

Model Question Paper
Thermodynamics - II - Part II

12th Standard

Chemistry

Reg.No. :

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I. Answer all the questions.

II. Use blue pen only.

Time : 01:30:00 Hrs

Total Marks : 75

5 x 1 = 5

Part-A

- 1) Which one of the following is a state function?
(a) q (b) Δq (c) w (d) ΔS
- 2) Standard free energies of formation of elements are taken as
(a) positive (b) negative (c) zero (d) all
- 3) The network obtained from a system is given by
(a) $w + P\Delta v$ (b) $w - P\Delta v$ (c) $-w + P\Delta v$ (d) $-w - p\Delta v$
- 4) In SI unit 1 eu is
(a) 41.84 EU (b) 4.184 EU (c) 418.4 EU (d) 4184 EU
- 5) The SI unit of entropy is
(a) $\text{Cal.K}^{-1} \text{mil}^{-1}$ (b) $\text{erg.K}^{-1} \text{mol}^{-1}$ (c) $\text{J deg}^{-1} \text{mol}^{-2}$ (d) $\text{J K}^{-1} \text{mol}^{-1}$

Part-B

5 x 3 = 15

- 6) Define standard entropy.
- 7) Define standard entropy change of reaction.
- 8) Define standard entropy change of formation.
- 9) How is entropy change related to enthalpy change? (or) How is entropy calculated?
- 10) What is the nature of the reaction when (i) $\Delta G > 0$, (ii) $\Delta G < 0$, (iii) $\Delta G = 0$.

Part-C

7 x 5 = 35

- 11) Calculate the efficiency of an engine which has a work output of 3000 J for the input heat of 4500 J.
- 12) For the melting of ice of 25°C enthalpy of fusion is 6.97 kJ mol^{-1} and entropy of fusion is $25.4 \text{ J mol}^{-1}\text{K}^{-1}$. Calculate the free energy change and predict whether melting of ice is spontaneous or not at this temperature.
- 13) Discuss the conditions for the spontaneity of a process in terms of entropy change.
- 14) State Trouton's rule. Discuss its limitations
- 15) Define entropy. Discuss any five characteristics of entropy
- 16) Define free energy. Discuss its characteristics
- 17) Explain the thermodynamic conditions for spontaneity and equilibrium

Part-D

2X10=20

- 18) a) The entropy change and enthalpy change for melting of KCl is $0.007 \text{ kJ mol}^{-1}\text{K}^{-1}$ and 7.25 kJ mol^{-1} . Calculate the melting point of KCl
b) Calculate the molar heat of vapourisation of the ideal liquid CCl_4 (Boiling point of CCl_4 is 76.7°C and $\Delta s = 87.864 \text{ J}$)
- 19) a) Show that decrease in free energy change is equal to the net work of the system.
b) What are standard entropy and standard free energy? Explain.
