

**SVERI'S COLLEGE OF ENGINEERING, PANDHARPUR**  
**Electrical Engineering Department**  
**B. Tech, Semester-II**

**Subject: SMART GRID TECHNOLOGY**  
**(ELECTIVE-II) Course Code: EL423.4-21**

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Date 6/04/23

**Question Bank:**

**Unit 1: The Smart Grid:**

Introduction, Why implement the Smart Grid now?, What is the Smart Grid? Overview of how Indian power market is organized, operated and challenges being faced, Overview of the technologies required for the Smart Grid.

Q.N.	Questions
1	What is the Smart Grid?
2	Why implement the Smart Grid ?,
3	Differentiate between conventional grid and smart grid.
4	Write a short note on “issues and challenges in smart grid implementation.”
5	Explain the technologies required for the smart grid.
6	Explain the overview of how Indian power market is organized.
7	Write the different characteristics of smart grid
8	Explain the different characteristics and features of the smart grid.
9	What are the different benefits of a smart grid?
10	Explain the function of smart grid components

**Unit 2: Smart Grid Technologies:**

Smart meters: An overview of the hardware used, Evolution of electricity metering, Key components of smart metering, Automatic Meter Reading(AMR), Demand-side integration, Substation automation equipment, Switching techniques, Communication channels, The ISO/OSI model, Communication technologies, Geographic Information System(GIS), Intelligent Electronic Devices(IED) & their application for monitoring & protection, Smart storage like Battery, Phase Measurement Unit(PMU).

Q.N.	Questions
1	What are smart meters?
2	Explain the function of smart energy meters in the smart grid.
3	Explain smart meters. Give its function when deployed in the domestic sector.
4	Give a list of smart appliances & explain how they can enhance the system.

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5	Explain how smart appliances can be part of a smart grid.
6	How advanced metering infrastructure is going to help the system?
7	What are the different communication technologies in smart grid?
8	How does Automatic Meter Reading (AMR) work? Explain its block diagram and advantages of AMR
9	Explain Intelligent Electronic Devices(IED) & their application for monitoring & protection of smart grid.
10	Explain the demand response issue.
11	What are different energy storage devices? Explain in details.
12	Explain any two-energy storage equipment's (device) in details?
13	What do you mean Real Time Pricing? Why it should be implemented?
14	Define real-time pricing & explain its necessity.
15	Comparison between smart metering and Conventional metering
16	Explain the role of Phasor Measurement Unit in smart grid.

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#### Question Bank:

##### Unit 3: Electrifying rural India through Smart grid:

Electrifying rural India community and the challenges being faced. (Developing technology and systems that will enable smarter rural electrification, Financing programmes, Virtual power plants, Solar power, Geothermic power), Smart Utilities (case studies), Presentation on the Smart Grid Maturity Model (SGMM), Architecture for smart grids.

Q.N.	Questions
1	Write a short note on “wind and solar renewable energy sources
2	Why Do Utilities Use the Smart Grid Maturity Model (SGMM)?
3	What is geothermal energy and how does it work?
4	What are the advantages and disadvantages of geothermal energy?
5	How does geothermal energy work?
6	How wind is used to generate electricity
7	Explain architecture for smart grids in details
8	Explain domain wise architecture for smart grids in detail.
9	Explain Virtual power plant in details
10	What are Challenges in Rural electrification?
11	Explain Rural electrification: Challenges and the way ahead

##### Unit 4: Power Quality Issues in Smart Grid

Power Quality & EMC in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring, Power Quality Audit.

Q.N.	Questions
1	How does Power Quality Management work in Smart Grid?
2	What is the role of Electromagnetic Compatibility (EMC) in Smart Grid?
3	Explain Relation between Voltage Quality and EMC.
4	Explain Power Quality Audit in Details. Also Specify Its Applications
5	Explain the Flow Chart of Procedure for Monitoring Power Quality and Issues of Power Quality Monitoring
6	What is the Future PQ Challenge in Smart Grid?
7	How the Smart Grid help improve power quality?
8	Draw Classification diagram of Power Quality Compensator and explain it in details
9	Explain Smart Grid help improve power quality.

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**Assignment 3**

**Chapter 3**

Q.No.	Questions
1	Write a short note on “wind and solar renewable energy sources
2	Why Do Utilities Use the Smart Grid Maturity Model (SGMM)?
3	What is geothermal energy and how does it work?
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5	How does geothermal energy work?
6	How wind is used to generate electricity
7	Explain architecture for smart grids in details
8	Explain domain wise architecture for smart grids in detail.
9	Explain Virtual power plant in details
10	What are Challenges in Rural electrification?
11	Explain Rural electrification: Challenges and the way ahead

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**Assignment 4**

**Chapter 4**

Q.No.	Questions
1	How does Power Quality Management work in Smart Grid?
2	What is the role of Electromagnetic Compatibility (EMC) in Smart Grid?
3	Explain Relation between Voltage Quality and EMC.
4	Explain Power Quality Audit in Details. Also Specify Its Applications
5	Explain the Flow Chart of Procedure for Monitoring Power Quality and Issues of Power Quality Monitoring
6	What is the Future PQ Challenge in Smart Grid?
7	How the Smart Grid help improve power quality?

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8	Draw Classification diagram of Power Quality Compensator and explain it in details
9	Explain Smart Grid help improve power quality.

## Smart Grid Technologies

# Assignments 5 & 6

Chapter no 5: Power Electronics in Smart Grid	
<b>Unit Content:</b> Introduction, Current source converters, Voltage source converters, Renewable energy generation, Fault current limiting, Shunt compensation, D-STATCOM, FACTS.	
1	Explain role and significance of power electronics in the smart grid.
2	What is the application of power electronic technology in a Smart grid?
3	Explain current source convertors in the smart grid.
4	Explain voltage source converters in the smart grid.
5	Comparison between the current source and voltage source converters.
6	Write a note on Renewable energy generation and its advantages in the smart grid.
7	What are the different Renewable energy sources used in smart grids?
8	What is the fault current limiting in a smart grid?
9	Explain shunt compensation.
10	What is D-STATCOM? Explain in Detail.
11	Explain FACTS in Smart Grid.
Chapter no 6: Distribution Management System	
<b>Unit Content:</b> Introduction, Data sources and associated external systems, Modelling and analysis tools, Energy management systems, and Visualization techniques.	
1	Explain the distribution management system in the smart grid.
2	What data sources and associated external systems?
3	Explain the modelling and analysis tool in Distribution Management System.
4	Explain Energy Management System (EMS) in the smart grid.
5	What are the applications of an Energy Management System?
6	Explain visualisation Techniques in smart grid.