Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (EE) PT (Sem.–9)

POWER SYSTEM ANALYSIS

Subject Code : BTEE-801

M.Code : 75642

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

a. Write down the generalized step of 1st modification of impedance matrix.

b. Draw single line diagram of power system.

c. Describe the symmetrical component in terms of unsymmetrical components.

d. Construct the sequence network of power system.

e. Mark the quantities to be calculated and specified over the different buses in power system.

f. Write any two factors which affects the transient stability.

g. Derive the expression of fault current in case of 3 phase faults.

h. Define the criterion of selection of circuit breaker.

i. What do you mean by power system stability, define briefly.

j. What is numerical solution of swing equation?

SECTION-B

2. A delta connected balanced resistive load is connected across an unbalanced 3-phase supply (RYB). The currents in phase R and B are $10 \angle 30°$ and $15 \angle -60°$. Calculate the current in Y phase and also find the symmetrical component of delta currents.

3. Write down the algorithm and flowchart of Newton Raphson method including generation limits.

4. With the help of boundary conditions and network sequence equation explain the single line to ground fault and list the observations derived from it.

5. What is swing equation? How equal area criterion method for stability analysis is useful in power system? Derive relation for critical clearing angle using equal area criterion.

6. Write down the algorithmic steps for short circuit studies using Thevenin's theorem.

SECTION-C

7. The four-bus system interconnected through lines such as (1,-2), (1,-3), (2,-3), (2,4) and (3,4). The admittance of these lines is (2-j8), (l-j4), (0.666-j2.664), (l-j4) and (2-j8) in mho, respectively. The schedule of active and reactive powers is given below :

Bus	P	Q	V (initial)	Remarks
1	--	--	1.06	Slack bus
2	0.5	0.2	1 + j0.0	PQ bus
3	0.4	0.3	1 + j0.0	PQ bus
4	0.3	0.1	1 + j0.0	PQ bus

Determine the voltages at the end of first iteration using Gauss-Seidel method. Take a = 1.6.

8. Find the steady state power limit of a system consisting of a generator equivalent reactance 0.50pu connected to an infinite bus through a series reactance of 1.0pu. The terminal voltage of the generator is held at 1.20pu and the voltage of the infinite bus is 1.0pu.

9. For the power system, as shown below, the sub-transient reactance is given in percentage corresponding to their own rating. Calculate the per unit values of each component when base quantities are 100MVA and 33kV and draw the single line reactance diagram, in per unit system.

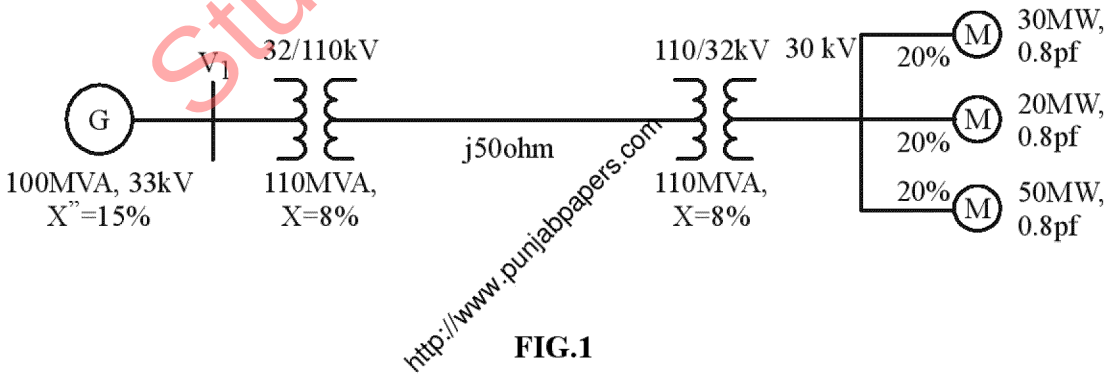

FIG.1

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.