**INDEX**

**Chapter Topics Page no.**

1. **Wind Energy- An Overview**...…………………………………………[1-3]
   1. Definition of wind…..……………………………………….[1]
   2. Wind Energy and wind Power……………………………...[1]
   3. Renewable energy…………………………………………..[1]
   4. Overview................................................................................ [2]
2. **Literature survey**…………………………………………………….....[4-5]
3. **History Of Wind Energy**....................................................................... .[6-7]
   1. Major Factors That Have Accelerated The Wind-Power

Technology………………………………………………………………………….[7]

1. **Statistics**……………………………………………………………….. [8-9]

**5 Wind Turbines**……………...................................................................[10-22]

4.1 Principles of wind turbines…………………………………[10]

4.2 Internal components of a wind turbine……...........................[11]

4.3 Types of wind turbines……………………………………..[13]

4.4 Wind Turbine Topologies……...…………………………... [18]

**6** **Wind Farms**…………………………………………………………. [23-25]

5.1 Off shore wind farms………………………………………. [23]

5.2 On shore wind farms………………………………………...[24]

**7 MATLAB/SIMULINK Model**……………………….…..…................[26-29]

6.1 Introduction about MATLAB ……………………………… [26]

6.2 Introduction about SIMULINK……………….......................[26]

6.3 Simulink model of wind speed………………………………[28]

**8** **Wind Turbine Model**…………………………………………………. ..[30-36]

7.1 Design of the wind turbine rotor……………………………...[30]

7.2 Power from the wind………………………………………….[32]

7.3 Mechanical power extracted from the wind…………………..[32]

7.4 Cp (λ, Ө) characteristics of wind turbine……………………..[33]

7.5 Power speed characteristics…………………………………...[34]

7.6 Torque speed characteristics…………………………………..[35]

7.7 Power speed characteristics of variable speed wind turbine….[36]

**9 Drive Train Model**………………………………………………………..[37-38]

**10 Generator Modeling**……………………………………………………….[39-49]

10.1 Introduction about generator……………………………….[39]

10.2 Introduction about PMSG………………………………….[42]

10.3 Mathematical Model of PMSG…………………………….[43]

10.4 PMSG modeled with simulink……………………………..[47]

10.5 Detailed model of a variable-speed PMSG wind turbine…..[48]

**11 Conclusions**……………………………………………………………….50

**12** **Future scope**………………………………………………………………51

**References**………………………………………………………………....52