

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII EXAMINATION – SUMMER 2025

Subject Code:3170922

Date:08-05-2025

Subject Name:Smart Grids

Time:02:30 PM TO 05:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

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|------------|-----|--|-----------|
| <b>Q.1</b> | (a) | Mention the benefits of smart grid w r to conventional Grid.   | <b>03</b> |
|            | (b) | Specify the conditions in which power system operates in a normal state.<br>What is the various analysis to be carried out for it? | <b>04</b> |
|            | (c) | Draw smart grid architecture and discuss function of each component.   | <b>07</b> |
| <b>Q.2</b> | (a) | What are the challenges of smart grid implementation in India ?  | <b>03</b> |
|            | (b) | List the Name the latest technologies that enable smart Grid Deployment.   | <b>04</b> |
|            | (c) | Describe the various Standards of Smart Grid Establishment.  | <b>07</b> |
|            |     | <b>OR</b>  |           |
|            | (c) | Explain Economic Dispatch and unit commitment  | <b>07</b> |
| <b>Q.3</b> | (a) | What is PLC?   | <b>03</b> |
|            | (b) | List the key feature of communication technology in smart grid.  | <b>04</b> |
|            | (c) | Explain the Role of Fiber optic communication and Zigbee in smart grid   | <b>07</b> |
|            |     | <b>OR</b>  |           |
| <b>Q.3</b> | (a) | List the main feature of Bluetooth technology.   | <b>03</b> |
|            | (b) | Draw the diagram showing the various networks in smart grid Infrastructure.  | <b>04</b> |
|            | (c) | List the merits and demerits of Zigbee.  | <b>07</b> |
| <b>Q.4</b> | (a) | List the advantages of Distributed Generation.   | <b>03</b> |
|            | (b) | Explain the different features of islanding Detection methods  | <b>04</b> |
|            | (c) | Explain in brief: Types of Smart Energy Sources.   | <b>07</b> |
|            |     | <b>OR</b>  |           |
| <b>Q.4</b> | (a) | Explain the islanding operation in microgrid.  | <b>03</b> |
|            | (b) | Write active and passive methods of islanding detection  | <b>04</b> |
|            | (c) | Discuss the various issues encountered while interconnecting distributed generation with the main grid.                            | <b>07</b> |
| <b>Q.5</b> | (a) | List out types of demand response  | <b>03</b> |
|            | (b) | Describe the concept of Micro grids.   | <b>04</b> |
|            | (c) | Explain: Phasor Measurement Units  | <b>07</b> |
|            |     | <b>OR</b>  |           |
| <b>Q.5</b> | (a) | Classify the Demand Side Management  | <b>03</b> |
|            | (b) | List the constraints of DSM.   | <b>04</b> |
|            | (c) | Explain advanced metering infrastructure (AMI) with block diagram  | <b>07</b> |

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