PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - NOV 2023

Semester : Semester V - 2021

Course Code : EEE3026

Course Name : Sem V - EEE3026 - Energy Auditing and Demand Side Management
Program : B. TECH

Date : 2-NOV-2023
Time : 2:00PM -3:30PM

Max Marks : 50

Weightage : 25%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS   **(5 X 2 = 10M)**

1. Describe the significance of energy monitoring and training programs in ensuring the long-term success of energy conservation efforts in residential areas

    (CO1) [Knowledge]

2. Discuss how sensitivity analysis aid businesses in making strategic decisions related to energy-saving initiatives?

    (CO1) [Knowledge]

3. What are the common project financing options available for energy-saving initiatives, and how do they facilitate the implementation of sustainable technologies?

    (CO1) [Knowledge]

4. What are some effective energy-saving methods applicable to boilers, and how do they contribute to reduced energy consumption?

    (CO2) [Knowledge]

5. Explain the role of excess air in boiler efficiency and how minimizing it enhances the overall performance of a boiler.

    (CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS   **(2 X 10 = 20M)**

6. How can a comprehensive energy audit define the roadmap for effective energy conservation strategies in a world striving for sustainability? Summarize a detailed overview of the energy audit process, its primary objectives, and the role it plays in shaping energy scenarios. Offer solutions on how governments and businesses can collaborate to implement impactful energy conservation measures based on audit findings.

<div align="right">(CO1) [Comprehension]</div>

7. How can sensitivity analysis enhance the decision-making process in energy audits and contribute to better energy management? Present a case study highlighting the application of sensitivity analysis in identifying key variables and offering actionable solutions to mitigate risks and optimize energy efficiency.

<div align="right">(CO1) [Comprehension]</div>

PART C

ANSWER THE FOLLOWING QUESTION   **(1 X 20 = 20M)**

8. The following are the data collected for a boiler using coal as the fuel. Find out the boiler effi☐ciency by indirect method
Fuel firing rate = 5599.17 kg/hr Steam generation rate = 21937.5 kg/hr Steam pressure = 43 kg/cm2 (g) Steam temperature = 377 °C Feed water temperature = 96 °C %CO2 in Flue gas = 14 %CO in flue gas = 0.55 Average flue gas temperature = 190 °C Ambient temperature = 31 °C Humidity in ambient air = 0.0204 kg / kg dry air Surface temperature of boiler = 70 °C Wind velocity around the boiler = 3.5 m/s Total surface area of boiler = 90 m2 GCV of Bottom ash = 800 kCal/kg GCV of fly ash = 452.5 kCal/kg Ratio of bottom ash to fly ash = 90:10 Fuel Analysis (in %) Ash content in fuel = 8.63 Moisture in coal = 31.6 Carbon content = 41.65 Hydrogen content = 2.0413 Nitrogen content = 1.6 Oxygen content = 14.48 GCV of Coal = 3501 kCal/kg.
a) Identify the unknown parameters that could be computed from the given data
b) Compute the unknown parameters

<div align="right">(CO2) [Application]</div>