

Calculation/Application of Entropy to Assess Spontaneity**Question-1 (Calculation of  $\Delta S_{\text{total}}$  by selection of hypothetical reversible process)**

An insulated tank ( $V=1.663\text{L}$ ) is divided into two equal parts by a thin partition. On the left is an ideal gas at 100 kPa and 500K and on the right is a vacuum. The partition ruptures with a loud bang.

- (a) What is the final temperature in the tank?
- (b) What is the  $\Delta S_{\text{sys}}$  for the process/system?

**Question-2 (Calculation of entropy change for an isolated system in obtaining thermal equilibrium)**

Consider an isolated system containing two blocks of copper with equal mass. One block is initially at  $0^\circ\text{C}$  while another is at  $100^\circ\text{C}$ . They are allowed to contact each other and thermally equilibrate. The heat capacity for copper is  $24.5\text{ J/mol-K}$

- (a) What is the final temperature of the two blocks?
- (b) What is the entropy change of the system during this process?