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



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

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| **Code :** | **18EE3012** | **Duration :** | **3hrs** |
| **Sub. Name :** | **GRID CONVERTERS FOR SOLAR AND WIND POWER SYSTEMS** | **Max. marks :** | **100** |

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Draw the schematic diagram of H5 Inverter and explain the function with advantages and justify this is suitable for which condition. | CO1 | 8 |
| b. | Give outlines of WTS Grid Control with the Different power transfers achieved by the grid converter in the different operating conditions. | CO2 | 8 |
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| 2. | a. | Discuss the International Regulations for Grid Requirements for PV with German, US and Switzerland standard. | CO1 | 8 |
| b. | Give outlines of Active and reactive Power Control in Normal Operation of WTS system. | CO2 | 8 |
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| 3. | a. | Sketch the block diagram of SRF-PLL and explain the operation with the following conditions.   1. Balanced sag. 2. Balanced sag with distorted. 3. Unbalanced sag. | CO3 | 8 |
| b. | Discuss the SOGI –FLL and obtain the steady state frequency error. | CO3 | 8 |
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| 4. | a. | What is the essential for Islanding Detection in DPGS and elaborately discuss any two types of Passive Islanding Detection?. | CO4 | 12 |
| b. | Distinguish between different Active Islanding Detection Methods. | CO4 | 4 |
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| 5. | a. | Derive the mathematical model of a single-phase voltage source inverter (H-bridge) where an LCL ﬁlter is connected on the grid side. | CO6 | 8 |
| b. | Sketch the Grid Converter Control for Wind Turbine System with PQ closed-loop voltage oriented control based on the synchronous dq frame and explain. | CO5 | 8 |
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| 6. | a. | Draw the schematic diagram of HERIC Inverter and explain the function with advantages and justify this is suitable for which condition. | CO1 | 8 |
| b. | Develop the Small Signal Model of a PLL and derive the transfer function of the PLL. | CO3 | 8 |
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| 7. | a. | How to determine the active and reactive power in Grid Converter Control for WTS using direct power control. | CO5 | 8 |
| b. | Discuss the Frequency and Voltage Deviation under Normal Operation of WT System. | CO2 | 8 |
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| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | Illustrate the Decoupled Double Synchronous Reference Frame Current Controllers for Unbalanced Current Injection. | CO6 | 10 |
| b. | Explain the control of the instantaneous active and reactive power exchanged with the grid. | CO6 | 10 |