Preface

The ' thesis ' is intended to study and to investigate theoretically the nature of the flow of viscous (Stratified) incompressible fluid over a porous surface and commits to infer fundamental features at length. In laminar flow , the fluid adhers to certain laws viz , the particle of fluid moves parallel to the plane boundary and has its velocity in direction on everywhere same and in magnitude proportional to the distance from the rigid boundary.The relation between shearing stress and the strain is governed by Stoke's Law. The flow region for viscous stratified fluid in this study of consideration , is divided into two zones. Zone-1 pertains to the flow called free flow governed by Navier-Stokes equation in the region between the permeable upper plate and porous bed. Zone 2 pertains to the flow in the bed governed by modified Darcy's Law.

Stokes hypothesis and the incompressible assumption of the viscous fluid in Zone-1 make the fundamental Stokes-Navier equation amenable to integration which otherwise impossible in the general case.

The intention of the study of the flow of viscous stratified fluid over a porous bed is that stratification may provide a scope to evolve techniques for studying pore size in a porous media. The physical reason is that the stratification may retard or accelarate the flow depending on the magnitude of the retardation or accelaration in relation to slip parameter (α), stratification factor (n) and porosity factor (δ). Hence it may be expected that these factors might provide a technique for studying pore size in a porous medium which may be significant in petroleum industry.

The topic has provided exact solution of many problems of practical interests as has been reiterated in a number of research papers.

The present work aims at studying certain problems of laminar viscous incompressible fluid and viscous stratified fluid over a porous bed under applied forces and natural conditions. The contents of

the topics are arranged in five chapters. Chapter-I is the review work and deals with the introduction of the thesis. The remaining Chapters in succession , are concerned with the flow of viscous strartified fluid , effects of viscous stratified fluid on boundary layer thickness,flow of viscous liquid over a porous bed and the flow of viscous stratified liquid over an inclined porous bed . Synopsis of work , review of allied works and discussion of the result are given in the general introduction and also in the introduction of each paper .