

Model Question Paper-1 with effect from 2021(CBCS Scheme)

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7th Semester B.E. Degree Examination

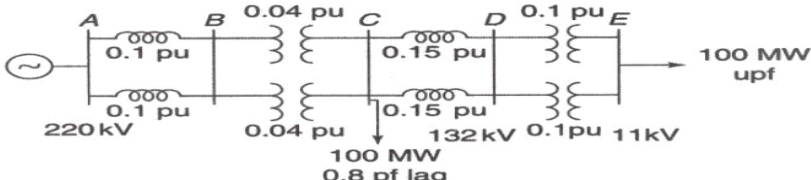
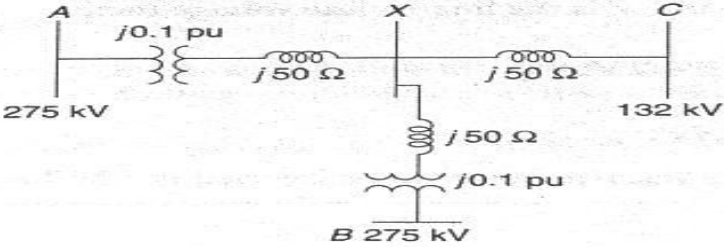
Subject: Power System Operation and Control

TIME: 03 Hours

Max. Marks: 100

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

Module -1			*Bloom's Taxonomy Level	COs	Marks
Q.01	a	Which are the operating states of power system? explain with the help of neat figure.	L3	CO1	7
	b	Explain the SCADA system and its components.	L3	CO1	7
	c	Explain the operation of energy management system.	L3	CO1	6
OR					
Q.02	a	Explain the preventive & emergency controls of a power system	L3	CO1	7
	b	Explain the following configuration of SCADA with neat block diagram i) multiple master –multiple RTU ii). single master,multiple submaster ,multiple remote	L3	CO1	7
	c	. What are IED's? explain the functional block diagram of modern IED's	L3	CO1	6
Module-2					
Q. 03	a	Explain in brief the function of load frequency control and excitation voltage regulators of turbo generators with a neat schematic diagram.	L3	CO2	7
	b	Draw the schematic diagram of steam turbine speed governing system and explain the various components.	L3	CO2	7
	c	With a neat diagram, explain the proportional plus integral controller.	L4	CO2	6
OR					
Q.04	a	Explain the modeling of i) Speed governor system model ii) Turbine model iii)Generator-load model	L4	CO2	12
	b	Two generators rated 200MW and 400MW are operating in parallel. The droop characteristics of their governors are 4% and 5% respectively from no load to full load. Assuming that the generators are operating at 50Hz at no load, how would a load of 600MW be shared between them? What will be the system frequency at this load? Assume free governor operation.	L4	CO2	8

Q. 05	a	Discuss the composite block diagram of two area load frequency control.	L4	CO3	10
	b	Explain the function of important components and their transfer function of automatic voltage regulator of a generator with a neat diagram.	L4	CO3	10
OR					
Q. 06	a	Explain load frequency and economic dispatch control	L3	CO3	7
	b	A single area consists of two generators as follows G1:200MW,R=4%(on machine base), G2:400MW,R=5%(on machine base) They are connected in parallel and share load of 600MW in proportion to their rating,at 50Hz.200MW of load is tripped. What is the generation to meet the new load if D=0?What is the frequency at new load.	L4	CO3	7
	c	Explain the effect of Generator Rate Constraints (GRCs) on AGC.	L4	CO3	6
Module-4					
Q. 07	a	In view of reactive power generation and absorption, briefly explain the characteristics of synchronous generator, overhead lines and cables.	L3	CO4	7
	b	Explain the voltage control using tap changing transformer.	L3	CO4	6
	c	Consider the transmission system shown in figure below. The pu values are referred to the respective voltage bases and 100MVA base. Determine the power supplied by the generator and its pf. 	L4	CO4	7
OR					
Q. 08	a	A single line diagram for a typical 3 supply points A, B, & C is shown in Fig Determine the reactive power compensation required to inject at point 'X' to reestablish original value when the voltage at 'X' falls by 6 kV (Assume 500 MVA Base and Neglect resistances) 	L4	CO4	7
	b	Explain the voltage control using booster transformer and phase shifting transformer.	L4	CO4	7
	c	What is voltage collapse? Explain with PV and QV characteristics of loads .	L4	CO4	6
Module-5					
Q. 09	a	Define system security and explain major functions involved in the system security	L3	CO5	6
	b	Explain the contingency analysis with the help of flow chart.	L4	CO5	7
	c	Explain the contingency analysis using sensitivity factors with the help of flow chart.	L4	CO5	7
OR					
Q. 10	a	What are state variables? Explain linear least square method for Power Systems State Estimation.	L4	CO5	6
	b	What is security constrained optimal power flow(SCOPF)? Explain with example.	L4	CO5	7
	c	Explain the AC power flow security analysis with contingency case selection.	L4	CO5	7