

Code: EE8T3B

**IV B.Tech - II Semester –Regular / Supplementary Examinations  
May - 2022**

**REAL TIME CONTROL OF POWER SYSTEMS  
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

**PART – A**

Answer *all* the questions. All questions carry equal marks

11 x 2 = 22 M

1.

- a) List the various methods used for state estimation.
- b) What are the methods used to detect bad data?
- c) List the levels of power system security.
- d) Define line outage distribution factor.
- e) What is the need for computer control in power system?
- f) Define SCADA system.
- g) What is voltage stability?
- h) Sketch Q-V curve.
- i) What is an artificial intelligence neural network?
- j) List some applications of PMU in power systems.
- k) What is the objective of power system state estimator?

## PART – B

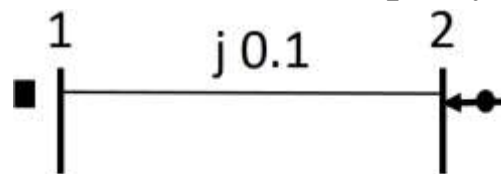
Answer any **THREE** questions. All questions carry equal marks.  
3 x 16 = 48 M

2. a) What is the importance of state estimation? Explain the method of weighted least square. 8 M

b) A 2-bus power system is shown in Figure. Assume that the following measurement set is available for estimation:

$$[z]^T = [P_2 \ Q_2 \ V_1] = [-0.30, -0.15, 1.0]$$

Assume that measurements are equally accurate.



● : Power measurement

■ : Voltage magnitude measurement

a) Find the weighted least square estimator for  $V_2$  and  $\theta_2$

b) What is the value of the objective function  $J(x)$  at the optimal solution? 8 M

3. a) Explain the steps involved in contingency analysis with an example. 8 M

b) Illustrate the uses of network sensitivity factor. 8 M

4. a) Describe the numerous operating states of a power system with a neat sketch. 8 M

- b) Illustrate the software requirements for implementing SCADA. 8 M
5. a) Explain the main factors that contribute the phenomena of voltage collapse. 8 M
- b) Develop voltage stability analysis by using P-V curves. 8 M
6. Discuss the algorithm for load flows and short term load forecasting using artificial neural network technique in power systems. 16 M