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Question Paper Code : 11244

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

Sixth Semester

Electrical and Electronics Engineering

080280055 — POWER SYSTEM ANALYSIS AND STABILITY

(Common to 080280049 — Power System Analysis and Stability, for B.E. (Part–Time), Fifth Semester, Electrical and Electronic Engineering)

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the power angle relation between real and reactive powers.

2. Write the significance of line charging admittance.

3. List out the applications of tap changing transformer.

4. What are the different types of power system buses?

5. Write the importance of accelerating factor.

6. Write the various sequence impedances.

7. Enumerate the concept of transient power condition.

8. Write the significance of fault through impedance.

9. What do you mean by infinite bus system?

10. How do you classify the power system stability studies?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Distinguish between steady, transient and dynamic states of power system. (8)

(ii) Describe the basic procedure to enroute the real and reactive powers in the power system. (8)

Or

(b) Two generators are connected in parallel to the same bus and have sub–transient reactances of X^{11} =0.14 p.u. generator 1 is rated 2500 KVA, 2.4 KV and generator 2 is rated 5000 KVA, 2.4 KV. Find the per unit reactance of each generator on a 15 MVA, 2.4 KV base. What is the per unit reactance of a single generator equivalent to the two generators in parallel on a 15 MVA, 2.4 KV base? (16)

12. (a) Briefly describe the modelling of generator, load and transmission line for power system analysis. (16)

Or

(b) Find the bus admittance matrix and bus impedance matrix of the power network shown in Fig. 1 (16)

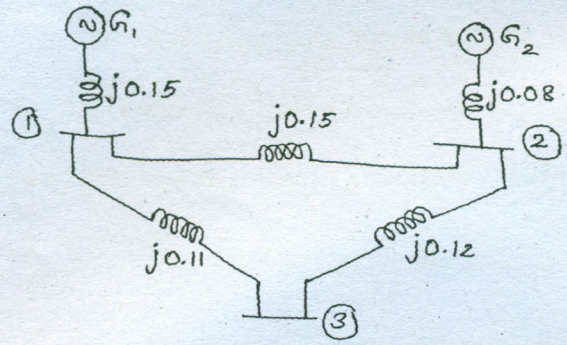

Figure – 1

13. (a) Given the three–phase load flow problem represented by the fig.2 find the first iteration of voltage for bus 2 and voltage angle of bus 3, using Gauss–seidel iteration method. (16)

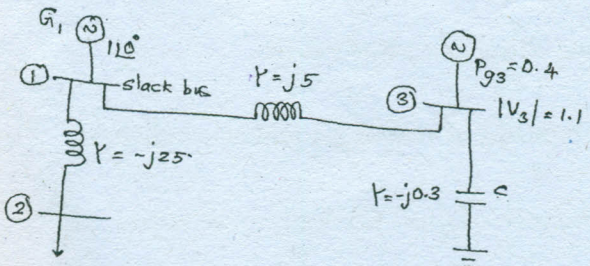

Figure – 2

Or

(b) (i) Derive the power flow equation of a network. (8)

(ii) Write the procedure to compute the slack bus power and transmission loss. (8)

14. (a) (i) Determine the voltages to neutral V_a, V_b and V_c in a circuit where $V_{a1} = 30\angle 0°$, $V_{a2} = 30\angle 90°$ and $V_{a0} = 60\angle 180°$ (8)

(ii) Write the significance of symmetrical short circuit analysis of the power system. (8)

Or

(b) Obtain the expression for the fault current when single line to ground fault occurs in the power system. (16)

15. (a) Describe the solution procedure of swing equation used to describe the power system stability using Euler's method. (16)

Or

(b) Describe the procedure to compute the critical angle and time of the power network using equal area criterion. (16)
