| Reg. No. | | | | | | | | | | | | | | | | |
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| Question Paper Code | 14773 |
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026**

Seventh Semester

**Electrical and Electronics Engineering**

**20EEEL703 - ENERGY MANAGEMENT AND AUDITING**

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

**PART – A (i) (MCQ)**
**(16 × 1 = 16 Marks)**
Answer ALL Questions

| | | Marks | K – Level | CO |
|---|---|---|---|---|
| 1. | ECI stands for ____ .<br>a) Electrical count index b) Energy count index<br>c) Energy cost index d) Energy cost increment | 1 | K1 | CO1 |
| 2. | _____ is a statistical technique which determines and quantifies the relationship between variables and enables standard equations to be established for energy consumption.<br>a) Linear regression analysis b) Time-dependent energy analysis<br>c) Moving annual total d) CUSUM | 1 | K2 | CO1 |
| 3. | Identify the importance of setting energy targets in energy planning.<br>a) To increase energy consumption b) To enhance the appearance of energy meters<br>c) To establish specific goals for reducing energy consumption d) To increase energy waste | 1 | K3 | CO1 |
| 4. | Which method provides cash for the replacement of assets at the end of its useful life?<br>a) Straight line depreciation b) Sum of years digits depreciation<br>c) Declining balance depreciation d) Sinking fund depreciation | 1 | K1 | CO2 |
| 5. | To reduce the power consumption, the capacitors should be located.<br>a) As close as possible to the load b) As far as possible to the load<br>c) Not too close not too far from the load d) All of these | 1 | K2 | CO2 |
| 6. | Choose the suitable application of shunt capacitor connections.<br>a) Distribution Voltage improvement. b) Power factor improvement<br>c) Both a and b. d) None of these | 1 | K3 | CO2 |
| 7. | The feasibility study of cogeneration evaluates the facility's _____ profile to determine the size of the chp system required.<br>a) Electrical load b) Capital costs<br>c) Energy savings d) Thermal load | 1 | K1 | CO3 |
| 8. | In cogeneration, the system efficiencies can go up to ------<br>a) 70% b) 80%<br>c) 90% d) 60% | 1 | K2 | CO3 |
| 9. | Identify the exhaust gas temperature in a combined cycle power plant consisting of a gas turbine and waste heat boiler.<br>a) around 150 °C b) around 500 °C<br>c) around 300 °C d) around 400 °C | 1 | K3 | CO3 |

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| 10. | How can lighting energy be optimized by focusing on specific tasks or work areas?<br>a) Implementing adaptive lighting b) Using occupancy sensors<br>c) Implementing task lighting d) Applying daylight harvesting | *1* | *K1* | *CO4* |
| 11. | Name the strategy divides spaces into different lighting zones for independent control of illumination levels?<br>a) Task lighting b) Zoning<br>c) Reflective surfaces d) Daylight harvesting | *1* | *K2* | *CO4* |
| 12. | Identify the lighting control system automatically adjusts artificial lighting based on the availability of natural light?<br>a) Occupancy sensors b) Daylight harvesting<br>c) Time based control d) Dimming controls | *1* | *K3* | *CO4* |
| 13. | Which metering technique would be most appropriate for monitoring and correcting power quality issues affecting sensitive equipment in a manufacturing plant?<br>a) Direct metering b) Indirect metering<br>c) Sub-metering d) Power quality metering | *1* | *K1* | *CO5* |
| 14. | In which scenario would direct and indirect metering techniques be applied together for energy monitoring?<br>a) Energy audits in commercial buildings b) Industrial energy management<br>c) Residential energy monitoring d) Power quality analysis in data centers | *1* | *K2* | *CO5* |
| 15. | Choose the main focus area of Activity Based Costing.<br>a) Efficient management b) Effective cost control<br>c) Performance management d) Cost reduction | *1* | *K3* | *CO6* |
| 16. | Select the appropriate formula for calculating marginal cost<br>a) Prime cost + All Variable overheads b) Direct material + Direct labor + Direct Expenses + All variable overheads<br>c) Total costs – All fixed overheads d) All of the above | *1* | *K3* | *CO6* |

**PART – A (ii) (Short Answer Questions)**
**(6 × 3 = 18 Marks)**
Answer ALL Questions

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| 17. | Identify the classification of HDD and CDD. | *3* | *K3* | *CO1* |
| 18. | Choose the process of energy conversion in electric motors. | *3* | *K3* | *CO2* |
| 19. | Compare the feasibility of cogeneration with conventional energy systems. | *3* | *K4* | *CO3* |
| 20. | Analyze the parts of a lighting control system. | *3* | *K4* | *CO4* |
| 21. | Identify the classification of energy metering and monitoring. | *3* | *K3* | *CO5* |
| 22. | Analyze the concept of time value of money in financial decision-making. | *3* | *K4* | *CO6* |

**PART - B (Descriptive Answer Questions)**
**(6 × 11 = 66 Marks)**
Answer ALL Questions

| | | | | | |
|---|---|---|---|---|---|
| 23. | a) | Develop a detailed procedure for energy monitoring, targeting, and reporting in industries. | *11* | *K3* | *CO1* |
| | | **OR** | | | |
| | b) | Make use of energy accounting procedures to monitor and control energy consumption. | *11* | *K3* | *CO1* |

| | | | | | |
|---|---|---|---|---|---|
| 24. | a) | Build an energy management system incorporating reactor functions. | *11* | *K3* | *CO2* |
| | | **OR** | | | |
| | b) | Choose suitable measures for improving the efficiency of electric motors. | *11* | *K3* | *CO2* |
| 25. | a) | Develop strategies for energy management using cogeneration systems. | *11* | *K3* | *CO3* |
| | | **OR** | | | |
| | b) | Apply gas turbine-based cogeneration systems for efficient energy management. | *11* | *K3* | *CO3* |
| 26. | a) | Develop a detailed procedure for designing lighting systems and optimizing lighting energy. | *11* | *K3* | *CO4* |
| | | **OR** | | | |
| | b) | Construct a framework illustrating the impact of power factor and harmonics on lighting energy systems. | *11* | *K3* | *CO4* |
| 27. | a) | Compare utility meters and demand meters with respect to their applications in energy management. | *11* | *K4* | *CO5* |
| | | **OR** | | | |
| | b) | Analyze the various cost factors associated with metering systems. | *11* | *K4* | *CO5* |
| 28. | a) | Analyze the possibilities of demand control in load management systems. | *11* | *K4* | *CO6* |
| | | **OR** | | | |
| | b) | Analyze the concept of economic justification in energy management. | *11* | *K4* | *CO6* |