Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VIII (New) EXAMINATION – WINTER 2019

Subject Code: 2180903 **Date: 27/11/2019**

Subject Name: Power System Planning and Design

Time: 02:30 PM TO 05:00 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)**	State the factors to be considered in the selection of a voltage suitable for transmitting a certain amount of power over a given distance.	**03**
	(b)	What is the effect of stranded conductors and bundled conductors on corona?	**04**
	(c)	Write all steps required to design a transmission line.	**07**
Q.2	**(a)**	What are the factors which affects the type of distribution system chosen under different conditions in the area?	**03**
	(b)	A three-phase four wire 400/230 V distribution system is loaded as below. a) A 3-phase induction motor load of 250 kW at 0.8 power factor lagging b) Single-phase resistance load of 200 kW between R and N c) Single-phase resistance load of 150 kW between Y and N d) Lightning load of 150 kW between B and N. Find (1) line currents, (2) power factor of the distribution system loads and (3) current in the neutral. Represent the result with help of phasor diagram.	**04**
	(c)	Discuss the steps for planning and designing of electrical distribution schemes.	**07**
		OR	
	(c)	Explain the methods of designing primary-distribution system with reference to (a) choice of voltage (b) conductor size (c) type of distribution and (d) Voltage drops.	**07**
Q.3	**(a)**	Explain briefly the main consideration in planning and designing generating stations in power systems with reference to choice of generator unit constants.	**03**
	(b)	Briefly explain considerations in the location of substations.	**04**
	(c)	What are the causes of high losses and poor voltage regulation in a power system? What are the points to be considered in system improvement to bring it to normal operation with voltage regulation within limits and better efficiency?	**07**
		OR	
Q.3	**(a)**	State the advantages of interconnecting large power systems and use of interconnections in the system.	**03**
	(b)	What are the points to be considered in system improvement to bring high losses and poor voltage regulation to its normal values?	**04**
	(c)	What are the financial considerations to make the system improvement scheme viable? Explain with an illustration.	**07**

Q.4	**(a)**	Give objective and definitions of power system earthing.	**03**
	(b)	What is B.I.L.? How lightning arrestor selection is done with proper insulation coordination?	**04**
	(c)	Explain station earthing system with earthing grid.	**07**

OR

Q.4	**(a)**	What is insulation coordination?	**03**
	(b)	Explain briefly step potential and touch potential?	**04**
	(c)	Write short note on Power system over voltages.	**07**
Q.5	**(a)**	List out methods used for power system improvement.	**03**
	(b)	Explain briefly why load and energy forecasting is necessary in power system planning?	**04**
	(c)	Explain how voltage regulation and losses in a power system is determined?	**07**

OR

Q.5	**(a)**	Which methods are adopted for power system planning?	**03**
	(b)	Write short note: Shifting of distribution transformer center.	**04**
	(c)	Explain any one method used for measurement of power system reliability.	**07**

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