Exam.Code:0936
Sub. Code: 6717

2054

B.E. (Electrical and Electronics Engineering)

Sixth Semester

EE-601: Computer Aided Power System Analysis

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.

x-x-x

1. **Attempt the following:-**

   a) The positive sequence current of voltage at the point of fault becomes zero for which fault and why?

   b) For a 100 MVA turbo alternator, the inertia constant is 5. Find the H for alternator with 50 MVA.

   c) What is the need of symmetrical components in fault studies of power system?

   d) What are the limitations of Equal Area Criterion method?

   e) Why is NR method preferred over Gauss Seidel method in load flow studies?

(5x2)

UNIT - I

2. Find the Jacbion sub-matrices J_1 and J_3 as obtained using NR method for the power system network defined using data given below.

Bus	P_L	Q_L	P_g	Q_g	V	Bus Specification
1	2	0.5	---	---	1	Slack
2	0	0	1	---	1	PV
3	0.7	0.3	0	0	---	PQ
4	0.7	0.3	0	0	---	PQ

Line	Impedance (p.u.)
1-2	0.15+j0.6
1-3	0.1+j0.4
1-4	0.15+j0.6
2-3	0.05+j0.2
3-4	0.05+j0.2

(10)

3. **a)** Use equal area criterion to explain the stability of the SMIB system connected through two parallel lines when a line is disconnected suddenly.

   b) Consider the following incremental cost curves in ₹/MWh for a plant of 2 units

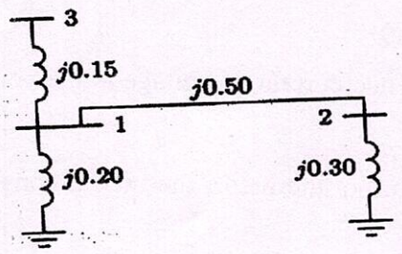
   $\frac{dc_1}{dp_{g1}} = 0.20P_{g1} + 40$ and $\frac{dc_2}{dp_{g2}} = 0.25P_{g2} + 30$. Calculate the extra cost incurred in ₹/h if a load of 220 MW is scheduled as P_{g1}= P_{g2}=110 MW. **(2x5)**

4. Explain the mathematical modeling of point-by-point method, the numerical solution used to solve the swing equation and use it to study the concept of stability of the power system. **(10)**

P.T.O.

UNIT - II

5. Give the major step to formulate Z_{BUS} algorithm. For the network shown below assemble Z_{BUS} matrix. The impedance of each element is shown in the figure.



(10)

6. a) What is the role of symmetrical component transformation in fault studies? Hence derive the expressions for the sequence voltages from the three phase voltages.

   b) Determine the relation for the fault current and voltage when a SLG fault occurs on a three phase power system with fault impedance Z_f. Hence draw the sequence network diagram for the same. **(2x5)**

7. Determine the fault currents in each phase following a double line to-ground short circuit at the terminals of a star connected synchronous generator operating initially on an open circuit voltage of 1.0 p.u. The positive negative and zero sequence reactance's of the generator are respectively j0.35, j0.25 and j0.20 and its star point is isolated from the ground. **(10)**

x-x-x