YAKEEN NEET 2.0

2026

Thermodynamics & Thermochemistry

Physical Chemistry | **Lecture -2**

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Topics to be covered

1. Revision of Last Class
2. State Functions, Path Functions
3. Types of Process

Rules to Attend Class

1. Always sit in a peaceful environment with headphone and be ready with your copy and pen.
2. Never ever attend a class from in between or don't join a live class in the middle of the chapter.
3. Make sure to revise the last class before attending the next class & always complete your Magarmach Practice Questions.
4. Never ever engage in chat whether live or recorded on the topic which is not being discussed in current class as by doing so u can be blocked by the admin team or your subscription can be cancelled.

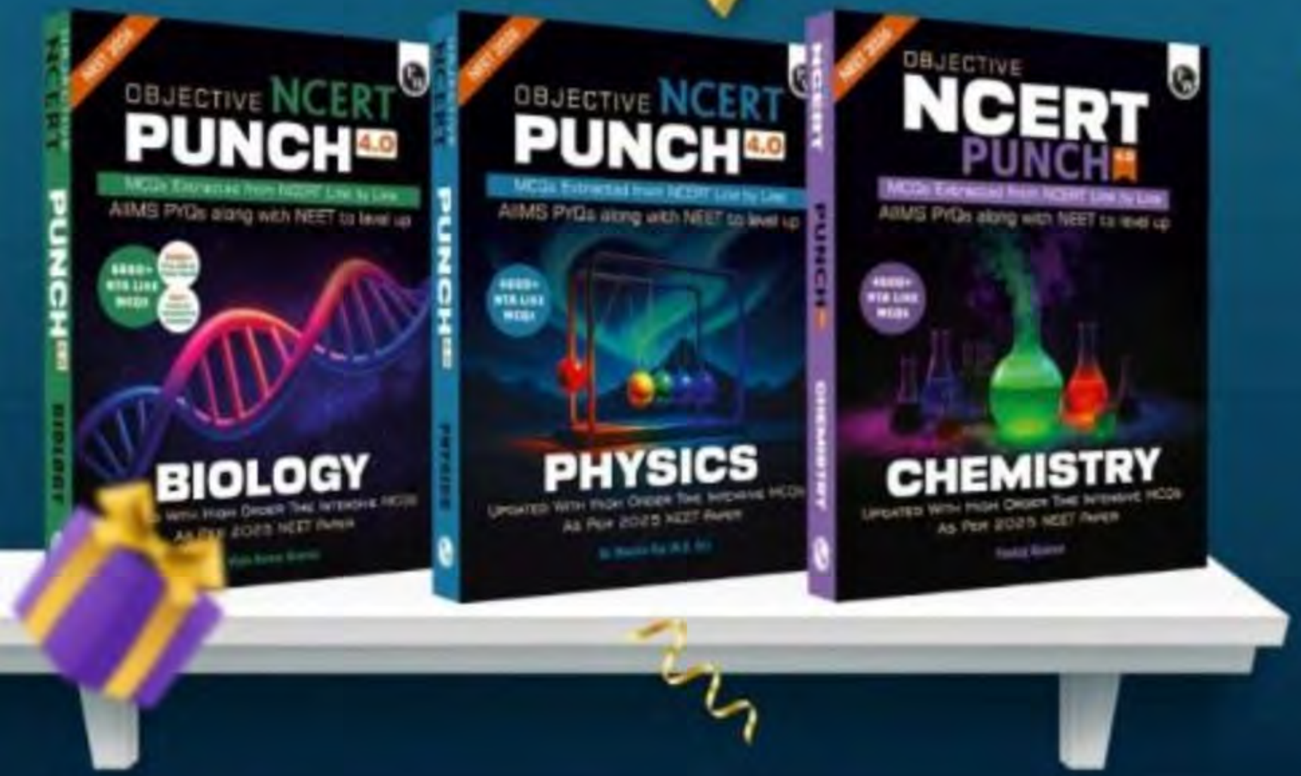
Rules to Attend Class

5. Try to make maximum notes during the class if something is left then u can use the notes pdf after the class to complete the remaining class.
6. Always ask your doubts in doubt section to get answer from faculty. Before asking any doubt please check whether same doubt has been asked by someone or not.


There is one big flaw in your Preparation that's name is Backlog ? What do we say to Backlog ?
NOT TODAY !!!

TO QUALIFY FOR GIVEAWAYS, MAINTAIN CONSISTENT PERFORMANCE IN THE FOLLOWING FOR ARJUNA, LAKSHYA, AND YAKEEN BATCHES:

GIVEAWAY



- Attendance
- DPP Attempts
- Weekly Test Results

In the upcoming week, the **Top 10 students** on the **Weekly Test leaderboard** will receive **exclusive giveaway books.**

NOTE:

1. The Books are only for those who meet all three criteria.
2. Top 5–10 consistent toppers across all criteria win giveaways!

GIVE AWAY

Revision :

Thermodynamics

Ideal gas $PV = nRT$

$PV = K \Rightarrow P_1V_1 = P_2V_2$

$\frac{V}{T} = K \Rightarrow \frac{V_1}{T_1} = \frac{V_2}{T_2}$

$V \propto n \Rightarrow \frac{V}{n} = K \Rightarrow \frac{V_1}{n_1} = \frac{V_2}{n_2}$

Chem. rxn^n → energy changes & spontaniety or extent of rxn^n

System :

State Variables

↓

P, V, n, T

PV = nRT

Ext Prop.

Int. Prop.

State Function

- **The depend upon initial and final stage and do not depend upon path followed.** $\frac{dP\ dV\ dT}{\Delta P\ \Delta V\ \Delta T}$

For Exmaple: P, V, T, U, H, S, G,

MIT

① depend upon initial & Final stt.

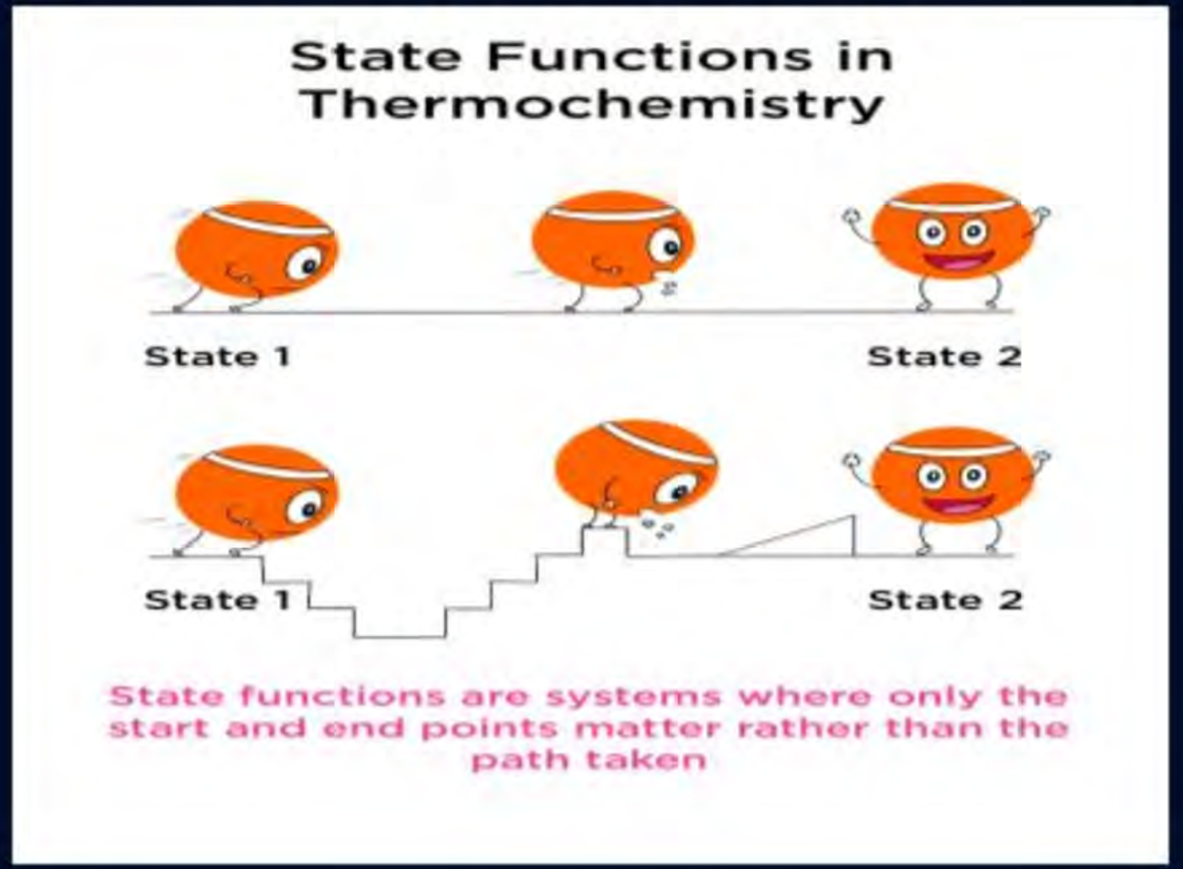
② f^ns which Can be found at any particular stt.

③ On Changing stt. of system atleast 1 stt f^n is Changed.

④ If a = stt. f^n.

Small Change $a = da$

large " " $= \int_i^f da = \Delta a$



Path Function

#MIT ①

➤ **They depend upon path followed:**

For example: Heat and work

(Heat Capacities)

② y^n's which can't be defined at any stt. of system.

③ If b is path f^n.

Small change in b = δb

large ——— = b

1 mole gas. — $C_{p,m}$ — $\Delta T = 1°C$ — $C_{v,m}$ — 1 mole gas.

δq q. dq Δq

2atm V δw w Δw

QUESTION

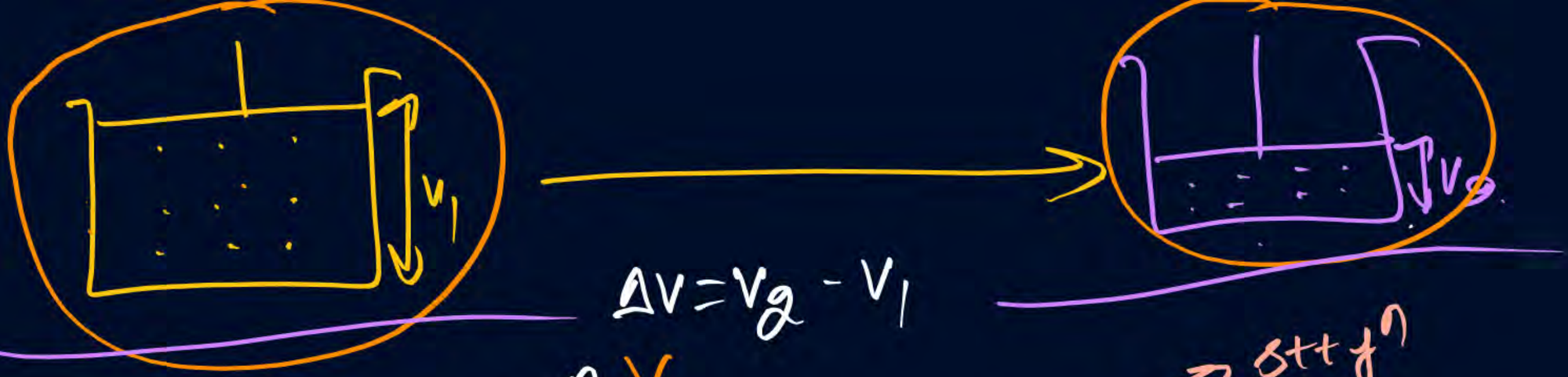
Which among the following is not a state function:

A Internal energy

B Free energy

C Enthalpy

D Work



$\Delta V = V_2 - V_1$

ΔV → stt fn. ✗

ΔV → Path fn. ✗

ΔT → stt fn

ΔT → Path fn

T ⋮ S

Types of Process

#MIT

$q = m s \Delta T$

m = mass, s = sp. heat

$\Delta T = T_2 - T_1$

① ➤ **Isothermal process:** $q \neq 0$

Temp. remains Constt. $\Rightarrow \Delta T = T_2 - T_1 = 0$

for ex: Melting, Boiling

$$H_2O(l) \longrightarrow H_2O(g)$$

$100^\circ C$ $\quad$ $100^\circ C$

② $q = m s \Delta T \Rightarrow s = \dfrac{q}{m \Delta T} \Rightarrow s = \infty$

$\Delta T = 0$

ISOTHERMAL PROCESS

AN ISOTHERMAL PROCESS IS A CHANGE OF A SYSTEM, IN WHICH THE TEMPERATURE REMAINS CONSTANT: $\Delta T = 0$.

Adiabatic Process

#MIT

① $q = 0$, $\Delta T \neq 0$

for ex :- Bursting of Tyre.

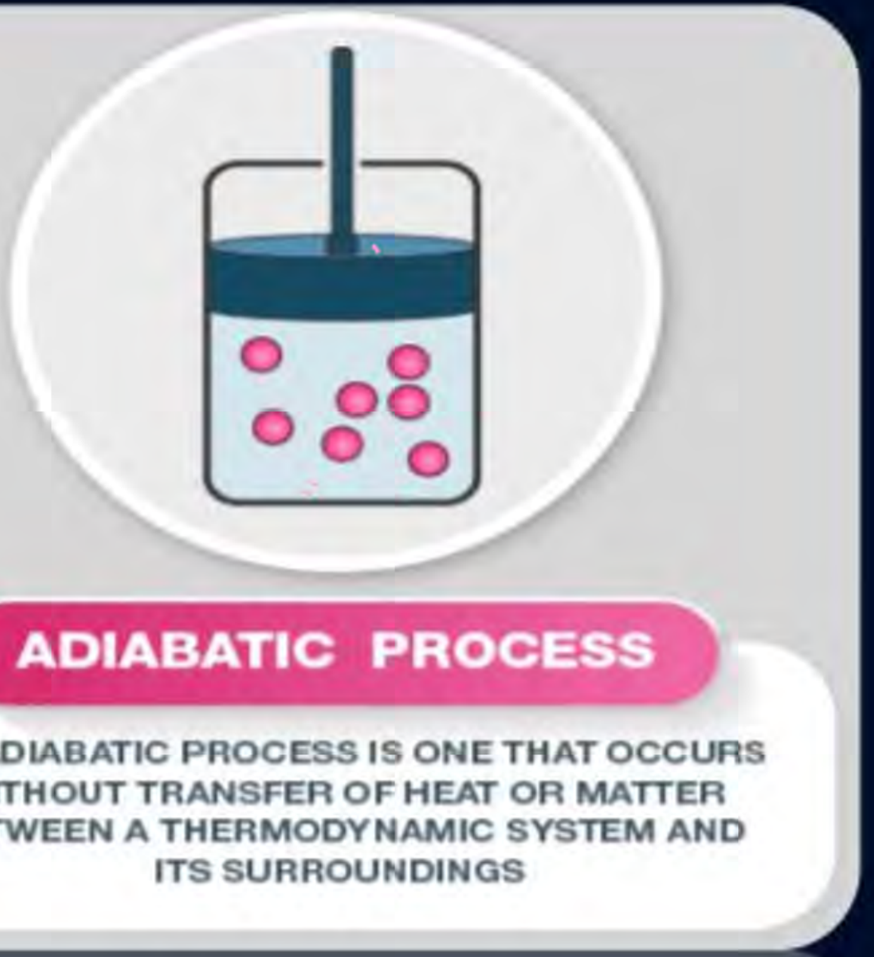
③ $q = m s \Delta T$

$s = \frac{q}{m \Delta T} \Rightarrow s = 0$

$(q = 0)$

② Adiabatic expansion $\Rightarrow T_2 < T_1 \Rightarrow$ gas cools down.

" Compression $\Rightarrow T_2 > T_1 \Rightarrow$ gas heats up.



Isobaric Process

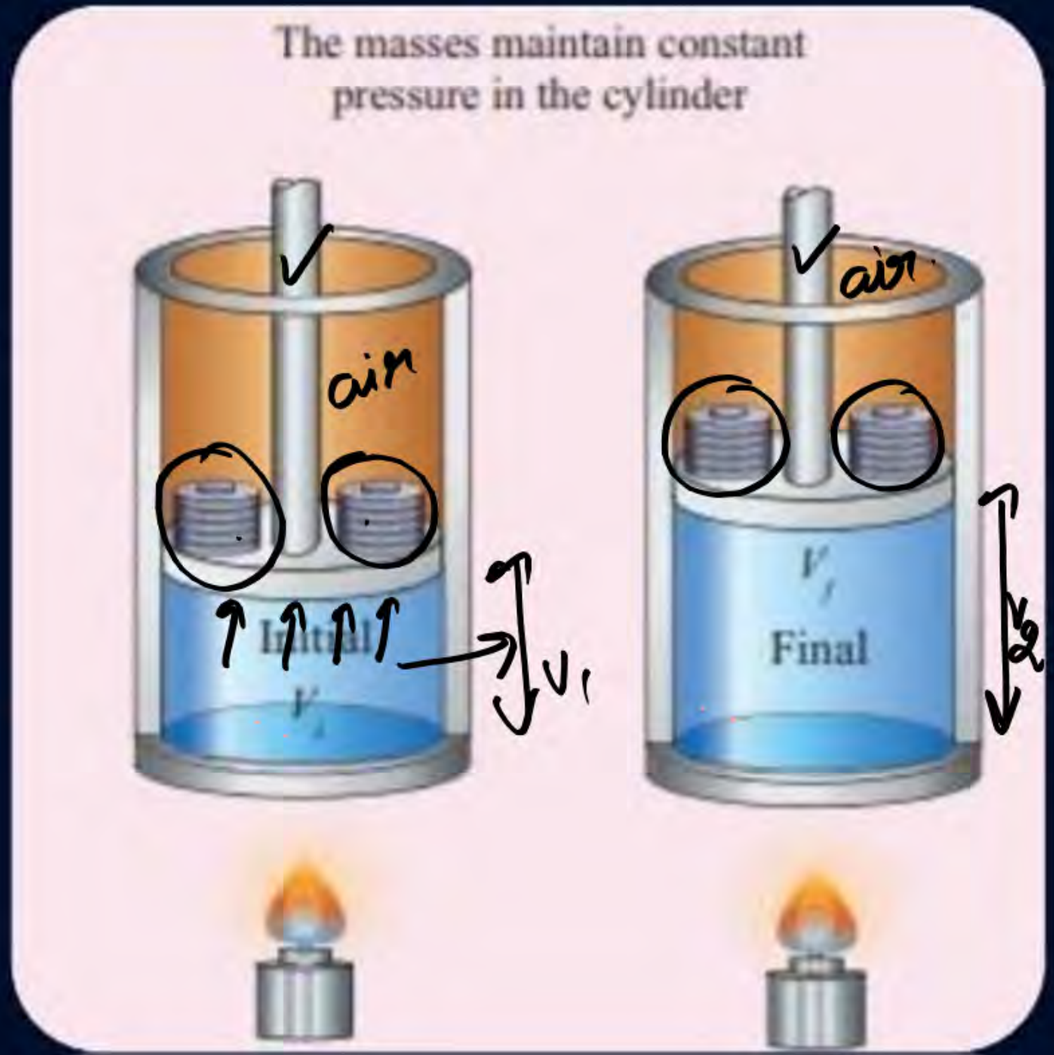
$C_{p,m}$ $\underline{U}$ $\underline{H}$

#MIT...

① here P remains Constt.

$\Delta P = P_2 - P_1 = 0$

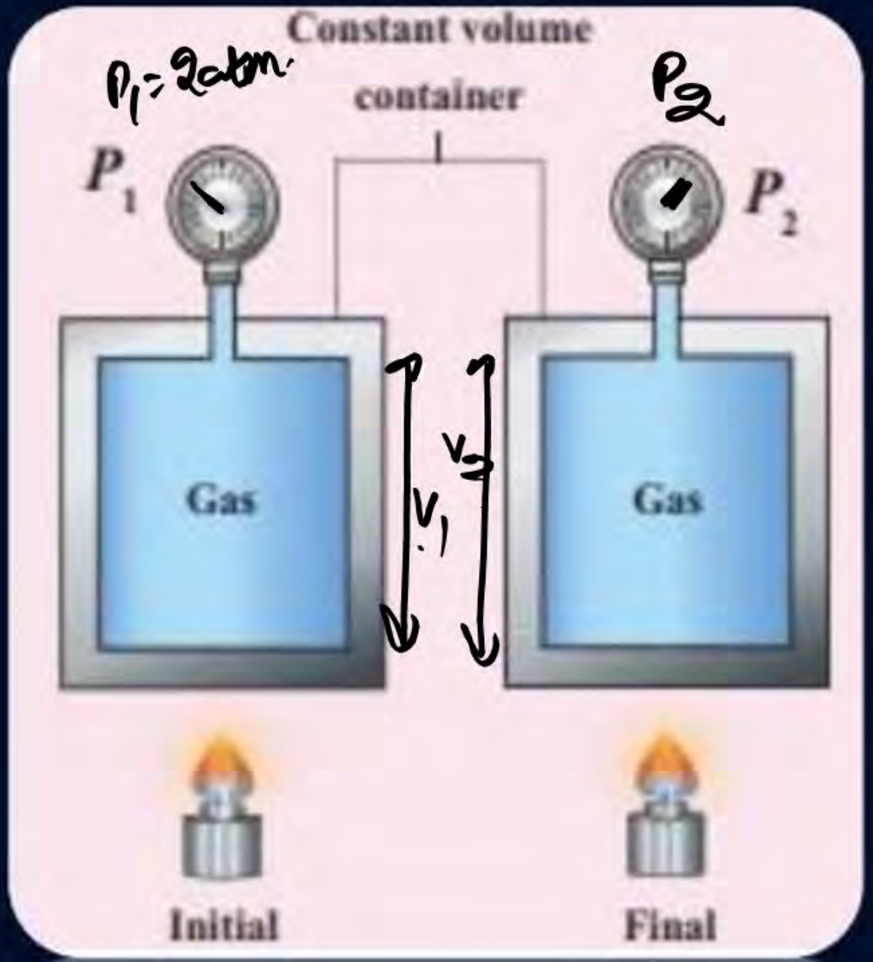
for ex :- Lab. → Δ's at Constt. Pressure.



Isochoric Process

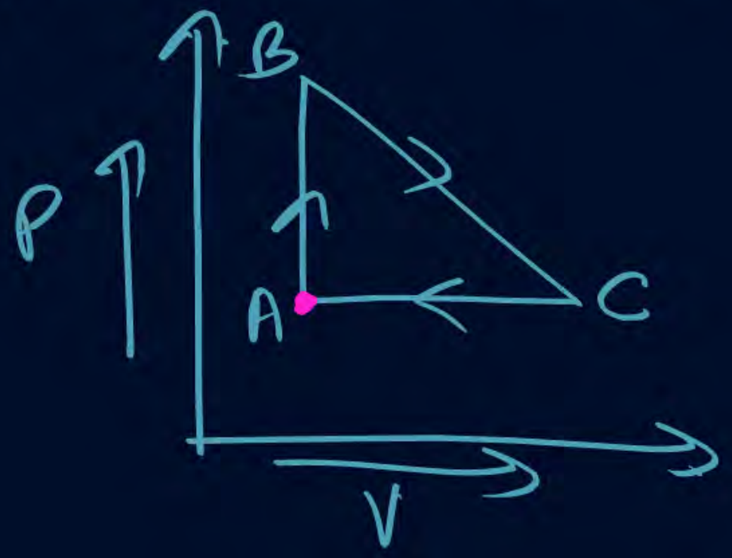
① Volume remains Constt.

$$\Delta V = V_2 - V_1 = 0$$



Cyclic Process

Initial pt. & Final Pt. same.



Irreversible Process

process which takes place in finite steps.

System & surroundings are not in eq. with each other.

Reversible Process

process which takes infinitesimally slowly
System & surroundings are in eq. with each other.

1Croore sand particles

99,99,999

#MIT

Irreversible process

1. finite steps
2. Real process
3. b/w two steps difference is finite.
4. Can't be plotted in graph.
5. fast
6. Numericals :-

finite steps or quickly or suddenly or fast or Const. external pressure.

Reversible process

1. Infinite steps.
2. Hypothetical process
3. b/w two steps difference is infinitesimally small
4. Can be plotted in graph.
5. slow
6. Numericals

infinite steps or slowly or gradually or graph plotted

QUESTION

In thermodynamics, a process is called reversible when:

A surroundings and system change into each other ✗

B there is no boundary between system and surroundings ✗

C ✓ the surroundings are always in equilibrium with the system

D the system changes into the surroundings spontaneously

QUESTION – (AIIMS 2002)

Assertion: During an adiabatic process, heat energy is not exchanged between system and its surroundings.

Reason: The temp. of a gas increases when it undergoes an adiabatic expansion.

(A) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

(B) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

(C) If the Assertion is correct but Reason is incorrect.

(D) If both the Assertion and Reason are incorrect.

(E) If the Assertion is incorrect but the Reason is correct.

QUESTION – (NEET 2024)

Match List I with List II. Choose the correct answer from the option given.

List – I (Process)		List (conditions)	
A.	Isothermal process	I.	No heat exchange
B.	Isochoric process	II.	Carried out at constant temperature
C.	Isobaric process	III.	Carried out at constant volume
D.	Adiabatic process	IV.	Carried out at constant pressure

(A) A-IV, B-III, C-II, D-I

(B) A-IV, B-II, C-III, D-I

(C) A-I, B-II, C-III, D-IV

(D) A-II, B-III, C-IV, D-I

QUESTION

The process, in which no heat enters or leaves the system, is termed as:

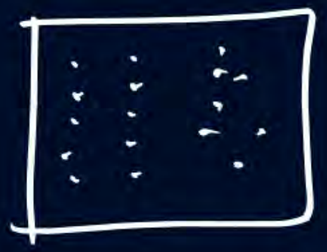
A. Isochoric

B. Isobaric

C. Isothermal

D. Adiabatic

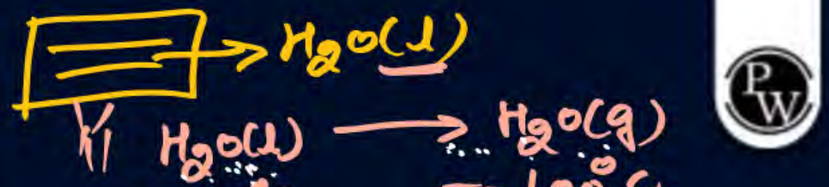
Internal energy (U or E) :-



Sum of all the energies of system.

$U = K.E. + P.E.$ $\left(K.E. = \frac{3}{2}nRT\right)$ $(K.E. \propto T)$

(P.E. → interaction) (P.E. Changes $\underline{V}$)



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① $U = f(T, V)$

② in Case of Ideal gas ⇒ $U = f(T)$

③ unit is J or Cal $\quad 1\,Cal = 4.183\,J \approx 4.2\,J$

④ Ext. prop.

⑤ for ideal gas; $T \uparrow \; U \uparrow$

$T \downarrow \; U \downarrow$

$\therefore \Delta T = (+)ve \Rightarrow \Delta U = (+)ve$

$\Delta T = (+)ve \Rightarrow \Delta U = (-)ve$

⑥ U is stt f^n

QUESTION – (AIPMT 2012)

Adiabatic expansions of an ideal gas is accompanied by

(A) decrease in ΔE or ΔU

(B) increase in temperature

(C) decrease in ΔS

(D) no change in any one of the above properties

THANK YOU