



- Notes :
1. Attempt **any five** out of 8 questions.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Illustrate your answers wherever necessary with the help of neat sketches.
 4. Assume suitable data wherever necessary.
 5. Use of slide rule, Logarithmic Tables, Steam Tables, Mollier's Chart, Drawing Instruments, Thermodynamic tables for moist air, Psychometric Charts and Refrigeration charts is permitted.
 6. All questions carry equal marks.

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| 1. | a) | Explain the present scenario for the Indian smart grid and what the key challenges are? | 7 |
| | b) | What is a geographic information system (GIS) and given its application in monitoring and protection? | 7 |
| 2. | a) | Write a short note on Plug-in Hybrid Electric Vehicle (PHEV) | 7 |
| | b) | Define the smart grid concept and what are the key challenges for the smart grid? | 7 |
| 3. | a) | List different smart applications and describe the integration of smart appliances into the grid for Home and Building Automation. | 7 |
| | b) | Explain how the reliability of the smart grid can be enhanced by integrating Intelligent Electronic Devices (IEDs) into it. | 7 |
| 4. | a) | What are the various energy storage technology in microgrids? | 7 |
| | b) | What are the environmental impact and climate change due to renewable energy technologies? | 7 |
| 5. | a) | Explain the reactive power control in smart grid. | 7 |
| | b) | Explain the concept of microgrids and discuss the need and application of microgrids? | 7 |
| 6. | a) | Explain the concept of power quality and EMC in smart grid. | 7 |
| | b) | Explain power quality conditioners for smart grid. | 7 |
| 7. | a) | Explain Load Frequency control (LFC) in microgrid systems. | 7 |
| | b) | Write a note on 'IP-based Protocols'. | 7 |
| 8. | a) | Write a note on Synchro Phasor measurement units (PMU). | 7 |
| | b) | Explain Wide Area Measurement system (WAMS). | 7 |
