

Hall Ticket Number :

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R-19

Code: 19B21AT

M.Tech. I Semester Regular & Supplementary Examinations June 2022

HVDC Transmission
(Electrical Power Systems)

Max. Marks: 60

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x12 = 60 Marks)

- | | Marks | CO | BL |
|--|-------|-----|----|
| UNIT-I | | | |
| 1. a) Explain in detail, the major components of a HVDC transmission in converter station. | 6M | CO1 | L2 |
| b) With a neat diagram, explain different kinds of DC links and justify under which circumstances back-to-back HVDC link is used. | 6M | CO1 | L3 |
| OR | | | |
| 2. a) Discuss the different factors that favour HVDC transmission systems over EHVAC transmission over long distances. | 6M | CO1 | L2 |
| b) Explain the choice of converter configuration for any pulse number. | 6M | CO1 | L2 |
| UNIT-II | | | |
| 3. a) Analyze the performance of Gratez circuit without overlap condition with relevant waveforms. | 6M | CO2 | L4 |
| b) Obtain a relation between firing angle and power factor angle in a 3- bridge rectifier. | 6M | CO2 | L3 |
| OR | | | |
| 4. a) Derive the expression for average DC voltages of a six pulse bridge converter, considering gate control and source reactance. | 6M | CO2 | L2 |
| b) Assume for a three-phase bridge rectifier, the transformer secondary leakage reactance per phase is 0.4 Ohms and the secondary line voltage is 400 V. If the output current is 200 A, find the angle of overlap and the DC output voltage when the firing angle is 15°. | 6M | CO2 | L3 |
| UNIT-III | | | |
| 5. a) Enumerate the relative merits and demerits of constant current control and constant voltage control of HVDC link. | 6M | CO2 | L2 |
| b) Explain pulse frequency control scheme for firing pulse generation and discuss its drawbacks. | 6M | CO2 | L2 |
| OR | | | |
| 6. a) With block diagram, discuss the principle of operation of a basic power controller. | 6M | CO2 | L2 |
| b) Explain with neat sketch, constant extinction angle control. | 6M | CO2 | L2 |
| UNIT-IV | | | |
| 7. a) Enumerate various faults that can occur in converter station and brief about each. | 6M | CO3 | L2 |
| b) What do you mean by commutation and what are the various effects of commutation failure? | 6M | CO3 | L2 |
| OR | | | |
| 8. a) Explain in detail about Arc through faults in a converter station. | 6M | CO3 | L2 |
| b) Explain in detail about misfiring of valves in a HVDC controller and brief how it can be prevented. | 6M | CO3 | L3 |
| UNIT-V | | | |
| 9. a) Explain in detail, the reactive power requirements in steady state conditions. | 6M | CO4 | L2 |
| b) What are the various types of filters that are employed in HVDC converter station? Discuss them in detail. | 6M | CO4 | L3 |
| OR | | | |
| 10. a) Discuss about characteristic and non-characteristic harmonics generated in HVDC systems. | 6M | CO4 | L2 |
| b) Explain in detail about sequential method of DC power flow? | 6M | CO4 | L3 |

END

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R-19

Code: 19BE11T

M.Tech. I Semester Regular & Supplementary Examinations June 2022

Research Methodology and IPR

(Common to All Branches)

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1. Explain the characteristics of a good research problem?

OR

2. Elucidate the different types of Data collection process.

UNIT-II

3. Elucidate the various sources of collecting review of literature. Also explain how to write a good review article.

OR

4. Elucidate the format of research proposal.

UNIT-III

5. Write a short note on:
a) Plagiarism
b) Research Ethics

OR

6. Explain the format of research proposal.

UNIT-IV

7. Elucidate the patent information and databases.

OR

8. Elucidate the scope of patent rights.

UNIT-V

9. What are the patentee rights under the Indian Patent Act, 1970?

OR

10. How to administrating patent system.

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R-19

Code: 19B21FT

M.Tech. I Semester Regular & Supplementary Examinations June 2022

Reactive Power Compensation & Management

(Electrical Power Systems)

Max. Marks: 60

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x12 = 60 Marks)

UNIT-I

1. a) Define load compensation and explain it's specifications in detail.
b) Explain the reactive power characteristics of load compensation with varying inductive load.

OR

2. a) Explain how load compensator acts as a voltage regulator.
b) Explain the concept of phase balancing and power factor correction for unsymmetrical loads.

UNIT-II

3. Classify various methods of compensation and explain passive shunt compensation in detail.

OR

4. a) Explain series capacitor compensation in detail.
b) Explain the phenomenon of compensation by using synchronous condensers.

UNIT-III

5. Explain the basic concepts of transmission benefits in power system.

OR

6. a) What are the sources of harmonics and effect of harmonics on electrical equipment's?
b) Explain the radio frequency and electromagnetic interferences in brief.

UNIT-IV

7. Explain the KVAR based tariffs and also discuss the penalties for voltage flickers and harmonic voltage levels in detail.

OR

8. a) Explain various power tariffs in detail.
b) What are the system losses? Explain the loss reduction methods in distribution system?

UNIT-V

9. What are the reactive power control requirements for electric traction systems?

OR

10. a) Explain about the reactive power control requirements for distribution transformer.
b) Draw the typical layout of traction system.

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Code: 19B211T

M.Tech. I Semester Regular & Supplementary Examinations June 2022

Advanced Power System Analysis

(Electrical Power Systems)

Max. Marks: 60

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x12 = 60 Marks)

UNIT-I

- a) Define sparse matrix. Explain brief various schemes of optimal ordering.
b) Explain the factorization method using Gauss elimination method.

OR

- a) Briefly explain the π -representation of off-nominal tap transformer.
b) Explain briefly the flexible storage schemes.

UNIT-II

- How the Z_{BUS} is modified when a branch of impedance Z_B is added from a new bus – P to the reference bus. Explain with suitable example.

OR

- a) Compare the different types of load flow methods.
b) Write an algorithm for the load flow solution using NR method polar co-ordinates.

UNIT-III

- Explain the Zbus building algorithm with and without addition of link and mutual coupling between any two busses for construction of impedance matrix.

OR

- Develop the load flow equations suitable for solving fast decoupled method and draw the flow chart.

UNIT-IV

- Derive the equations for total fault current and bus voltage for the following faults through fault impedance Z_F i) LLG FAULT II) LL fault

OR

- Define methods of Optimal Power Flow solution. Explain any one method in detail.

UNIT-V

- a) Explain about the fourth order Runge-Kutta method of transient stability analysis
b) What are the various factors influencing the transient stability?

OR

- Describe step by step algorithm for solving stability analysis of multi machine system using classical synchronous machine model.

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M.Tech. I Semester Regular & Supplementary Examinations June 2022

Advanced Power System Protection

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 12 = 60Marks)

UNIT-I

1. a) What are different advantages of static relays 6M
b) Explain the operation of level detector used in static relays 6M

OR

2. a) Explain the concept of missing circuit 6M
b) Explain about two input phase comparator 6M

UNIT-II

3. a) Explain static definite time over current relay 6M
b) Explain basic principle of time over current relays? 6M

OR

4. a) Explain coincidence circuit type block spike phase comparator 6M
b) Explain integrating type phase comparators 6M

UNIT-III

5. Explain the analysis of static differential relays 12M

OR

6. a) Explain the significance of static harmonic restraint relay 6M
b) Explain the principle and operation of MHO relay 6M

UNIT-IV

7. a) Explain about three input comparator & hybrid comparator 6M
b) What are the switched distance relaying schemes. Explain them in detail 6M

OR

8. a) Explain about effect of power swings on the performance of distance relays 6M
b) Explain principle of out of step tripping and blocking relays 6M

UNIT-V

9. a) Explain the flow chart for the Microprocessors based impedance relay 6M
b) Explain the block diagram of the Microprocessors based Directional relay 6M

OR

10. a) Explain the flow chart for the Microprocessors based Reactance relay 6M
b) Explain the principle of digital computer relaying 6M
