

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 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 a microgrid? List the characteristics.  | (5) |
| 2 | Explain the merits and demerits of a solar PV plant.  | (5) |
| 3 | Why conventional over current relays may slowly respond or fail to operate in stand-alone Microgrid with significant number of microsources and power electronic interfaces? Justify.         | (5) |
| 4 | A power generating station has a connected load of 80MW and maximum demand of 52MW. The total energy generated annually is $90 \times 10^6$ kWh. Calculate the demand factor and load factor. | (5) |
| 5 | List various components of Advanced Metering Interface (AMI).   | (5) |
| 6 | Describe the challenges and benefits of Home Area Network(HAN).   | (5) |
| 7 | List the advantages of cloud computing.   | (5) |
| 8 | What are the various sources of harmonics in a smart grid?  | (5) |

**PART B**

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

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|----|--|-----|
| 9  | a) Explain with diagram, the working of energy router based interconnecting frame work for the microgrid system. | (7) |
|    | b) What is the function of Energy Management module in a microgrid configuration?                                | (3) |
| 10 | a) With help of a neat sketch, explain a typical microgrid configuration.  | (6) |
|    | b) Discuss the factors which necessitate the development of smart grid technology.                               | (4) |
| 11 | a) Explain the voltage control method in a microgrid with a Q-V diagram.   | (5) |
|    | b) Explain the load frequency control in micro grid with a P-f diagram.  | (5) |

**PART C**

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

- 12 a) Write a short note on the Plug in Hybrid Electric Vehicle Technology describing the architectures. (5)
- b) What is a Phasor Measurement Unit(PMU)? How PMUs improve the operational efficiency of smart grid? (5)
- 13 Explain in detail, the load shaping objectives and methodologies. (10)
- 14 a) Illustrate the role of technology in demand response. (6)
- b) What are the challenges in implementing demand side management in smart grid? (4)

**PART D**

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

- 15 a) Explain with diagram, about IEC 61850 substation architecture. (5)
- b) Write down the transmission protocol of IEC 61850. (5)
- 16 a) Explain the role of NAN in smart grid technology. (5)
- b) Draw the cloud architecture of a smart grid. (5)
- 17 Briefly explain various harmonic indices. (10)

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