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By-Amrinder Sir

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- Example
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## Thermodynamics

Books : Cengel & Boles  $\Rightarrow$  Theory

P.K. Nag  $\Rightarrow$  Questions

Questions  $\rightarrow$  Work Book  $\rightarrow$  class  
 $\rightarrow$  Guide  
 $\rightarrow$  Theory Book

$\rightarrow$  GATE Previous Year

$\rightarrow$  ESE PYQ (5 Year)

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HW

TH-B

P-224

Q8, Q9

"Reversible & Irreversible"

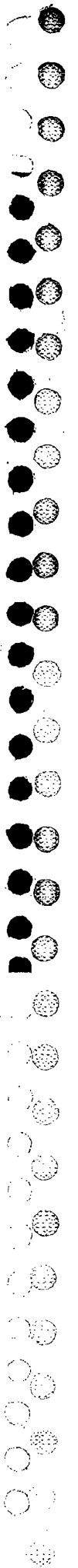
$\rightarrow$  Video

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"Civil Services questions"

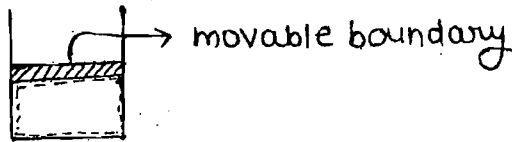


## \* Thermodynamics -

It is a branch of science which deals with energy interaction and its effect on system and surrounding.

→ Energy - It is the Ability to cause changes.

→ System - It is a fixed mass (control mass) system or a region in a space (control volume) where our study is focused.

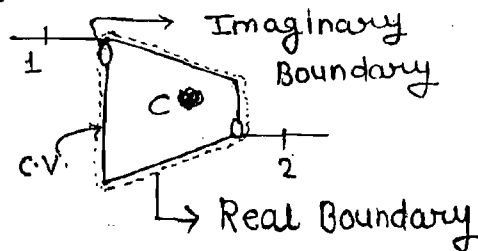


→ Surrounding - Everything except the system becomes surrounding.

- The part of surrounding which is directly affected by the system is called Immediate surrounding.

→ Boundary - It is a real or imaginary surface which separates the system from the surrounding.

Boundary can be fixed or movable.

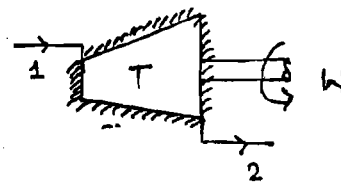


Type of system:→

Type of system	Mass	Energy	Example
1. closed	X	✓	Piston cylinder without valves
2. open	✓	✓	Piston cylinder with valves
3. Isolated	X	X	Perfectly insulated thermos universe

	Mass	Work	Heat
Insulated	✓	✓	x
Isolated	x	x	x

eg. insulated turbine



• Properties of the System : →

Any characteristics of the system is called as the Property of the system. and the Properties can be classified as :

1. Intensive (Intinsic) : →

Independent of mass of the system under consideration.

eg.  $P, T, \rho, \mu$ , velocity ( $c$ ), thermal conductivity ( $k$ )

NOTE: All specific Properties are intensive Properties,

eg.  $h, s, u, w, z, C$   
specific heat

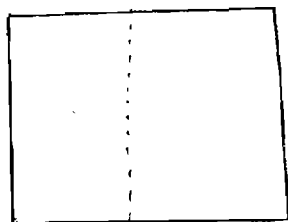
2. Extensive (Extrinsic) : →

Depense of mass of the system Under consideration.

eg.  $E, V, m$ , Entropy, Enthalpy, Internal Energy

$$C_{rms}^2 \propto T$$

$$\frac{1}{2} m_1 c_1^2 + \frac{1}{2} m_2 c_2^2 + \dots = \frac{1}{2} \sum m C_{rms}^2$$



$$P_L = P$$

$$T_L = T$$

$$V_L = V/2$$