

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**
- Give complete classification of Micro grid.
  - Explain the power quality issue “voltage sag” and justify in what way it is different from under voltage.
  - Explain the role of Energy storage system in micro grid.
  - What is event triggered and time triggered communication.
  - What is Adaptive protection in micro grid?
  - What is non detection zone for protection in micro grid?
- Q 2 a) With the help of neat diagram explain flywheel as ESS for MG. **10**
- Q 2 b) Explain hybrid micro grid with any 2 types of micro sources with neat diagram. **10**
- Q 3 a) What are the different measures to overcome power quality issues in MG. **10**
- Q 3 b) What is P-f and Q-V droop control strategies and why it is required in MG. **10**
- Q 4 a) Explain the different types of power converters or PE interfaces for micro sources. **10**
- Q 4 b) What are the different types of Data communication /protocols used in micro grid? **10**
- Q 5 a) Discuss the centralized & hierarchical control method **10**
- Q 5 b) Explain the issues in islanding detection with an example. **10**
- Q 6. Write a short note (**any two**) **10**
- Battery as ESS in MG. **10**
  - Behavior of fault current in grid connected and islanded mode of operation
  - Basic structure of micro grid with neat diagram and explanation.

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