

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

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

**Course Code: EE403**

**Course Name: DISTRIBUTED GENERATION AND SMART GRIDS**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 5 marks.*

Marks

- |   |   |     |
|---|---|-----|
| 1 | What is an active distribution network? Explain its relevancy in microgrid system.                      | (5) |
| 2 | Explain the operation of a lead acid battery and mention its merits and demerits.                       | (5) |
| 3 | Draw the block diagram of an Automated Meter Reading(AMR) system and write the functions of each block. | (5) |
| 4 | Define Energy management. What is the significance of energy management?                                | (5) |
| 5 | Explain briefly the benefits AMI?   | (5) |
| 6 | What are the different advantages of smart substations over conventional substations?                   | (5) |
| 7 | What are the various types of clouds?   | (5) |
| 8 | List the various power quality disturbances in the grid.  | (5) |

**PART B**

*Answer any two full questions, each carries 10 marks.*

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|----|---|------|
| 9  | Draw and explain the typical configuration of a DC microgrid.   | (10) |
| 10 | a) Explain the role of central controller in stand-alone and grid connected mode of operation of microgrids.                  | (5)  |
|    | b) Explain the control functions of micro-resource controller (MC).   | (5)  |
| 11 | Explain the working and operation of different Wind Energy Conversion Systems. Also mention the advantages and disadvantages. | (10) |

**PART C**

*Answer any two full questions, each carries 10 marks.*

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|----|--|---|
| 12 | a) Draw the block diagram and explain the working of Phasor Measurement Unit(PMU). | 5 |
|    | b) What is a smart sensor? Using block diagram, explain the different components   | 5 |

of a smart sensor.

- 13 Explain different scenarios related to the islanding of microgrid? 10
- 14 a) A power station has a maximum demand of 35MW, a plant capacity factor of 50%, a plant use factor of 70% and load factor of 60%. Determine (i) Reserve capacity (ii) Daily energy produced (iii) Maximum energy that can be produced daily if the plant runs as per the schedule. 7
- b) Justify the statement 'Greater the diversity factor, the lesser is the cost of generation of power'. 3

#### **PART D**

*Answer any two full questions, each carries 10 marks.*

- 15 a) Explain the application of SANET in Smart Grid 5
- b) List the SANET actors and explain the requirements of these for different Smart Grid applications. 5
- 16 List and explain the various harmonic sources in grid. 10
- 17 a) Explain cloud computing infrastructure. 5
- b) Explain with neat sketch cloud computing architecture 5

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