



- Notes :
1. All questions carry equal marks.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answers wherever necessary with the help of neat sketches.
  5. Use of slide rule, Logarithmic tables, Steam tables, Mollier's chart, Drawing instruments, Thermodynamic tables for moist air, Psychrometric charts and Refrigeration charts is permitted.
  6. Attempt **any five** questions.
  7. Every question has equal weightage.
  8. Use programmable calculator is prohibited.
  9. Draw neat and proper diagram / sketches.
  10. Don't use red pen for writing the answers.
  11. Don't write any other comments except answers of questions.

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| 1. | a)  | How can the benefits of energy conservation measures be evaluated ? Explain.   | 5 |
|    | b)  | Briefly discuss the energy audit of HVAC systems.  | 6 |
|    | c)  | What are the mechanical measurements necessary in an energy Audit?   | 3 |
| 2. | a)  | Discuss briefly any five energy efficiency improvement opportunities in lighting systems.  | 7 |
|    | b)  | List any six guiding principles for carrying out material and energy balance.  | 7 |
| 3. | a)  | Explain the energy saving opportunities in electrical power system.  | 7 |
|    | b)  | Discuss flow control strategies and energy conservation opportunities in fans and pumps.   | 7 |
| 4. | a)  | What is CUSUM chart? Explain how CUSUM chart is drawn with suitable example?   | 7 |
|    | b)  | Write short notes on energy performance assessment of diesel generator set.  | 7 |
| 5. | a)  | What for humidity is measured in energy audit? List some of the tips for effective use of psychrometer for humidity measurement. | 7 |
|    | b)  | Explain the steps for preliminary energy audit. Elaborate the need of data energy flow diagram.                                  | 7 |
| 6. | a)  | Explain the internal rate of return method, justify your answer by giving an example.  | 7 |
|    | b)  | Write short notes on:  | 7 |
|    | i)  | Role of ESCOS.   |   |
|    | ii) | Energy performance contracting.  |   |
| 7. | a)  | What are the objectives of energy conservation? How will you achieve the objectives with motors?                                 | 7 |
|    | b)  | Explain key features of IS12615 and IEEMA standards.   | 7 |
| 8. | a)  | Explain fixed and variable concepts of tariff systems.   | 7 |
|    | b)  | State and explain various steps in implementation of energy management in an organization.                                       | 7 |

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