

CONTENTS	PAGE NO.
Acknowledgement	
List of publication	
Preface	
Contents	i
List of Photographs	iii
List of Tables	iv
List of Figures	v
Summary	vii
Chapter - 1: Introduction	1-17
Chapter - 2: Experimental Setup and Techniques	19-27
2.1 Experimental Setup	19
2.2 Rheological properties of SCMC solutions	19
2.3 Experimental Procedure	22
Chapter - 3: Hydrodynamics using non-Newtonian liquids	29-53
3.1 Introduction	29
3.2 Experimental Procedure	31
3.3 Results and Discussions	31
3.3.1 Effective shear rate	31
3.3.2 Bubble characteristics and flow regime	32
3.3.3 Frictional pressure drop	34
3.3.4 Effect of SCMC concentration	35
3.3.5 Effect of orifice diameter	37
3.3.6 Effect of taper angle	37
3.3.7 Comparison with literature	38
3.3.8 Empirical correlation	40
3.3.8.1 Correlation for gas holdup	40
3.3.8.2 Correlation for frictional pressure drop	42
3.4 Conclusions	43
Chapter - 4: Applicability of ANN in hydrodynamics studies	55-71
4.1 Introduction	55
4.2 ANN methodology	56
4.3 Performance of the ANN	57
4.4 Prediction of gas holdup	59
4.4.1 Input parameters are the physical and operating variables for prediction of gas holdup	59
4.5 Prediction of frictional pressure drop	60
4.5.1 Input parameters are the physical and operating variables for prediction of frictional pressure drop	60

4.6 Conclusions	61
Chapter - 5 : Hydrodynamics using electrolyte	73-78
5.1 Introduction	73
5.2 Experimental Procedure	74
5.3 Result and discussion	75
5.3.1 Variation of gas holdup with gas flow rate at different NaCl solution Concentrations	75
5.3.2 Variation of gas holdup with gas flow rate at different clear liquid Height	75
5.4 Conclusions	76
Nomenclature	79-80
References	81-95
Appendix - 1	97
Appendix - 2	103
Appendix - 3	129
Appendix - 4	136