

Nirma University

Institute of Technology

Supplementary Examination (SPE), March - 2023

B. Tech. in CH / IC / CSE, Semester-VII

2EEOE03 Introduction to Smart Grid

Roll/

Exam No.

Supervisor's

Initial With Date

Time: 3 Hours

Max. Marks: 100

Instructions: -

1. Attempt all questions.
2. Use section-wise separate answer book.
3. Figures to right indicate full marks.
4. Draw neat sketches wherever necessary.
5. Assume suitable data wherever necessary.
6. Notations used have their usual meaning.

SECTION- I

Q-1 (A) Enlist various components of smart grid. Discuss the motive behind development of smart grid. [6]
CO1_L3

(B) Elucidate the differences between conventional grid with smart grid. [6]
CO1_L2

(C) Explain basic structure of conventional power system with various specified voltages at different levels using single line diagram. [4]
CO1_L3

Q-2 (A) Describe the opportunities and challenges related to the smart grid. [4]
CO2_L3

(B) Explain the concept of phasor measurement unit (PMU) and also mention its applications. [6]
CO2_L3

OR

(B) Discuss the key features of wide area monitoring system (WAMS). [6]
CO2_L3

(C) Discuss functions of various components smart meter. [6]
CO2_L2

Q-3 (A) Enlist and Explain working of different substation equipment. [6]
CO2_L2

(B) Discuss the concept of substation automation in context of smart grid. [6]
CO3_L3

OR

(B) Discuss the concept of home and building automation. [6]
CO3_L3

(C) Discuss various components of SCADA in smart Grid. [6]
CO3_L3

SECTION -II

Q-4 (A) Discuss how voltage and frequency of the power system is maintained constant. [4]
CO2_L4

(B) Compare air insulated substation (AIS) and gas insulated substation (GIS). [6]
CO2_L4

- (C) Enlist the smart grid communication technologies and also compare [6]
CO3_L3 the wireless and wired communication technology.

OR

- (C) Explain the role of area network in smart grid and also discuss the [6]
CO3_L3 concept of various communication network (HAN, LAN, WAN etc.) in smart grid.
- Q-5(A) Enlist various renewable energy resources used for power generation [6]
CO4_L4 and also mention the advantages and disadvantages of each renewable energy source.
- (B) Discuss the industry and customer changing scenario with the [6]
CO4_L1 evolution of smart grid.
- (C) How is it possible to achieve energy efficiency in electrical systems and [6]
CO4_L2 power system as a whole using smart grid? Do you think that such energy efficiency not achieved earlier in the absence of "smart" features of the grid? Discuss.
- Q-6(A) With neat sketch, discuss various parts of digital relay. [6]
CO4_L3
- (B) Discuss the use of Machine Learning (ML) and Artificial Intelligence [4]
CO4_L3 (AI) in context of smart grid.
- (C) Suggest the changes in the policy for India to encourage peak load [6]
CO4_L3 demand reduction. How a smart grid implementation will help in achieving it?

OR

- (C) Discuss some of the barriers and research needs for DC power delivery [6]
CO4_L3 systems.
