CHAPTER - I : GENERAL INTRODUCTION

1.1 Plasma, the 4th state of matter ... 1
1.2 Occurrence of plasma ... 3
1.3 Laboratory plasma ... 4
1.4 Plasma processes ... 5
1.5 Plasma characteristics ... 9
1.6 Parameters of interest ... 10
1.7 Expression for rate of growth and decay of electron density in plasma ... 17
1.8 Present work ... 18
REFERENCES ... 23

CHAPTER - II : A GENERAL REVIEW

2.1 Breakdown potential & electrical discharge ... 26
2.2 Electrodeless RF discharge & breakdown ... 30
2.3 Ionisation and de-ionisation times ... 36
2.4 Microwave probing technique ... 38
2.5 Recombination coefficient ... 40
2.6 Attachment coefficient ... 46
REFERENCES ... 58
CHAPTER - III : EXPERIMENTAL ARRANGEMENT

3.1 Introduction

3.2 Radio frequency unit for plasma production

3.3 Microwave propagating system

3.4 Detection and display of microwave signal

3.5 Vacuum system and gas introducing procedure to the system

3.6 Delayed microwave scanning technique

3.7 Shielding of rf noise

3.8 Measurement of rf frequency, rf voltage and rf current

REFERENCES

CHAPTER - IV : EXPERIMENTAL METHOD & RESULTS

4.1 Introduction

4.2 Preparation prior to the experiment

4.3 Measurement of power absorbed during the discharge

4.4 Measurement of electron density

4.5 Instantaneous electron density, Ionisation time, de-ionisation time

4.6 Rate of generation, ionisation frequency, electron temperature and electron neutral collision frequency
CHAPTER V: DISCUSSION ON THE RESULTS OBTAINED AND SCOPE OF FUTURE STUDY

5.1 Introduction ... 157

5.2 Investigation on absorbed power density and the electron neutral collision frequency in rf plasma ... 157

5.3 Ionisation and de-ionisation times ... 160

5.4 Study of recombination coefficient, rate of generation and ionisation frequency ... 161

5.5 Measurement and study of attachment coefficient ... 163

5.6 Errors in the measurement ... 169

5.7 Importance of the study of attachment coefficient ... 171

5.8 Scope of future study ... 172

REFERENCES ... 173

4.7 Recombination coefficient ... 131

4.8 Attachment coefficient ... 131

4.9 Results obtained ... 135

REFERENCES ... 155