

M.Tech.

ADVANCED POWER SYSTEM ANALYSIS

SUBJECT CODE : PEE - 502Paper ID : [E0482]

[Note : Please fill subject code and paper ID on OMR]

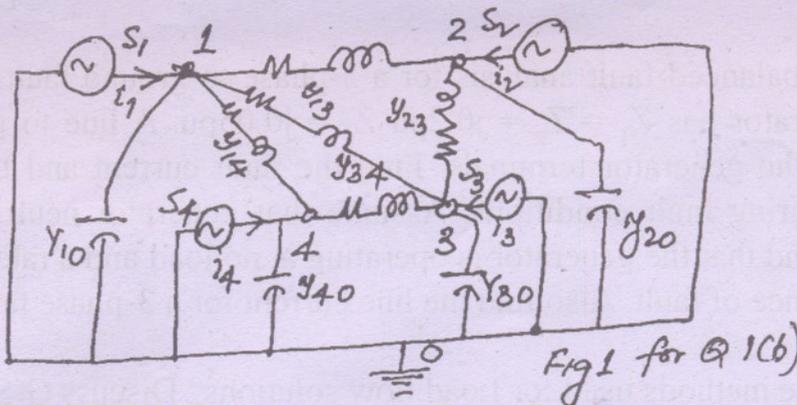
Time : 03 Hours

Maximum Marks : 100

Instruction to Candidates:

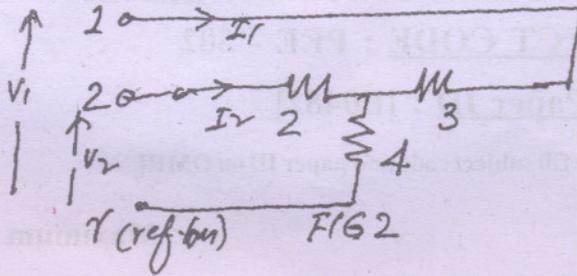
- 1) Attempt any Five questions.
- 2) All questions carry equal marks.

- Q1) a) What is meant Bus Incidence Matrix? How is this matrix useful to have singular transformation to formulate Z bus or Y bus – discuss.
- b) Equivalent circuit for 4 - bus system is shown in fig 1. Formulate Y bus for the circuit using singular transformation.

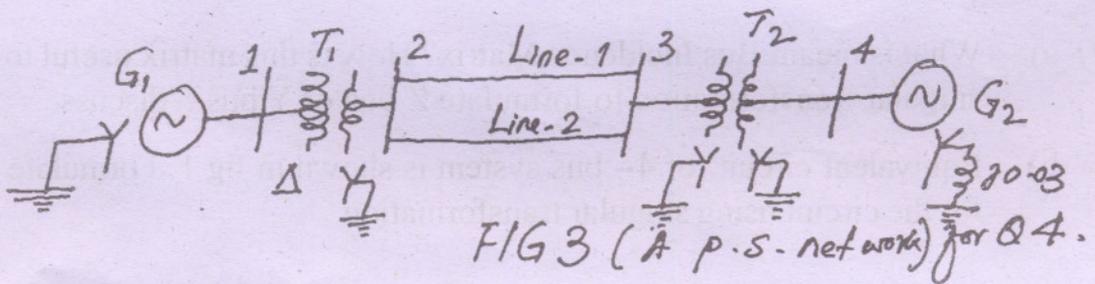


- Q2) (a) What is Load Flow problem? Why is formulation of Y bus more useful to Load Flow solution - discuss.
- (b) Develop algorithm for formulation of 1-phase bus Impedance matrix.
- Q3) (a) How is Z bus formulation accomplished using current injection technique - discuss.

- (b) Consider a situation showing equivalent network of 3-bus power system out of which one bus is a reference as shown in Fig. 2 Evaluate Z bus.



- Q4) Discuss how is short circuit calculations done using Z bus formulation. For the network shown in Fig 3. Formulate positive and negative sequence impedance matrices. Also obtain Z_0 bus for the given network.



- Q5) Discuss unbalanced fault analysis for a 3-phase to ground fault. A 30MVA, 11kV generator has $Z_1 = Z_2 = j0.2\text{pu}$ $Z_0 = j0.05\text{pu}$. A line to ground fault occurs on the generator terminals. Find the fault current and Line to Line voltages during fault conditions. Assume that generator neutral is solidly grounded and that the generator is operating at no load and a rated voltage at the occurrence of fault. Also find the line current for a 3-phase fault.
- Q6) What are the methods used for Load flow solutions? Discuss G-S method for Load flow solution and state advantages of this method.
- Q7) Discuss contingency analysis for power system using Brown's method.
- Q8) Write short notes on
- State estimation of power systems.
 - State estimation of the line power flow.

