## 2097. Applied Thermodynamics of Pure Substances

- Basic concepts and definitions.
- Zeroth and First Laws of Thermodynamics; thermodynamic temperature scale; entropy; volumetric work and technical work; thermodynamic temperature scale.
- Second Law of Thermodynamics; reversible and irreversible phenomena.
- Third Law of Thermodynamics.
- Ideal gas; cyclic processes; Carnot cycle for any working substance; reversible and irreversible phenomena.
- Thermodynamic probability; theoretical entropy of mixing; entropy of irreversible processes; Maxwell relations and Tds equations; two-phase thermodynamics, vaporization, diagrams, and steam tables.
- Phase change of pure substances.
- Equation of state for real gases.
- Vapour theory; T-S and H-S diagrams (Mollier).
- Exergy.
- Heat capacities of real gases.
- Thermodynamic power cycles using gas.
- Thermodynamic power cycles using steam.
- Thermodynamic cooling cycles.
- Thermodynamic representation of reversible processes.
- Joule-Thomson throttling.
- Thermodynamics of compressible fluids; nozzles.

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