

(3Hrs)

Marks: 80

N.B.

1. **Question No.1 is Compulsory.**
2. Answer any three out of remaining five questions
3. Assume any suitable data wherever required but justified the same
4. Illustrate answer with sketches wherever required

- Q 1 Answer **any four** from the following questions. (20)
- a. Illustrate the regulatory standards/ framework for Distributed
 - b. Illustrate the black-start and grid synchronization operation of
 - c. Compare characteristics of Solar PV and Wind energy source as a renewable energy sources.
 - d. Illustrate the role of bidirectional convertor in micro-grid?
 - e. Explain the concept of smart substation.
- Q 2 a) Discuss the issues in islanded mode of operation of micro-grid (10)
- b) What do you mean by Intelligent Electronic Devices (IED). Illustrate its role in monitoring and protection of smart grid. (10)
- Q 3 a) Illustrate operating principle of Fuel cell. State the types of fuel cell. (10)
- Explain the operation of any one in detail.
- b) State the different control architecture of Microgrids. Illustrate any one in detail. (10)
- Q 4 a) Discuss the anti-islanding schemes of operation of Microgrid. (10)
- b) Illustrate Adaptive protection in micro grid? (05)
- c) Compare AC micro-grid & DC micro-grid (05)
- Q 5 a) Illustrate the role of Energy storage system towards Microgrid operation and stability. (10)
- b) Explain the concept of real time pricing as a smart grid technology. (05)
- c) State the opportunities and barriers of smart grid. (05)
- Q 6 a) Illustrate different types of Data communication /protocols used in smart grid operation? (10)
- b) Explain the typical micro-grid structure configuration in grid connected mode. (10)
