

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2021****Subject Code:3170915****Date:27/12/2021****Subject Name:Power System Dynamics 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.

- Q1**
- | | | |
|-----|--|---|
| (a) | Draw the systematic diagram for 3phase synchronous machine. | 3 |
| (b) | State basic assumptions made in steady state analysis of an alternator. | 4 |
| (c) | Briefly describe Park's transformation and explain its importance in power system modeling and analysis. | 7 |

- Q2**
- | | | |
|-----|--|---|
| (a) | What is meant by speed governing system? | 3 |
| (b) | Explain three- Damper winding model with figure. | 4 |
| (c) | Explain transmission line modeling by D-Q transformation using α - β variables. | 7 |

OR

- (c) Draw general functional block diagram of an excitation control system and explain the function of each block.

- Q3**
- | | | |
|-----|--|---|
| (a) | Derive equation for power delivered for round and salient pole rotor. | 3 |
| (b) | Define the Classification of stability and Explain any one in details. | 4 |
| (c) | What is Sub-Synchronous Resonance (SSR)? Explain any one SSR mitigation technique. | 7 |

OR

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|-----|--|---|
| (a) | Briefly explain the procedure of small signal analysis. | 3 |
| (b) | Explain in the types of load models used in power system analysis. | 4 |
| (c) | What is voltage stability? Explain with neat diagrams. | 7 |

- Q4**
- | | | |
|-----|--|---|
| (a) | Define power system stabilizer. | 3 |
| (b) | Draw general functional block diagram of an excitation control system. | 4 |
| (c) | Compare voltage and angle stability. How to carry out integrated analysis of the same. | 7 |

OR

- | | | |
|-----|---|---|
| (a) | Explain classification of Bracking. | 3 |
| (b) | Using Part transformation derive voltage equation of synchronous machine. | 4 |
| (c) | Briefly explain : Discrete Control of HVDC Links. | 7 |

- Q5**
- | | | |
|-----|---|---|
| (a) | Why load is consider as a constant impedance model? | 3 |
| (b) | Explain any one method for analysis of voltage instability. | 4 |
| (c) | Briefly explain: Dynamic Braking. | 7 |

OR

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|------------|---|----------|
| (a) | Explain application of Model 1.1. | 3 |
| (b) | Describe the steps for calculating initial conditions of a synchronous generator. | 4 |
| (c) | What is PSS? Explain with neat block diagram. | 7 |

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2022****Subject Code:3170915****Date:06/06/2022****Subject Name:Power System Dynamics and Control****Time:02:30 PM TO 05:00 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

- | | | |
|------------|---|-----------|
| Q.1 | (a) Define power system stabilizer. | 03 |
| | (b) Explain in the types of load models used in power system analysis. | 04 |
| | (c) Mention the transformation matrix used and corresponding assumptions for Park's transformation. Describe the significance of Park's transformation. | 07 |
| Q.2 | (a) Draw the systematic diagram for 3phase synchronous machine. | 03 |
| | (b) Explain three- Damper wiring model with figure. | 04 |
| | (c) Give a classification of load models used in power system analysis. Briefly explain any one load model in detail. | 07 |
| | OR | |
| | (c) Draw general functional block diagram of an excitation control system and explain the function of each block. | 07 |
| Q.3 | (a) What is meant by speed governing system? | 03 |
| | (b) State basic assumptions made in steady state analysis of an alternator | 04 |
| | (c) Briefly describe the phenomenon of Sub-Synchronous Resonance. Describe any two techniques for SSR mitigation. | 07 |
| | OR | |
| Q.3 | (a) Briefly explain the procedure of small signal analysis | 03 |
| | (b) Define the Classification of stability and Explain any one in details. | 04 |
| | (c) What is voltage stability? Explain with neat diagrams. | 07 |
| Q.4 | (a) Explain classification of Bracking. | 03 |
| | (b) Using Part transformation derive voltage equation of synchronous machine. | 04 |
| | (c) Explain transmission line modeling by D-Q transformation using α - β variables. | 07 |
| | OR | |
| Q.4 | (a) Explain excitation system. | 03 |
| | (b) Explain three- Damper wiring model with figure. | 04 |
| | (c) Briefly explain : Discrete Control of HVDC Links. | 07 |
| Q.5 | (a) Explain application of Model 1.1. | 03 |
| | (b) Why load is consider as a constant impedance model? | 04 |
| | (c) Compare voltage and angle stability. How to carry out integrated analysis of the same. | 07 |

OR

- | | | |
|------------|---|-----------|
| Q.5 | (a) Explain classification of Bracking. | 03 |
| | (b) Explain any one method for analysis of voltage instability. | 04 |
| | (c) Briefly explain: Dynamic Braking. | 07 |
