SUMMARY

The motive of the present work is to design an efficient ejector system in order to establish the felicitous atmospheric discharge for Sub-atmospheric systems. Since these systems are usually beset with the quandary of atmospheric discharge, due to which the efficiency is decremented, ergo the design of an efficient ejector system for better efficiencies, is indispensable. Afore starting the project work, a profound study from the Book "Modern Compressible flow" and from an Online course of Gas dynamics has been done in order to assimilate cognizance of fundamental concepts of Thermodynamics, Compressible and Incompressible flows and their properties. This additionally includes the profound study of few Research articles predicated on Supersonic Chemical laser, Analysis of Ejector designs and their Performance. Two different modes of Motive gas injection namely Peripheral Mode and Central mode, for each stage of a 2-stage Ejector system, have been worked out in the present work. First of all, in order to study the pressure recuperated at the terminus of each stage, calculations regarding Mach numbers, Static Pressure, Stagnation Pressure for each stage have been carried out for both the modes. Withal, the calculations have been done to estimate the geometry of each stage of the ejector for two different modes. Further, to achieve the required pressure recuperation at the exit of ejector, the geometry of the ejector is estimated by carrying out the calculations. The geometry calculations are done by calculating the area, diameters and angles of sundry components of the ejector. A MATLAB code is developed to get all the calculated results analytically along with graph plotting. In order to understand the transmutation in recuperation ratio by transmuting input parameters, Pressure ratios and Entrainment ratios are varied, keeping one parameter constant and another varying at a time. And then analysis of varying recuperation ratio is done with the avail of graphs. To visually perceive how the recuperated pressure changes if the cavity conditions are transmuted, the values of Test chamber pressure and Mach number are varied and recuperated pressure is noted accordingly. First, the Cavity Mach number is kept constant and Test chamber pressure is varied and the transmutation in the Recuperated Static and stagnation pressure at the terminus of each stage is studied. After that, Test chamber Mach number is varied only and pressure is kept constant and the vicissitude in Static and stagnation pressure achieved at the cessation of each stage is studied. All the results have been shown graphically and analysis of Pressure instauration for varying conditions has been done.