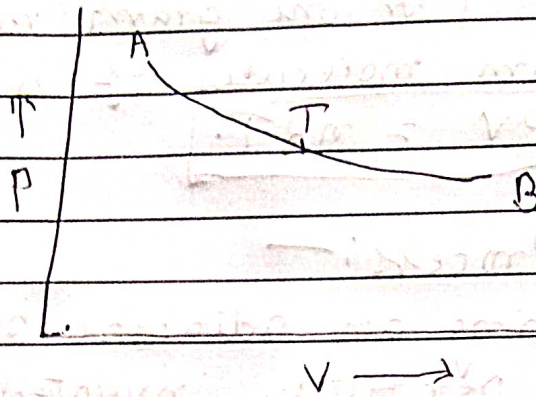


* Isothermal Process: -

If the system is perfectly conducting to the surroundings and the temperature remains constant throughout the process, it is called isothermal process.



Let us consider a working substance at a certain pressure and temperature and having a volume represented by the point A.

Pressure is decreased and work is done by working substance at the cost of its internal energy and there should be fall in temperature.

But the system is perfectly conducting to the surroundings. It absorbs heat from the surroundings and maintains a constant temperature. Thus from A to B the temperature remains constant. The curve AB is called the isothermal curve or isotherm.

Let us consider the working substance at the point B and let the pressure be increased. External work is done on working substance and there should be rise in temperature. But the system is perfectly conducting to the surroundings. It gives extra heat to the surroundings and its temperature remains constant from B to A.

Thus during the isothermal process, the temperature of the working substance

remains constant. It can absorb heat or give heat to the surroundings. The equation for an isothermal process is

$$PV = RT = \text{Constant}$$

(For one gram molecule of a gas.)

For n gram molecules of a gas

$$PV = nRT.$$

* Adiabatic Process:—

During an adiabatic process, the working substance is perfectly insulated from the surroundings. It can neither give heat nor take heat from surroundings. When work is done on the working substance, there is rise in temperature because the external work done on the working substance increases its internal energy. When work is done by working substance, it is done at the cost of its internal energy. As the system is perfectly insulated from the surroundings, there is fall in temperature.

Thus during an adiabatic process, the working substance is perfectly insulated from surroundings. All along the process, there is change in temperature. A curve between pressure and volume during the adiabatic process is called an adiabatic curve or an adiabatic.

- * Example I:— The compression of the mixture of oil vapour and air during compression stroke of an internal combustion is an adiabatic process and there is rise in temp.
- II:— The expansion of combustion products during the working stroke of an engine is an adiabatic process and there is fall in temperature.
- III:— The sudden bursting of a cycle tube is an adiabatic process.