



Thermodynamics I

Introduction



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Thermodynamics I



- Thermodynamics can be defined as the science of *energy*.
- Energy can be viewed as the ability to cause changes.
- The name thermodynamics stems from the Greek words therme (heat) and dynamis (power).

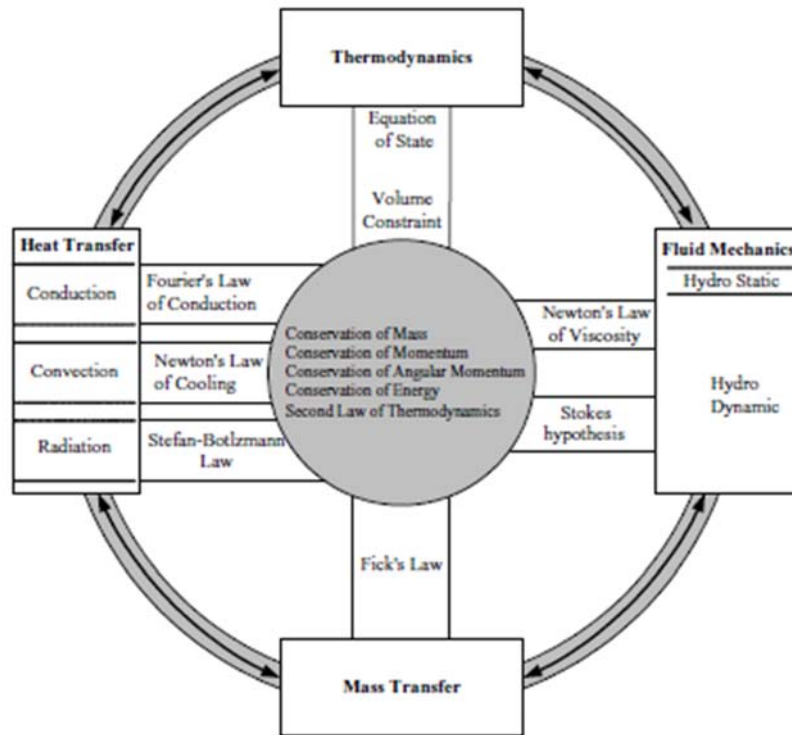
➔ Descriptive of the early efforts to convert heat into power

- Engineers use principles drawn from thermodynamics and other engineering sciences, such as fluid mechanics and heat and mass transfer, to analyze and design things intended to meet human needs.
- Engineers seek to achieve improved designs and better performance, as measured by factors such as
 - ✓ An increase in the output of some desired product,
 - ✓ A reduced input of a scarce resource,
 - ✓ A reduction in total costs, or
 - ✓ A lesser environmental impact.

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Thermodynamics II



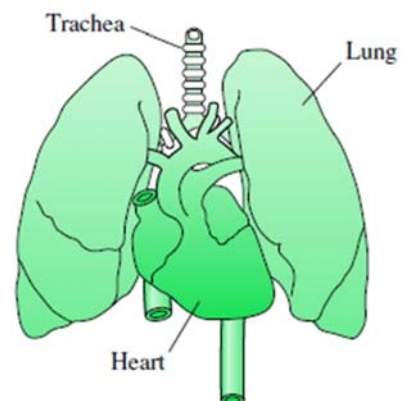
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Importance of Thermodynamics: Biomedical Applications

- The heart is constantly pumping blood
- Various energy
- Conversions occur in trillions of body cells, and the body heat generated is constantly rejected to the environment.
- The human comfort is closely tied to the rate of this metabolic heat rejection.
- We try to control this heat transfer rate by adjusting our clothing to the environmental conditions.

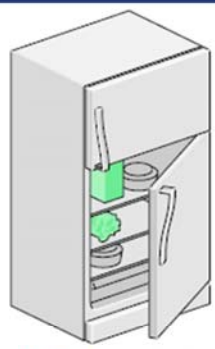


Thermometers.



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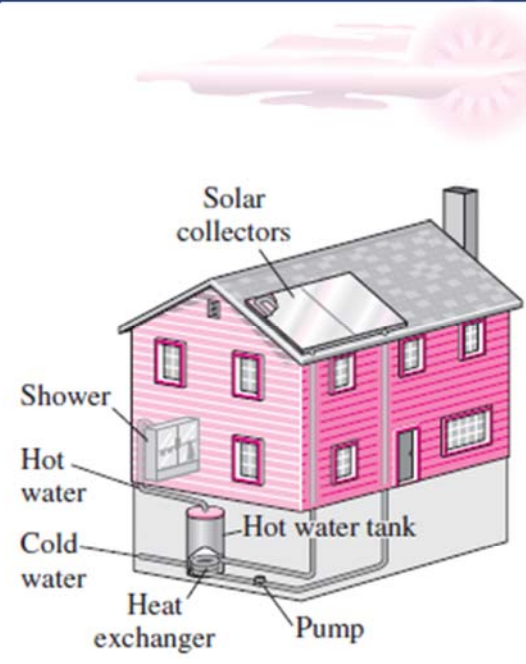
Importance of Thermodynamics: Household Applications



Refrigerator



Air conditioning systems

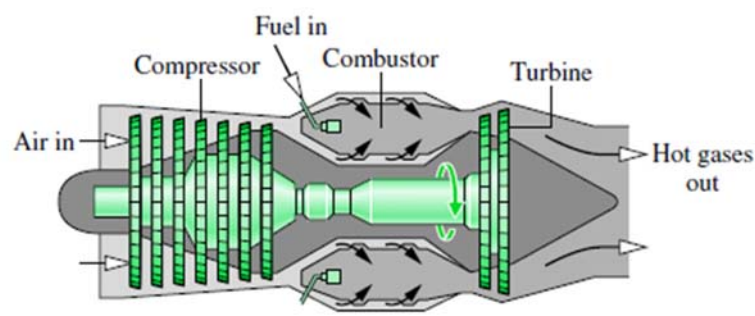


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Importance of Thermodynamics: Turbojet and Automobile engines

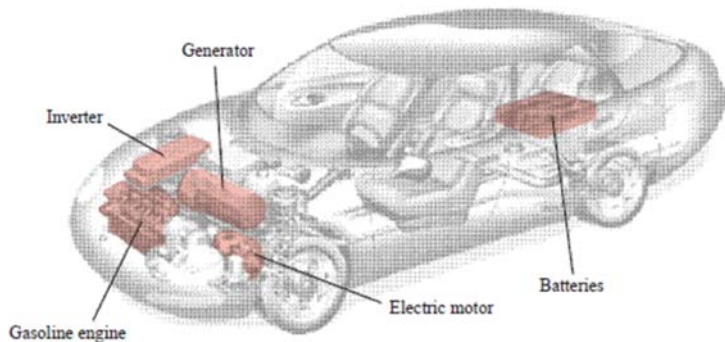


Rockets and jet engines, and airplanes

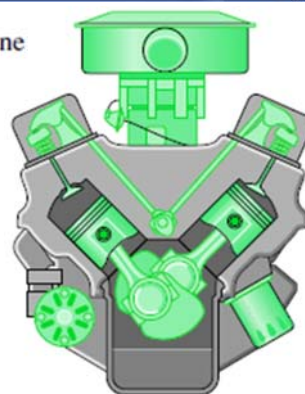


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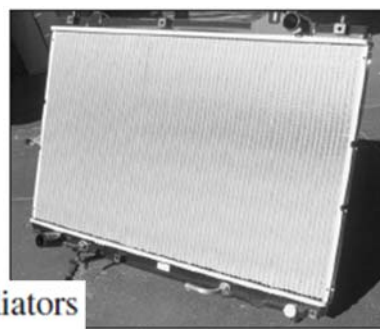
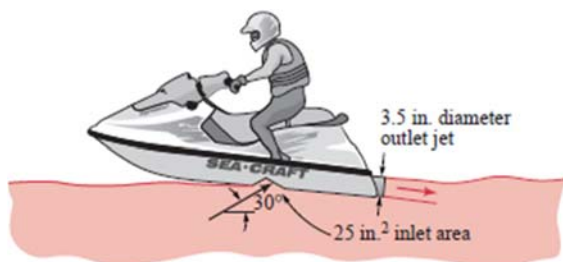
Importance of Thermodynamics: Automobile Engines



Automobile engine



Jet ski water =-pump propulsion

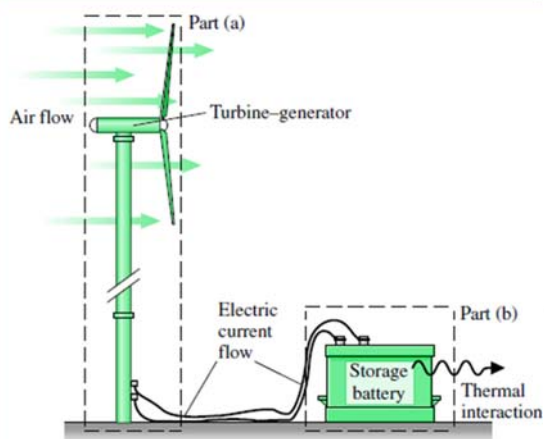


Car radiators

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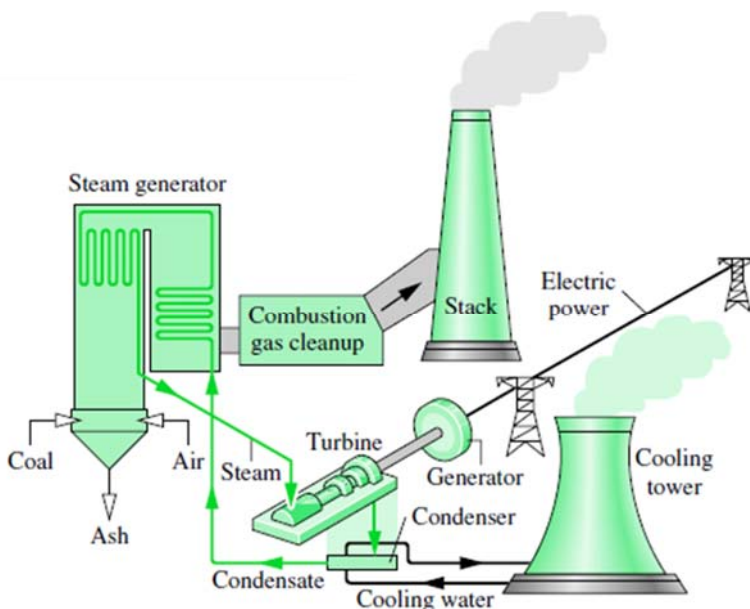


Importance of Thermodynamics: Power Generation



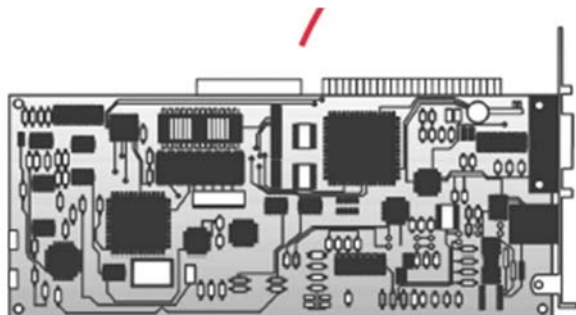
Wind turbine

Electrical power plant



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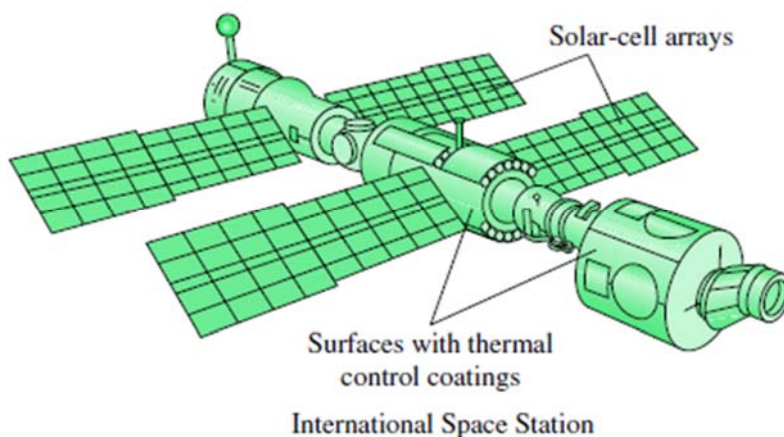
Importance of Thermodynamics: Computer and Electronics



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Importance of Thermodynamics: Space Applications



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