

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

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| 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 90×10^6 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)
