Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - IVth Semester–Examination – May- 2012
Subject code: X40903
Subject Name: Power System Analysis and Simulation

Date:10/05/2012 **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)** Derive the expression of A B C and D constants for medium transmission line using equivalent π model. **07**

(b) A Single phase 50 Hz generator supplies an inductive load of 5000KW at a power factor of 0.707 lagging by means of an overhead transmission line 20 km long. The line resistance and inductance are 0.0195 ohm and 0.63 mH per km. The voltage at the receiving end is required to be kept constant at 10KV. Find the sending end voltage, voltage regulation and efficiency of the transmission line. **07**

Q.2 **(a)** Derive the expressions for A B C and D Constants for long transmission using rigorous solution. **07**

(b) What is per unit system? Discuss the advantages of P.U. Systems. **07**

OR

(b) Three phase generators G_1 and G_2 supply motor loads M_1, M_2 and M_3, as shown in fig transformer T_1 and T_2 are rated at 100 MVA and 33/110 KV, and each has a reactance of 0.08 p.u. assume 100 MVA and 33 KV used as base values, obtain all reactance in P. U. values.. **07**

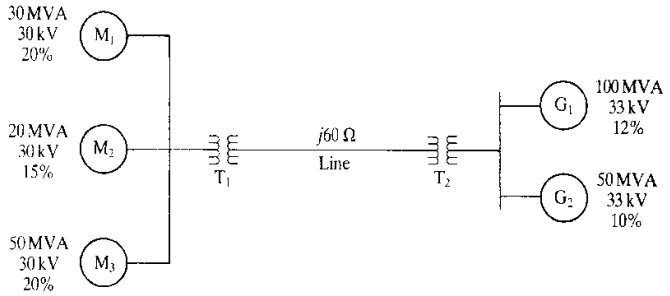

Fig. 2-9.

Q.3 **(a)** What is corona? Discuss the methods which are used to reduce the corona loss in the transmission systems **07**

(b) Three phase currents in a Wye-connected, unbalanced load are I_a = (44 - j33), I_b= - (32 + j24) and I_c = (-40 + j25) A. Determine the sequence currents. **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) What are the factors and conditions affecting corona loss? Explain them briefly **07**

Q.4	**(a)**	Explain different systems of neutral grounding and compare them.	**07**
	(b)	Starting from the first principles, show that surges behave as travelling waves. Find expressions for surge impedance and wave velocity	**07**

OR

Q.4	**(a)**	Explain travelling waves of a transmission line when the receiving end is short circuited.	**07**
	(b)	Write a brief note on capacitance switching	**07**
Q.5	**(a)**	Give the importance of single line diagram and reactance diagram and also explain how it is useful in fault calculation	**07**
	(b)	Write Short note on neutral earthing	**07**

OR

Q.5	**(a)**	Write short notes on zero sequence networks	**07**
	(b)	Explain lightning phenomena in detail	**07**

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