Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–IV • EXAMINATION – WINTER • 2014

Subject Code: X40903 **Date: 31-12-2014**

Subject Name: Power System Analysis and Simulation

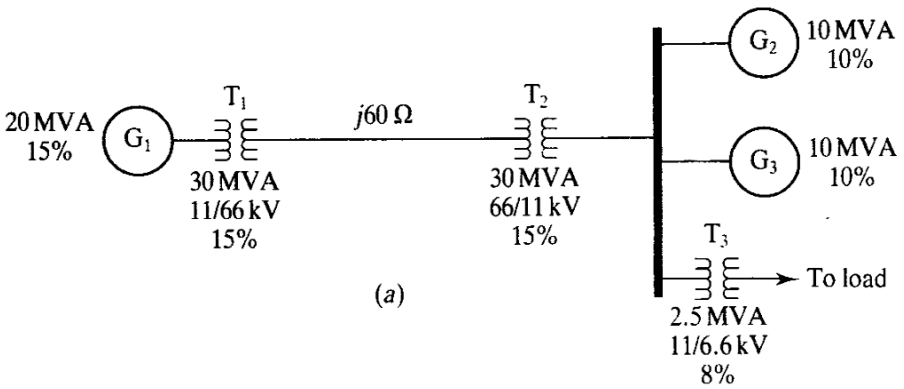
Time: 02:30 pm - 05:00 pm **Total Marks: 70**

Instructions:

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

Q.1 (a) What is Per Unit system? Explain the advantages of the PU systems **07**

(b) Find the PU values for each component of the system shown in the figure and draw the PU diagram. **07**



(a)

Q.2 (a) Explain corona and discuss the factors affecting the corona loss **07**

(b) Derive the expressions for active and reactive power at receiving end for medium transmission line in terms of transmission line constants and other usual notations. **07**

OR

(b) Explain need of neutral grounding using phasor diagrams. List different Neutral grounding and explain one of them. **07**

Q.3 (a) What are sequence components? How it is useful in fault calculation? Explain importance of zero sequence networks in brief. **07**

(b) Obtain the expression of power in a three phase system in terms of Symmetrical components. **07**

OR

Q.3 (a) Draw the waveforms for fault current for a 3-phase fault on alternator terminals. Explain the sub-transient, transient and steady state reactance. **07**

(b) Discuss the different types of faults on the transmission lines **07**

Q.4 (a) Three phase currents in a Wye-connected, unbalanced load are I_a = (40 - j30), I_b= - (34 + j25) and I_c = (-43 + j28) A. Determine the sequence currents **07**

(b) A three phase ,Wye connected load is connected across a three phase, balanced supply system. Obtain a set of equations relating the symmetrical components of the line and phase voltages for line voltage V_{ab}(V_{ab1} and V_{ab2}). **07**

OR

Q.4 (a) Explain travelling waves of a transmission line when the receiving end is short circuited. **07**

Q.4 (b) Starting from the first principles, show that surges behave as travelling waves. Find expressions for surge impedance and wave velocity **07**

Q.5	**(a)**	Write a brief note on capacitance switching.	**07**
	(b)	Write a brief note on selection of circuit breakers.	**07**

OR

Q.5	**(a)**	Write a brief note on phase shift of symmetrical components in Y-Δ transformer banks.	**07**
	(b)	Using appropriate sequence networks, derive the equation for a line to line fault in a power system with a fault impedance of Z_f.	**07**

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