PAPER ID-410201

Subject Code: KOE084

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VIII) THEORY EXAMINATION 2023-24
INTRODUCTION TO SMART GRID

TIME: 3 HRS **M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Q no.	Question	Marks	CO
a.	Why do we need Smart Grid technology?	02	1
b.	Explain the concept of a Resilient and Self-Healing Grid.	02	1
c.	Define Real-Time Pricing in Smart Grid.	02	2
d.	What is the role of Plug-in Hybrid Electric Vehicles in Smart Grid?	02	2
e.	What is the purpose of Smart Substation?	02	3
f.	Briefly explain the application of PMUs in power system monitoring.	02	3
g.	Name one issue related to microgrid interconnection.	02	4
h.	What is the role of fuel cells in microgrid?	02	4
i.	Define Electromagnetic Compatibility (EMC) in the context of Smart Grid.	02	5
j.	How does Web-based Power Quality monitoring differ from traditional monitoring?	02	5

SECTION B

2. Attempt any *three* of the following: **3 x 10 = 30**

a.	What are the major differences between the conventional grid and smart grid?	10	1
b.	What is an Outage Management System (OMS), and how does it help utilities to detect, locate, and respond to power outages more efficiently?	10	2
c.	What are phasor measurement unit (PMU)? How it helps in monitoring and control of power system.	10	3
d.	What are captive power plants, and how are they integrated into microgrid systems to enhance reliability, resilience, and energy self-sufficiency?	10	4
e.	How do Grid-connected Renewable Energy Sources impact Power Quality in Smart Grid, and what are some common Power Quality issues associated with their integration?	10	5

SECTION C

3. Attempt any *one* part of the following: **1 x 10 = 10**

a.	Explain briefly about the Smart Grid Roadmap for INDIA.	10	1
b.	What are the main opportunities offered by Smart Grid, and what barriers exist to their widespread implementation?	10	1

4. Attempt any *one* part of the following: **1 x 10 = 10**

a.	Explain the concept of Real-Time Pricing and its significance in demand-side management within Smart Grid environments.	10	2
b.	How does Automatic Meter Reading (AMR) enhance the functionality and accuracy of utility metering systems?	10	2

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5. Attempt any *one* part of the following: 1 x 10 = 10

a.	What are Smart Substation, and how do they differ from traditional substations in terms of functionality and capabilities?	10	3
b.	What are Intelligent Electronic Devices (IEDs), and how are they utilized for monitoring and protection functions in modern power systems, including substation and distribution network?	10	3

6. Attempt any *one* part of the following: 1 x 10 = 10

a.	Explain the different components used for solar PV integration with utility grid.	10	4
b.	Explain the concept of microgrid with neat and labelled diagram? What are the different modes of operation of microgrid?	10	4

7. Attempt any *one* part of the following: 1 x 10 = 10

a.	Explain the issues about power quality monitoring and power quality measurement in smart grid.	10	5
b.	How do Power Quality Conditioners contribute to mitigating voltage sags, swells, harmonics, and other Power Quality disturbances in Smart Grid?	10	5