B.E. Seventh Semester (Elect Engg (E & P), Elc and Electro, Ele & Power, Elc. Energy) (CGS)

10463 : Elective - I : Computer Methods in Power System Analysis
7 EE 05 / 7 EP 05 / 7 EL 05

P. Pages : 2 | **AU - 2908**

Time : Three Hours | * 0 2 5 8 * | Max. Marks : 80

Notes :
1. Answer **three** question from Section A and **three** question from Section B.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Diagrams and chemical equations should be given wherever necessary.
5. Illustrate your answer necessary with the help of neat sketches.
6. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

1. a) Give the mathematical model of synchronous generator for steady state and transient state analysis considering the effect of saliency and changes in the flux linkages. **7**

b) Explain the representation of load. **6**

OR

2. a) What is phase shifting transformer? Derive the Y_{BUS} matrix element for phase shifting transformer. **7**

b) Give the mathematical model of synchronous generator for steady state and transient state analysis neglecting the effect of saliency and changes in flux linkages. **6**

3. a) Using non-singular transformation, derive loop impedance matrix i.e. Z loop. **7**

b) Define the following terms. **7**
- i) Oriented graph.
- ii) Tree.
- iii) Basic cut-sets.
- iv) Basic loops.
- v) Bus incidence matrix.

OR

4. a) What is primitive network? Explain admittance and impedance form of representation. **7**

b) Derive branch admittance and branch impedance matrix by non-singular transformation. **7**

5. a) Explain the algorithm method of formulation of Z_{BUS}. **6**

b) Explain the algorithm method of formulation of Y_{BUS}. How to modify Y_{BUS} for changes in power system? **7**

OR

6. a) Explain how to represent three phase network element in impedance and admittance form. **6**

b) Prove that Clark's component transformation diagonalizes Z_{pa}^{abc} matrix in case of stationary elements. 7

SECTION – B

7. a) Derive the general expression for fault current and voltage, if fault occurs at bus 'P'. 7

b) Find fault impedance matrix in case of line to line fault. Also obtain the expression for the fault current and fault voltage in terms of symmetrical components. 6

OR

8. a) What is the use of short circuit studies? State the assumptions made during short circuit analysis of large power system. 7

b) Find 3-phase fault impedance matrix when three phase to ground fault occures at any bus of power system. Consider fault impedance per phase as Z_f and ground impedance as Z_g. 6

9. a) Explain objectives, assumptions made and importance of load flow studies. 7

b) Newton-Raphson method is preferred to Gauss-Seidel method for load flow studies in large power system, Give reasons. 7

OR

10. Draw flow chart of Gauss-Seidel method for load flow studies, when all types of buses are present. State its advantages and disadvantages. 14

11. State assumptions made in transient stability analysis with the help of flow chart and necessary equations. Explain Runge Kutta method for transient stability analysis. 13

OR

12. With the help of flow chart explain Euler's modified method used for transient stability analysis. 13

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