Seat No.: Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VIII (OLD) EXAMINATION – WINTER 2020

Subject Code:180906 Date:28/01/2021

Subject Name:Advanced Power System -II

Time:02:00 PM TO 04:00 PM Total Marks: 56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Explain bad data detection using χ^2 for state estimation. **07**

(b) In state estimation using weighed least square method, what will be difference in implementation of WLSE for DC network and AC network? Explain with example. **07**

Q.2 **(a)** Give classification of voltage stability. Explain each in detail. Out of all which phenomenon exist the most? Why? **07**

(b) Estimate two values random variables **x** by weighted least square estimate method for a given measurement vector '**Z**', weighted matrix '**W**', and coefficient matrix '**H**'. **07**

$$\boldsymbol{Z} = \begin{bmatrix} 0.75 \\ 0.25 \\ 0.45 \end{bmatrix}, \quad \boldsymbol{W} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \boldsymbol{H} = \begin{bmatrix} 1 & 1 \\ 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Q.3 **(a)** What is power system security? Explain major three function of a power system security and system state classification. **07**

(b) For a transmission line connected between two buses, derive the expression of voltage regulation and also establish from the phasor diagram and the equations that the Q and V have a strong coupling. **07**

Q.4 **(a)** Explain emergency control in power network with an example. **07**

(b) Discuss relation of voltage stability and rotor angle stability. **07**

Q.5 **(a)** Explain the characteristics of (i) the receiving end voltage of a basic power transmission system for varying system reactance and, (ii) the characteristic of voltage V/s system short circuit capacity for any fixed value of real power flow considering leading, u.p.f. and lagging power factors load. **07**

(b) A lossless three phase 50Hz transmission line has inductive reactance of 0.50 Ω/km while capacitive admittance of 60 μS/km. If the system voltage at the sending end is 220KV(L-L) and the line length is 150 km., find **07**

1) the electrical line length of line
2) the surge impendence of the line
3) the receiving end voltage at no load with sending end voltage as reference
4) the sending end current
5) the reactive power at sending end
6) the surge impedance loading

Q.6 **(a)** Using Econometric models explain Long Term Load Predictions. **07**

(b) What are the reasons for voltage collapse ? and explain in detail that how they lead to voltage collapse. **07**

Q.7 **(a)** Explain in detail, importance of load forecasting. Discuss regression analysis for short term load forecasting with example. **07**

(b) Explain the operation of synchronous condenser in steady state using V-I characteristics. Provide its application. **07**

Q.8 **(a)** What do you mean by deregulated power system ? How it is useful ? Who are the major entities in deregulated power system ? List disadvantages of deregulated power system. **07**

(b) Write in detail about black out in power system. **07**

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