Expansion in gases A gradual expansion without change in temperature is termed isothermal. 3.10.3 24 A gradual expansion without transfer of heat to or from the gas is termed adiabatic. If the temperature of a fixed mass of a gas was held constant while its volume was varied over wide limits, then the pressure exerted by the gas varies also in such a way that the product of pressure and volume remained approximately constant. This relation is known as Boyle's law may be written in the form: P * V = constant (18) Fig.8. show the relation between the volume and pressure of the gas at constant temperature. Fig.8. Expansion of gases under constant temperature All gases tend to expand when heated, and if the gas is allowed to expand by a suitable amount, then the pressure may be kept constant. Charles's constant pressure law states that at constant pressure, for a rise in 25 temperature, all gases expand by a constant amount, equal to about 1/273 the law states that: Vt = Vo (1 + α t) (19) Where Vt is the volume at t oC, Vo is the volume at 0 oC and α is the temperature coefficient of increase of volume at constant pressure. (α = 1/273 approximately). Fig.9. show the thermal expansion of gas at constant pressure. Fig. 9. Expansion of gas under thermal pressure If the volume of the gas is kept constant, then the pressure increases with temperature according to the relation: Pt = Po (1 + ؟ t) (20) Where Pt is the pressure at t oC, 25 temperature, all gases expand by a constant amount, equal to about 1/273 the law states that: Vt = Vo (1 + α t) (19) Where Vt is the volume at t oC, Vo is the volume at 0 oC and α is the temperature coefficient of increase of volume at constant pressure. (α = 1/273 approximately). Fig.9. show the thermal expansion of gas at constant pressure. Fig. 9. Expansion of gas under thermal pressure If the volume of the gas is kept constant, then the pressure increases with ,temperature according to the relation: Pt = Po (1 + ؟ t) (20) Where Pt is the pressure at t oC