(31)

Reg. No.									

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2011

ELECTRICAL AND ELECTRONICS ENGINEERING

V SEMESTER (REGULATIONS 2004)

EE 371 POWER SYSTEM ANALYSIS

Time: 3 hours **Max Marks: 100**

Answer ALL Questions

PART-A **10 x 2 = 20**

1. What are the advantages of per unit system?
2. What is reactance diagram?
3. What are symmetrical components?
4. Draw the zero sequence network for Δ/Δ connected transformer.
5. Name the three types of buses in load flow analysis?
6. What are the constraints that are considered in Gauss Seidel method?
7. What are the different types of faults that occur in a power system?
8. Draw the zero sequence impedance of a generator?
9. Define stability of a power system and mention its types.
10. What is meant by transient stability limit?

PART-B **5 x 16 = 80**

11. Two generators rated at 10 MVA, 13.2 KV and 15 MVA, 13.2 KV are connected in parallel to a bus bar. They feed supply to two motors of input 8 MVA and 12 MVA respectively. The operating voltage of motors is 12.5 KV. Assuming base quantities as 50 MVA and 13.8 KV, determine the reactance values and draw the reactance diagram. The percentage reactance for generators is 15% and that for the motors is 20%.

12(a). The parameters of a 4-bus system are as under:

Bus code	Line impedance (pu)
1-2	0.2 + j 0.3
2-3	0.2 + j 0.3
2-4	0.2 + j 0.3
3-4	0.2 + j 0.3
1-3	0.2 + j 0.3

Draw the network and find bus admittance matrix.

[OR]

12 (b). For the three-bus system given in the Table 12b, formulate the Z- bus using the Z Bus building algorithm.

Table.12b

S.No.	From Bus	To Bus	Impedance (p.u.)
1.	ref	1	j0.1
2.	1	2	j0.2
3.	2	3	j0.1
4.	3	ref	j0.2

13(a). Draw the flow chart for load flow solution by Gauss-Seidel method with necessary equations.

[OR]

13(b) The following data are given for a three-bus power system:

Bus 1 – Slack bus – V specified = $1.05\angle 0^0$

Bus 2 – PV bus – | V | specified = 1.02 p.u. P_G = 3 p.u.

Bus 3 – PQ bus – P_L = 4 p.u., Q_L = 2 p.u.

Line reactances in p.u are given in table 13b.

Table.13b

Bus code	Impedance
1 – 2	j0.5
2 – 3	j0.5
3 – 1	j0.5

14(a). Derive the relationship for fault currents in terms of symmetrical components when there is a line to line fault on phase b and c. Draw the diagram showing the interconnections of sequence networks.

[OR]

14(b) Fig. 14(b) shows a generating station feeding a 132 KV system. Determine the total fault current and fault current supplied by each alternator for a 3 phase fault at the receiving end bus. The line is 200 km long.

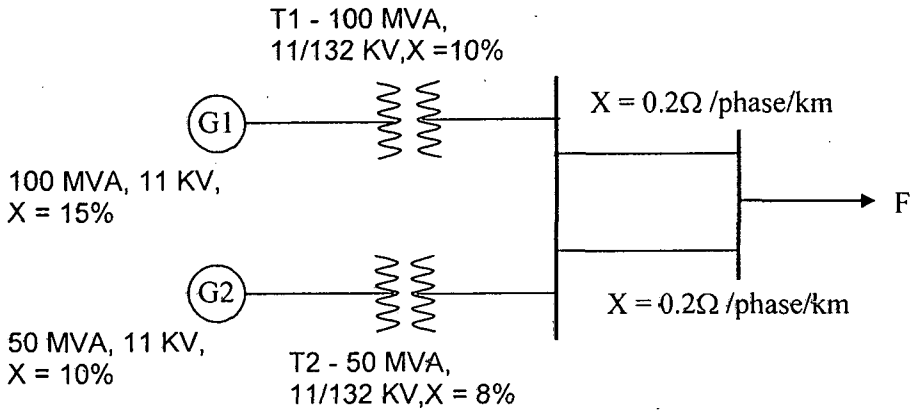

Fig. 14(b)

15(a). Derive the swing equation for a single machine connected to infinite bus system. State the assumptions if any and state the usefulness of this equation.

[OR]

15(b). What are the factors affecting the stability of a power system? Explain.