(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. Explain the operation of any one in detail.	**(10)**
	b)	Sate 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 prizing 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)**

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