Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **14EE2031** | **Duration :** | **3hrs** |
| **Sub. Name :** | **RENEWABLE ENERGY -I** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | With neat diagram(s), explain the principle and construction of photovoltaic cell. | CO1 | 10 |
| b. | Briefly discuss the importance of single axis and dual axis tracking system. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | With help of an equivalent circuit, explain the mathematical modeling of single diode model of photovoltaic cell under ideal and practical case. | CO1 | 10 |
| b. | Discuss the factors that affect the photovoltaic cell performance with supporting graphs. | CO1 | 10 |
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| 3. | a. | Discuss the need of Maximum Power Point Tracker in the photovoltaic system with help of P-V graphs for different irradiance and also explain the Incremental Conductance (INC) algorithm to track the maximum power with neat flow chart. | CO1 | 10 |
| b. | With help of neat diagram and equations, explain the Lithium-Ion battery and also discuss the advantages over the other batteries. | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | Discuss the need of DC-DC converter between photovoltaic modules and DC load and also derive an expression for output voltage of buck-boost converter with help of an equivalent circuit. | CO2 | 12 |
| b. | With help of neat diagram, explain the full-bridge PWM inverter showing the controller and PV connections. | CO2 | 8 |
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| 5. | a. | With help of block diagram, explain the Balance of System (BoS) for stand-alone solar photovoltaic system. | CO2 | 12 |
| b. | Briefly discuss the difference between local wind and global wind. | CO3 | 8 |
| (OR) | | | | |
| 6. | a. | Derive an expression for Betz limit and also explain the term cut-in velocity and cut-out velocity with neat Power verses Velocity graph. | CO3 | 15 |
| b. | List down the variables to be considered while selecting the wind mills. | CO3 | 5 |
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| 7. | a. | With help of diagram, derive an expression for axial thrust or force coefficient and torque coefficient. | CO3 | 15 |
| b. | Discuss the concept of dynamic matching in wind mills. | CO3 | 5 |
| (OR) | | | | |
| 8. | a. | With neat diagram, elaborate the construction and working of horizontal axis wind turbine. | CO3 | 10 |
| b. | Derive an expression for the power extraction from the wind and also give the definition of Tip Speed Ratio (TSR). | CO3 | 10 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Explain with relevant diagram, the principle and working of Solar –Wind-Diesel hybrid system. | CO2 | 10 |
| b. | With neat diagram(s), elaborate the working of stand-alone wind energy conversion system. | CO2 | 10 |