Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170922 Date:14/06/2022

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
Q.1	**(a)**	Enlist types of loads and load models	**03**
	(b)	Discuss changes to be made in conventional power grid to transform the same into smart grid.	**04**
	(c)	Discuss generalized smart grid architecture with appropriate diagram.	**07**
Q.2	**(a)**	Enlist types of generators and mathematical models for the same.	**03**
	(b)	Discuss changes to be made in conventional energy meter to smart energy meter.	**04**
	(c)	Elaborate different communication protocols to be used in smart grid architecture. State specific application of each.	**07**
		OR	
	(c)	Elaborate Advanced metering and communicating infrastructure in smart grid with appropriate diagram.	**07**
Q.3	**(a)**	Discuss the term Unit commitment in your words	**03**
	(b)	Discuss the role of policies and policies in implementation of smart grid in the nation.	**04**
	(c)	Given that, a home microgrid has PV panel connected such that, PV can only supply to grid and can not be utilized in hose wiring loads. • Discuss the islanding method for the same with appropriate diagram.	**07**
		OR	
Q.3	**(a)**	Discuss Economic Dispatch in your words	**03**
	(b)	Discuss the smart grid initiatives taken by Indian national power grid till date and their importance.	**04**
	(c)	Given that a home distribution system to be upgraded with DC microgrid for integrating solar PV and battery storage. Discuss DC microgrid architecture and all its components with appropriate diagram for the same.	**07**
Q.4	**(a)**	Discuss the term Distributed generation.	**03**
	(b)	Compare distributed renewable energy generators and fossil fueled generators based on reliability.	**04**
	(c)	Discuss principle and role of Phasor Measurement Units in smart grid energy management system.	**07**
		OR	
Q.4	**(a)**	Enlist the generators those can be located optimally as Distributed generators.	**03**

	(b)	Discuss the methods of estimation of energy generation from Renewable energy sources.	**04**
	(c)	Discuss concept of "self-healing" and elaborate generalized fault detection and self healing strategy at feeder level with appropriate diagram.	**07**
Q.5	**(a)**	Discuss the term "microgrid" in your words	**03**
	(b)	Compare the performance of microgrid integrated power grid system and centralized conventional power grid system with respect to quality, reliability and green energy aspects.	**04**
	(c)	Given that, Electric Vehicle parking lot with V2G and G2V facility at office area. • Discuss the microgrid model with appropriate diagram and strategy for operation and management of the same.	**07**

OR

Q.5	**(a)**	Discuss the term "smart grid" in your words	**03**
	(b)	Discuss role of demand response management in smart grid energy management system.	**04**
	(c)	Given that, a PV, Battery and Wind generators are connected to an isolated microgrid for the commercial load pattern. • Discuss the microgrid model with appropriate diagram and strategy for operation and management of the same.	**07**

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