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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Eighth Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; July / August - 2022

Power System Operation and Control

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:

CO1: Understand about computer control centers to control power systems, timeline power flow, frequency deviation.

CO2: Design and develop different system models to Load-Frequency control, Single area control and two area control methods.

CO3: Understand the different methods of controlling voltage, Different methods inject reactive power and working of tap changing transformer in voltage control.

CO4: Understand the need of unit commitment and different constraints in unit commitment.

CO5:Study about power system security, different methods to get the solution of network problems

Note: ***I) PART - A*** *is compulsory.* ***Two*** *marks for each question.*

II) PART - B*: Answer any* ***Two*** *sub questions (from a, b, c) for Maximum of* ***18 marks*** *from each unit.*

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
I a.	Mention the objectives of automatic generation control	2	L1	CO1	PO1
b.	Mention the basic control loops of a generator.	2	L1	CO2	PO1,2
c.	What are the sources of reactive power?	2	L1	CO3	PO1
d.	Distinguish between the problem of economic dispatch and unit commitment.	2	L1	CO4	PO1
e.	List out the security level of power system.	2	L1	CO5	PO1
	II : PART - B	**90**			
	UNIT - I	**18**			
1 a.	Write a note on area control error.	9	L2	CO1	PO1,2
b.	With a block diagram, describe typical digital computer control and monitoring for power system.	9	L2	CO1	PO1,2
c.	Explain the parallel operation of generators.	9	L2	CO1	PO1,2
	UNIT - II	**18**			
2 a.	Derive the mathematical model of speed governing system.	9	L2	CO2	PO1
b.	Derive the ALFC mathematical model of turbine and generator load model.	9	L3	CO2	PO1
c.	With block diagram, explain load frequency of two area system.	9	L2	CO2	PO1
	UNIT - III	**18**			
3 a.	Consider a single phase 220 kV line of length200 km. The resistance per km is 0.3 Ω and the reactance per km is 0.32 Ω. Compute the sending end voltage with accurate and approximate formulae if the load is 500 MW at pF of 0.85.	9	L3	CO3	PO1,2

Contd….2

b.	Explain voltage control method using tap changing transformer.	9	L2	CO3	PO1
c.	Derive the relationship between the voltage at the receiving end and the reactive power in terms of the short circuit strength.	9	L2	CO3	PO1
	UNIT - IV	**18**			
4 a.	Interpret the algorithm used for priority list method of unit commitment.	9	L2	CO4	PO1,2
b.	Enumerate the need and importance of unit commitment.	9	L2	CO4	PO1
c.	Explain spinning reserve constraint in unit commitment.	9	L2	CO4	PO1
	UNIT - V	**18**			
5 a.	Explain the factors affecting the power system security.	9	L2	CO5	PO1
b.	Explain AC power flow security analysis with flowchart.	9	L2	CO5	PO1
c.	Explain 1P1Q method for contingency ranking.	9	L2	CO5	PO1

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