Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent Institution of MAHE, Manipal)

VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

MAKE UP EXAMINATIONS, JANUARY 2018

SUBJECT: ADVANCED ENERGY MANAGEMENT [ELE 4005]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 02 January 2018** **Max. Marks: 50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. Explain with a neat sketch on how a EMS (Energy management system) fit in an electrical network? ***(05)***

1B. Explain the drawbacks of using a file based systems to store EMS data. ***(05)***

2A. Suppose you want to monitor energy consumption of the occupants in an apartment building. Your job is to set up the energy information system using a relational database. Your first step to do is set up an Entity-Relationship Model that should roughly represent the following real-world objects:

- Occupants of the apartment building
- Consumption details of the occupants
- Monthly bills of the occupants.

Explain your Entity-Relationship Model. Find sensible attributes for your entities. Mark primary keys and key candidates. What problems do you encounter? Are there any constraints you can't model with the ER Model? ***(06)***

2B. With reference to the ER model developed in Q2A, write relational algebraic queries and SQL statements for

1. Listing the names of the occupants and their contact number.
2. Listing the energy consumption details of the occupants for the month of "November 2017"

(04)

3A. Explain the methodology adopted for the technology assessment to implement Demand-Side-Management (DSM). ***(05)***

3B. Explain the technology options available in terms of improving power factor of a facility? ***(05)***

4A. With the help of suitable examples explain the terms Time-of-Day and Progressive tariffs. ***(05)***

4B. Explain DSM strategies in interior lighting? ***(05)***

5A. The cost characteristics of two units in a plant are:

$C1 = 0.40\ P1^2 + 160\ P1 + K1$ Rs/hr

$C2 = 0.45\ P2^2 + 120\ P2 + K2$ Rs/hr

Where P1 and P2 are power output in MW. Find the optimum load allocation between the two units, when the total load is 162.5MW. What will be the daily loss if the units are loaded equally? ***(06)***

5B. List and explain the functions of Supervisory Control and Data Acquisition (SCADA) systems. ***(04)***