Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2180909 **Date: 06/05/2017**

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.**

Q.1	**(a)**	In weighted least square estimation (WLSE) what do mean by term "weighted"? How it affects the estimation procedure? Explain WLSE method of state estimation in detail.	**07**
	(b)	Bad data are necessary to remove for state estimation. Explain. How bad data affects state estimation procedure? Explain methods to detect bad data.	**07**
Q.2	**(a)**	What do you mean by deregulation and restructuring of power system? How it affects power system? Explain its advantages and disadvantages to power scenario of India.	**07**
	(b)	Explain important points of electricity act - 2003.	**07**
		OR	
	(b)	State the electricity market players of deregulated power system. Explain the role of each in detail.	**07**
Q.3	**(a)**	State different load forecasting techniques. Explain in detail the reactive load forecasting. Also state its advantages.	**07**
	(b)	What is the role of load forecasting? How it reflects in current and future trends?	**07**
		OR	
Q.3	**(a)**	Derive the expression for estimation of average and trend terms of deterministic part of load in load forecasting method.	**07**
	(b)	Derive the expression for critical receiving end voltage and critical power angle at voltage stability limit for a two bus power system.	**07**
Q.4	**(a)**	Explain the characteristics of (i) the receiving end voltage of a basic power transmission system for varying system reactance and, (ii) the characteristic of voltage V/s system short circuit capacity for any fixed value of real power flow considering leading, u.p.f. and lagging power factors load.	**07**
	(b)	A cable has surge impedance of 50 Ω and operates at 500 kV (L-L) at 50 Hz. If the electrical line lengths is 30 deg. equivalent, find the steady state stability limit. Obtain the value of the transmission angle and reactive power requirements at both ends of the cable when the transmitted power through the cable is 50 % of the SIL value. Assume both ends of the line are maintained at 500 kV.	**07**
		OR	
Q.4	**(a)**	Explain role of load dispatch center in power system. What is its role as a part of national grid?	**07**
	(b)	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.5	**(a)**	Derive the expression for voltage regulation of a transmission line and explain its relation with reactive power.	**07**
	(b)	With necessary block diagrams explain automatic voltage and reactive power control.	**07**

OR

Q.5	**(a)**	Discuss in brief the application aspects of the primary and secondary automatic load frequency control loops.	**07**
	(b)	What is power system security? Explain major three function of a power system security and system state classification.	**07**

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