

Duration – 3 Hours

Total Marks- 80

- N.B.:-** (1) Question No.1 is compulsory.
 (2) **Attempt** any **three** questions out of remaining **five** questions.
 (3) Assume suitable data if necessary and justify the same.

- Q 1. Answer **any four** from the following questions. **20**
- A. What is micro-grid? Explain the significance of Micro grid.
 - B. Explain the need of bidirectional convertor in micro-grid
 - C. Distinguish between micro-grid & smart grid
 - D. What are the different micro sources used in MG.
 - E. Compare AC micro-grid & DC micro-grid
 - F. What are the marketing models of MG.
- Q 2 a) Explain the typical micro-grid structure configuration in grid connected mode. **10**
- Q 2 b) What are the power quality issues in Micro grid? Suggest the suitable methods to mitigate the power quality issues. **10**
- Q 3 a) Explain the micro-grid protection scheme when the fault has occurred in grid connected mode. **10**
- Q 3 b) Discuss the technique to control DC-AC convertor in micro-grid. Also elaborate the inverter control issues in formation of micro-grid **10**
- Q 4 a) Discuss the issues in islanded mode of operation of micro-grid **10**
- Q 4 b) Explain the power electronic interface configuration for battery as an energy storage element in micro-grid **10**
- Q 5 a) Discuss the centralized/ hierarchical /hybrid control methods. **10**
- Q 5 b) Describe the power electronic interfaces used for micro sources in MG with neat diagrams. **10**
- Q 6. Write a short note (**any two**) **10**
- a) Communication protocols in micro grid. **10**
 - b) Event triggered & time triggered system
 - c) Flywheel and ultra-capacitor as ESS
