

Code: 19B211T

M.Tech. I Semester Regular & Supplementary Examinations July 2021

Advanced Power System Analysis

(Electrical Power Systems)

Max. Marks: 60

Time: 3 Hours

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

UNIT-I

1. a) Define the term sparsity in detail, along with suitable examples 3M
 b) Discuss about the triangular factorization. 5M
 c) Discuss about the Optimal Ordering & different schemes to obtain it. 4M

OR

2. a) Describe the flexible storage scheme for storing matrix as Compact Arrays 6M
 b) Explain the algorithm for Gauss elimination method 6M

UNIT-II

3. Form the ZBUS for the given network connections. (Take bus-1 as Reference)

Element	Self impedance		Mutual impedance	
	Bus no (p-q)	$Z_{pq \ pq}$	Bus no (m-n)	$Z_{pq \ mn}$
1	1-2(a)	0.5		
2	1-3	0.5	1-2(a)	0.3
3	3-4	0.25		
4	1-2 (b)	0.6	1-2(a)	0.4
5	2-4	0.75		

12M

OR

4. a) 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. 8M
 b) What are the approximations made in impedance diagram 4M

UNIT-III

5. Develop the load flow equations suitable for solving fast decoupled method and draw the flow chart. 12M

OR

6. a) Briefly explain fast decoupled power flow method 6M
 b) Explain sensitivity factors for P – V bus adjustment 6M

UNIT-IV

7. 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 12M

OR

8. Explain the formation of bus impedance matrix with mutual coupling for a sample four bus system and its significance to solve the fault analysis 12M

UNIT-V

9. a) Explain the Eulers method of transient stability analysis 8M
 b) Explain what is transient stability problem 4M

OR

10. Describe step by step algorithm for solving stability analysis of multi machine system using classical synchronous machine model. 12M

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Advanced Power System Protection

(Electrical Power Systems)

Max. Marks: 60

Time: 3 Hours

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

UNIT-I

1. a) Explain about two input amplitude comparator 6M
 b) Explain opposed voltage type of rectifier bridge comparator 6M

OR

2. Explain the duality between amplitude and phase comparator 12M

UNIT-II

3. a) Explain coincidence circuit type block spice phase comparator 6M
 b) Explain the principle of static inverse definite time over current relay 6M

OR

4. a) Explain the principle of static definite time over current relay 6M
 b) Explain the techniques to measure period of coincidence in phase comparators 6M

UNIT-III

5. a) Explain Duo bias transformer differential protection 6M
 b) Explain the concept of reactance MHO relay 6M

OR

6. a) Explain the significance of angle impedance relay sampling comparator 6M
 b) Discuss the problems involved in the operation of differential relay and suggest respective remedies 6M

UNIT-IV

7. Explain the principle of out of step tripping and blocking relays 12M

OR

8. a) Explain the effect of line length and source impedance on the performance of impedance relays 6M
 b) Explain the concept of power swings 6M

UNIT-V

9. a) Explain the block diagram of the Microprocessors based Reactance relay 6M
 b) Explain the block diagram of the Microprocessors based impedance relay 6M

OR

10. a) Explain the generalized mathematical expression for distance relay 6M
 b) Explain the concept of realization of offset MHO characteristics 6M

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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 comparison of AC and DC transmission.	6M	CO1	L2
b) With the help of a neat schematic diagram of a typical HVDC converter station explain the functions of various components available.	6M	CO1	L2
OR			
2. a) Define pulse number and justify how the higher pulse number will improve the converter operation.	6M	CO1	L3
b) Enumerate the disadvantages of HVAC and justify how the drawbacks can be overcome in HVDC transmission system.	6M	CO1	L2
UNIT-II			
3. For a 3- , 6 pulse Graetz's circuit, draw the timing diagram considering overlap angle is less than 60° and without overlap for the following: a) Voltage across load, b) Voltage across any two pair of conduction values.	12M	CO2	L3
OR			
4. a) What is the reason for using star-star and star-delta transformer configurations for 12 pulse converter?	6M	CO2	L4
b) A three-phase bridge inverter has a commutating reactance of 150 Ohms. The current and voltage at the DC side are 1053 A and 285 kV respectively. The AC line voltage is 345 kV. Determine the extinction angle and the overlap angle.	6M	CO2	L4
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 the necessity of "VDCOL" control in a HVDC link with the help of VI characteristics.	6M	CO2	L3
OR			
6. a) What is meant by current margin between two stations in a HVDC link? Why is the inverter station, operated as a constant voltage controller under normal conditions?	6M	CO2	L3
b) Draw the complete converter control characteristics and explain the principle of power control in a DC link.	6M	CO2	L2
UNIT-IV			
7. a) Explain about the commutation failure in an inverter and enumerate the effects of failure.	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 control and protection level in HVDC.	6M	CO3	L2
UNIT-V			
9. a) Why Reactive power control is required for HVDC stations? Discuss about conventional control strategies for Reactive power control in HVDC link.	6M	CO4	L2
b) Explain in detail, the power flow analysis in a HVDC link.	6M	CO4	L2
OR			
10. a) Discuss how shunt capacitors can be used to meet reactive power requirement of a converter.	6M	CO4	L3
b) Discuss about various types of AC filters employed in HVDC systems for harmonic suppression.	6M	CO4	L3

END

Hall Ticket Number :										
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R-19

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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 any two multivariate techniques used in data analysis?

OR

2. Elucidate the various errors in selecting the research problem.

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 Patent, Design, Trade and Copyright.

OR

6. Explain the international scenario on Patent.

UNIT-IV

7. Elucidate the Patent rights.

OR

8. Explain Licensing and Transfer Technology in Patent.

UNIT-V

9. Elucidate the patent information and databases.

OR

10. Elucidate the new developments in IPR

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Reactive Power Compensation and Management

(Electrical Power Systems)

Max. Marks: 60

Time: 3 Hours

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

UNIT-I

1. a) Explain about inductive approximate biasing. 6M
 b) Explain about reactive power characteristics 6M

OR

2. a) Illustrate with an example, load compensator as a power factor correction of un symmetrical loads. 6M
 b) Clearly discuss the various type of loads requiring compensation and state the specification for load compensation. 6M

UNIT-II

3. a) Discuss the types of compensation in transmission systems. 6M
 b) What is the need of series capacitor compensation in transmission systems? Explain how it improves the performance of the power system during disturbances? 6M

OR

4. a) Explain the characteristic time periods in transmission system in detail. 8M
 b) Explain the concept of dynamic shunt compensation in transmission systems. 4M

UNIT-III

5. Explain the KVAR based tariffs and also discuss the penalties for voltage flickers and harmonic voltage levels in detail. 12M

OR

6. a) What are the sources of harmonics and effect of harmonics on electrical equipment's? 6M
 b) Explain the basic concepts of transmission benefits in power system. 6M

UNIT-IV

7. a) Explain the deciding factor for selection of capacitors for reactive power management at the user side. 6M
 b) Explain about the system losses in a distribution system. 6M

OR

8. a) Discuss about KVAr requirements for domestic appliances. 6M
 b) Explain about economic planning of capacitor placement. 6M

UNIT-V

9. a) Discuss the reactive power control requirements in electrical traction systems. 6M
 b) Explain the typical layouts of electrical traction systems with neat diagrams. 6M

OR

10. a) Explain the functions of distribution transformers in Electric arc furnace industries 6M
 b) How does voltage flickers occur in electric arc furnaces? Explain how those can be reduced? 6M
