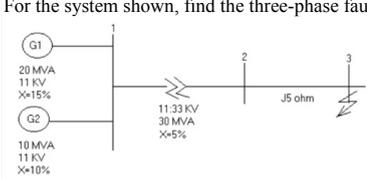




B.Tech - Odd Sem : End Semester Exam
Academic Year:2020-2021
18EE2203 - Power System Analysis & Stability
Set No: 3

Time:		Max.Marks: 100				
S.NO	Answer All Questions	Choice	Options	Marks	CO	COI BTL
1.	The parameters of a 4-bus system are as under: Line starting bus Line ending bus Line impedance 1 2 0.2+j0.8 2 3 0.3+j0.9 2 4 0.25+j1 3 4 0.2+j0.8 1 3 0.1+j0.4 Draw the network and obtain the bus admittance matrix	choice Q-2		10Marks	CO1	3 2
2.	Derive the static load flow equations of n-Bus system			10Marks	CO1	3 2
3.	Draw the detailed flow chart and explain the algorithm of NR method when the system contains all types of buses	choice Q-4		15Marks	CO1	3 2
4.	Consider a three bus system, whose bus and line data are given below are in PU Bus Data Bus no Type Voltage Angle Load Generator Q limits PD QD PG QG Qmin Qmax 1 Slack 1.06 0 0 0 0 0 0 2 P-V 1.03 0 0.5 0.2 0.2 0 0 0 3 P-Q - 0 0.6 0.25 0 0 0 0.35 Line Data Bus y in PU From To 1 2 1.25 - j 3.75 2 3 1.667 - j 5 1 3 5-j 15 Obtain power flow solution by Gauss-seidal method for 1 iteration if α is 1.4.			15Marks	CO1	3 2
5.	Illustrate the concept of Doubling effect in case of transmission lines in detail.	choice Q-6		10Marks	CO2	3 2
6.	Two generators rated at 10 MVA, 13.2kV and 15 MVA, 13.2 kV respectively are connected in parallel to a bus. The bus feeds two motors rated at 8 MVA and 12 MVA respectively. The rated voltage of motors is 12.5 kV. The reactance of each generator is 15% and that of each motor is 20% on its own rating. Assume 50 MVA, 13.8 kV base and draw reactance diagram.			10Marks	CO2	3 2
7.	For the system shown, find the three-phase fault current at bus 3 	choice Q-8		15Marks	CO2	3 3
8.	A 300 MVA, 20 kV three-phase generator has a subtransient reactance of 20%. The generator supplies two synchronous motors over 64-km transmission line having transformers at both ends. The motors, all rated 13.2kV, 200 MVA and 100 MVA for M1 and M2, respectively. For both motors $X'' = 20\%$. The three phase transformer T1 is rated 350 MVA, 20/230 kV with leakage reactance of 10%. Transformer T2 is composed of three Single -phase transformers each rated 230/13.2 kV, 100 MVA with leakage reactance of 10%. Series reactance of the transmission line is 0.5 Ω /km. Draw the impedance diagram, with all impedances marked in per-unit. Select the generator rating as base in the generator circuit.			15Marks	CO2	3 3
9.	Obtain an expression for the fault current for a LG fault at the terminals of an unloaded generator through a fault impedance Z_f	choice Q-10		10Marks	CO3	4 2
10.	a) An 11 kV, 35MVA synchronous generator has positive, negative and zero sequence reactance's of 0.15, 0.15 and 0.09 p.u. respectively. The generator neutral is grounded through a reactance of 0.04p.u. A single line to ground fault occurs at the generator terminals. Determine the fault current and the line to line voltages. Assume that the generator was unloaded before fault.			10Marks	CO3	4 2
11.	A 60 MVA, 11 kV generator has $Z_1 = Z_2 = j0.2$ p.u, $Z_0 = j0.05$ p.u. A line to ground fault occurs on the generator terminals. Find the fault current and line to line voltages during fault conditions. Assume that the generator neutral is solidly grounded and that the generator is operating at no-load and at rated voltage at the occurrence of fault. Also find the fault current if it is a line to line fault	choice Q-12		15Marks	CO3	4 4
12.	A 25MVA 13.2 kV alternator, with a solidly grounded neutral has a subtransient reactance of 0.25pu. the negative and zero sequence reactances are 0.35 and 0.1 pu. respectively. Determine the fault current and the line-to-line voltage at the fault, when a line-to-line fault occurs at the terminals of the alternator. Neglect the resistance.			15Marks	CO3	4 4
13.	A 4-pole, 50 Hz, 11kV turbo generator is rated 75 MW and 0.86 pf lagging. The machine rotor has a moment of inertia of 9000 kg-m ² . Find the inertia constant and moment of inertia.	choice Q-14		10Marks	CO4	2 2
14.	b) A 50 Hz synchronous generator having an internal voltage 1.1 pu, $H = 5.5$ MJ/MVA and a reactance of 0.45 pu is connected to an infinite bus through a double circuit line, each line of reactance 0.30 pu. The generator is delivering 0.9 pu power and the infinite bus voltage is 1.0 pu. Determine: maximum power transfer, Steady state operating angle, and Natural frequency of oscillation if damping is neglected.			10Marks	CO4	2 2
15.	A generator is operating at 50Hz, delivers 1pu power to an infinite bus through a transmission circuit in which resistance is ignored. A fault takes place reducing the maximum power transferred to 0.5 pu. Before the fault, the power was 2.0pu and after the clearance of the fault it is 1.5pu. by the use of equal area criterion, determine the critical clearing angle. Comment on stability.	choice Q-16		15Marks	CO4	2 2
16.	Two generators rated at 4-pole, 50 Hz, 50 MW 0.85 pf (lag) with moment of inertia 28,000 kg-m ² and 2-pole, 50 Hz, 75 MW 0.82 pf (lag) with moment of inertia 15,000 kg-m ² are connected by a transmission line. Find the inertia constant of each machine and the inertia constant of single equivalent machine connected to infinite bus. Take 100 MVA base.			15Marks	CO4	2 2