P R E F A C E

This dissertation entitled "Some Problems in boundary layer theory" contains two chapters.

First chapter is introductory which deals with the brief history of the boundary layer theory. In this chapter we enlisted some major developments in this theory by various research workers and also gave some basic concepts as per requisite for the problems to be discussed in the second chapter.

The second chapter covers the study of approximate methods for the solution of boundary layer equations. Firstly in this chapter we have studied the approximate solution of Pohlhausen's problem of free convection on a heated vertical plate by taking the boundary conditions as

$$u = u_1(x)\eta\ (1 - \eta)^4$$

$$\theta = (1 - \eta)^4$$

and obtained the solution

Secondly we have studied the approximate solution of Ka'rm'ans - Pohlhausen method for taking the sixth degree velocity profile as

$$\frac{u}{U} = f(\eta) = \sum_{i=0}^{6} a_i \eta^i \quad ; \quad 0 \leq \eta \leq 1$$

$$\frac{u}{U} = 1 \quad \text{for } \eta \geq 1, \quad \eta = y/\delta$$

Further we obtain the displacement thickness, momentum thickness and shearing stress at the wall. Also we obtain the application of Ka'rm'an Pohlhausen method for (i) Boundary layer over a flat plate, and (ii) Two dimensional stagnation point flow.

Thirdly we calculate suction velocity at the point of separation for a boundary layer flow over a flat porous plate by using second problem.

Lastly we calculate the approximate solution of Pohlhausen's problem of forced convection on a heated vertical plate by taking the tenth degree velocity profile as

$$\frac{u}{U_\infty} = f(\eta) = \sum_{i=0}^{10} a_i \eta^i \qquad 0 \leq \eta \leq 1$$

$$u = U_\infty , \quad \eta > 1$$

where $\eta = y/\delta$

and also we discuss the cooling problem and adiabatic wall for the above problem.