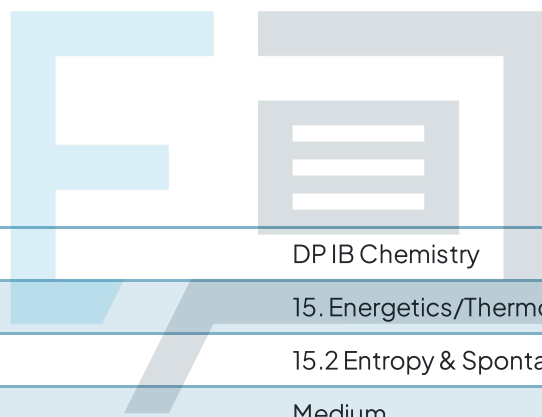




15.2 Entropy & Spontaneity

Question Paper



Course	DP IB Chemistry
Section	15. Energetics/Thermochemistry (HL only)
Topic	15.2 Entropy & Spontaneity
Difficulty	Medium

Exam Papers Practice

To be used by all students preparing for DP IB Chemistry HL
Students of other boards may also find this useful

Question 1

Which of the following conditions will mean a reaction is never feasible?

	ΔH	ΔS	Temperature
A	Negative	Positive	High
B	Positive	Negative	High
C	Negative	Negative	Low
D	Positive	Positive	High

[1 mark]

Question 2

Ethene is produced according to the following gas-phase synthesis:



Thermodynamic data for the components of this equilibrium are

Change	Value
$\Delta H_r^\ominus / \text{kJ mol}^{-1}$	p
$\Delta S^\ominus / \text{JK}^{-1} \text{mol}^{-1}$	q

The free energy change for this reaction at 298 K is:

A. $\Delta G^\ominus = p - 298 \times q$

B. $\Delta G^\ominus = \frac{p}{298 \times \frac{q}{1000}}$

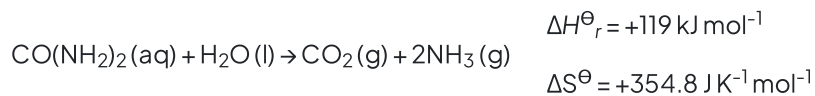
C. $\Delta G^\ominus = p - 298 \times \frac{q}{1000}$

D. $\Delta G^\ominus = \frac{p \times 298}{q}$

[1 mark]

Question 3

Which statements are correct for the following reaction?



- I. The reaction will be feasible at high temperatures
- II. The reaction will never be feasible
- III. The reaction becomes more disordered

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

[1 mark]

Question 4

Which of the following equations is used when calculating the temperature, in Kelvin, at which a reaction becomes feasible if $\Delta H^\ominus = x$ and $\Delta S^\ominus = y$.

- A. $T = \frac{x}{y}$
- B. $T = xy$
- C. $T = x + y$
- D. $T = \frac{y}{x}$

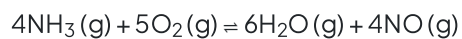
[1 mark]

Question 5

The ΔG_f^\ominus values for the following substances are shown.

Substance	ΔG_f^\ominus (kJ mol ⁻¹)
NH ₃ (g)	-16.4
O ₂ (g)	0
H ₂ O (g)	-228.6
NO (g)	87.6

Which of the following is the correct calculation to determine ΔG^\ominus ?



- A. $(-228.6 + 87.6) + (-16.4)$
- B. $(-16.4 \times 4) - [(-228.6 \times 6) + (87.6 \times 4)]$
- C. $[-228.6 + (87.6 \times 4)] - (-16.4 \times 4)$
- D. $[(-228.6 \times 6) + (87.6 \times 4)] - (-16.4 \times 4)$

[1 mark]