GUJARAT TECHNOLOGICAL UNIVERSITY PDDC - SEMESTER-VII • EXAMINATION – SUMMER 2013

Sub	ject	Code: X 70902 Date: 14-05-2013	
Sub Tim Instr	ject e: 1(uctior	Name: Interconnected Power System 0.30 am - 01.00 pm Total Marks: 70 Is:	
	1. 2. 3.	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
Q.1	(a) (b)	Explain State load dispatch centre with necessary diagram A 2 pole, 50 Hz, 60 MVA turbo generator has a moment of inertia of 9000 kg-m ² . Calculate:	07 07
		 The kinetic energy in MJ at the rated speed. The constants 'M' and 'H'. 	
Q.2	(a) (b)	Also derive relationship for 'M' and 'H'. Using first principles derive the swing equation. What is equal area criterion of stability? Explain with necessary diagram.	07 07
	(b)	A synchronous generator is feeding 250 MW to a large 50 Hz network over a double circuit transmission line. The maximum steady state power that could be transmitted over the line with both the lines in operation is 500 MW and is 350 MW with only one line in operation. A solid three phase fault occurring at the network end of one of the lines causes it to trip. Find the critical clearing angle.	07
Q.3	(a)	A synchronous generator transmits power to an infinite bus through a reactive network. The sudden occurrence of a fault reduces the generator output to zero. When the fault is cleared, the original network conditions are regained. Derive an expression for the critical clearing angle and the critical clearing time.	07
	(b)	Derive the approximate load flow equations. Hence classify the buses.	07
Q.3	(a)	What is the criteria for the economic distribution of load between different units of a plant when transmission losses are incorporated.	07
	(b)	On a system consisting of two generating plants, the incremental costs in Rs/MWhr with P ₁ and P ₂ in MW are	07
		$IC_1 = 0.15 P_1 + 150$ and	
		IC ₂ = 0.25 P ₂ + 175 The system is operating on economic dispatch with P ₁ =P ₂ =200 MW and $(\delta P_1 / \delta P_2) = 0.2$	
Q.4	(a) (b)	Find the penalty factor for plant 1. Explain the turbine speed governing model. Two synchronous generators operate in parallel and supply a total load of 500 MW. The capacities of the machines are 300 MW and 600 MW respectively and both have droop characteristics of 4% from no-load to full load. Calculate the load taken by each machine, assuming free governor action. Also find the system frequency at this load.	07 07
•		OR	07
Q.4	(a) (b)	Explain Flat Frequency control. Explain: Automatic Generation Control with block diagram.	07 07
Q.5	(a) (b)	Explain cascade tripping. Explain Dynamic Programming method with necessary expressions.	07 07
Q.5	(a) (b)	Explain Gauss Seidel method for load flow study. Form Y bus for a sample 3 bus system using singular transformation method. Assume necessary data.	07 07
