# CONTENTS

## CHAPTER - 1 INTRODUCTION

1.1 Scope and objective .......................... 1  
1.2 Radiation protection ......................... 7  
1.3 Early work .................................. 12  
1.4 Importance of the present work .............. 17  
1.5 Neutron sources .................................. 19

## CHAPTER - 2 NEUTRON DETECTORS

2.1 Principles .................................... 43  
2.2 Long counter .................................. 46  
2.3 Activation detectors .......................... 52  
2.4 Gamma ray spectrometer ...................... 65  
2.5 Multichannel analyzer ........................ 76  
2.6 Scintillometer (SM 141D) ..................... 85

## CHAPTER - 3 NEUTRON SHIELDING

3.1 Introduction to polymers ..................... 86  
3.2 Attenuation of Am-Be (α, n) neutrons ......... 95  
3.3 Production of high energy gamma rays ....... 119

## CHAPTER - 4 THEORY OF NEUTRON SCATTERING

4.1 Interaction of neutrons with matter .......... 124  
4.2 Resonance scattering .......................... 128  
4.3 Method of partial wave analysis .............. 133  
4.4 Optical method ................................ 136  
4.5 The scattering cross section for hydrogen ... 137  
4.6 Macroscopic cross section & relaxation length 138  
4.7 Macropscopic removal cross section .......... 140

## CHAPTER - 5 THEORETICAL COMPARISON

5.1 Monte Carlo technique ........................ 141  
5.2 Statistics of neutron transmission ............ 147

## CHAPTER - 6 CONCLUSION

.................................................. 154