Total No. of Questions : 09

B.Tech.(EE)(2019 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. Differentiate between primary and secondary energy with the help of suitable example.

   b. Briefly explain the differences between preliminary and detailed energy audit.

   c. What is the greenhouse effect? List and describe the various impacts of global warming?

   d. What is the role of Energy Service Companies (ESCOs) ?

   e. How energy is related to the growth of a country? Justify your answer with suitable data.

   f. The illuminance is 17 lm/m^2 from a lamp at a distance of 2 meter. What will be the illuminance at a distance of 1.5 meter?

   g. What is 'Simple Payback Period' technique?

   h. A municipal corporation has 30000 numbers of 250 watts HPMV lamps. The annual operating hours of these lamps are 3600 hours. Calculate the annual energy consumption and annual cost if tariff is 4.75 Rs./kWh.

i. Name five parameters which psychometric chart provides to an air conditioning engineer.

j. The cost of replacement of inefficient compressor with an energy efficient compressor in a plant was Rs.5 lakhs. The net annual cash flow is Rs.1.25 lakh. Calculate the return in percentage on investment.

SECTION-B

2. List five energy saving measures in lighting system. Define the term Lux, CRI, luminous efficacy.

3. What are the different components of Material and Energy Balance of a process or unit? A sample of coal from the mine is found to contain 67.2% carbon and 22.3% ash. The refuse obtained at the end of combustion is analyzed to contain 7.1 % carbon and the rest is ash. Compute the % of the original carbon unburnt in the refuse.

4. Explain different steps to perform detailed energy audit in an industry.

5. Explain these following terms with examples :

   a. Block rate tariff

   b. Two-part tariff.

   c. Power factor tariff.

   d. Three-part tariff.

6. Discuss the disadvantages of a low power factor. Explain the causes of low power factor of the supply system.

SECTION-C

7. a. What are the different losses in electrical motors? What are the different causes of energy losses in Induction motors in any industry?

   b. What is air compressor system?   Explain working of **any one** air compressor.

8. Define one 'Ton of Refrigeration (TR)'. Explain the principle of 'vapour compression refrigeration' system with a neat sketch.

9. Using the net present value analysis technique, evaluate the financial merits of two proposed products shown in below table. The annual discount rate of 8% is considered for each case.

	Project 1	Project 2
Capital cost (Rs.)	30000	30000
Year	Net Annual Saving (Rs.)	Net Annual Saving (Rs.)
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
Total net saving at the end of 10th	+60000	+60000

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.