

Seat No.	
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B.E. (Electrical) (Semester - VII) Examination, December - 2015

**RENEWABLE ENERGY SOURCES**

**Sub. Code : 47938**

Day and Date : Tuesday, 22 - 12 - 2015

Total Marks : 100

Time : 10.00 a.m. to 01.00 p.m.

- Instructions :
- 1) Attempt any three questions from each section.
  - 2) Figures to the right indicate full marks.
  - 3) Draw neat sketches wherever necessary.

**SECTION-I**

- Q1)** a) State various types of renewable energy sources and explain each briefly. [10]  
 b) State and explain factors responsible for growth of renewable energy. [8]
- Q2)** a) Derive expression for power extracted from the wind and explain different terms in the expression. [8]  
 b) At standard atmospheric pressure wind speed is 10m/s calculate power produced by a wind turbine having 100m diameter. The overall efficiency is 42% and density of air is 1.220 kg/M<sup>3</sup>. [8]
- Q3)** a) Explain working of a typical utility scale horizontal axis wind turbine system. Describe functions of major components. [8]  
 b) Using disc theory derive equation to calculate the magnitude of maximum power that can be extracted from the wind stream. [8]
- Q4)** a) Using simplified equivalent circuit explain the working of induction generator. [8]  
 b) Explain working of direct connected synchronous generator in wind power generation. [8]

**P.T.O.**

**SECTION-II**

- Q5) a) Derive time domain model for wind turbine drive train system. [8]  
b) From first principle derive steady state model of constant speed induction generator. [8]
- Q6) a) Describe working of double fed induction generator based on variable speed wind energy system. [8]  
b) Explain working of induction generator with variable rotor resistance. [8]
- Q7) a) What is wind farm integration? Explain effect of wind farm integration on voltage variation of grid. [8]  
b) Explain various causes of harmonics in wind integrated power system. [8]
- Q8) a) Explain different types of PV cell technologies. [9]  
b) Draw and explain equivalent circuit of Photo voltaic cell. [9]

