GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– VI (New) EXAMINATION – WINTER 2019

Subject Code: 2160908   **Date: 06/12/2019**

Subject Name: Electrical Power system – II

Time: 02:30 AM 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.

			MARKS
Q.1	**(a)**	Write voltage and current relationship of transmission line using A, B, C, D parameters. Write expression of A, B, C, D parameter in terms of Y and Z for medium transmission line and long transmission line.	**03**
	(b)	Define positive, negative and zero sequence component.	**04**
	(c)	Derive equation of voltage and current of long transmission line considering uniformly distributed parameters through the line.	**07**
Q.2	**(a)**	Draw wave form of short circuit current of an alternator. Explain the subtransient, transient and steady state period.	**03**
	(b)	Explain Reactive power compensation of transmission line in brief.	**04**
	(c)	A 3-phase 50 Hz, 120 km transmission line has following parameters. R= 0.2Ω/km, L= 1.2 mH/km and c= 0.014µf/ km. Determine sending end voltage and efficiency. A line delivering power of 45 MW at 132KV and 0.85 power factor lagging. Use Nominal T method for calculation.	**07**

OR

	(c)	The voltage across three phase unbalanced load are V_a=200<40˚, V_b=320<90˚, V_c =480 <340˚.Determine symmetrical component of voltage. Phase sequence abc.	**07**
Q.3	**(a)**	Classify transmission line.	**03**
	(b)	Draw and Explain zero sequence network of transformer for Y-Y, Δ-Δ, Δ-Y, Y-Δ connection with and without neutral grounded	**04**
	(c)	Obtain expression of three phase power in terms of sequences component.	**07**

OR

Q.3	**(a)**	Explain any two causes which are producing Transient on line.	**03**
	(b)	Explain zero sequence impedance and network for synchronous machine.	**04**
	(c)	Write criteria for selection of circuit breaker.	**07**
Q.4	**(a)**	Define surge impedance. Explain surge impedance loading of transmission line.	**03**
	(b)	A 50 MVA, 11KV, 3-phase synchronous generator was subjected to 3-phase fault and line to line fault. A generator neutral is solidly grounded. Find out positive sequence and negative sequence reactance of synchronous generator if 3-phase fault is 1780A and line to line fault current is 2590A.	**04**
	(c)	Derive expression for fault current for single line to ground fault as an unloaded generator.	**07**

OR

Q.4	**(a)**	Give model of synchronous machine with load under transient condition.	**03**

(b) A 132 KV 3-phase transmission line has equilateral spacing. R = **04**
3m. The conductor radius = 10 mm, Temperature = 22˚C and pressure
= 73 cm of Hg. Surface factor m_o = 0.84. Obtain relative density and
critical disruptive voltage.

(c) Derive equation of restriking voltage across circuit breaker after **07**
removal of short circuit.

Q.5 **(a)** Write methods of reducing corona. **03**

(b) Discuss capacitance switching. **04**

(c) Consider the three bus system shown in fig.1 the generators are 100 **07**
MVA with a transient reactance of 10% each. Both the transformers are
100MVA with a leakage reactance of 5% The reactance of each line to
a base of 100 MVA. 110KV is 10%. Find the value of fault current for
a three phase solid short circuit on bus no: 3. Assume prefault voltages
to be 1.0 p.u. and prefault currents to be zero.

OR

Q.5 **(a)** Discuss the phenomena of wave reflection and wave refraction. **03**

(b) Describe formation of corona in H.V. transmission line. write merits **04**
and demerits of Corona

(c) Introduce symmetrical components and state their application. Derive **07**
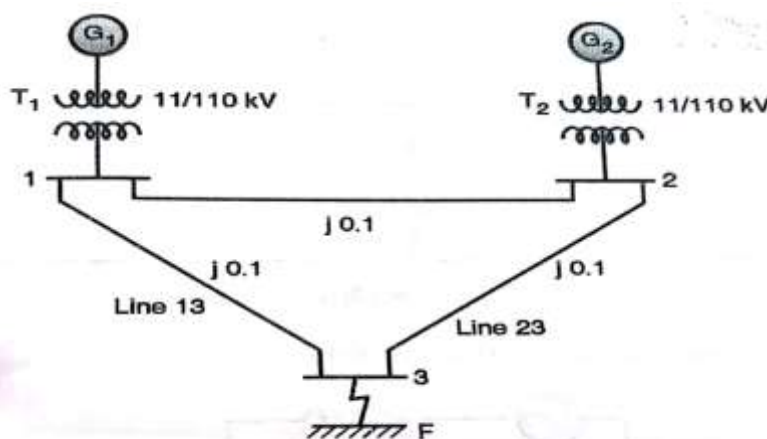symmetrical components of a given set of three unbalanced line.

fig.1

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