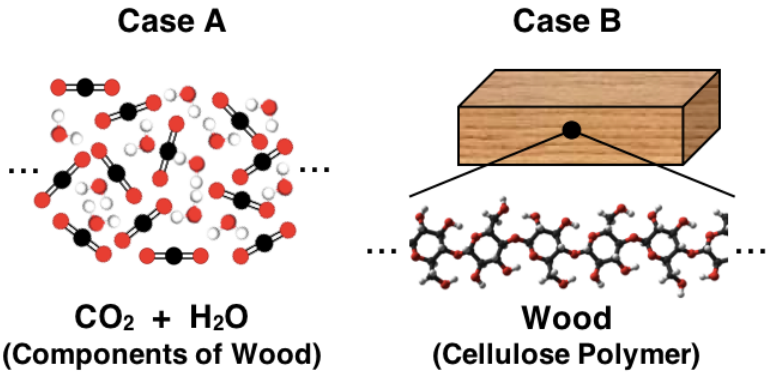
Question 16

Consider the two systems described below. Which case -A or B -has the greatest entropy?



Question 17

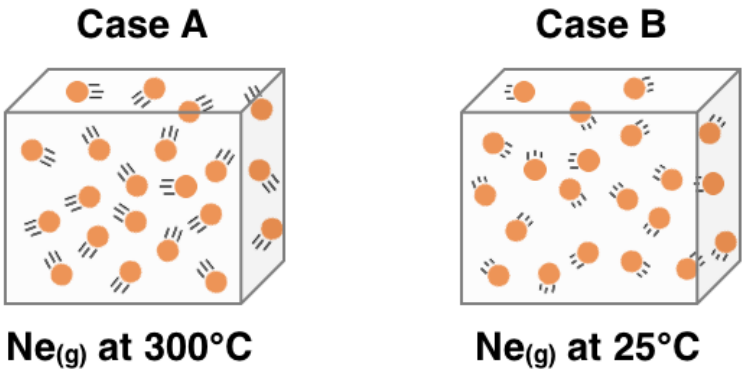
Consider the two systems described below. Which case -A or B -has the greatest entropy?



Question Group 6

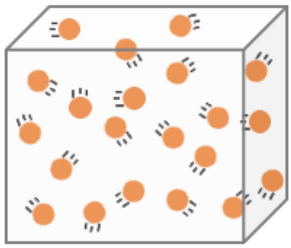
Question 18

Consider the two systems described below. Which case -A or B -has the greatest entropy?



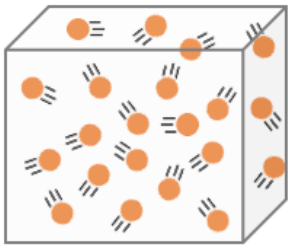
Question 19
Consider the two systems described below. Which case -A or B -has the greatest entropy?

Case A



$Ne_{(g)}$ at 25°C

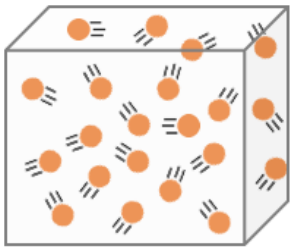
Case B



$Ne_{(g)}$ at 300°C

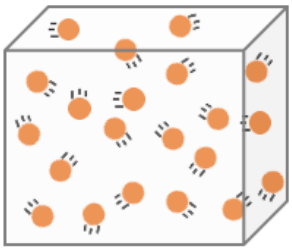
Question 20
Consider the two systems described below. Which case -A or B -has the greatest entropy?

Case A



$Ar_{(g)}$ at 300°C

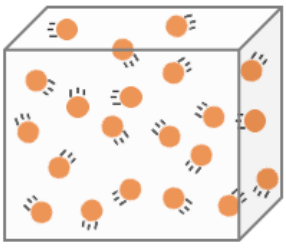
Case B



$Ar_{(g)}$ at 25°C

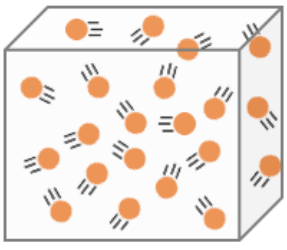
Question 21
Consider the two systems described below. Which case -A or B -has the greatest entropy?

Case A



$Ar_{(g)}$ at 25°C

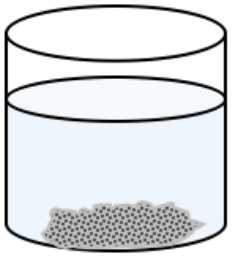
Case B



$Ar_{(g)}$ at 300°C

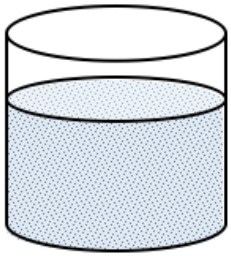
Question Group 7
Question 22
Consider the two systems described below. Which case -A or B -has the greatest entropy?

Case A



Undissolved $NaCl_{(s)}$

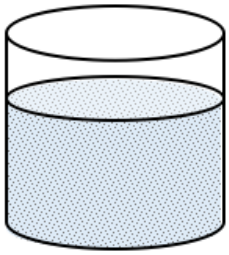
Case B



Dissolved $NaCl_{(aq)}$

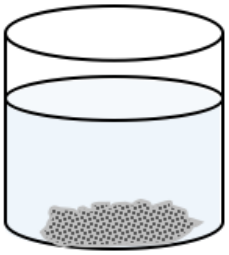
Question 23
Consider the two systems described below. Which case -A or B -has the greatest entropy?

Case A



Dissolved $NaCl_{(aq)}$

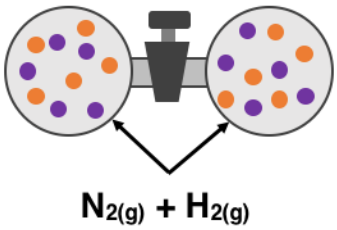
Case B



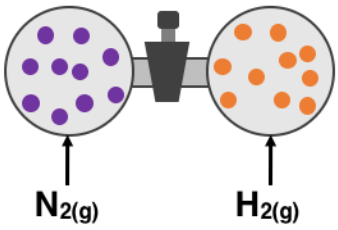
Undissolved $NaCl_{(s)}$

Question 24
Consider the two systems described below. Which case -A or B -has the greatest entropy?

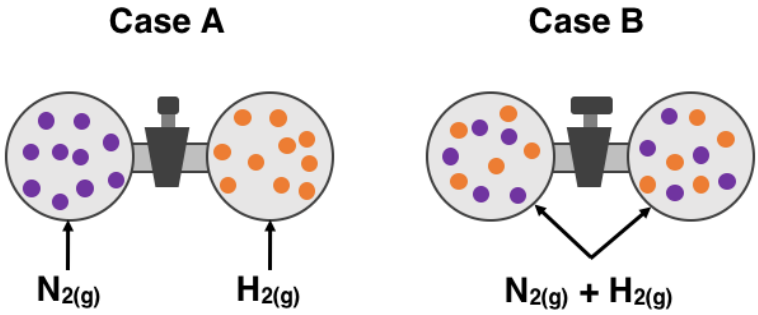
Case A



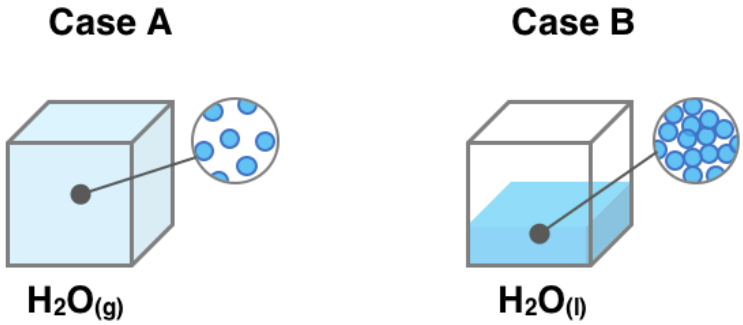
Case B



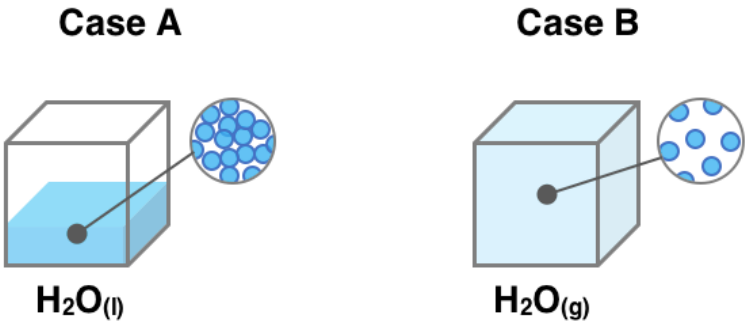
Question 25
Consider the two systems described below. Which case -A or B -has the greatest entropy?



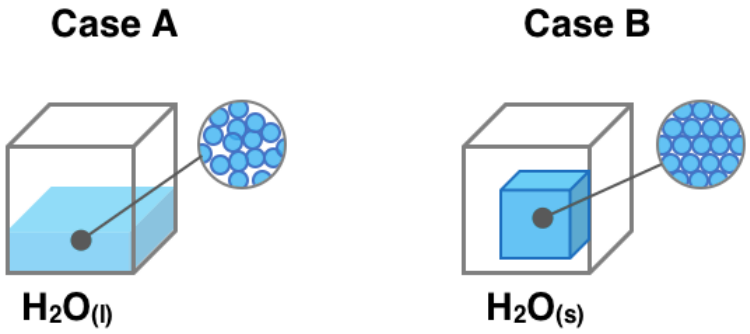
Question Group 8
Question 26
Consider the two systems described below. Which case -A or B -has the greatest entropy?



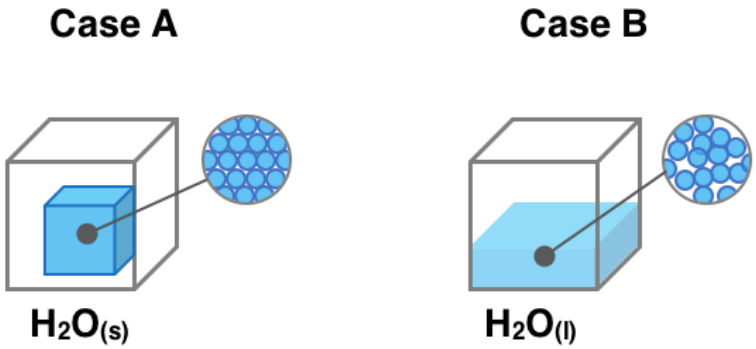
Question 27
Consider the two systems described below. Which case -A or B -has the greatest entropy?



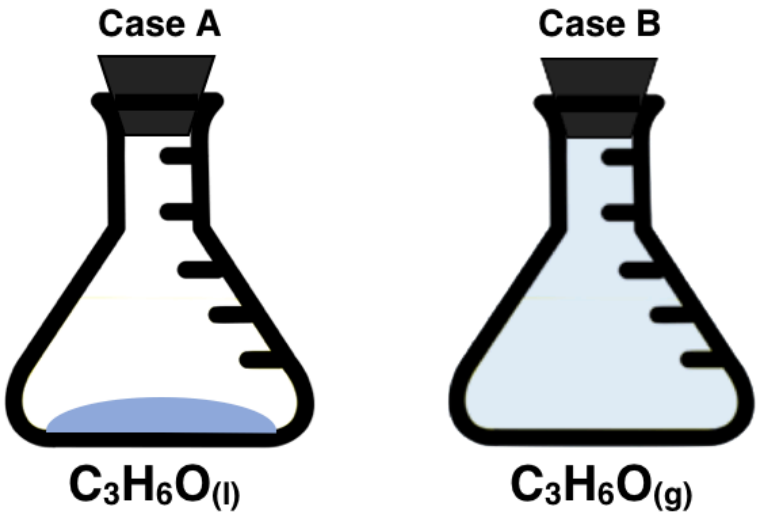
Question 28
Consider the two systems described below. Which case -A or B -has the greatest entropy?



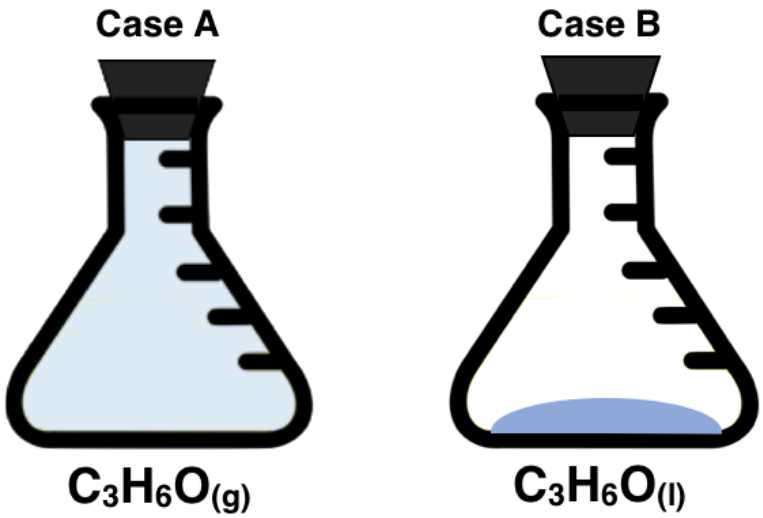
Question 29
Consider the two systems described below. Which case -A or B -has the greatest entropy?



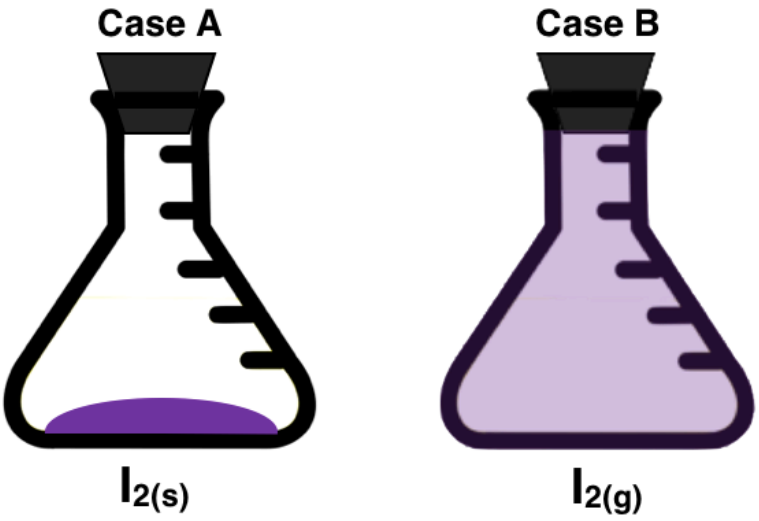
Question Group 9
Question 30
Consider the two systems described below. Which case -A or B -has the greatest entropy?



Question 31
Consider the two systems described below. Which case -A or B -has the greatest entropy?

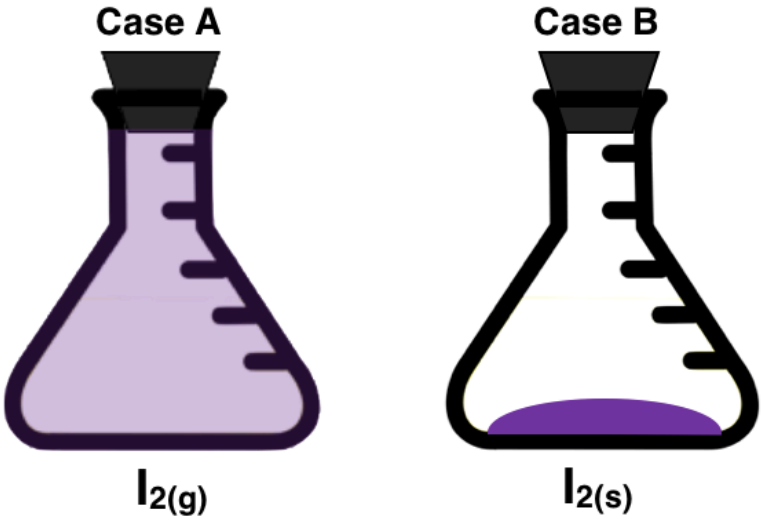


Question 32
Consider the two systems described below. Which case -A or B -has the greatest entropy?

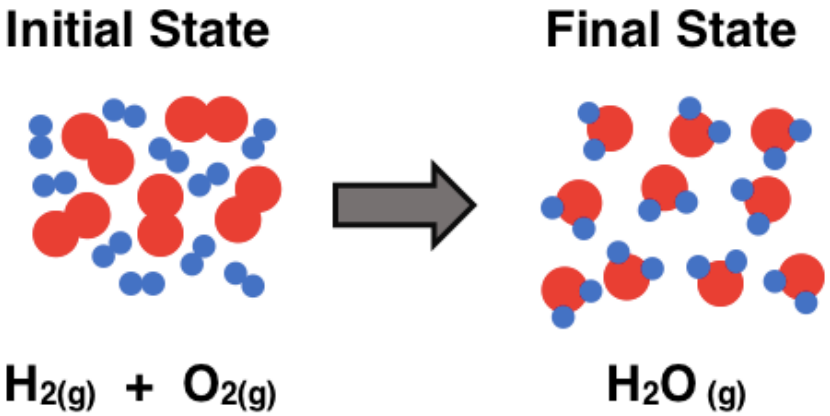


Question 33

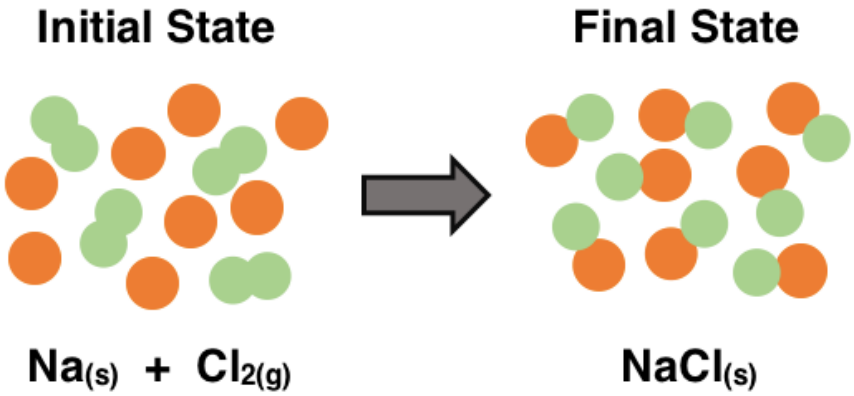
Consider the two systems described below. Which case -A or B -has the greatest entropy?



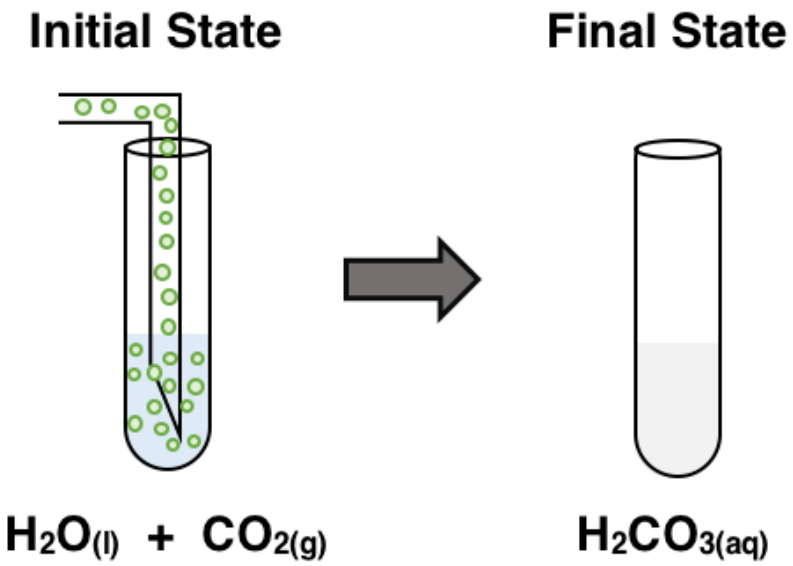
Activity 3: Entropy Changes
Question Group 10
Question 34
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



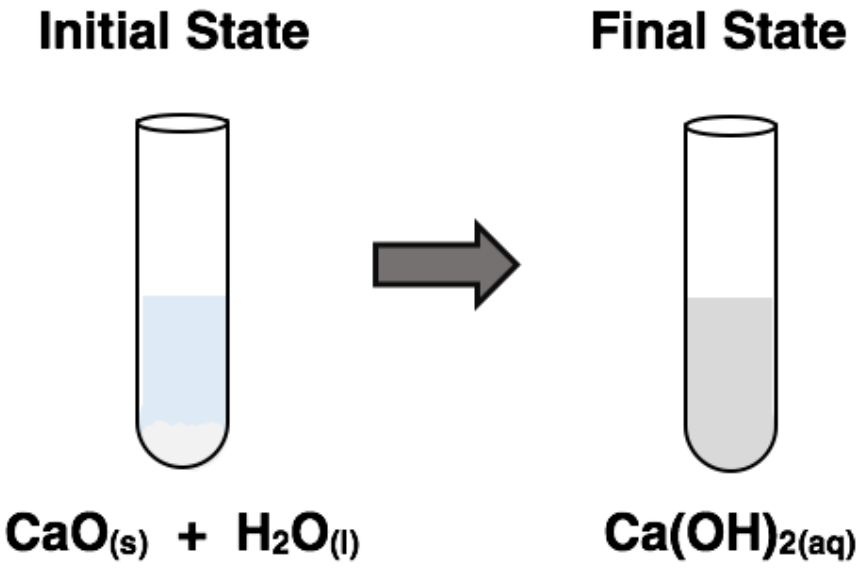
Question 35
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



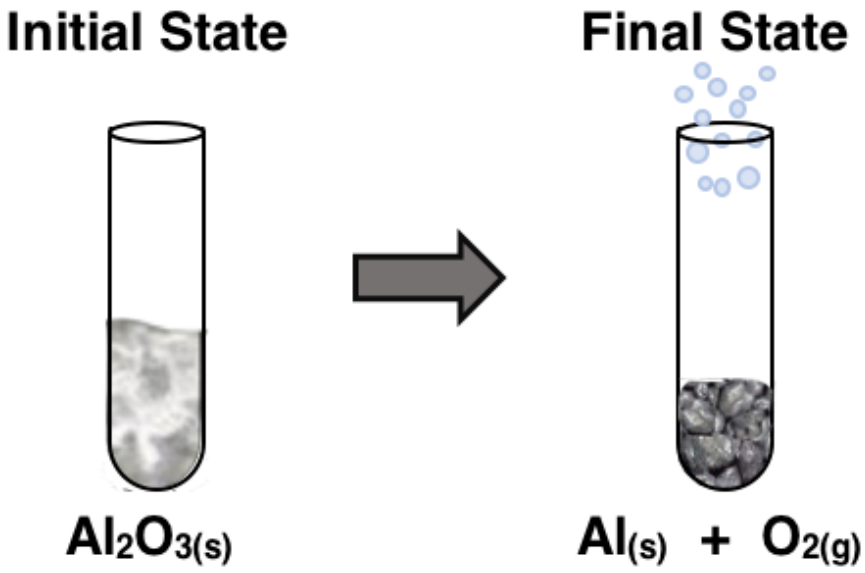
Question 36
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



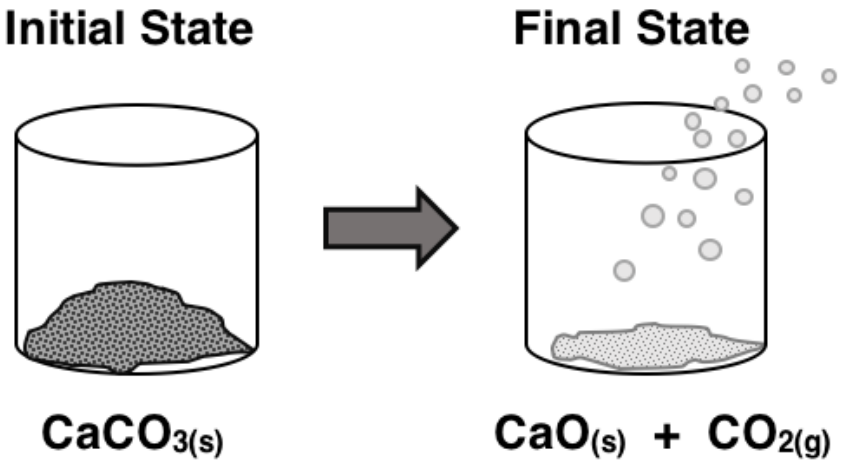
Question 37
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



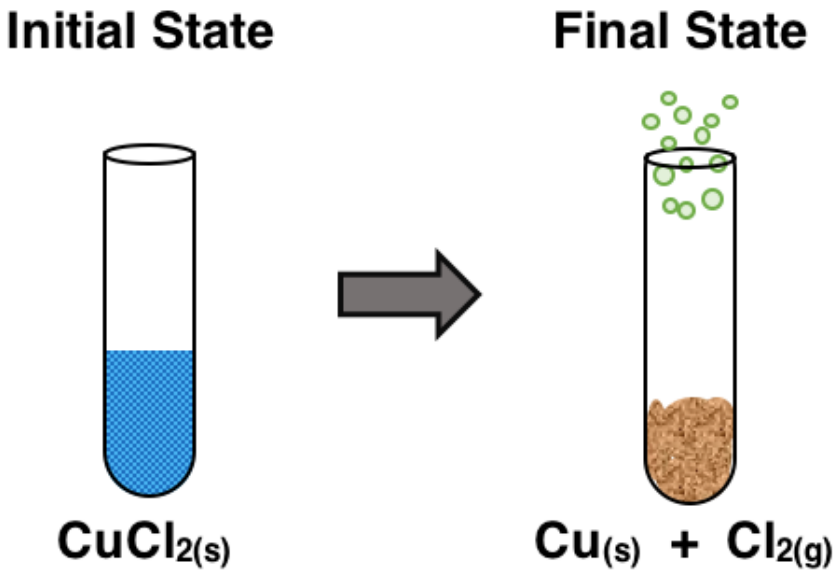
Question Group 11
Question 38
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



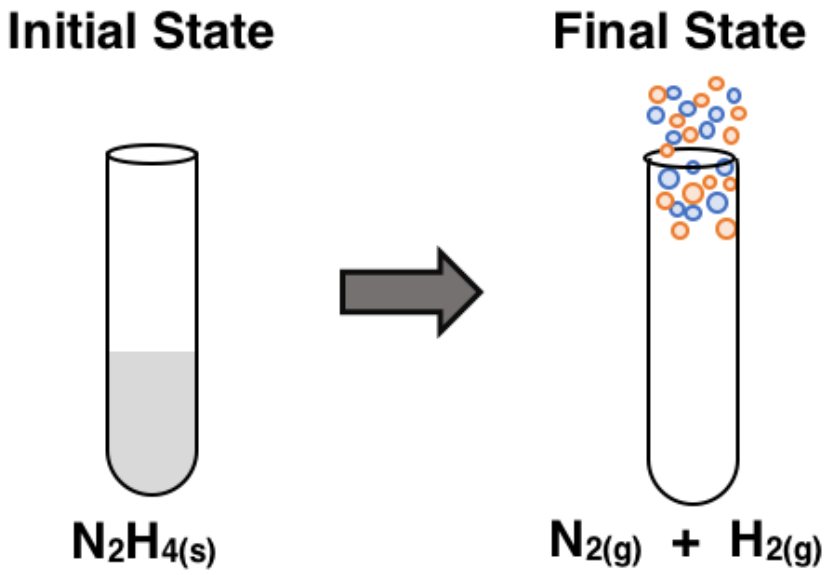
Question 39
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



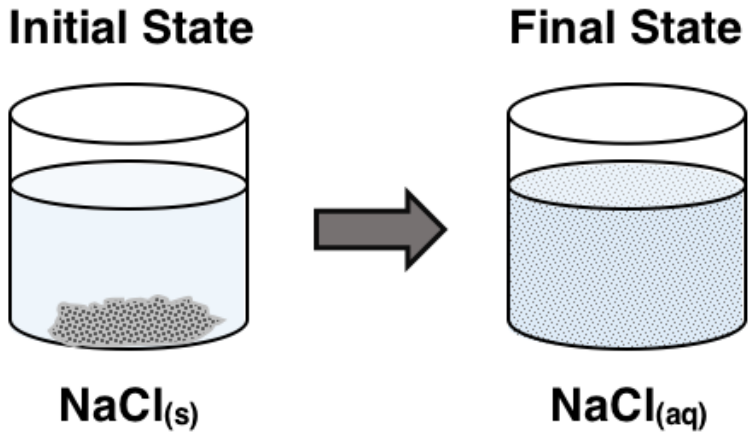
Question 40
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



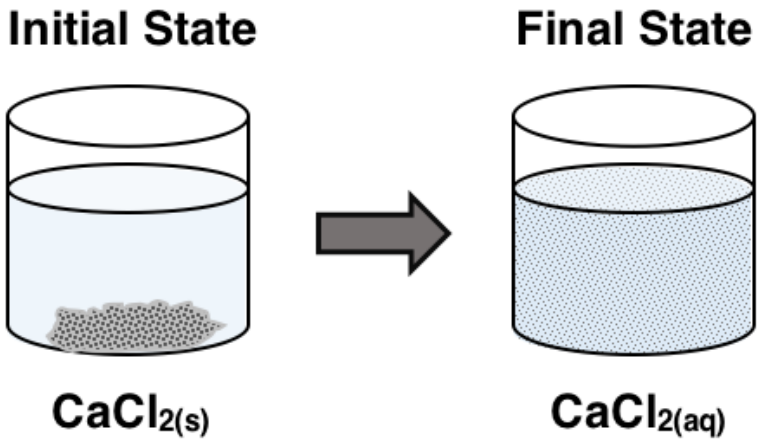
Question 41
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



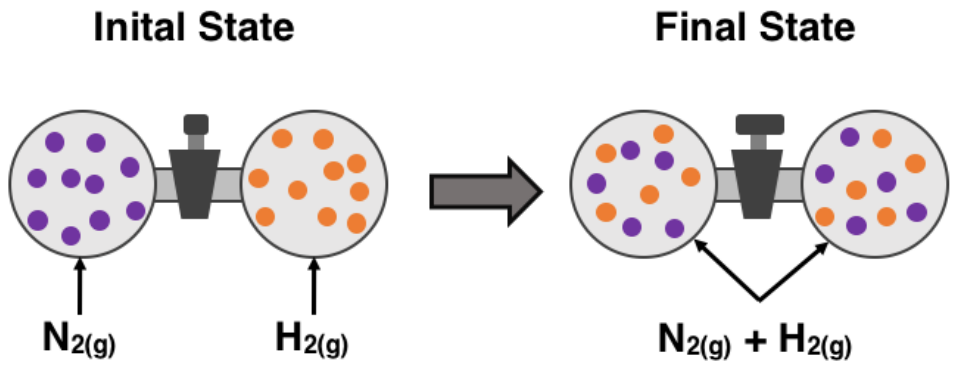
Question Group 12
Question 42
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



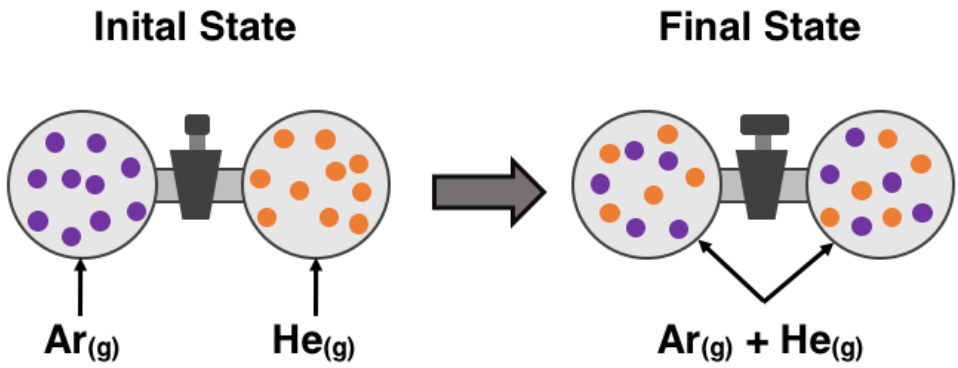
Question 43
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



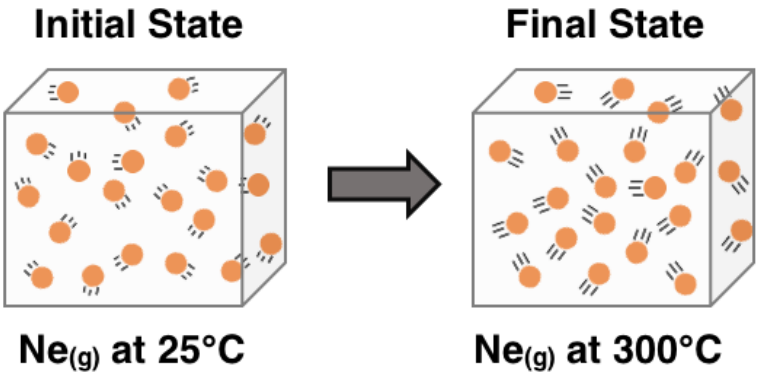
Question 44
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



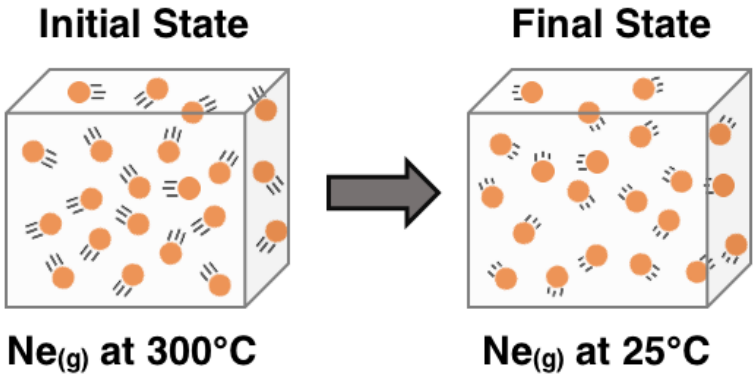
Question 45
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



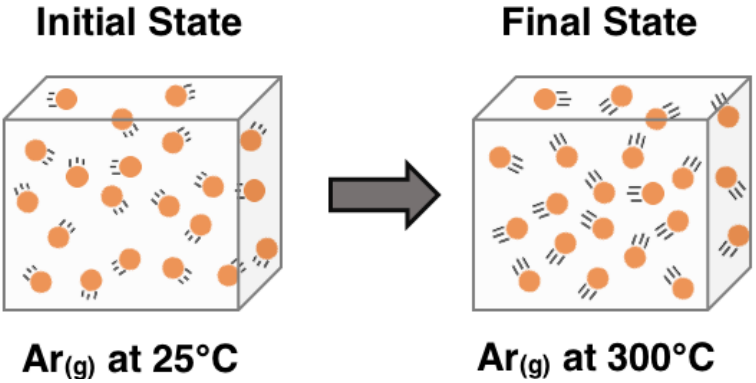
Question Group 13
Question 46
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



Question 47
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?

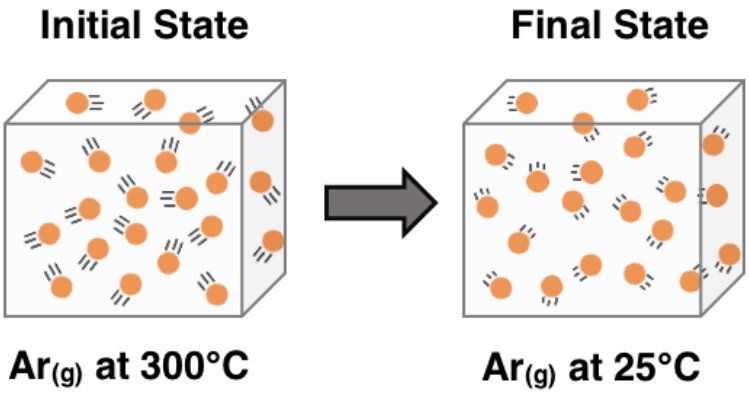


Question 48
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



Question 49

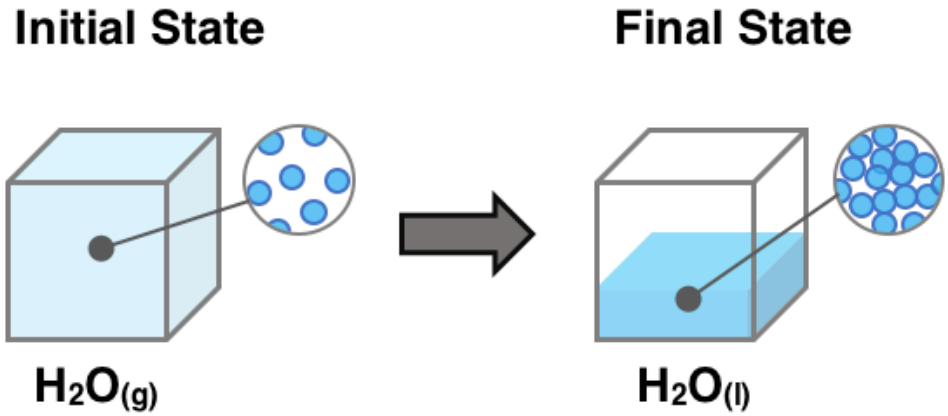
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



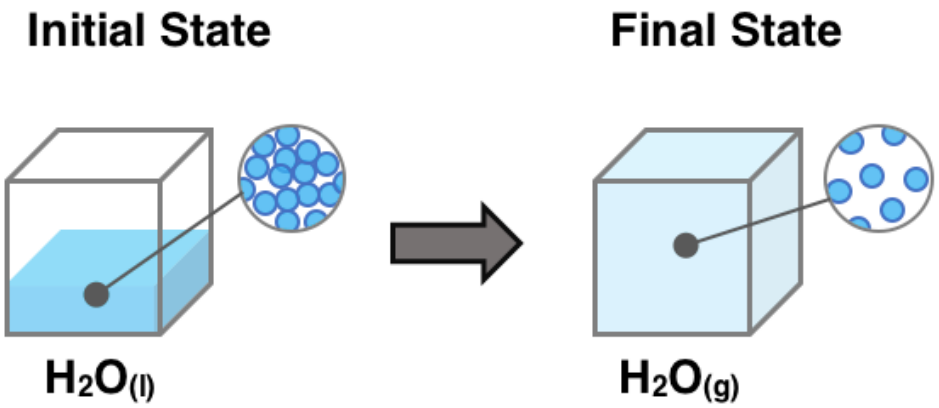
Question Group 14

Question 50

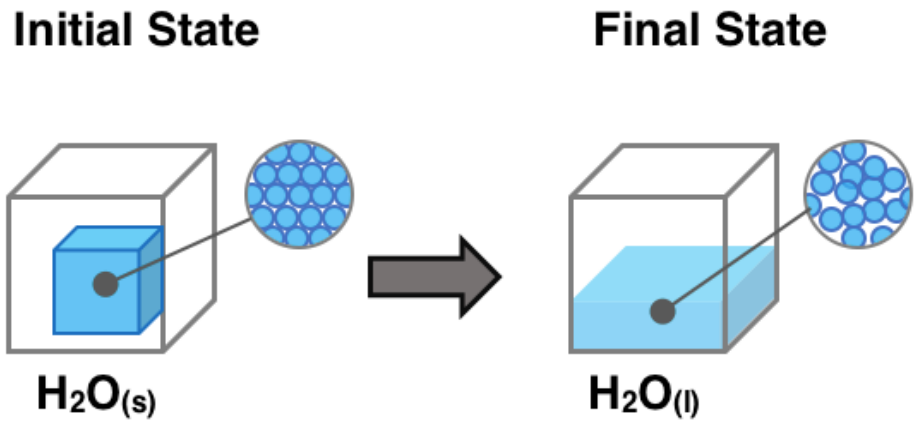
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



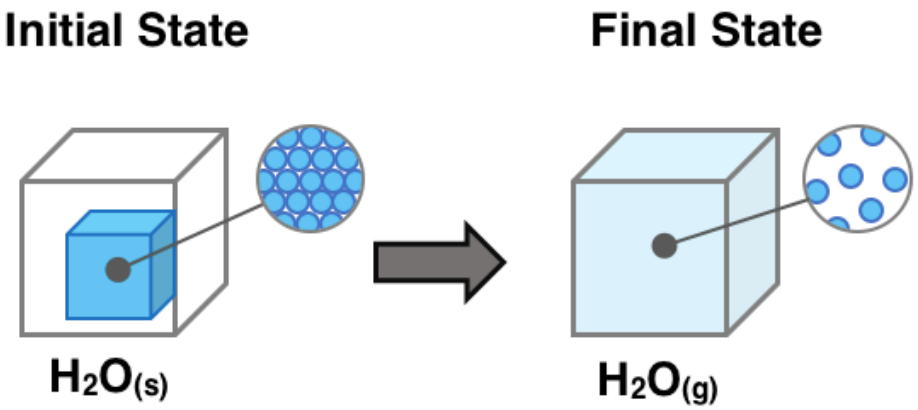
Question 51
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



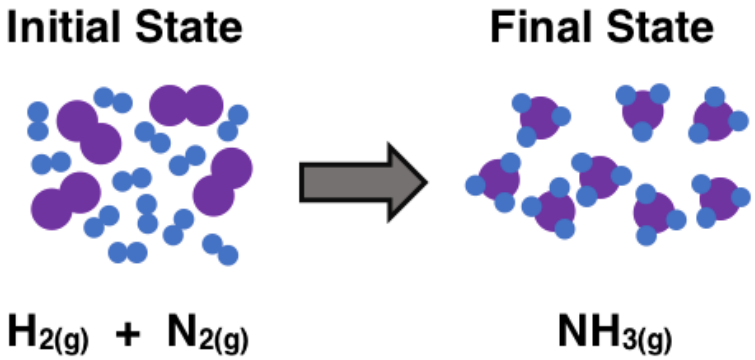
Question 52
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



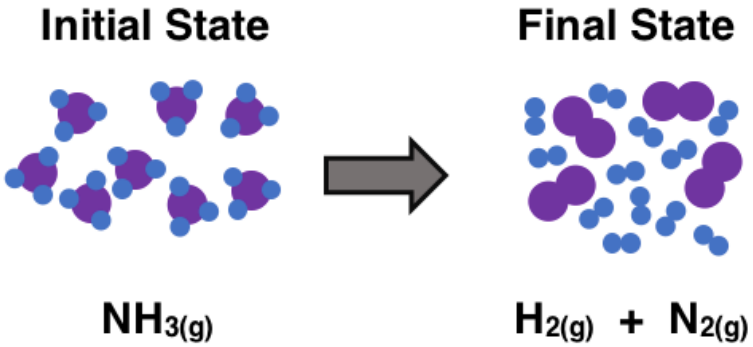
Question 53
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



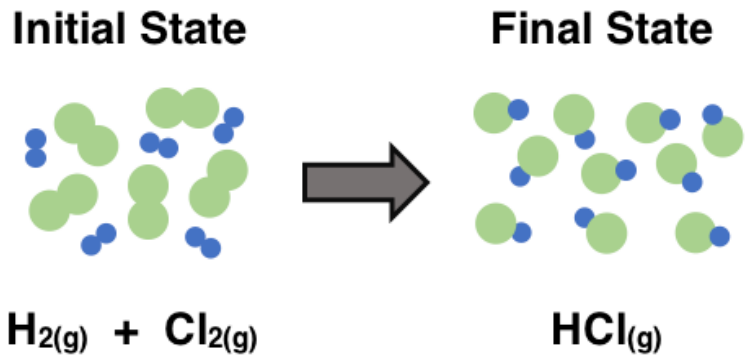
Question Group 15
Question 54
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



Question 55
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



Question 56
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?



Question 57
Consider the process or change shown below. Will the entropy change (ΔS) be positive or negative?