Contents		Pages
Acknowledgement		**v-vi**
Contents		**vii-x**
List of Figures		**xi-xiii**
List of Tables		**xiv**
Preface		**xv-xvii**
Chapter 1.	**Introduction**	**01-30**
§1.1	**Non-linear waves**	**01**
§1.2	**Hyperbolic partial differential equations**	**04**
§1.3	**Shock wave and Rankine-Hugoniot Condition**	**07**
§1.4	**Simple Wave and Progressive wave**	**10**
§1.5	**Non-Ideal Gas**	**13**
§1.6	**Magnetogasdynamics**	**15**
§1.7	**Cauchy problem**	**17**
§1.8	**Riemann problem**	**18**
§1.9	**Dusty gas and its equation of state**	**20**
§1.10	**Review of literature**	**25**

Chapter 2.	**On the decay of a sawtooth profile in non-ideal magnetogasdynamics**	**31-44**
§2.1	**Introduction**	**31**
§2.2	**Governing equations**	**32**
§2.3	**Progressive wave solution**	**33**
§2.4	**Acceleration waves**	**36**
§2.5	**Weak shock**	**37**
§2.6	**Behavior of sawtooth profile**	**38**
§2.7	**Result and Discussion**	**42**
§2.8	**Conclusion**	**43**
Chapter 3.	**Solution of Riemann problem for dusty gas flow**	**45-72**
§3.1	**Introduction**	**45**
§3.2	**Formulation of the problem**	**47**
§3.3	**The Riemann problem and generalized Riemann invariants**	**48**
§3.4	**Equation for pressure and velocity**	**51**
§3.5	**Numerical solution**	**57**
§3.6	**Summary of the solution**	**58**

§3.7	**Result and discussion**	**63**
Chapter 4.	**On the Cauchy problem for isentropic dusty gas**	**73-82**
§4.1	**Introduction**	**73**
§4.2	**Governing equations**	**74**
§4.3	**Solution of the problem**	**75**
§4.4	**Main result**	**76**
§4.5	**Conclusion**	**82**
Chapter 5.	**Simulation of two dimensional dam break problem with variable bottom geometry**	**83-112**
§5.1	**Introduction**	**83**
§5.2	**Governing equations**	**86**
§5.3	**One dimensional flow and Riemann problem**	**86**
§5.4	**Numerical solution** **5.4.1 Method of solution** **5.4.2 Random Choice Method** **5.4.3 The FORCE Method** **5.4.4 Source term discretization** **5.4.5 Time Step**	**88-94** **89** **90** **92** **94** **94**

§5.5	**Two Dimensional Case**	**95**
§5.6	**One dimensional test problems**	**96**
§5.7	**Two dimensional test problems**	**99**
§5.8	**Conclusion**	**112**
Chapter 6.	**Numerical solution of Euler equations with gravity using HLLC method**	**113-128**
§6.1	**Introduction**	**113**
§6.2	**Governing Equations**	**116**
§6.3	**One dimensional flow and Riemann problem**	**117**
§6.4	**Method of solution**	**120**
§6.5	**HLLC Method**	**121**
§6.6	**Wave speed estimate and time step size**	**124**
§6.7	**Numerical Examples**	**126**
§6.8	**Result and discussions**	**127**
Bibliography		**129-137**
List of Publications		