Total No. of printed pages = 3

EE 1818PE52

Roll No. of candidate | | | | | | | | | | |

2022

B.Tech. 8th Semester End-Term Examination

EE

SMART GRID TECHNOLOGY

(New Regulation 2017-18) &

(New Syllabus 2018-19)

Full Marks – 70 Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No. 1 and any *four* questions from the rest.

1. Answer the following questions :- (10 × 1 = 10)

(i) How to manage demand on it smart grid network?

(a) Shifting demand to another time or day

(b) Rescheduling usage

(c) Reducing Consumption

(d) All of the above

(ii) What is the benefit of demand response?

(a) Reduce peak demand

(b) Increase network life

(c) Increase reliability

(d) All of the above

(iii) Which of the following is NOT a Demand Response Programs?

(a) Task Scheduling

(b) Critical Peak Pricing

(c) Direct Load Control

(d) Time of Use Rate

[Turn over

(iv) A localized grouping of electricity generations, energy storages, and loads is termed as?

(a) Virtual Power Plant

(b) Macro Grid

(c) Micro Grid

(d) Traditional Grid

(v) A system that integrates several types of power sources? (wind-turbines, hydro, photovoltaics and batteries) to give a reliable overall power supply is termed as?

(a) Micro Grid

(b) Virtual Power Plant

(c) Macro Grid

(d) Traditional Grid

(vi) Which is NOT a key drivers of Smart Grids?

(a) Reduction of T&D losses in all utilities as well as improved collection efficiency

(b) Peak load management

(c) Financial sound utilities

(d) Timely completion of projects

(vii) Which is NOT a task of ISGF?

(a) Improve power quality

(b) Reduce power losses by under 10%

(c) Provide free electricity to 300 million people from grid

(d) Evaluate standards and technologies

(viii) Who is NOT a main" stakeholder in Smart Grid?

(a) Workforce

(b) Political Parties

(c) Consumers

(d) Environmental Groups

(ix) Sensors cannot be used for the following purpose in Smart Grids

(a) Detect mechanical failures, tower collapses, extreme mechanical conditions

(b) Real time mechanical and electrical conditions of power lines

(c) Detect and count number of vehicles passing under the line

(d) Diagnose imminent as well as permanent faults

(x) Which of the following is NOT a layer of smart grid communication?

(a) Application Layer

(b) Power Layer

(c) Control Layer

(d) Cross Platform Layer

2. (a) Discuss three important ways the Smart Grid is different from Conventional Grid. (7)

(b) Draw the NIST Smart Grid conceptual model and explain any of its component or subsystem. (8)

3. (a) Discuss the "Plug-and-Play" capability of Smart Grid. (7)

(b) Discuss at least 3 ways that Smart grid may reduce carbon footprint and contribute towards green environment. (8)

4. (a) Draw a neat sketch of Substation Automation system and briefly discuss about the following components of it: relay IED (Intelligent Electronic Device), Meter IED, Recording IED and Bay Controller. (7)

(b) Highlight the key components of a SCADA (Supervisory Control and Data Acquisition) system and their functions. (8)

5. (a) Discuss one of the communication based field schemes of FLISR (Fault Location, Isolation and Service Restoration), that may be implemented in Smart Grid, with an example with neat sketch. (7)

(b) Discuss in brief the enabling Energy Storage technologies for development and implementation of Smart Grid. (8)

6. (a) Discuss the different levels of G2V (Grid-to-Vehicle) charging configurations. (7)

(b) The Integration of DER (Distributed Energy Resource) operation to the DMS (Distribution Management System) has a large impact on the performance of a smart distribution network. Comment. (8)

7. (a) Discuss the demand response management based on at least 3 (three) types of incentive-based demand side integration (DSI). (7)

(b) Discuss how the different price-based implementation of DSI would affect demand response. (8)
