

# **CONTENTS**

Acknowledgments	(i)
Abstract	(ii)
Contents	(v)

## **CHAPTER ( I )**

### **INTRODUCTION**

1.1. Direct Nuclear Reactions	1
1.1.1. Survey On One And Two Nucleon Transfer Reactions	3
1.1.2. Survey On One Cluster Transfer Reactions	7
1.2. Elastic Scattering Processes	9
1.2.1. Ambiguities In Optical Potentials	11
1.2.2. Anomalous Large Angle Scattering (ALAS)	12
1.2.3. Survey On The Elastic Scattering Of $^{16}\text{O}+^{12}\text{C}$ , $^{19}\text{F}+^{12}\text{C}$ , $^{16}\text{O}+^{24}\text{Mg}$ , $^{12}\text{C}+^{24}\text{Mg}$ , $^4\text{He}+^{12}\text{C}$ And $^4\text{He}+^6\text{Li}$ Processes	14
1.3. High Energy Nuclear Reactions	17
1.4. The Aim Of The Present Work And Brief Description Of The Contents Of The Thesis	19

## **CHAPTER ( II )**

### **TWO CLUSTER TRANSFER REACTION MECHANISM**

2.1. DWBA Differential Cross-Section Formalism	21
2.2. Numerical Calculations	29
2.3. Some Remarks About The Parameters	30
2.3.1. Effect Of The Size Parameters Variation	31

---

2.4. Analysis Of Some Nuclear Reactions Through Two	
Cluster Transfer Mechanism	33
2.4.1. The $({}^6\text{Li}, d)$ Reactions	33
2.4.2. The $({}^{16}\text{O}, {}^{12}\text{C})$ Reactions	36
2.5. Elastic Transfer Process	37
2.5.1. The ${}^{12}\text{C}({}^{16}\text{O}, {}^{16}\text{O}){}^{12}\text{C}$ Process	38
2.5.2. The ${}^{24}\text{Mg}({}^{16}\text{O}, {}^{16}\text{O}){}^{24}\text{Mg}$ Process	39
2.5.3. The ${}^{24}\text{Mg}({}^{12}\text{C}, {}^{12}\text{C}){}^{24}\text{Mg}$ Process	40
2.5.4. The ${}^{12}\text{C}({}^4\text{He}, {}^4\text{He}){}^{12}\text{C}$ Process	40
2.5.5. The ${}^6\text{Li}({}^4\text{He}, {}^4\text{He}){}^6\text{Li}$ Process	41
2.5.6. The ${}^{12}\text{C}({}^{19}\text{F}, {}^{19}\text{F}){}^{12}\text{C}$ Process	42
2.6. Conclusions	43
Tables	45
Figure Captions	47

### CHAPTER ( III )

#### ANALYSIS OF THE ELASTIC SCATTERING PROCESS THROUGH KNOCK-OUT MECHANISM

3.1. The differential Cross-Section Of The Knock-Out Mechanism	63
3.2. The ${}^{12}\text{C}(p, p){}^{12}\text{C}$ Process	68
3.3. Conclusions	72
Tables	73
Figure Captions	75
Appendix (A)	84
References	88
	97