Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, NOVEMBER 2019

ENERGY AUDITING [ELE 4006]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 23 November 2019** **Max. Marks: 50**

Instructions to Candidates:

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

1A. What is Energy Conservation? Explain the benefits of energy conservations for industry point of view. ***(03)***

1B. Explain three important features of the Energy Conservation Act 2001. ***(03)***

1C. Write short notes on

(i) Production factor (ii) Plant Energy Performance

(iii) Psychrometer (iv) Stroboscope ***(04)***

2A. Explain why parallel flow is adopted in a high temperature furnace recuperator. ***(03)***

2B. Explain the key elements of Monitoring & Targeting System. ***(03)***

2C. A tank initially contains 2 m^3 of pure water. A stream of brine containing 25 kg/m^3 of salt is fed into the tank at a rate of 0.02 m^3/sec. Liquid flows from the tank at a rate of 0.01 m^3/sec. If the tank is well mixed, what is the salt concentration (kg/m^3) in the tank when the tank contains 4 m^3 of brine. ***(04)***

3A. What is Force Field Analysis and how it can be useful for Energy Action Planning? ***(03)***

3B. Explain the operational features of LED lamps, Incandescent lamp, Fluorescent lamp and Metal Halide lamp. ***(04)***

3C. Which is the best location for capacitor bank for power factor improvement from energy conservation point of view? Why? ***(03)***

4A. Explain the significance of the following on cooling tower performance

(i) Range (b) Approach

(c) Liquid/Gas (L/G) Ratio (d) Wet Bulb Temperature (WBT) ***(04)***

4B. Explain the term "Building Management System (BMS)" with a suitable example. ***(03)***

4C. What are the factors which affect the energy efficiency and loss minimization in the operation of energy efficient motor. ***(03)***

5A. Define the following terms:

(i) Simple Pay Back Period (ii) Time value of Money

(iii) Return on Investment ***(03)***

5B. Describe three selling points to top management for investing in energy efficiency projects over other competitive projects. ***(03)***

5C. A proposed project requires an initial capital investment of Rs. 20,000. The cash flows generated by the project are shown in the table below:

Investment	Rs. 20,000
saving in Year	Cash flow
1	6000
2	5500
3	5000
4	4500
5	4000
6	4000

The cost of capital (discount rate), k for the firm is 8%, 12%, 13% and 16%.

i. Calculate Net Present Values of the proposal.

ii. Calculate the discount rate for which Net Present Value =0.

iii. Calculate exact internal rate of return by using interpolation method. ***(04)***