Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – WINTER 2018

Subject Code:2160908 Date:20/11/2018

Subject Name:Electrical Power system – II

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)**	Explain Types of Transmission Line.	**03**
	(b)	Obtain the Equivalent circuit for nominal-T representation for long transmission line.	**04**
	(c)	A 3 phase 220 Kv, 50 Hz transmission line consists of 1.5 cm radius conductor spaced 2 meters apart in equilateral triangular formation. If the temperature is 40^o C and atmospheric pressure is 76 cm, calculate the corona loss per km of the line. Take $m_o = 0.85$.	**07**
Q.2	**(a)**	How do the term impedance drop, voltage drop and voltage regulation, in connection with transmission line differs?	**03**
	(b)	Prove that in case of transients in RL series circuits, short circuit current contains symmetrical short circuit components and DC offset components.	**04**
	(c)	Explain Symmetrical components and state their application. Derive Symmetrical components of a given set of three unbalanced current phasors.	**07**
		OR	
	(c)	A 3-phase. 50-Hz overhead transmission line 100 km long has the following constants. Resistance/km/phase = 0.1 Ω Inductive reactance/km/phase = 0.2 Ω Capacitive susceptance/km/phase = 0.04 × 10 -4 siemen Determine (i) the sending end current (ii) sending end voltage (iii) sending end power factor and (iv) transmission efficiency when supplying a balance load of 10,000 kW at 66 kV p.f 0.8 lagging . Use nominal T method.	**07**
Q.3	**(a)**	What is arcing ground? Explain its effect on the performance of a power system.	**03**
	(b)	Write a note on selection of circuit breaker.	**04**
	(c)	The currents in a 3-phase unbalanced system are :$I_R = (12 + j\ 6)$ A; $I_Y = (12 - j\ 12)$ A; $I_B = (-15 + j\ 10)$ A. The phase sequence in RYB. Calculate the zero, positive and negative sequence components of the currents.	**07**
		OR	
Q.3	**(a)**	What is the reason for transient during short circuits?	**03**

	(b)	Explain Various factors affecting Corona effect.	**04**
	(c)	Describe analysis of single line to ground fault at a point of power system using symmetrical components and sequence networks.	**07**
Q.4	**(a)**	Discuss phase shifting in star-delta transformers.	**03**
	(b)	What is 3 phase unsymmetrical fault? Discuss any one type of unsymmetrical in brief.	**04**
	(c)	With suitable example explain the single and double frequency transients in power system.	**07**

OR

Q.4	**(a)**	Explain Capacitance switching.	**03**
	(b)	Differentiate between transient and sub transient reactance.	**04**
	(c)	Explain travelling waves of a transmission line when the receiving end is short circuited.	**07**
Q.5	**(a)**	Explain the performance of loaded Synchronous Machine.	**03**
	(b)	Explain why the control of reactive power is essential for maintaining a desired voltage profile?	**04**
	(c)	An unloaded star connected solidly grounded 10 MVA, 11 kV generator has positive, negative and zero sequence impedances are j1.3 Ω, j 0.8 Ω and j 0.4 Ω respectively. A single line to ground fault occurs at the terminals of the generator. 1) Calculate the fault current. 2) Determine the value of the inductive reactance that must be inserted at the generator neutral to limit the fault current to 50 % of the value obtained in (1)	**07**

OR

Q.5	**(a)**	Enlist the various unsymmetrical fault occurring in power system.	**03**
	(b)	Explain importance of power circle diagram.	**04**
	(c)	A generator rated 100 MVA, 20 kV has $X_1=X_2=20\%$ and $X_0=5\%$. Its neutral is grounded through reactor of 0.32 Ω. The generator is operating at rated voltage with load and is disconnected from the system when a single line to ground fault occurs at its terminals. Find the subtransient current in the faulted phase and line to line voltages.	**07**

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