

CBCS SCHEME

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15EE81

Eighth Semester B.E. Degree Examination, July/August 2021 Power System Operation and Control

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions.

- 1 a. What are the different operating states of power system? Explain the transition that can take place from one state to another state, with a block diagram. (08 Marks)
b. What is SCADA? Explain the components of SCADA with a general SCADA configuration. (08 Marks)
- 2 a. List the seven key concepts proposed by NERC. Explain any two. (08 Marks)
b. What is a unit commitment problem? Draw and explain the flow chart for forward dynamic programming method. (08 Marks)
- 3 a. Explain the algorithm for hydrothermal scheduling using discrete time interval method. (10 Marks)
b. Explain the basic control loop of a generator with a schematic diagram. (06 Marks)
- 4 a. Draw the block diagram of steam turbine governing system and explain the functions of various components. (08 Marks)
b. Explain the following terms :
 - i) Control Area
 - ii) Tie – line
 - iii) Area Control Error (ACE). (08 Marks)
- 5 a. Obtain the transfer function for the complete ALFC system. (08 Marks)
b. A control area has the following data :
Total generation capacity = 2000MW, Normal load = 1500MW, $H = 4.8s$, $D = 1.2\%$, $f = 50Hz$, $R = 2.5Hz/pu MW$.
 - i) Determine the primary ALFC parameters
 - ii) For an increase of 0.02pu in the load, find the frequency drop without and with governor control. (08 Marks)
- 6 a. Obtain the block diagram representation of a two area system, with primary control. (08 Marks)
b. Obtain the state space model of a single area system. (08 Marks)
- 7 a. Explain tie line oscillations in a 2-area system. (10 Marks)
b. Explain briefly the components of a power system that can generate and /or absorb reactive power. (06 Marks)

- 8 a. Show that the real power flow between nodes is proportional to the transmission angle ' δ ' and reactive power flow is proportional to the scalar voltage difference between the two nodes. (08 Marks)
- b. Explain the method of voltage control by reactive power injection. (08 Marks)
- 9 a. Explain the Security Constrained Optimal Power Flow (SCOPF) function of power system security with an example. (08 Marks)
- b. Explain contingency analysis using a flow chart. (08 Marks)
- 10 a. What is state estimation in power system? Discuss need and importance of state estimation. (06 Marks)
- b. Explain the Weighted Least Square Estimation (WLSE) method of power system state estimation. (10 Marks)

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15EE833

Eighth Semester B.E. Degree Examination, July/August 2021 Integration of Distributed Generation

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions.

- 1 a. Briefly explain different MPPT algorithms incorporated within the interfacing technology of a PV unit. (08 Marks)
b. Explain the properties of wind power and power distribution as a function of the wind speed. (08 Marks)
- 2 a. Explain the status and properties of combined heat and power. (08 Marks)
b. What are the different reasons for introducing new types of production into the power system. (08 Marks)
- 3 a. Explain impact of the type of interface on the power system. (08 Marks)
b. Discuss the importance of local control of distributed Generation. (08 Marks)
- 4 a. Define Hosting capacity and explain its importance to measure the performance of the power system. (08 Marks)
b. Explain distributed power electronics interface to the grid and what are its advantages. (08 Marks)
- 5 a. Explain the energy management system in distributed generation. (08 Marks)
b. Explain the impact of distributed Generation on voltage magnitude. (08 Marks)
- 6 a. With suitable Graph, explain a method for estimating over voltage margin without measurement. (08 Marks)
b. Outline the intertrip schemes used during connecting a large generator unit into the network. (08 Marks)
- 7 a. Explain the impact on the power quality due to introduction of Distributed generation. (08 Marks)
b. Discuss the advantages and disadvantages of over voltage protection of distributed generation by tripping. (08 Marks)
- 8 a. Explain the sources of unbalanced voltage results a weaker transmission system. (08 Marks)
b. Explain the dynamic voltage control used for increasing the hosting capacity. (08 Marks)
- 9 a. List the causes of voltage dips due to distributed generation. (08 Marks)
b. Explain the parallel and series resonance concerned to harmonics. (08 Marks)
- 10 a. Discuss the objectives and disturbance levels related to the compatibility between equipment and the power supply. (08 Marks)
b. Explain the various methods to mitigate the voltage dip issues. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.