Code No.: **52110**

MR 15

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad.

M.Tech II Semester Supplementary Examinations, DECEMBER-2017

SUBJECT: **Power System Dynamics**

Branch/Specialization: **EEE/Electrical Power Systems.**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer All Questions **5 x 4Marks=20 Marks**

1. What is system security?
2. What is park's transformation?
3. Write stator and rotor equation of synchronous machine
4. Draw block diagram for small signal analysis.
5. What are the basic concepts in PSS?

PART-B

Answer any five of the following questions **5 x 8 Marks= 40 Marks**

1. a) Explain the system model analysis of steady state stability.
   b) Describe the simplified representation of excitation control.

2. Derive the equivalent circuits of synchronous machine and determine the parameters.

3. a) Derive state equations to represent the system.
   b) Describe the synchronous machine model with field circuit.

4. a) Explain the Routh-Hurwitz criterion for synchronous machine stability.
   b) Explain the damping torque analysis of synchronous machine.

5. Explain Dynamic compensator analysis of single machine infinite bus system with and without PSS

6. a) Explain analysis of transient stability by equal area criterion
   b) Explain analysis of steady state performance of unload generator?

7. a) Explain equivalent circuit parameter determination by direct axis?
   b) Explain excitation system modeling for terminal voltage transducer and load compensation?

8. Answer any **TWO**
   a) Explain small signal model of state equation?
   b) Explain control signals of power system stabilizer?
   c) Explain structure and tuning of PSS?

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad.

M.Tech II Semester Supplementary Examinations, DECEMBER-2017

SUBJECT: **FLEXIBLE AC TRANSMISSION SYSTEMS (FACTS)**

Branch/Specialization: **EEE/Electrical Power Systems.**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer All Questions **5 x 4Marks=20 Marks**

1. Write briefly about basic types of FACTS controllers
2. Explain 3-phase bridge converter with necessary expressions.
3. Explain the Mid-point voltage regulation for line segment of two machine power system with static shunt compensation
4. Explain the Transfer function and dynamic performance of STATCOM?
5. Explain the control schemes for GSC?

PART-B

Answer any five of the following questions **5 x 8 Marks= 40 Marks**

1. a) Describe the Importance of inter connection of transmission lines in power system.
   (b) How do you classify the FACTS controllers?
2. Explain the 24-pulse voltage source converter operation?
3. Write a short notes on the following
   a) Voltage instability prevention using shunt compensation
   b) Mid-point voltage regulation using shunt compensation
4. (a) Explain the regulation and slope transfer function of SVC
   (b) Explain the enhancement of transient stability by using SVC
5. What are the objectives of series compensation and show that how it can improve transient stability and voltage stability of power system
6. a) Explain with neat sketch power flow in parallel paths?
   b) With a neat circuit diagram and waveforms, describe the operation of three level Voltage source converters.
7. Write short notes on the following
   a) Damping operating point control
   b) Hybrid VAR generators
8. Write short notes on the following
   a) Advantages of FACTS Technology
   b) Explain different modes of operation of TCSC
   c) controllable parameters

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad.

M.Tech II Semester Supplementary Examinations, DECEMBER-2017

SUBJECT: **Power System Operation And Deregulation**

Branch/Specialization: **EEE/Electrical Power Systems.**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer All Questions **5 x 4Marks=20 Marks**

1. Explain about security constrained OPF?
2. What are the factors affecting power system security?
3. What are the three estimation formulas used in the state estimation?
4. What is deregulated market? Explain.
5. What are the cost components of transmission system?

PART-B

Answer any five of the following questions **5 x 8 Marks= 40 Marks**

1. Explain the Gradient method solution of economic dispatch problem. 8M
2. a) Explain briefly about contingency analysis? 4M
   b) Briefly explain about different operating states of a power system? 4M
3. a) Explain various applications of state estimations in power systems? 4M
   b) Write a short note on Network Observability and pseudo measurements? 4M
4. a) Write a short note on power pools? 4M
   b) Write about the motivation for restructuring of power system? 4M
5. a) Define the following. 4M
   i) Available Transfer Capability (ATC)
   ii) Total Transfer Capability (TTC)
   b) Explain about transmission pricing methods. 4M
6. a) Explain about interior point method 4M
   b) What are the factors affecting power system security. 4M
7. a) Describe how the detection and identification of bad measurements are done in the state estimation
   b) What are the benefits of deregulation? (4M+4M)
8. Write short notes on any TWO of the following
   a) Define terms TTC, TRM, CBM and ETC 4M
   b) Bounding area method 4M
   c) Indian power sector- past and present status 4M

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M.Tech II Semester Supplementary Examinations, DECEMBER-2017

SUBJECT: **Gas Insulated Systems**

Branch/Specialization: **EEE/Electrical Power Systems.**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer All Questions **5 x 4Marks=20 Marks**

1. Explain any 4 electrical properties of SF_6.
2. Write short note on main features of GIS.
3. Differentiate double bus bar system and main and transfer bus bar system in GIS.
4. Give a few conditions to be followed for on-site dielectric testing.
5. What are the future trends in GIS Technology?

PART-B

Answer any five of the following questions **5 x 8 Marks= 40 Marks**

1. A) Write short note on decomposition products of SF_6.

   B) List out a few safety rules in personnel protection. [4+4]

2. Write short note on SF_6 gas handling procedures. [8]

3. Analyze the effect of Very Fast Transient Over-voltages (VFTO) on the GIS design. [8]
4. Give an overview of various components in a GIS station. [4+4]

5. Discuss about different types of Electrical Stresses in GIS and explain estimation method. [8]

6. Examine the impact of Partial Discharge on spacer surfaces. [8]

7. Inspect the testing of GIS for VFTO. [8]

8. Write short notes on any two of the following : [4+4]
   A) Economic advantages of GIS.
   B) Reusability of Reclaimed gas.
   C) VFTO Propagation.

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad.

M.Tech II Semester Supplementary Examinations, DECEMBER-2017

SUBJECT: **Power System Reliability**

Branch/Specialization: **EEE/Electrical Power Systems.**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer All Questions **5 x 4Marks=20 Marks**

1. Explain the two state Markov process of a single component with repair.
2. Explain Unit removal method
3. Draw 2-level daily representation
4. Explain common mode failures
5. Define preventive and exponential maintenance terms.

PART-B

Answer any five of the following questions **5 x 8 Marks= 40 Marks**

1 A system consists of two units of 25 MW and one unit of 50 MW. Each unit has a failure rate of 0.01 failures/day and repair rate of 0.49 repairs/day. (i) Using sequential addition method, determine the capacity outage cumulative probability table. (ii) Now if the 50 MW unit is removed, determine cumulative probabilities of various remaining capacity states

2 Consider there are two generating units of 25 MW each with a forced outage rate of 0.01 failures per day repair rate of 0.49 repairs per day. The load data is:

Daily peak load in MW:	57	52	46	41	34
No. of occurrences :	42	83	107	116	47

Compute the loss of load expectation.

3 Define mean cycle time and explain one, two component repairable models reliability evaluation using the concept of frequency of encountering states

4 Two identical transmission lines operate in two weather environment with a mean normal weather of 10 days and mean severe weather duration of 0.15 days. The line failure rate is 0.00025/day in normal weather and 0.05/day in severe weather. The repair rate is 1/day. Calculate the probability of double failure using weighted average

5 Explain the decomposition method of evaluation of bulk power system for Reliability analysis

6 a) Explain Active and passive failures

b) Explain customer oriented interrupted indices in radial distribution systems

7 a) Write a short notes on Merging equal capacity states of a generation system

b) Explain PJM method

8 Answer any **TWO**
Write a short notes on
i) LOLP ii) LOLE)security function Modeling of hot reserve and rapid start units using STPM approach

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M.Tech II Semester Supplementary Examinations, DECEMBER-2017

SUBJECT: **AI Techniques In Electrical Power Systems**

Branch/Specialization: **EEE/Electrical Power Systems.**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer All Questions **5 x 4Marks=20 Marks**

1. Compare the error correction learning and Hebbian learning
2. Describe the radial function network in ANN
3. What are the properties of Fuzzy sets?
4. What are the reproduction operators in GA?
5. Describe the role of AI techniques in load flow solutions.

PART-B

Answer any five of the following questions **5 x 8 Marks= 40 Marks**

1. a) Describe the models of neural networks.
   b) Explain the knowledge representations in neural networks.

2. Explain Multi – layer perceptron using Back propagation Algorithm.

3. Explain the following:
   a) Fuzzy Quantifiers
   b) Fuzzy inference

4. a) Describe about the fitness function in GA
   b) What is cross over? Explain the role of crossover function in GA

5. Describe the role of AI techniques in Economic dispatch problem and deduce the importance.

6. a) Write the differences between Biological neuron and artificial neuron models.
   b) Explain the convergence of Genetic Algorithm.

7. a) Explain some basic set theoretic operations of fuzzy sets.
   b) Explain how genetic algorithms are influenced by knowledge based techniques.

8. Answer any **TWO**
   a. Discuss various Artificial Neural Network Architectures.
   b. How Genetic Algorithm is different from traditional algorithms?
   c. Write the limitations of Back Propagation training Algorithm.