Reg. No. | | | | | | | | | | | | |

Question Paper Code : 51443

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Sixth Semester

Electrical and Electronics Engineering

EE 2351/EE 61/10133 EE 601 – POWER SYSTEM ANALYSIS

(Regulation 2008/2010)

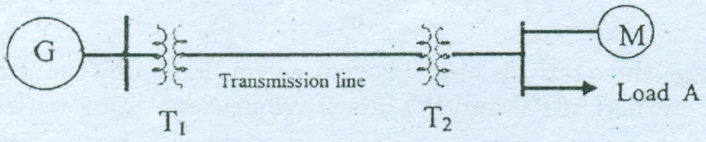
(Common to PTEE 2351 Power System Analysis for B.E. (Part-Time) Fourth Semester Electrical and Electronics Engineering Regulation 2009)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw the impedance diagram for the given single line representation of the power system.



2. What are the types of load modeling?

3. What is the role of swing bus in power flow study?

4. At what condition generator bus is treated as load bus?

5. Give the frequency of various faults occurrence in ascending order.

6. Define bolted fault.

7. What are the features of zero sequence current?

8. Write the symmetrical component currents of phase 'a' in terms of three phase currents.

9. Define dynamic stability with an example.

10. Find the frequency of oscillation for a synchronizing co-efficient of 0.6, inertia constant H = 4 and system frequency of 50 Hz.

PART B — (5 × 16 = 80 marks)

11. (a) The single line diagram of a power system is shown in figure. 11. (a) along with components data. Determine the new per unit values and draw the reactance diagram. Assume 25 MVA, and 20KV as new base on generator G_1. (16)

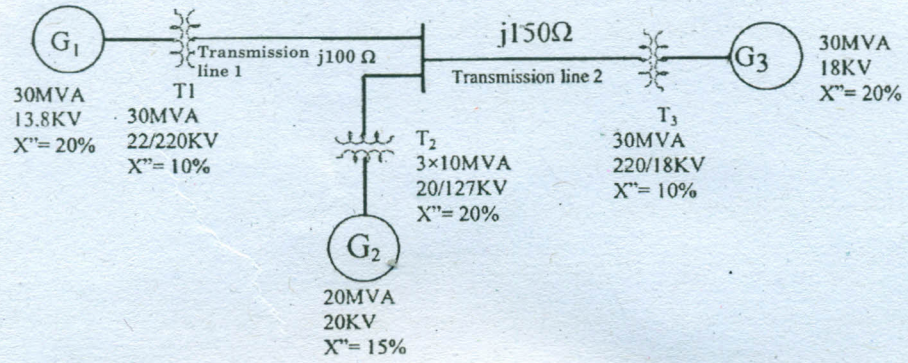


Figure 11. (a)

Or

(b) Describe the Z_{Bus} building algorithms in detail by using a three bus system. (16)

12. (a) (i) Formulate the power flow equation for *n* bus system. (4)

(ii) Give the detailed flow chart for newton raphson method. (12)

Or

(b) Describe the step by step procedure for load flow solution from Gauss siedal method, if PV and PQ buses are present along with slack bus. (16)

13. (a) A generator is connected through a five cycle circuit breaker to a transformer is rated 100MVA, 18KV with reactances X_d"=20%, X_d'=25% and X_d =110%. It is operated on no-load and at rated voltage. When a 3 phase fault occurs between the breaker and the transformer, find,

(i) Short circuit current in circuit breaker

(ii) The initial symmetrical rms current in the circuit breaker

(iii) The maximum possible dc component of the short circuit current in the breaker

(iv) The current to be interrupted by the breaker

(v) The interrupting MVA. (16)

Or

(b) With the help of a detailed algorithm, explain how a symmetrical fault can be analysed using Z_{Bus}. (16)

14. (a) A 25 MVA, 13.2 KV alternator with solidly grounded neutral has a sub transient reactance of 0.25 p.u. The negative and zero sequence reactances are 0.35 and 0.01 p.u. respectively. If a double line–to–ground fault occurs at the terminals of the alternator, determine the fault current and line-to-line voltages at the fault. (16)

Or

(b) Obtain the expression for fault current for a line to line fault taken place through an impedance Z_b in a power system. (16)

15. (a) Derive the swing equation of synchronous generator connected to infinite bus from the rotor dynamics, and extend the derivation for two parallel connected coherent and incoherent machines. (16)

Or

(b) Describe the algorithm for modified Euler method of finding solution for power system stability problem studies. (16)

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