

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE- VII SEMESTER-EXAMINATION – SUMMER 2018**Subject code:170807****Date: 28-04-2018****Subject Name: POWER SYSTEM ANALYSIS****Time: 02:30 pm to 05:00 pm****Total Marks: 70****Instructions**

1. Make suitable assumptions wherever necessary.
2. Figures to the right indicate full marks.
3. Each question carry equal marks (14 marks)

Q.1

- (a) Derive the per unit model of a single phase transformer. 7
- (b) Define per unit system. Derive the formulae of per unit impedance with usual notations. 7

Q.2

- (a) Derive the formulae for peak to peak value of symmetrical short circuit current for the transmission line subjected to short circuit under no load condition. 7
- (b) Draw the oscillogram of an alternator subjected to symmetrical fault. Describe the various terminology used for it. 7

OR

- (b) Discuss the factors affecting the selection of circuit breaker. 7

Q.3

- (a) State the percentage occurrence of unsymmetrical fault. What is α ? With usual notations prove that $1 + \alpha + \alpha^2 = 0$. 7
- (b) Briefly explain the significance of positive sequence impedance and positive sequence network model of alternator for fault analysis. 7

OR**Q.3**

- (a) With usual notations prove that $[V_p] = [A] [V_s]$. 7
- (b) Explain the various configuration of zero sequence networks of transformers. 7

Q.4

- (a) Derive the formulae for positive sequence current I_{a1} when 3 phase transmission line is subjected to double line to ground fault. 7
- (b) Draw the connection of sequence network for the following cases of open conductor fault. (i) one conductor open (ii) two conductor open 7

OR**Q.4**

- (a) State the comparisons for various methods of load flow solutions. 7
- (b) Explain the fast decoupled load flow solution method. 7

Q.5

- (a) Derive the equation of per unit value of moment of inertia for the synchronous machine subjected to acceleration due to input feed of mechanical energy. 7
- (b) Describe equal area criterion with. Usual notations. 7

OR

- Q.5** (a) Derive the swing equation describing the rotor dynamics for synchronous machines. **7**
- (b) Discuss the conditions for parallel operation of generators. **7**

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