R25 Regulation *Subject code: F431PE12*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

M.Tech I Semester Regular Examinations, March 2026

SMART GRID TECHNOLOGIES

(Power Electronics)

Maximum Marks: 60 D: 06.03.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10Marks)		Marks	CO	BTL
1.a	Define Smart Grid.	1M	1	L1
b	List the challenges relate to smart grid.	1M	1	L1
c	What is "Real Time Pricing" ?	1M	2	L1
d	What is Smart sub-station Automation?	1M	2	L1
e	Mention the need of Phase Measurement Unit (PMU).	1M	3	L2
f	List out the applications of smart storage batteries.	1M	3	L1
g	What are thin film solar cells?	1M	4	L1
h	Illustrate the purpose of Integration of renewable energy sources.	1M	4	L2
i	What is EMC in smart grid?	1M	5	L1
j	Mention the need of Power Quality Audit.	1M	5	L2

Part-B

Answer All the following questions. (5X10M=50Marks)			CO	BTL
2	a) Examine the Evolution of Electric Grid. b) Analyze the need of Smart Grid and Explain neatly with detailed reasons.	5M 5M	1	L4 L4
	OR			
3	Generalize the International policies in Smart Grid and explain the National and International Initiatives in Smart Grid.	10M	1	L4
4	Explain the Plug in Hybrid Electric Vehicles and vehicle to grid operation.	10M	2	L4
	OR			
5	a) Evaluate how the automatic meter reading can make the system smarter. b) Explain outage management system.	5M 5M	2	L4 L3
6	a) Discuss the role of IEDs in a smart grid. b) Explain pumped hydro and compressed air energy storage.	5M 5M	3	L3 L4

	OR			
7	a) Illustrate briefly about Geographic Information System (GIS). b) How can wide area monitoring improve the efficiency and reliability of the grid?	5M 5M	3	L4 L3
8	a) Compare micro grid and smart grid. b) Explain variable speed wind generators	5M 5M	4	L3 L4
	OR			
9	a) Explain the protection and control of micro grid. b) Discuss briefly about capacitive power plants.	5M 5M	4	L4 L3
10	a) Explain the importance of power quality Conditioners for smart grid. b) Explain the web based power quality monitoring system.	5M 5M	5	L4 L3
	OR			
11	Explain Advanced Metering Infrastructure (AMI), Various Communication means and IP based Protocols.	10M	5	L4