Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18EE3003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ENERGY MANAGEMENT AND AUDIT** | **Max. Marks :** | **100** |

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | With a case study, discuss the ten steps involved in the detailed energy audit. | CO2 | 16 |
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| 2. |  | Calculate:  (i) Iron plus friction and Windage losses.  (ii) Stator resistance at 110°C  (iii) Stator copper looses at operating temperature of resistance  at 110°C  (iv) Full load slip and rotor input assuming rotor losses are  slip times rotor input  (v) Motor input assuming that stray losses are 0.5% of the  motor rated power  (vi) Motor full load efficiency and full load power factor.   |  |  | | --- | --- | | **Motor Specifications**  Rated power = 34 kW/45 HP  Voltage = 415 Volt  Current = 57 Amps  Speed = 1475 rpm  Insulation class = F  Frame = LD 200 L  Connection = Delta | **No load test Data**  Voltage, V = 415 Volts  Current, I = 16.1 Amps  Frequency, F = 50 Hz  Stator phase resistance at 30°C = 0.264 Ohms  No load power, Pnl = 1063.74 Watts | | CO3 | 16 |
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| 3. | a. | Discuss the essential elements of a monitoring and targeting system. | CO5 | 10 |
| b. | As an energy manger, how to relate the energy consumption and production? | CO5 | 6 |
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| 4. |  | Discuss the steps involved in the force field analysis. Taking your own industry as an example, list down the positive and negative forces. | CO5 | 16 |
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| 5. | a. | Consider a project, which has the following cash flow stream with the cost of Capital, k, for the firm is 11%. Calculate Net Present Value (NPV) and also list the advantages of NPV over simple pay-back method.   |  |  | | --- | --- | | **Investment** | **Rs. 15,00,000/-** | | **Saving in year** | **Cash Flow** | | 1 | 2,00,000 | | 2 | 3,00,000 | | 3 | 3,00,000 | | 4 | 3,50,000 | | 5 | 3,00,000 | | CO6 | 10 |
| b. | Calculate simple payback period for a boiler that cost Rs.75.00 lakhs to purchase and Rs.5 lakhs per year on an average to operate and maintain and is expected to annually save Rs.30 lakhs and also discuss the pros and cons of simple payback period. | CO6 | 6 |
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| 6. | a. | Discuss the role(s) of BEE in star labeling and also give the importance of labeling in domestic appliances. | CO3 | 6 |
| b. | Briefly discuss the following terms in cogeneration with suitable examples:   1. Topping cycle. 2. Bottoming cycle. 3. Heat-to-power ratio. | CO3 | 10 |
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| 7. | a. | Discuss the factors that affect the performance of electric motors. | CO4 | 8 |
| b. | Give the importance of boiler water treatment and explain the internal water treatment methods with necessary diagrams. | CO4 | 8 |
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| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | Discuss the general fuel economy measures in furnace. | CO3 | 10 |
| b. | With neat diagram(s), explain the inverted bucket steam trap system to extract the condensate steam in steam pipe. | CO3 | 10 |