



## INTERMEDIATE

# Heat Physics

*Hand Notes For JEE Mains, Advance, NEET UG, Class 11 & 12 etc...*

## Hand Notes

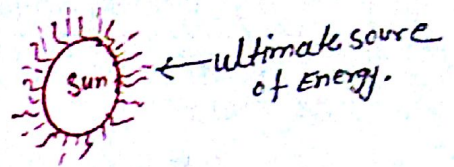
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**Note :** We also providing IIT JEE, Advance, NEET, JEE UG, GATE, IES, PSUs & Competitive Exam Materials [Handnotes, Shortnotes & Books], All Reports [Seminar Reports & PPT]

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# HEAT

- |1| → CALORIMETRY
- |2| → K.T.U
- |3| → THERMODYNAMICS
- |4| → THERMAL EXPANSION



## Heat Transfer

- |1| → CONDUCTION
- |2| → CONVECTION
- |3| → RADIATION

## CALORIMETRY

### 1 → # Internal energy (U)

$$U = K.E + P.E$$
 Molecular motion.      Molecular configuration

$* K.E = f(T)$   
 $* P.E \propto I.M.F$

$* T = \text{const} \Rightarrow K.E \Rightarrow \text{const.}$   
 $U_{\text{solid}} < U_{\text{liq}} < U_{\text{R.G}} < U_{\text{I.G}}$

$* I.M.F \rightarrow \text{solid} > \text{liquid} > \text{Real gas} > \text{Ideal gas}$   
 $* P.E \rightarrow \text{Solid} < \text{liq} < \text{R.G} < \text{I.G}$

Eg →  $U_{\text{Ice}} < U_{\text{H}_2\text{O}}$

### # Internal Energy of gas

#### Ideal Gas (I.G)

- \*  $I.M.F = 0$
- \*  $P.E = 0$
- \*  $U = K.E = f(T)$

#### Real Gas (R.G)

- \*  $I.M.F \neq 0$  ( $I.M.F \propto \frac{1}{I.M.D}$ )
- \*  $P.E \neq 0$
- \*  $U = f(T, I.M.D)$
- \*  $I.M.D \uparrow$  (Expansion)  $\Rightarrow I.M.F \downarrow \Rightarrow P.E \uparrow \Rightarrow U \uparrow$
- \*  $I.M.D \downarrow$  (compression)  $\Rightarrow I.M.F \uparrow \Rightarrow P.E \downarrow \Rightarrow U \downarrow$

AIR  
AIMS

- NOTE** • Applicable for both I.G & R.G.
- \* In isothermal process of I.G internal energy remain same but in case of Real gas it will change with intermolecular distance.
  - \* In a <sup>or Isochoric</sup> isometric process when gas absorb heat internal energy ↑ & when it is reject heat its energy ↓.
  - \* Phase conversion takes place at const. temp but change in internal energy is not equal to zero.

Solid  $\xrightarrow[T_m.P]{T=C}$  Liq  $\xrightarrow[T.B.P=C]{T=C}$  Vapour

- \*  $T=C \Rightarrow K.E \Rightarrow \text{same} \Rightarrow \Delta K.E = 0$
- \*  $V \uparrow \Rightarrow I.M.D \uparrow \Rightarrow I.M.F \downarrow \Rightarrow P.E \uparrow \Rightarrow U$

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### EXCEPTION

Ice  $\xrightarrow[T_m.P=C]{T=C}$  Water

- \*  $V_{\text{ice}} > V_{\text{water}} \rightarrow$  due to H-bonding
- \*  $V \downarrow \Rightarrow I.M.D \downarrow \Rightarrow I.M.F \uparrow, P.E \downarrow \Rightarrow U$