GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (Second Semester) Examinations, May – 2024

MPEPE2043 – Smart Grids

(Power Electronics)

Time: 3hrs Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A **(2 x 10 = 20 Marks)**

	Q1. Answer all the Questions	CO	Blooms Level
a.	Explain the concept of home automation and its relevance in modern households.	CO3	K2
b.	Define plug-in hybrid energy vehicles and discuss their advantages.	CO3	K2
c.	Describe conventional metering and its limitations.	CO4	K2
d.	What are Intelligent Electronic Devices (IEDs), and how are they used in modern power systems?	CO4	K3
e.	Discuss the benefits and advantages of implementing a smart grid.	CO3	K4
f.	Explain the services provided by Distribution System Integrators (DSI).	CO2	K4
g.	Discuss the concepts of "Vehicle to Grid" and "Grid to Vehicle."	CO2	K3
h.	Provide two practical applications of Bay controllers within the context of power systems.	CO2	K3
i.	Compare and contrast conventional metering with smart metering, highlighting at least two key differences.	CO1	K2
j.	Explain the concept of "Grid Resilience" in the context of Smart Grids and discuss one key technology or strategy used to enhance grid resilience.	CO1	K3

PART – B **(10 x 5=50 Marks)**

	Answer ***ANY FIVE*** questions	Marks	CO#	Blooms Level
2. a.	Offer detailed insights into the block diagram of a smart substation, highlighting its various components and their functions.	5	CO4	K3
b.	Describe the configuration and key components of an Energy Management System (EMS) within the framework of a smart grid.	5	CO4	K4
3.a.	Discuss the importance of power quality audits within the context of a smart grid.	4	CO3	K3
b.	Can you provide a brief overview of voltage regulation in power systems?	6	CO3	K3
4. a.	Analyze the intricacies of how smart meters contribute to enhanced energy management, including data collection, two-way communication, and real-time monitoring.	5	CO3	K4
b.	Explain the various sensing, measurement, control, and automation technologies	5	CO4	K4

	employed in modern power systems, their roles, and their impact on system efficiency and reliability.			
5.a.	Write an in-depth analysis of the opportunities and barriers associated with the implementation of smart grids, considering economic, technological, and regulatory aspects.	6	CO1	K3
b.	Delve into the concept of power quality audits, detailing their methodologies and the critical parameters they assess in electrical supply.	4	CO1	K3
6. a.	Discuss the cybersecurity measures and distributed storage solutions that are essential for safeguarding smart grid infrastructure and ensuring reliable operation.	5	CO1	K3
b.	Provide a comprehensive breakdown of the subsystems utilized in smart sensors, covering aspects such as data acquisition, processing, and communication.	5	CO3	K3
7.a.	Explore the various issues that may arise when interconnected microgrids.	4	CO3	K3
b.	Elaborate on the functional block diagram of a smart meter, detailing the components and their functions.	6	CO2	K3
8. a.	Explain the significance and interplay between Distribution Automation (DA) and Advanced Metering Infrastructure (AMI) in modern power systems.	5	CO2	K3
b.	Describe the concept of Automatic Meter Reading (AMR) and its significance.	5	CO2	K3

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