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

T 3264

B.E/B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Sixth Semester

(Regulation 2004)

Electrical and Electronics Engineering

EE 1352 — POWER SYSTEM ANALYSIS

(Common to B.E. (Part-Time) Fifth Semester Regulation 2005)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. List the different components of power system.

2. What are the advantages of per unit system?

3. What is a slack bus?

4. What is meant by acceleration factor in Gauss-Seidel load flow solution and its best value?

5. Define short circuit MVA.

6. How do short circuits occur in a power system?

7. What is a sequence network?

8. What are unsymmetrical faults?

9. On what basis do you conclude that a given synchronous machine has lost stability?

10. Define infinite bus in a power system.

PART B — (5 × 16 = 80 marks) 12

11. (a) Write short notes on :

(i) Single line diagram. (5)

(ii) Change of base. (5)

(iii) Reactance of synchronous machines. (6)

Or 13

(b) Figure 11(b) shows a single line diagram of unloaded three generator power system with interconnection between the generators by means of three transformers and a transmission line with two sections with their impedances marked on the diagram. The ratings of generators and transformers are given below : (16)

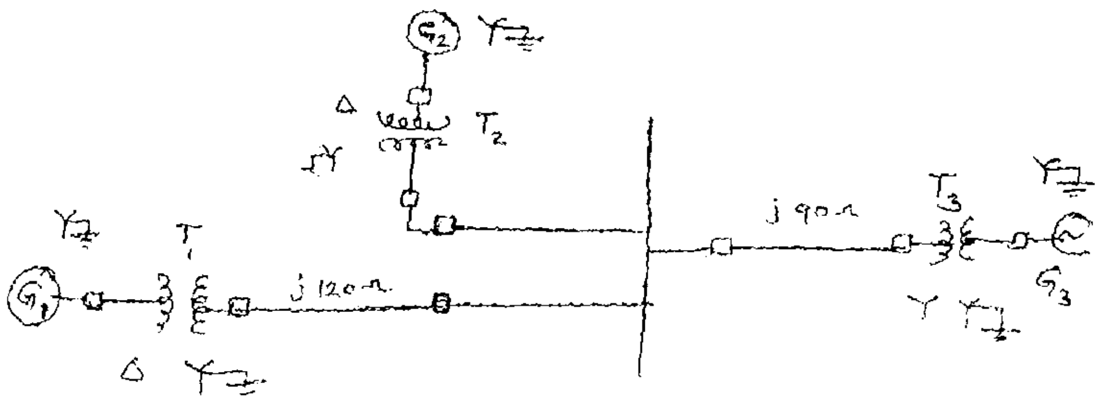


Figure 11(b) 14.

Generator	MVA	KV	Reactance in per unit
1	25	6.6	0.2
2	15	6.6	0.15
3	30	13.2	0.15

Transformer 1 : 30 MVA, 6.9 Δ – 115 Y KV, X = 10% 15.

Transformer 2 : 15 MVA, 6.9 Δ – 115 Y KV, X = 10%

Transformer 3 : single phase units, each rated

10 MVA, 6.9/69 KV, X = 10%

Draw an impedance diagram and mark all values in p.u choosing a base of 30 MVA, 6.6 KV in generator 1 circuit.

12. (a) With a flow chart, explain the Newton-Raphson iterative method for solving load flow problem. (16)

Or

(b) (i) Explain why power flow studies are essential and vital parts of power system studies. (6)

(ii) Discuss about the fast decoupled power flow method. (10)

13. (a) A 3 phase 5 MVA, 6.6 KV alternator with a reactance of 8% is connected to a feeder of series impedance $(0.12 + j0.48)$ ohm/phase/km through a step up transformer. The transformer is rated at 3 MVA, 6.6 KV/33 KV and has a reactance of 5%. Determine the fault current supplied by the generator operating under no load with a voltage of 6.9 KV, when a 3-phase symmetrical fault occurs at a point 15 km along the feeder. (16)

Or

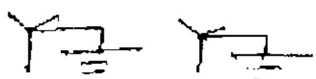
(b) With a help of a detailed flowchart, explain how a symmetrical fault can be analysed using Z_{bus}? (16)

14. (a) Develop the connection of sequence network when a line to line fault occurs in a power network. (16)

Or

(b) (i) Explain how an unbalanced set of three phase voltages can be represented by system of balanced voltages. (10)

(ii) Draw the zero sequence network for :

(1)  connected transformer. (2)

(2) $\Delta - \Delta$ connected transformer. (2)

(3) Star connected generator earthed through R. (2)

15. (a) State and explain 'equal area criterion' in connection with transient stability analysis. What are the advantages and limitations of this method? (16)

Or

(b) Describe the Runge-Kutta method of solution of swing equation for multi-machine systems. (16)
