**EE2**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **January, 2024** | **Common to CE, EC, ME, CS, EI & IT** | | |
| **Seventh Semester** | **Electrical Energy Conservation and Auditing** | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |
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|  |  |  | CO | BL | M |
| 1 | a) | Compare renewable and non-renewable energy sources. | CO1 | L2 | 1M |
|  | b) | Showthe types of energy sources. | CO1 | L1 | 1M |
|  | c) | Outline about PPP. | CO1 | L1 | 1M |
|  | d) | Outline different types of losses present in motors. | CO1 | L1 | 1M |
|  | e) | Discuss any two advantages of EEM over normal motors. | CO2 | L1 | 1M |
|  | f) | Paraphrase the star labelling of EEM. | CO2 | L2 | 1M |
|  | g) | Elaborate VCR and VAR in refrigeration. | CO2 | L1 | 1M |
|  | h) | List the types of commonly used lamps. | CO2 | L1 | 1M |
|  | i) | Explain energy efficient lighting controls. | CO3 | L2 | 1M |
|  | j) | Define luminous flux. | CO3 | L1 | 1M |
|  | k) | Discuss the advantages of using the Watt per Square Meter Method. | CO3 | L2 | 1M |
|  | l) | What does 'overall plant heat rate' refer to in the context of energy production or thermal power plants? | CO4 | L1 | 1M |
|  | m) | A new small cogeneration plant installation is expected to reduce a company's annual energy bill by Rs.4,86,000. If the capital cost of the new boiler installation is Rs.22,20,000 and the annual maintenance and operating costs are Rs. 42,000, the expected payback period for the project can be worked out as. | CO4 | L3 | 1M |
|  | n) | Define ROI. | CO4 | L1 | 1M |
| **Unit-I** | | | | | |
| 2 | a) | Summarize the various instruments and metering devices commonly used in energy audits. | CO1 | L2 | 7M |
|  | b) | Provide an in-depth explanation of the Detailed Energy Audit process, highlighting its methodologies, intricacies in data collection, comprehensive analysis techniques. | CO1 | L2 | 7M |
| **(OR)** | | | | | |
| 3 | a) | Outline and discuss the key components and processes involved in conducting a preliminary energy audit, highlighting its significance in initial stage of energy assessment. | CO1 | L1 | 7M |
|  | b) | Explain the primary categories of energy sources available for power generation. | CO1 | L2 | 7M |
| **Unit-II** | | | | | |
| 4 | a) | With neat sketch explain about Vapour compression refrigeration. | CO2 | L4 | 7M |
|  | b) | Describe in detail about the loss distribution and constructional details of a motor. | CO2 | L2 | 7M |
| **(OR)** | | | | | |
| 5 | a) | Illustrate Psychometrics’ chart and air conditioning process. | CO2 | L3 | 7M |
|  | b) | Explain the factors affecting energy efficient motors (EEM). | CO2 | L2 | 7M |
| **Unit-III** | | | | | |
| 6 | a) | Describe energy efficient lighting controls. | CO3 | L2 | 7M |
|  | b) | Classify light source and lamp types. | CO3 | L4 | 7M |
| **(OR)** | | | | | |
| 7 | a) | Summarize about Energy conservation building code (ECBC). | CO3 | L2 | 7M |
|  | b) | Illustrate lighting and electrical power in ECBC. | CO3 | L3 | 7M |
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| **Unit-IV** | | | | | |
| 8 | a) | Provide a summary explanation of cogeneration systems, detailing their principle and operational functionality. | CO4 | L2 | 7M |
|  | b) | Kiln capacity: 4300 tons per day.  Preheater exit gas details:  Volume (mp): 167559 Nm³/hr, Specific heat capacity (CPH): 0.355 kcal/kg/ Deg C,  Inlet temperature T: 295 Deg C, Outlet temperature with WHRB: 195 Deg C  Cooler exit gas details:  Volume (m): 91000 Nm³/hr, Specific heat capacity (C): 0.316 kcal/kg/ Deg C,  Inlet temperature T: 360 Deg C, Outlet temperature with WHRB: 130 Deg C,  Overall conversion efficiency -Pre heater section: 20% ,  Overall conversion efficiency- Cooler section: 21%,  Calculate total power generation possible. | CO4 | L4 | 7M |
| **(OR)** | | | | | |
| 9 | a) | Discuss briefly about interest charges, simple payback period, and discounted cash flow methods. | CO4 | L2 | 7M |
|  | b) | Categorize fixed and variable costs with an example. | CO4 | L4 | 7M |

