Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: DISTRIBUTED ENERGY RESOURCES [ELE 447]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 06 December 2016** **MAX. MARKS: 50**

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitable assumed.

1A. What are the different types of charge controllers are used in Distributed Generation (DG) system? Explain the commonly used set points in charge controller and with neat circuit diagram explain the shunt type charge controller. ***(04)***

1B. What are the benefits of Distributed Generation? Mention their applications. ***(04)***

1C. What is the role of state load dispatch Centers in India. ***(02)***

2A. Design a PV system for powering a telecom tower having connected load of 2kW. The PV system should be supplying power to the load even if there are clouds for 5 continuous days. There is no other power supply available to the telecom tower. Provide all details of components be used in proposed PV system.

Assuming following: Inverter efficiency=90%, battery efficiency =85 %, Depth of discharge of battery = 50 %, Available battery having fallowing specification: 12 V, 150 Ah. Available PV modules have following specification 15 Vm, 150 Wp, avilable solar radiation 2000 kWh/m^2 /year. ***(07)***

2B. Discuss the role of power conditionar unit in PV system. Mention the advantage of Net metering. ***(03)***

3A. What are the different types of Interface topologies are used in the Micro turbine. Explain the back to back converter interface topology with neat block diagram. ***(05)***

3B. With the help of neat block diagram, explain the supervisory control strategies in grid connected PV/Wind/ Battery hybrid energy system. ***(05)***

4A. Explain the issues and Challenge's for low power grid integration and mention its solutions. ***(05)***

4B. With the help of neat block diagram explain the PMSG based wind energy conversion system in grid connected mode of operation. What are its advantages? ***(05)***

5A. Discuss the predictive current control technique in grid connected power converter operation. Mention its advantages and disadvantages. ***(05)***

5B. Find the required diameter of a wind turbine to generate 4 kW at a wind speed of 7 m/s and a rotor speed of 120 rpm. Assume power coefficient = 0.4, efficiency of mechanical transmission = 0.9 and efficiency of generator = 0.95. ***(02)***

5C. Discuss the requirements of grid integration and its control problems in DG system. ***(03)***

6A A remote hospital where no grid electricity is available has a load of 10kwh/day. The power should be available to the load 24 hours a day. For this hospital, the use of solar PV module or a diesel generator is being planned. Find out and compare the unit cost of electricity generated from a solar PV system and a diesel generator, if the load is to be operated for 20 years. ***(06)***

6B What is islanding of DG system? Explain the benefits and requirement of successful islanding operation? ***(04)***