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

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**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18EE3019** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DISTRIBUTED GENERATION AND MICRO GRID** | **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. | Define distributed generators. When can a distribution system called a microgrid? | CO1 | 3 |
| b. | List out the advantages and disadvantages of DGs being integrated into a distribution system. | CO1 | 4 |
| c. | Highlight the importance of DG integration in smart grids, Also discuss in detail how the load flow anlaysis changes in disitrbution system oing to the integration of DGs. Also write a note on IEEE 1547 Standards. | CO1 | 9 |
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| 2. | a. | What are the inertial systems used as DGs? In what way do they mainly differ from those non-inertial systems? | CO2 | 4 |
| b. | What is the difference between battery and fuel cell? | CO2 | 3 |
| c. | Briefly write the significance of the following types of DGs:   1. Combined heat and power generation 2. Small hydro power generation 3. Solar thermal power generation | CO2 | 9 |
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| 3. | a. | What is the necessity for using power electronic interface in case of micro-turbine being used as DGs? | CO2, CO3 | 2 |
|  | b. | Explain with the schematic diagram, the details of the BoS for Solar and fuel cell based distirbuted generation units. | CO2, CO3 | 8 |
|  | c. | Where are PMSGs preferred over induction generators in wind energy conversion systems? Also draw any one topology used for charging of electic vehicles. | CO3 | 6 |
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| 4. | a. | Comment on the reclosure transients that could occur in DGs | CO4 | 4 |
|  | b. | Brief on the grounding issues and most severe faults with due justification. | CO4 | 4 |
|  | c. | Differentiate active and passive islanding techniques in DGs. Also draw and explain any one topology for active islanding detection technique. | CO4 | 8 |
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| 5. | a. | What is an unbalanced grid? What are the possible power quality issues that could frequently occur in a micro-grid? | CO5 | 5  (2+3) |
|  | b. | Write in detail the power quality issues that are more prone in Inverter based DGs. | CO5 | 4 |
|  | c. | Give few suggestions to be followed in DG integration to avoid power quality issues. | CO5 | 7 |
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| 6. | a. | What are the significant advantages of autonomous and non-autonomous micro-grids? | CO6 | 3 |
|  | b. | Explain with suitable case study the micro-grid communication architecture of any type. | CO6 | 8 |
|  | c. | What is the necessity of stability analysis for a radial structured micro-grid? | CO6 | 5 |
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| 7. | a. | What is a micro-turbine? In what way is it different from hydro-turbines? | CO2 | 4 |
|  | b. | Brief on the flicker issues that are possible to happen in micro-grids. | CO5 | 3 |
|  | c. | What is a DC micro-grid? What is its significance? In what means is it different from AC Micro-grids? | CO6 | 9 |
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| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | Explain the impacts of DGs on transmission systems. | CO1 | 5 |
|  | b. | What are the possibilities of current distortion in power electronics interfaced DGs? | CO4 | 5 |
|  | c. | Give a detailed economic analysis of a micro-grid using an appropriate case study. | CO6 | 10 |