Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2022

Subject Code:3170922 Date:16-01-2023

Subject Name:Smart Grids

Time:10:30 AM TO 01:00 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
Q.1	**(a)**	What are the key features of smart grid?	**03**
	(b)	What are the challenges of smart grid implementation?	**04**
	(c)	Define smart grid. What are the necessities of smart grid in existing electric power system network?	**07**
Q.2	**(a)**	Mention the benefits of smart grid.	**03**
	(b)	Write short technical note about Unit commitment.	**04**
	(c)	Draw smart grid architecture and discuss function of each component.	**07**
		OR	
	(c)	Specify the conditions in which power system operates in a normal state. What are the various analysis to be carried out for it?	**07**
Q.3	**(a)**	What is the role of ZigBee in smart grid?	**03**
	(b)	What is power line communication? Classify PLC technologies.	**04**
	(c)	Draw and explain smart metering architecture and its components.	**07**
		OR	
Q.3	**(a)**	Write technical features of Bluetooth technology.	**03**
	(b)	Mention the benefits of geographic information system (GIS) in smart grid.	**04**
	(c)	Draw and explain structure of wide area monitoring, protection and control system (WAMPC).	**07**
Q.4	**(a)**	Mention the advantages of distributed generation.	**03**
	(b)	Explain solar thermal based electricity generation.	**04**
	(c)	Discuss the various issues encountered while interconnecting distributed generation with the main grid.	**07**
		OR	
Q.4	**(a)**	Explain the islanding operation in microgrid.	**03**
	(b)	Write active and passive methods of islanding detection.	**04**
	(c)	What are the barriers to utilize the distributed generation? Suggest the remedies to overcome it.	**07**
Q.5	**(a)**	What do you mean by demand side management?	**03**
	(b)	Discuss the basic components of PMU.	**04**
	(c)	Discuss vehicles to grid and grid to vehicles system.	**07**
		OR	
Q.5	**(a)**	List out types of demand response.	**03**
	(b)	Classify time based tariff .	**04**
	(c)	Explain advanced metering infrastructure (AMI) with block diagram.	**07**

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