Arjuna NEET (2024)

Thermodynamics

DPP-05

1. In which reaction ΔS is positive:

(1) $H_2O_{(\ell)} \rightarrow H_2O_{(s)}$

(2) $3O_{2(g)} \rightarrow 2O_{3(g)}$

(3) $H_2O_{(\ell)} \rightarrow H_2O_{(g)}$

(4) $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$

2. When the egg is hard boiled, there is-

(1) Increase in disorder
(2) Decrease in disorder
(3) No change in disorder
(4) ΔG is negative

3. If S° for H_2, Cl_2 and HCl are 0.13, 0.22 and 0.19 KJ K^{-1} mol^{-1} respectively. The total change in standard entropy for the reaction $H_2 + Cl_2 \longrightarrow 2HCl$ is:

(1) 30 JK^{-1} mol^{-1} (2) 40 JK^{-1} mol^{-1}
(3) 60 JK^{-1} mol^{-1} (4) 20 JK^{-1} mol^{-1}

4. The enthalpy of vaporization for water is 186.5 KJ mol^{-1}, the entropy of its vaporization will be-

(1) 0.5 KJ K^{-1} mol^{-1}
(2) 1.0 KJ K^{-1} mol^{-1}
(3) 1.5 KJ K^{-1} mol^{-1}
(4) 2.0 KJ K^{-1} mol^{-1}

5. The enthalpy of vaporization of per mole of ethanol (b.p. = 79.5°C and ΔS = 109.8 JK^{-1} mol^{-1}) is:

(1) 27.35 KJ/mol (2) 32.19 KJ/mol
(3) 38.70 KJ/mol (4) 42.37 KJ/mol

6. In a spontaneous irreversible process the total entropy of the system and surroundings

(1) Remains constant
(2) Increases
(3) Decreases
(4) Zero

7. Determine the entropy change for the reaction given below:

$2H_{2(g)} + O_{2(g)} \longrightarrow 2H_2O_{(\ell)}$ at 300 K.

If standard entropies of $H_{2(g)}$, $O_{2(g)}$ and $H_2O_{(\ell)}$ are 126.6, 201.20 and 68.0 J K^{-1} mol^{-1} respectively.

(1) –218.4 J K^{-1} mol^{-1}
(2) –318.4 J K^{-1} mol^{-1}
(3) –520.2 J K^{-1} mol^{-1}
(4) –128.6 J K^{-1} mol^{-1}

8. Calculate the entropy change in melting of one gm ice at 0°C if latent heat of ice is 80 cal/g-

(1) 80 Cal K^{-1}
(2) 20 Cal K^{-1}
(3) 4.4 Cal K^{-1}
(4) 0.3 Cal K^{-1}

9. If 900 J/g of heat is exchanged at boiling point of water, then what is increase in entropy?

(1) 43.4 J/K mole
(2) 87.2 J/K mole
(3) 900 J/K mole
(4) Zero

10. 5 mole of an ideal gas expand reversibly from a volume of 8 dm^3 to 80 dm^3 at a temperature of 27°C. The change in entropy is:

(1) 41.57 JK^{-1} (2) –95.73 JK^{-1}
(3) 95.73 JK^{-1} (4) –41.57 JK^{-1}

11. For the reaction at 300 K.

$A(g) + B(g) \rightarrow C(g)$

ΔU = –3.0 kcal ΔS = –10.0 cal/K

(R ≈ 2 cal mol^{-1} K^{-1})

ΔG is:

(1) – 600 cal (2) –3600 cal
(3) 2400 cal (4) 3000 cal

12. Mark the correct statement
(1) For a chemical reaction to be feasible, ΔG should be zero
(2) Entropy is a measure of order in a system
(3) For a chemical reaction to be feasible, ΔG should be positive
(4) The total energy of an isolated system is constant

13. Two molecules of an ideal gas expand spontaneously into a vacuum. The work done is
(1) 2J (2) 4J
(3) 8J (4) zero

14. Predict which of the following reaction (s) has a positive entropy change?
I. $Ag^+ (aq) + Cl^- (aq) \rightarrow AgCl (s)$
II. $NH_4Cl (s) \rightarrow NH_3 (g) + HCl (g)$
III. $2NH_3 (g) \rightarrow N_2 (g) + 3H_2 (g)$
(1) I and II (2) III
(3) II and III (4) II

15. Which of the following reactions is associated with negative change in entropy?
(1) $2SO_3 (g) \rightarrow 2SO_2 (g) + O_2 (g)$
(2) $C_2H_6 (g) \rightarrow C_2H_4 (g) + H_2 (g)$
(3) $2C (s, graphite) + O_2 (g) \rightarrow 2CO(g)$
(4) $3C_2H_2 (g) \rightarrow C_6H_6 (l)$

16. Which one of the following has $\Delta S°$ greater than zero?
(1) $CaO(s) + CO_2 (g) \rightleftharpoons CaCO_3 (s)$
(2) $NaCl(aq) \rightleftharpoons NaCl(s)$
(3) $NaNO_3 (s) \rightleftharpoons Na^+(aq) + NO_3^- (aq)$
(4) $N_2 (g) + 3H_2 (g) \rightleftharpoons 2NH_3 (g)$

17. The entropy of vaporization of benzene is 85 JK^{-1} mol^{-1}. When 117 g benzene vaporizes at it's normal boiling point, the entropy change of surrounding is (assuming reversible process)
(1) $-85\ JK^{-1}$ (2) $-85 \times 1.5\ JK^{-1}$
(3) $85 \times 1.5\ JK^{-1}$ (4) None of these

18. 1 mole of a diatomic ideal gas at 25°C is subjected to expand reversibly and adiabatically to ten times of its initial volume. Calculate the change in entropy during expansion (in JK^{-1} mol^{-1})
(1) R ln 10 (2) –R ln 10
(3) 2.5 R ln 10 (4) Zero

19. Three moles of an ideal gas expanded spontaneously into vacuum. Then which is correct?
(1) $W = 0, \Delta G = 0$ (2) $W = 0, \Delta G < 0$
(3) $W = 0, \Delta G > 0$ (4) $W \neq 0, \Delta G = 0$

20. For the reaction $2Cl (g) \rightarrow Cl_2 (g)$
What are the sign of ΔH and ΔS?
(1) $\Delta H > 0, \Delta S > 0$
(2) $\Delta H < 0, \Delta S < 0$
(3) $\Delta H > 0, \Delta S < 0$
(4) $\Delta H < 0, \Delta S > 0$

21. For a spontaneous process:
(1) $\Delta G = 0$
(2) $\Delta G < 0$
(3) $\Delta G > 0$
(4) Any of the above

22. Criteria for spontaneity of process is:
(1) Maximum Randomness
(2) Maximum energy
(3) Minimum energy and max. randomness
(4) Minimum randomness and max. energy

23. For a reversible process at equilibrium, the change in entropy may be expressed as :
(1) $\Delta S = Tq_{rev}$ (2) $\Delta S = \frac{q_{rev}}{T}$
(3) $\Delta S = \frac{\Delta H}{T}$ (4) $\Delta S = \Delta G$

24. Entropy is a measure of
(1) Disorder
(2) Internal energy
(3) Efficiency
(4) Useful work done by the system

25. When a solid is converted directly into gaseous state, the process is called sublimation. The entropy change during the process is:

(1) Zero
(2) Negative
(3) Positive
(4) May be negative or zero

26. The enthalpy of vaporisation of a compound AB at its boiling point (127°C) is 6.4 kJ mol^{-1}. Its entropy of vaporisation is:

(1) 2.56 kJ mol^{-1}
(2) 16 J mol^{-1} K^{-1}
(3) 16×10^{-3} J mol^{-1}
(4) $l.6 \times l0^{3}$ kJ mol^{-1}

27. The entropy change for the conversion of 1 mol of α-tin (at 13°C, 1 atm) to 1 mol of β-tin (13°C, 1 atm), if enthalpy of transition is 2.095 kJ mol^{-1} is:

(1) 7.32 J mol^{-1} K^{-1}
(2) 14.62 J K^{-1} mol^{-1}
(3) 56.3 J mol^{-1} K^{-1}
(4) 0

Note: Kindly find the Video Solution of DPPs Questions in the DPPs Section.

Answer Key

1.	**(3)**	**15.**	**(4)**
2.	**(1)**	**16.**	**(3)**
3.	**(1)**	**17.**	**(2)**
4.	**(1)**	**18.**	**(4)**
5.	**(3)**	**19.**	**(2)**
6.	**(2)**	**20.**	**(2)**
7.	**(2)**	**21.**	**(2)**
8.	**(4)**	**22.**	**(3)**
9.	**(1)**	**23.**	**(2)**
10.	**(3)**	**24.**	**(1)**
11.	**(1)**	**25.**	**(3)**
12.	**(4)**	**26.**	**(2)**
13.	**(4)**	**27.**	**(1)**
14.	**(3)**		

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