

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 7 – EXAMINATION – SUMMER 2026

Subject Code: 3170922

Date: 20/05/2026

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.**

- Q.1**
- (a) List out the features of smart grid. **03**
 - (b) Give comparison of smart grid with conventional inherited grid. **04**
 - (c) Draw and explain the architecture of smart grid. **07**
- Q.2**
- (a) List the methods of power line communication along with its key characteristics. **03**
 - (b) Write a brief note on advanced metering infrastructure. **04**
 - (c) Identify "smart grid initiatives for the power distribution utility in India" **07**
- OR
- Q.2**
- (c) List out the different communication protocols used with smart grid architecture. **07**
Elaborate upon its applications at the appropriate levels.
- Q.3**
- (a) Give advantages and disadvantages of distributed generators being used with the smart grid. **03**
 - (b) Compare distributed generators with fossil fueled generators. **04**
 - (c) Define demand side management. List out the methods of DSM along with its posing constraints. **07**
- OR
- Q.3**
- (a) Distinguish between automated meter reading and smart meter. **03**
 - (b) Explain the terms, (a) Economic dispatch, and (c) Unit Commitment. **04**
 - (c) Discuss the barriers to Distributed Generation's integration in the electric grid and suggest possible solutions. **07**
- Q.4**
- (a) Define microgrid and list out its applications. **03**
 - (b) List out the control techniques available with the control of microgrids, and explain any one of them in brief. **04**
 - (c) Give detailed classification of various island detection methods and explain each of them in brief. **07**
- OR
- Q.4**
- (a) Define microgrid, and specify the reason of its emergence. **03**
 - (b) List the storage technologies that can be used with electrical system. Provide Modelling of any one of them. **04**
 - (c) What is islanding? Why is islanding needed? Specify the benefits of islanding. **07**

Q.5	(a) Compare generalized fault detection with self-healing strategy.	03
	(b) Discuss vehicles to grid and grid to vehicles system.	04
	(c) Explain the concept of wide area monitoring system (WAMS)	07
	OR	
Q.5	(a) Describe the role of load dispatch centers (LDC) in smart grid operations.	03
	(b) List and explain various Tariff Mechanisms.	04
	(c) Describe the working principle, components, and applications of Phasor Measurement Units.	07
