

NEET THERMODYNAMICS — SPONTANEITY AND ENTROPY — PYQS

Max. Marks: 60

Questions: 15

Section A (MCQ) — 15 questions

Q.1 Two moles of an ideal gas undergo free expansion from 10 L to 100 L at 300 K. The values of ΔS_{system} and $\Delta S_{\text{surroundings}}$ are

(R is universal gas constant) [RE-NEET (UG) 2026]

- (1) $\Delta S_{\text{system}} = 4.606R$; $\Delta S_{\text{surroundings}} = 0$
 (2) $\Delta S_{\text{system}} = 0$; $\Delta S_{\text{surroundings}} = 0$
 (3) $\Delta S_{\text{system}} = 4.606R$; $\Delta S_{\text{surroundings}} = -4.606R$
 (4) $\Delta S_{\text{system}} = 0$; $\Delta S_{\text{surroundings}} = 4.606R$

Scan or tap for the full solution



Q.2 In which of the following processes entropy increases?

- A. A liquid evaporates to vapour.
 B. Temperature of a crystalline solid lowered from 130 K to 0 K.
 C. $2\text{NaHCO}_3(\text{s}) \longrightarrow \text{Na}_2\text{CO}_3(\text{s}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$
 D. $\text{Cl}_2(\text{g}) \longrightarrow 2\text{Cl}(\text{g})$

Choose the correct answer from the options given below:

[NEET (UG) 2024]

- (1) A and C (2) A, B and D
 (3) A, C and D (4) C and D

Scan or tap for the full solution



Q.3 For irreversible expansion of an ideal gas under isothermal condition, the correct option is :

[NEET (UG) 2021]

- (1) $\Delta U \neq 0$, $\Delta S_{\text{total}} = 0$ (2) $\Delta U = 0$, $\Delta S_{\text{total}} = 0$
 (3) $\Delta U \neq 0$, $\Delta S_{\text{total}} \neq 0$ (4) $\Delta U = 0$, $\Delta S_{\text{total}} \neq 0$

Scan or tap for the full solution



Q.4 For the reaction, $2\text{Cl}(\text{g}) \longrightarrow \text{Cl}_2(\text{g})$, the correct option is :

[NEET (UG) 2020]

- (1) $\Delta_r H > 0$ and $\Delta_r S < 0$ (2) $\Delta_r H < 0$ and $\Delta_r S > 0$
 (3) $\Delta_r H < 0$ and $\Delta_r S < 0$ (4) $\Delta_r H > 0$ and $\Delta_r S > 0$

Scan or tap for the full solution



Q.5 In which case change in entropy is negative?

[NEET (UG) 2019]

- (1) Sublimation of solid to gas
 (2) $2\text{H}(\text{g}) \longrightarrow \text{H}_2(\text{g})$
 (3) Evaporation of water
 (4) Expansion of a gas at constant temperature

Scan or tap for the full solution



Q.6 For a sample of perfect gas when its pressure is changed isothermally from p_i to p_f , the entropy change is given by

[NEET 2016 (Phase 2)]

- (1) $\Delta S = nR \ln \left(\frac{p_f}{p_i} \right)$ (2) $\Delta S = nR \ln \left(\frac{p_i}{p_f} \right)$
 (3) $\Delta S = nRT \ln \left(\frac{p_f}{p_i} \right)$ (4) $\Delta S = RT \ln \left(\frac{p_i}{p_f} \right)$

Scan or tap for the full solution



Q.7 The enthalpy of fusion of water is 1.435 kcal/mol. The molar entropy change for the melting of ice at 0°C is

[AIPMT 2012 (Prelims)]

- (1) 10.52 cal/(mol K) (2) 21.04 cal/(mol K)
 (3) 5.260 cal/(mol K) (4) 0.526 cal/(mol K)

Scan or tap for the full solution



Q.8 If the enthalpy change for the transition of liquid water to steam is 30 kJ mol⁻¹ at 27°C, the entropy change for the process would be

[AIPMT 2011 (Prelims)]

- (1) 10 J mol⁻¹ K⁻¹ (2) 1.0 J mol⁻¹ K⁻¹
 (3) 0.1 J mol⁻¹ K⁻¹ (4) 100 J mol⁻¹ K⁻¹

Scan or tap for the full solution



Q.9 For the gas phase reaction,



which of the following conditions are correct?

[AIPMT 2008]

- (1) $\Delta H < 0$ and $\Delta S < 0$ (2) $\Delta H > 0$ and $\Delta S < 0$
 (3) $\Delta H = 0$ and $\Delta S < 0$ (4) $\Delta H > 0$ and $\Delta S > 0$

Scan or tap for the full solution



Q.10 Which of the following pairs of a chemical reaction is certain to result in a spontaneous reaction ?

[AIPMT 2005]

- (1) Exothermic and increasing disorder
- (2) Exothermic and decreasing disorder
- (3) Endothermic and increasing disorder
- (4) Endothermic and decreasing disorder

Scan or tap for the
full solution



Q.11 Considering entropy (S) as a thermodynamic parameter, the criterion for the spontaneity of any process is [AIPMT 2004]

- (1) $\Delta S_{\text{system}} + \Delta S_{\text{surroundings}} > 0$
- (2) $\Delta S_{\text{system}} - \Delta S_{\text{surroundings}} > 0$
- (3) $\Delta S_{\text{system}} > 0$ only
- (4) $\Delta S_{\text{surroundings}} > 0$ only

Scan or tap for the
full solution



Q.12 What is the entropy change (in $\text{J K}^{-1} \text{mol}^{-1}$) when one mole of ice is converted into water at 0°C ? (The enthalpy change for the conversion of ice to liquid water is 6.0 kJ mol^{-1} at 0°C). [AIPMT 2003]

- (1) 20.13 (2) 2.013 (3) 2.198 (4) 21.98

Scan or tap for the
full solution



Q.13 Unit of entropy is [AIPMT 2002]

- (1) $\text{J K}^{-1} \text{mol}^{-1}$ (2) J mol^{-1}
(3) $\text{J}^{-1} \text{K}^{-1} \text{mol}^{-1}$ (4) J K mol^{-1}

Scan or tap for the
full solution



Q.14 2 moles of an ideal gas at 27°C temperature is expanded reversibly from 2 lit. to 20 lit. Find entropy change. ($R = 2 \text{ cal/mol K}$) [AIPMT 2002]

- (1) 92.1 (2) 0 (3) 4 (4) 9.2

Scan or tap for the
full solution



Q.15 The entropy change in the fusion of one mole of a solid melting at 27°C (latent heat of fusion is 2930 J mol^{-1}) is : [AIPMT 2000]

- (1) $9.77 \text{ J/mol} - \text{K}$ (2) $10.77 \text{ J/mol} - \text{K}$
(3) $9.07 \text{ J/mol} - \text{K}$ (4) $0.977 \text{ J/mol} - \text{K}$

Scan or tap for the
full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	1	3	4	3	2	2	3	4	4	1	1
Ques.	12	13	14	15							
Ans.	4	1	4	1							