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Roll No. : .....

**325833(25)**

APR-MAY

**B. E. (Eighth Semester) Examination, 2020**

**(New Scheme)**

**(EEE Engg. Branch)**

**COMPUTER AIDED POWER SYSTEM**

*Time Allowed : Three hours*

*Maximum Marks : 80*

*Minimum Pass Marks : 28*

*Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from (b), (c) and (d).*

**Unit-I**

1. (a) Define Tree and Co-tree.

2

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- (b) Discuss the step by step method of formation of  $Y_{bus}$  7
- (c) Explain in brief the procedure for formation of  $Y_{bus}$  using singular transformation. Derive the necessary equations. 7
- (d) An incomplete nodal admittance matrix for a 4-bus system with negligible charging admittance is given below. Find missing terms : 7

$$\begin{bmatrix} 0.7 - j_3 & -0.2 + j_1 & -0.5 + j_2 & y_{14} \\ y_{21} & y_{22} & -0.3 + j_2 & -0.5 + j_3 \\ y_{31} & y_{32} & y_{33} & -1 + j_4 \\ y_{41} & y_{42} & y_{43} & y_{44} \end{bmatrix}$$

**Unit-II**

2. (a) Why are fault studies important? 2
- (b) For the 3-bus network shown in fig. 1, find build  $Z_{bus}$  7

[ 3 ]

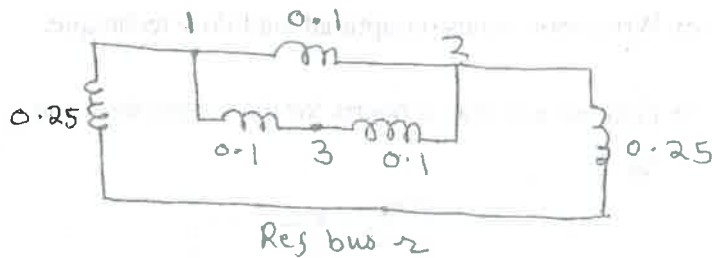


Fig. 1

(c) A generator experiences a double line to ground fault in phase  $b$  and  $c$  through a fault impedance  $Z_f$ . Derive the necessary expression for this fault and hence give the connection between three sequence networks. 7

(d) Why the phase shift in the positive sequence and negative sequence quantities through a star delta transformer are opposite to each other? Explain in brief. 7

### Unit-III

3. (a) What is meant by optimal load flow? 2

(b) Draw and explain flow chart for fast decoupled load flow method. 7

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(c) Write short notes on optimal load flow technique. 7

(d) Find bus admittance matrix for the system shown in fig. 2. 7

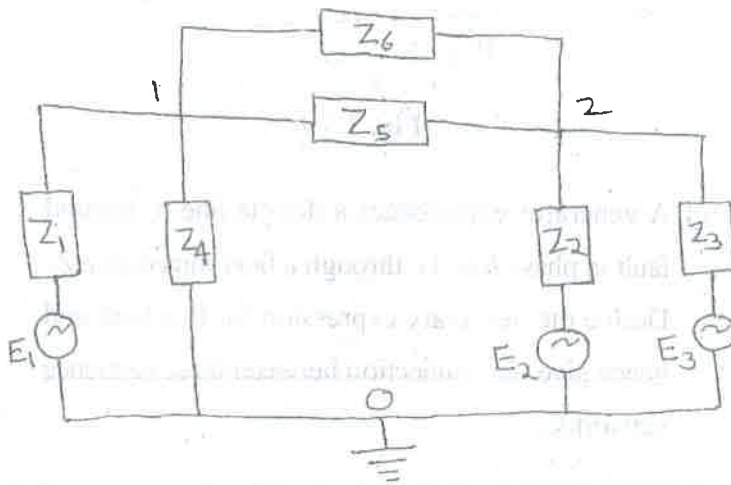


Fig. 2

#### Unit-IV

4. (a) What is the essential difference between steady state stability and transient stability? 2

(b) Write down the swing equation and drive the expression for iterative solution of swing equation using modified Euler method. 7

[ 5 ]

- (c) How can the transient stability of a system be improved? Discuss the traditional as well as new approaches to the problem. 7
- (d) A 50 Hz, 4 pole turbogenerator rated 100 mVA, 11 kV has an inertia constant of 0.8 MJ/mVA :
- (i) Find the stored energy in the rotar at synchronous speed.
  - (ii) If the mechanical input is suddenly raised to 80 MW for an electrical load of 50 MW, find rotar acceleration, neglecting mechanical and electrical losses.
  - (iii) If the acceleration calculated in part (ii) is maintained for 10 cycles. Find the change in torque angle and rotar speed in revolution per minute at the end of this period. 1+3+3=7

#### Unit-V

5. (a) What is contingency analysis? 2
- (b) Discuss the factors affecting power system security. 7
- (c) Explain AC power flow method of contingency analysis. 7

(d) Explain following terms : (any two) 7

- (i) Contingency selection
- (ii) Network sensitivity method for contingency analysis
- (iii) Static security analysis at control centers