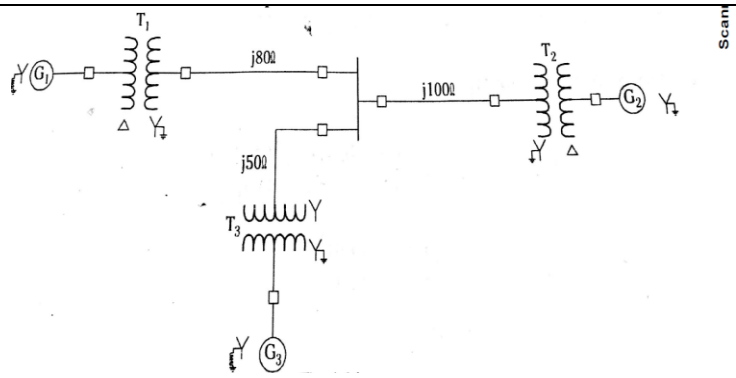
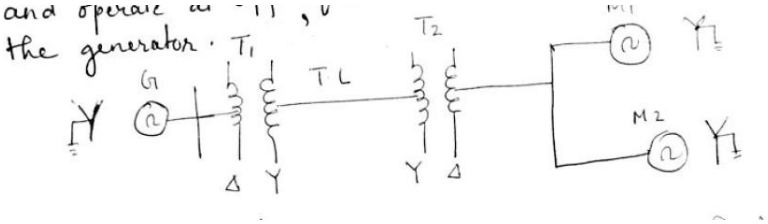
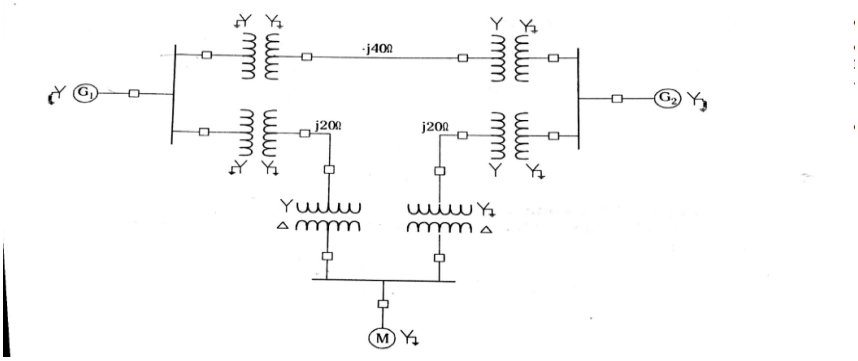
Scheme Of Evaluation
Internal Assessment Test 1 – March.2019

Sub:	Power System Analysis-1							Code:	15EE62
Date:	05/03/2019	Duration:	90mins	Max Marks:	50	Sem:	VI	Branch:	EEE

Note: Answer Any Five Questions

Question #		Description	Marks Distribution		Max Marks
1	a)	Show that the per unit impedance of a transformer is the same whether computed from primary or secondary side so long as the voltage bases on the two sides are in the ratio of transformation. • Conversion of impedance w.r.t primary or secondary side formula • Formula for p.u value • substitution	1.5 M 1.5 M 2 M	05 M	10 M
	b)	A three phase Δ/Y transformer with rating 100kVA,11kV/400Vhas its primary and secondary leakage reactance as 12-Ω/phase and 0.05Ω/phase respectively. Calculate p.u reactance of transformer. • Conversion of impedance w.r.t primary or secondary side formula • Formula for p.u value • substitution	1.5 M 1.5 M 2 M	05M	
2		The one line diagram of an unloaded generator is shown in figure. Draw the p.u. impedance diagram. Choose a base of 50 MVA, 13.8kkV in the circuit of generator G1. The generators and transformers are rated as follows: G1: 20MVA, 13.8kV, X"=0.2 p.u. G2: 30MVA, 18kV, X"=0.2 p.u. G3: 30MVA, 20kV, X"=0.2 p.u. T1: 25 MVA, Y 220kV/13.8kVΔ, X=10% T2: Three single phase units each rated 10MVA, 127/18kV, X=10% T3: 35 MVA,220kV Y/22kV Y, X=10%			

		 • Choose base voltage at different sections of power system • Calculate p.u impedance w.r.t common base • Reactance diagram as per newly calculated value	2 M 5 M 3 M	10 M	10 M
3	a)	**A generator is rated 500MVA, 22kV. Its Y-connected windings have a reactance of 1.1p.u. Find the ohmic value of the reactance of the windings. Find the reactance in p.u for a base of 100MVA, 20KV.** • ohmic value • p.u value	3 M 2 M	5 M	10 M
	b)	**Write down the advantages of per unit system in power system analysis.** • Minimum four points including advantages p.u impedance calculation for transformer	3 M 2M	5 M	
4		With the help of oscillogram of short circuit current of a synchronous generator, operating on no load, distinguish between subtransient, transient and steady state periods. Also write the corresponding equivalent circuits, which are used in computing Xd", Xd' and Xd. • Explanation of sub transient, transient and steady state period • Graph • Circuit model(three)	5 M 2 M 3 M	10 M	10 M
5		A 300 MVA, 20kV, 3ϕ generator has a reactance of 20%. The generator supplies two motors M1 and M2 over a transmission line of 64km as shown in figure. The ratings of components are as follows: T1: 350MVA, 230kV Y/20kV Δ, X=10%; TL: Length =64km, reactance 0.5Ω/km; T2: composed of three 1ϕ transformer each rated 127/13.2 kV,100MVA with leakage reactance of 10%.; M1: 200MVA,13.2kV, X"=20%; M2: 100MVA,13.2 kV, X"=20%. Select the generator ratings as	1 M 3 M 2 M 4 M	10 M	10 M

		base and draw the reactance diagram with all reactance marked in p.u. If the motors M1 and M2 have inputs of 120MW and 60MW at 13.2 kV and operate aat upf, find the voltage at the terminals of the generator.  • Choose base voltage at different sections of power system • Calculate p.u impedance w.r.t common base • Reactance diagram as per newly calculated value • Calculate terminal voltage of generator			
6		Obtain the impedance diagram of the electrical power system shown in figure. Mark all the impedance values in per unit on a base of 50MVA, 138kV in the 40Ω line. The machine ratings are : G1 : 20 MVA, 13.2 kV, X"=15% G2 : 20 MVA, 13.2 kV, X"=15% M; 30 MVA, 6.9kV, X"=20% Three phase Y-Y transformers: 20 MVA, 13.8/138kV, X=10%  Three phase Y-Δ transformers: 15 MVA, 6.9/138kV, X=10% • Choose base voltage at different sections of power system • Calculate p.u impedance w.r.t common base • Reactance diagram as per newly calculated value	2 M 5 M 3 M	10 M	10 M