

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025***Sixth Semester**Electrical and Electronics Engineering***EE3007 – Smart Grid****Regulations - 2021****Duration : 3 Hrs****Maximum : 100 Marks****PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BLT	CO	Marks
1.	Define the term: Smart Grid. What are its functional characteristics?	L1	1	2
2.	What are the salient features of smart grid over traditional power grid?	L1	1	2
3.	What is role of PMU in smart grid?	L2	2	2
4.	Compare and Contrast: Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI).	L2	2	2
5.	List some of the standards followed in substation automation.	L1	3	2
6.	Discuss about the wide area monitoring system in a transmission network.	L2	3	2
7.	How Volt/Var control is being done in the distribution side of Smart Grid?	L1	4	2
8.	Write the merit of high-efficiency distribution transformer.	L2	4	2
9.	What is the smart grid cyber security requirements? Map the smart grid applications with information, infrastructure and application security.	L2	5	2
10.	What is the role of HAN in smart grid?	L1	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11. a	Discuss in detail the smart grid architectural frame work with neat sketches. Also comment on various components pertaining to control and communication of power generation, transmission and distribution systems.	L2	1	16
	Or			
b	Explain key aspects and the national and international initiatives related to the Indian smart grid.	L2	1	16
12. a i	With a neat schematic, describe the construction and working of a smart meter for advanced metering infrastructure.	L3	2	8
i	Illustrate the AMI Drivers and benefits with a neat sketch.	L3	2	8
	Or			
b i	Draw the conceptual diagram of a phasor measurement unit and explain the significance of positive sequence phasor estimates in power system protection applications.	L3	2	10

	i		L3	2	6
	i	Describe the AMI needs in the smart grid.			
13.	a	i	L2	3	8
		Discuss in detail the sub-station automation scheme with necessary diagrams.			
		i	L2	3	8
		Describe the key objectives of implementing feeder automation in your distribution network.			
		Or			
	b	i	L2	3	8
		Discuss the role of EMS in monitoring, protection and control in transmission systems.			
		i	L2	3	8
		Explain the role of wide area monitoring and protection and control in a Smart Grid.			
14.	a	i	L2	4	10
		Discuss in detail the peer to peer architecture of a fault detection, isolation and service restoration techniques for a distribution automation system.			
		i	L2	4	6
		Discuss the high-efficiency distribution transformers in smart grid.			
		Or			
	b	i	L2	4	8
		Explain how phase shifting transformers help manage dynamic power flow in a Smart Grid, especially under changing load and generation conditions.			
		i	L2	4	8
		Explain the working and power management system of electric vehicle.			
15.	a		L2	5	16
		Compare the various technologies available for implementing Home Area Network (HAN) and Neighborhood Area Network (NAN) based on Bandwidth, Latency, Interoperability, Scalability, Security, and Reliability.			
		Or			
	b		L2	5	16
		Discuss in detail various smart grid cyber security issues, potential threats, vulnerabilities and their risks. Narrate the importance of smart grid security in advanced metering infrastructure.			