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

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

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| **Code :** | **17EE3029** | **Duration :** | **3hrs** |
| **Sub. Name :** | **POWER ELECTRONICS IN WIND AND SOLAR POWER CONVERSION** | **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. | Review the recent trends in energy consumption and the world energy scenario. | CO2 | 10 |
| b. | Write a detailed note on the various energy sources and their availability in India. Comment on the initiatives of the Indian government in expansion of renewable capacity. | CO2 | 10 |
| (OR) | | | | |
| 2. | a. | Assess the availability of solar and wind energy in India. | CO1 | 10 |
| b. | Detail the recent advances in new energy technologies. | CO2 | 10 |
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| 3. | a. | Discuss in detail about photovoltaic energy conversion and the influence of insulation and temperature in PV arrays. | CO1 | 10 |
|  | b. | Explain the operation of various switching devices for solar energy conversion. | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | Elaborate on the various maximum power point tracking algorithms in photovoltaic energy conversion. | CO1 | 10 |
|  | b. | With neat diagrams, write the operation of AC power conditioners in solar PV system. | CO4 | 10 |
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| 5. | a. | Outline the various components of wind energy conversion system and describe the energy conversion process. | CO2 | 10 |
|  | b. | A four pole induction generator is rated at 300 kVA and 480 V. It has the followingparameters: *X LS*= *X LR*= 0.15 Ω, *RLS*= 0.014 Ω, *RLR*= 0.0136 Ω, *X M*= 5 Ω. Howmuch power does it produce at a slip of -0.025? How fast is it turning at that time? Also,find the torque, power factor and efficiency. (Ignore mechanical losses.)  Suppose the generator is used in a wind turbine, and the torque due to the wind isincreased to a value of 2100 Nm. What happens? | CO3 | 10 |
| (OR) | | | | |
| 6. | a. | Discuss the need for and operation of power conditioning schemes in wind energy conversion. | CO4 | 10 |
|  | b. | Illustrate with a neat circuit diagram, the operation of a doubly fed induction generator system. | CO2 | 10 |
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| 7. | a. | Outline the grid connector concepts and grid related problems. | CO6 | 10 |
|  | b. | Write a note on generator control and different schemes of performance improvements during grid integration. | CO5 | 10 |
| (OR) | | | | |
| 8. | a. | Elaborate on the optimization of system components in a wind/solar PV integrated system. | CO6 | 10 |
|  | b. | Highlight on storage and reliability evaluation during grid integration. | CO5 | 10 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Explain the topology and operation of laddered multi-level inverters (MLI) and trinary hybrid MLI for a solar panel. | CO6 | 10 |
|  | b. | Discuss the operation of AC/DC/AC converters for wind turbine systems. | CO6 | 10 |