

**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  $\chi^2$  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  $\mathbf{x}$  by weighted least square estimate method for a given measurement vector ' $\mathbf{Z}$ ', weighted matrix ' $\mathbf{W}$ ', and coefficient matrix ' $\mathbf{H}$ '. **07**
- $$\mathbf{Z} = \begin{bmatrix} 0.75 \\ 0.25 \\ 0.45 \end{bmatrix}, \quad \mathbf{W} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad \mathbf{H} = \begin{bmatrix} 1 & 1 \\ 1 & 0 \\ 0 & 1 \end{bmatrix}$$
- 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  $\Omega$ /km while capacitive admittance of 60  $\mu$ S/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 impedance 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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