

### 1. Detail of Unit Revision

Subject Name	Physics
Course Name	Physics 02 (Physics Part-2, Class XI)
Module Name/Title	Unit 8: Thermodynamics_Revision
Objectives	<p>After going through this lesson, the learners will be able to understand</p> <ul style="list-style-type: none"> <li>• How to plan for study</li> <li>• How to consolidate the unit</li> </ul>
Keywords	Zeroth law of thermodynamics, thermal equilibrium, Work, internal energy, heat, temperature, pressure, volume etc.

### 2. Development Team

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## Study Guide

### Unit 8 Physics 02

#### Thermodynamics

**Thermal equilibrium and definition of temperature (zeroth law of thermodynamics), heat, work and internal energy. First law of thermodynamics: isothermal and adiabatic processes. Second law of thermodynamics: reversible and irreversible processes, Heat engine and refrigerator.**

This unit has many new concepts and new words. You may need extra effort to understand these.

So

- **first just read from the e content**
- **make a list of new words**
- **Next watch the videos**
- **Then read the book**
- **Now make your notes-definitions, processes, graphs**
- **Solve problems**

#### Check list for each new concept

- **Thermal equilibrium and definition of temperature**  
The word equilibrium means balance, hence balance of heat exchange
- **Zeroth law of thermodynamics**  
Essentially explains the concept of temperature
- **Difference between temperature heat,**  
Heat is a form of energy; temperature is an indicator of heat, not a measure. Two objects at the same temperature may have different amounts of heat, because their mass and material may be different. The amount of heat absorbed or released by a unit mass of material to raise its temperature by unity is different.
- **Work and internal energy.**  
Addition of heat causes the temperature to rise, may change the state or expand the heated system. The expansion is used for doing external mechanical work. The expansion of gases is far greater than that in solids and liquids. This makes gaseous

systems more useful for doing mechanical work such as moving vehicles. It is for this reason that in our course we give more importance to gases.

- **First law of thermodynamics:**

This relates heat energy to change in internal energy (accounted by change in temperature) and mechanical work.

- **Isothermal and Adiabatic processes.**

Processes or ways in which we can change the state of an enclosed mass of gas under suitable conditions.

- **Second law of thermodynamics:**

Since all the heat energy cannot be converted into mechanical energy, the experimental result led to the scientific statement by Kelvin and others

- **Reversible and irreversible processes,**

- **Heat engine**

A device which converts heat energy into mechanical work

- **Refrigerator.**

The e content should help you overcome the difficulties.

Write the equations

- **Relation between change in heat energy, change in internal energy and heat**
- **Efficiency of heat engines**
- **Coefficient of performance of Refrigerator.**

Draw P-V indicator diagrams to show change of state of a gas by different processes

- **Isothermal,**
- **isochoric,**
- **adiabatic,**
- **isobaric,**
- **reversible cycles**