

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (NEW) EXAMINATION – SUMMER 2022****Subject Code:2180909****Date:02/06/2022****Subject Name:Power System Operation and Control****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

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|------------|--|-----------|
| Q.1 | (a) What is contingency Analysis? | 03 |
| | (b) Discuss the block diagram of load frequency control for Isolated system. | 04 |
| | (c) The Gen-1 and Gen-2 is rated for 100 MW and 300 MW, respectively. The governor speed regulation of Gen-1 and Gen-2 is of the order of 4.0 and 6.0 percent from no-load to full-load, respectively. They are operating in parallel and share a load of 400 MW. Assuming free governor action and no-load operating frequency of generator is 50 Hz. determine the load shared by each unit.What will be the system frequency at that load? | 07 |
| Q.2 | (a) Discuss load frequency control with generator rate constraints | 03 |
| | (b) Define (i) State Variables (ii) Measurement Variables (iii) Redundancy Factor and (iv) Noise related to state estimation. | 04 |
| | (c) Discuss (i) Security Assessment and (ii) Security Control | 07 |
| | OR | |
| | (c) Discuss (i) Generator shift factor and (ii) Line outage distribution factor | 07 |
| Q.3 | (a) Discuss variance matrix in state estimation | 03 |
| | (b) Discuss the Properties of the Gaussian probability density function | 04 |
| | (c) Discuss weighted least square estimation technique for state estimation | 07 |
| | OR | |
| Q.3 | (a) Explain the significance of Pseudo measurement in state estimation | 03 |
| | (b) Discuss the comparison between state estimation and load flow study. | 04 |
| | (c) The connection configuration for three ammeters (Z1, Z2, & Z3) and two voltmeters (Z4 & Z5) are shown in Fig.1. Find out size of following matrices
(i) H-coefficient matrix (ii) Error matrix (iii) matrix of measurement variable (iv) Matrix of state variables (v) Gain matrix (G) | 07 |
| Q.4 | (a) Discuss line load-ability | 03 |
| | (b) Discuss voltage collapse and role of online tap changer in this regard. | 04 |

- (c) Derive the equation which represents the relation between line length of power line and maximum power. 07

OR

- Q.4** (a) Discuss series compensation of transmission line 03
 (b) Discuss Voltage regulation of the transmission line and its relation with reactive power. 04
 (c) Discuss reactive power generators and load bus voltage compensation. 07

- Q.5** (a) Discuss types of load forecasting 03
 (b) Discuss Auto Regressive models for load forecasting 04
 (c) Enlist the benefits of Deregulation and Explain the functions of ISO. 07

OR

- Q.5** (a) Discuss the objectives of load forecasting. 03
 (b) Reactive load forecasting. 04
 (c) Discuss the below given terminologies related to deregulation of power system 07
 (i) Unbundling (ii) Wheeling (iii) Recall-ability (iv) Capacity benefit margin

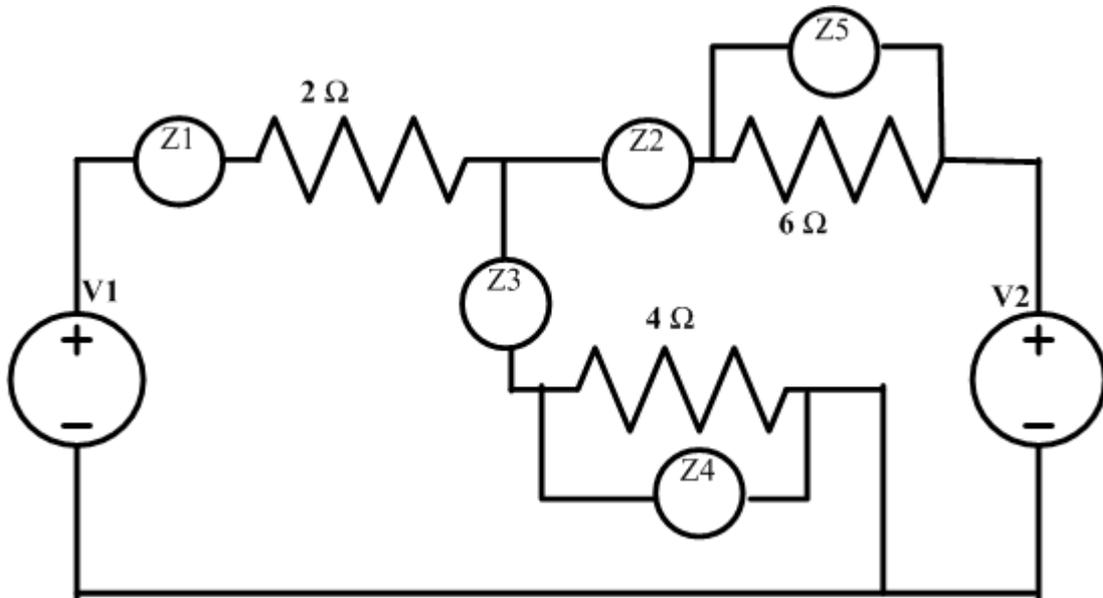


Figure 1
