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Total No. of Pages :03

Total No. of Questions : 09

**B.Tech.(Electrical & Electronics)(2011 & 2012 Batch E-II)****B.Tech.(EE)(2011 Onwards E-II)(Sem.-7,8)****ENERGY AUDITING AND MANAGEMENT****Subject Code : BTEE-804B****M.Code : 71937****Time : 3 Hrs.****Max. Marks : 60****INSTRUCTION TO CANDIDATES :**

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION-A****1. Write briefly :**

- a. Write a note on energy conservation. Give few tips to save energy in home appliances.
- b. What is the greenhouse effect? List and describe the various impacts of global warming.
- c. Differentiate between following with the help of suitable example.
  - i. Primary and Secondary energy
  - ii. Renewable and Non-Renewable energy
- d. Briefly explain the differences between preliminary and detailed energy audit
- e. What is a cash flow diagram?
- f. What are the different components of Material and Energy Balance of a process or unit?
- g. What is the function of a condenser in a refrigeration cycle?
- h. Highlight advantages of CFL lamp (compact fluorescent lamp) over incandescent lamps.
- i. What are the commonly used refrigerants for vapour compression chillers?
- j. Write short notes on the following:
  - i) Two-part tariff
  - ii) Power factor tariff

### SECTION-B

2. Write short notes on the following (**any two**) :
  - a) BEE's Standards and Labeling programme for equipment and appliances
  - b) ESCOs
  - c) Duties and responsibilities of Energy Manager
3. Using the net present value analysis, evaluate the financial merits of two projects shown in table below. The discount rate is 8% for each project.

|   | <b>Project 1</b>               | <b>Project 2</b>               |
|---|--------------------------------|--------------------------------|
| <b>Capital cost (Rs.)</b>                               | <b>30000</b>                   | <b>30000</b>                   |
| <b>Year</b>   | <b>Net annual saving (Rs.)</b> | <b>Net annual saving (Rs.)</b> |
| ' 1   | +6000                          | +6600                          |
| 2   | +6000                          | +6600                          |
| 3   | +6000                          | +6300                          |
| 4   | +6000                          | +6300                          |
| 5   | +6000                          | +6000                          |
| 6   | +6000                          | +6000                          |
| 7   | +6000                          | +5700                          |
| 8   | +6000                          | +5700                          |
| 9   | +6000                          | +5400                          |
| 10  | +6000                          | +5400                          |
| <b>Total net savings at end of 10<sup>th</sup> year</b> | <b>+60000</b>                  | <b>+60000</b>                  |

4. Describe the Energy Conservation Act, 2001 and its Features.
5. Name the instrument to measure each of the following in an energy audit :
  - a) O<sub>2</sub>, CO, CO<sub>2</sub> and temperature in flue gas
  - b) Illumination levels
  - c) Non-contact type speed measurement
  - d) kW, kWh, kVA<sub>r</sub>, kVA<sub>rh</sub>, kVA, kVA<sub>h</sub> and power factor
  - e) Non-contact type surface temperature measurement
6. Discuss the disadvantages of a low power factor. Explain the causes of low power factor of the supply system.

### SECTION-C

7. Write the step wise methodology of performing detailed energy audit.
8.
  - a. List five energy saving measures in lighting system. Define the term Lux, CRI, luminous efficacy.
  - b. A factory has a maximum load of 300 KW at 0.72 power factor with annual consumption of 40000 units. The tariff is Rs. 300 per KVA of max. demand plus 5 Rs. per unit. Find out the average price per unit.
9. Define one 'Ton of Refrigeration (TR)'. Explain the principle of 'vapour compression refrigeration' system with a neat sketch.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**