PRN:		Course Code :	PPD352

Second Year **M. Tech** End Semester Examination Winter 2024

SMART GRID

000943

Day and Date: Wed 10:30AM To 01.30PM

Time : 4 DEC 2024

Max Marks: **100**

Duration: **03** hrs.

Instructions: All questions are compulsory.

			Marks	Bloom's Level	CO
Q.1	**Attempt the following**				
	a)	Discuss the Smart Grid initiative for power distribution utilities in India. Highlight the policies, standards, and applications involved.	08	L2	CO1
	b)	Describe the architecture of a smart grid. What are the main components, and how do they interact to facilitate advanced functionalities.	08	L2	CO1
		OR			
	b)	Discuss the significance of power flow analysis in grid operation. What methods are commonly used for power flow analysis?	08	L3	CO1
Q.2	**Attempt the following**				
	a)	Describe the concept of a Multi-agent System (MAS) and its application in power systems.	08	L3	CO1
	b)	Analyze the significance of big data analysis for smart grid operations. What types of data are collected, and how is this information utilized to optimize grid performance?	08	L2	CO1
		OR			
	b)	Discuss the role of Power Line Communications in smart grids. What are its advantages and limitations compared to other communication technologies?	08	L3	CO2
Q.3	**Attempt any two from the following**				
	a)	Discuss the methods used for congestion management in smart grids. How do these methods ensure optimal power flow and prevent overloads in the network?	08	L2	CO2
	b)	Explain the importance of visualization in smart grid decision support systems. How does effective visualization aid operators in monitoring and managing grid performance?	08	L2	CO2
	c)	Explain Dynamic Optimal Power Flow (Dynamic OPF) and discuss its significance in power system operation and control.	08	L3	CO2
Q.4	**Attempt any two from the following**				
	a)	What are Wide Area Monitoring and Control Techniques, and how do they contribute to the stability and reliability of modern power grids?	08	L4	CO2
	b)	Explain the concept of distributed generation (DG) resources.	08	L2	CO3

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		What types of technologies are commonly classified as distributed generation?			
	c)	Explain the role of Smart Grid components and control elements in the integration of distributed generation resources.	08	L2	CO3
Q.5		**Attempt any Two of the following**			
	a)	How do smart homes and smart cities contribute to renewable integration, and what is the role of cooperative grids in these settings?	09	L2	CO3
	b)	Discuss the challenges and benefits of integrating renewable energy sources into the power grid. How does renewable integration impact grid stability and reliability?	09	L2	CO3
	c)	What is a Microgrid, and how does it differ from traditional power grids? Discuss its significance in modern energy systems.	09	L3	CO4
Q.6		**Attempt any Two of the following**			
	a)	Identify the key dynamics and challenges associated with the economic aspects of smart grids. What barriers hinder the effective implementation of smart grid technologies?	09	L3	CO4
	b)	Describe the strategies employed for demand side management in smart grids. How do these strategies optimize energy use and reduce peak demand?	09	L3	CO4
	c)	Describe the dynamics and challenges associated with pricing and energy consumption scheduling in smart grid systems.	09	L2	CO4

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