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# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

*A Constituent Institution of Manipal University*

## VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

## MAKEUP EXAMINATIONS, DEC 2016 - JAN 2017

## SUBJECT: DISTRIBUTED ENERGY RESOURCES [ELE 447]

REVISED CREDIT SYSTEM

**Time: 3 Hours** **Date: 06 January 2017** **Max. Marks: 50**

**Instructions to Candidates:**

- Answer **ANY FIVE Full** questions.
- Missing data may be suitably assumed.

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|---|---|---|
| **1A.** | What are sources of missmatch losses in PV System. How to minimige these losses. | ***04*** |
| **1B.** | Define the term fill factor and derating factor. | ***03*** |
| **1C.** | What are the Challenges Associated with Distributed Generating Systems in present Scenario? | ***03*** |
| **2A.** | Design a PV Water Pumping System, which is required to draw 30,000 litter of water every day from a depth of 15m. Pump efficiency 30%, mismatch factor 85%, peak power of solar PV module is 75 watts, operating factor is 75%. | ***05*** |
| **2B.** | With the help of a Single line diagram explain the control strategies of Hybrid PV/Battery/EU system in Distributed Generation. | ***05*** |
| **3A.** | Why Recuperate Type Micro turbine is more popular in DG System, With a neat diagram explain the operation of Recuperatory type Micro Turbine . | ***05*** |
| **3B.** | What are the pre-feasibility study is needed for investigation of technology option in hybrid energy system. | ***02*** |
| **3C.** | Estimate the number of PV modules to be connected together in order to design a solar PV system for power generation with following requirements: Power = 10 kW, Voltage at peak power = 200 V The PV modules available for this plant are having following parameters: $V_m$ = 35 V, $I_m$ = 8.5 A. | ***03*** |
| **4A.** | Explain the fallowing<br>i) Gear box ii) Yaw mechanism iii) Hub iv) Power Coefficient v) Tip speed ratio | ***05*** |
| **4B.** | With the help of neat block diagram explain the DFIG based wind energy conversion system in grid connected mode of operation. What are its advantages? | ***05*** |
| **5A.** | With the help of neat block diagram explain the Hysteresis current control in grid connected power converter operation. Mention its advantages and disadvantages. | ***05*** |
| **5B.** | Explain the concept of micro grid and smart grid. | ***02*** |
| **5C.** | Explain the IEEE1547 and IEEE519-1992 standards related to voltage and frequency. | ***03*** |

**6A** What are the advantages and disadvantages of Passive power factor correction (PFC) technique in Distributed power Generation. ***04***

**6B** A renewable power system in India consists of 40kW wind and 20kW of PV. Annual operation and maintenance =$0.01/kwh, use an average cost of =$4100/kW, annual energy production =62000kWh, fixed charge rate per year=0.03, calculate the cost of energy. How does that compare to the present rate you are paying for the electricity? ***04***

**6C** What are the differant types of load dispatch centers in INDIA . Explain the Role of NLDC? ***02***