Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII(NEW) EXAMINATION – SUMMER 2019

Subject Code:2180909 Date:13/05/2019

Subject Name:Power System Operation and Control

Time:10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Define the voltage regulation	03
	(b)	Explain what you mean by state estimation of power system and how does it differ from load flow solutions.	04
	(c)	Two generating units rated for 250 MW and 400 MW have governor speed regulation of 6.0 and 6.4 percent, respectively, from no-load to full-load, respectively. They are operating in parallel and share a load of 500 MW. Assuming free governor action, determine the load shared by each unit.	07
Q.2	**(a)**	Enumerate the need for restructuring.	03
	(b)	Write short note on System monitoring	04
	(c)	Develop step by step the mathematical model for a state estimator using line power flows with the help of weighted least square method as suggested by Dopazo et al.	07
		OR	
	(c)	Describe the different types of market model	07
Q.3	**(a)**	Define the surge impedance loading (SIL) of a transmission line.	03
	(b)	Find the capacity of static VAR Compensator to be installed at a bus with ±5% voltage fluctuation. The short circuit capacity is 5000 MVA.	04
	(c)	What do you mean by “Bad Data” in power system? How does it creep in while obtaining a good state estimator? Explain clearly how it is taken care of by using theory of probability	07
		OR	
Q.3	**(a)**	Explain how system blackout occur.	03
	(b)	A 250-MW, 60-Hz turbine generator set has a speed regulation of 5 percent based on its own rating. The generator frequency decreases from 60 Hz to a steady state value of 59.7Hz. Determine the increase in the turbine power output.	04
	(c)	Explain factors affecting power system security.	07
Q.4	**(a)**	What do you mean by line load ability?	03
	(b)	Describe the need for deregulation of various power system	04
	(c)	Drive the expression for steady state frequency change for single area system with the following cases. I. Changes in load with fixed speed 2.Changes in speed with fixed demand	07

OR

Q.4	**(a)**	Demonstrate why the frequency and voltage to be regulated in power system?	03
	(b)	Discuss the importance and features of congestion management in deregulated power system.	04
	(c)	Explain the following with the help of circuit diagrams. 1.Optimal dispatch 2 Post contingency 3 Secure dispatch 4 Secure post-contingency	07
Q.5	**(a)**	Which method of load forecasting would you suggest for long term and why?	03
	(b)	Explain various Players involved in the Indian Power sector	04
	(c)	Develop an expression to find the magnitude of reactive power requirement for voltage control in log transmission lines.	07

OR

Q.5	**(a)**	What is meant by free governor operation?	03
	(b)	How is the forecaster's knowledge and intuition considered superior to any load forecasting method? Should a forecaster intervene to modify a forecast, when, why and how	04
	(c)	Explain with the help of block diagram automatic voltage regulator of trubo generators.	07

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