GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-V • EXAMINATION – WINTER 2013

Subject Code: 150902

Date: 29-11-2013

Total Marks: 70

07

Subject Name: Power System Analysis and Simulation

Time: 10.30 am - 01.00 pm

Instructions:

1. Attempt all questions.

neutral grounding.

- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) Derive expression of current when there is a sudden three phase short circuit at the other end of unloaded transmission line. Assume a constant voltage source is connected at sending end and neglect line capacitance.
 - (b) Describe one line diagrams of power systems. Explain how they are drawn and 07 state its applications.
- Q.2 (a) State and explain the advantages of pu system used for a power system.
 - (b) A three phase, 60 Hz, completely transposed 345 kV, 200 km line has z= 0.032 **07** + j0.35 Ω /km and y= j4.2 x 10⁻⁶ S/km. Full load at the receiving end is 700 MW at 0.99 p.f leading and at 95% of rated voltage. Assuming a medium length line, determine the following: ABCD parameters of the nominal π circuit, sending end voltage and current and real power delivered by sending end.

OR

- (b) Derive expressions of voltage phasor and current phasor at any point of a long transmission line as function of distance *x* from receiving end in terms of distributed parameters of the line, voltage phasor VR (voltage at receiving end) and current phasor IR (current at receiving end).
- Q.3 (a) Explain how receiving end power circle diagram and sending end power circle 07 diagram are drawn? State applications of them.
 - (b) Draw phasor diagrams of synchronous generator for under excited, normal or excitation and over excitation conditions. Explain the operation of the machine for these three conditions.

OR

Q.3	(a) (b)	Write a short note on capacitance switching. Describe how zero sequence impedances of generator, transmission line and transformers are obtained. Draw zero sequence diagrams of transformer with different connections of primary and secondary.	07 07
Q.4	(a) (b)	Write a short note on the selection of circuit breaker Introduce symmetrical components and state their applications. Derive symmetrical components of a given set of three unbalanced current phasors.	07 07
Q.4	(a)	Describe analysis of single line to ground fault at a point of power system using symmetrical components and sequence networks.	07
	(b)	Derive A, B, C and D constants of a long transmission line from first principle.	07
Q.5	(a)	Derive expressions of active power and reactive power at the receiving end of a lossless line.	07
	(b)	Discuss phase shifting in a single phase transformer and $Y-\Delta$ transformers.	07
		OR	
Q.5	(a)	Write a short note on phenomena of corona.	07
	(b)	Explain the need of neutral grounding of system. Describe any one method of	07
