

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2021****Subject Code:3170922****Date:17/12/2021****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 is Smart Grid? Describe the importance of Smart Grid	03
	(b) Compare the smart grid and conventional grid system	04
	(c) Discuss the initiative taken for smart grid system in India.	07
Q.2	(a) Describe functional block diagram of a smart metering	03
	(b) Describe the advantage and disadvantage of distributed generations	04
	(c) Explain Energy management system (EMS) in detail.	07
	OR	
	(c) Discuss the challenges for electric vehicle in India. Also Explain electric vehicle to grid system in detail.	07
Q.3	(a) List out the types of communication system for smart grid	03
	(b) Compare the micro grid and smart grid.	04
	(c) State and explain the issues of interconnecting the micro grid with the utility grid.	07
	OR	
Q.3	(a) Explain the SCADA system and their limitations	03
	(b) Explain Energy management system (EMS) in detail	04
	(c) Explain the operational feature of phasor management Unit(PMU)	07
Q.4	(a) What is islanding? Explain the need and benefits of islanding	03
	(b) Explain the integration process for distributed generations to power grid	04
	(c) Explain the concept of wide area monitoring system (WAMS)	07
	OR	
Q.4	(a) Explain in brief: Automatic meter reading	03
	(b) Describe the role of load dispatch centers in smart grid operations	04
	(c) Explain the operational feature of fault detection and self-healing system	07
Q.5	(a) Explain the concept of islanding and its importance	03
	(b) What are the challenges of demand side management of smart grid.	04
	(c) Discuss the necessity of micro grid and their applications in detail	07
	OR	
Q.5	(a) Describe the Unit Commitment in brief	03
	(b) Explain the necessity of cyber security for smart grid operations	04
	(c) Explain Wi-Max based communication and wireless mesh network	07

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.	07
		<ul style="list-style-type: none"> • Discuss the islanding method for the same with appropriate diagram. 	
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

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| | (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. | 07 |
| | | <ul style="list-style-type: none"> Discuss the microgrid model with appropriate diagram and strategy for operation and management of the same. | |
| | | 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. | 07 |
| | | <ul style="list-style-type: none"> Discuss the microgrid model with appropriate diagram and strategy for operation and management of the same. | |
