* Heat Engines

Any practical machine which converts heat into mechanical work is called a heat engine. Heat engines in their operation absorb heat at a higher temperature, convert part of it into mechanical work, & reject the remaining heat at a low temperature. Working substance is used in this process. like water vapour in steam engines and a combustible mixture of gases in all gas engines.

* Definion of Efficiency

The efficiency η, of a heat engine is defined as the ratio of the mechanical work done by the engine in one cycle to the heat absorbed from the high temperature source.

$$\eta = \frac{Q_1 - Q_2}{Q_1} \quad \text{---(1)}$$

Where Q_1 is the heat absorbed from the source at high temperature, Q_2 is the heat rejected to a sink at low temperature & $(Q_1 - Q_2)$ is the mechanical work done by the engine in one cycle. Since $(Q_1 - Q_2) < Q_1$, the efficiency can never be 100%.

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