Quality Checkers Only way to fulfill your dreams	12th Science : Chemistry Chemical Thermodynamics,	**DATE:** **TIME: 1 hour** **MARKS: 25** SEAT NO:

Note:-

1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1 Select and write the correct answer. **(4)**

1. If for a reaction, ΔH is positive and ΔS is negative then the reaction is

   A) Spontaneous at all temperature B) Non-spontaneous at all temperature

   C) Spontaneous only at high temperature D) Spontaneous only at low temperature

2. Which of the following process is non-spontaneous?

   A) Dissolving KCl in water B) Mixing of iodine vapour nitrogen gas

   C) Decomposition of NaCl to Na(s) and $Cl_2(g)$ D) Freezing of water at 270 K

3. Change in internal energy when 4KJ of work is done on the system and 1KJ of heat is given out by the system is

   A) 3 kJ B) 4 kJ

   C) 7 kJ D) 6 kJ

4. Given reaction, $N_2(g) + 3H_2(g) \rightarrow 2NH_2(g)$, ΔH = 92.6 kJ the enthalpy of formation of NH_3 is

   A) – 185.2 kJ mol^{-1} B) – 46.3kJ mol^{-1}

   C) – 92.6 kJ mol^{-1} D) – 92.6 kJ

Q.2 Answer the following. **(3)**

1. Define Extensive properties.
2. In a process, 661 J of heat is absorbed by a system and 376 J of work is done by the system. What is the change in internal energy for the process?
3. Define non-spontaneous process.

Section B
Attempt any Four

Q.3 If the enthalpy change of reaction is ΔH. How will you calculate entropy of surroundings? **(2)**

Q.4 Distinguish between exothermic and endothermic reaction. **(2)**

Q.5 What is enthalpy of vaporization? **(2)**

Q.6 How is state of a system defined? When do we say that state of the system has changed? **(2)**

Q.7 What is Thermochemistry? Explain. **(2)**

Q.8 For a certain reaction $\triangle H^0$ is – 224 kJ and $\triangle S^0$ is – 153 J K^{-1}. At what temperature the change over from spontaneous to non-spontaneous will occur? **(2)**

Section C
Attempt any Two

Q.9 State Hess's law of constant heat summation. Illustrate with an example. State its applications. **(3)**

Q.10 What is enthalpy of ionization? **(3)**

Q.11 Calculate the constant external pressure required to compress 2 moles of an ideal gas from volume of 25 dm^3 to 13 dm^3 when the work obtained is 4862.4 J. **(3)**

Section D
Attempt any One

Q.12 Obtain the relation between ΔG and $\Delta S_{total.}$ Comment on spontaneity of reaction. **(4)**

Q.13 Calculate the amount of work done in the **(4)**

(a) Oxidation of 1 mole $HCl_{(g)}$ at 200 ^oC according to reaction, $4HCl_{(g)} + O_{2(g)} \rightarrow 2Cl_{2(g)} + 2H_2O_{(g)}$

(b) Decomposition of one mole of NO at 300 ^oC for the reaction, $2\ NO_{(g)} \rightarrow N_{2(g)} + O$