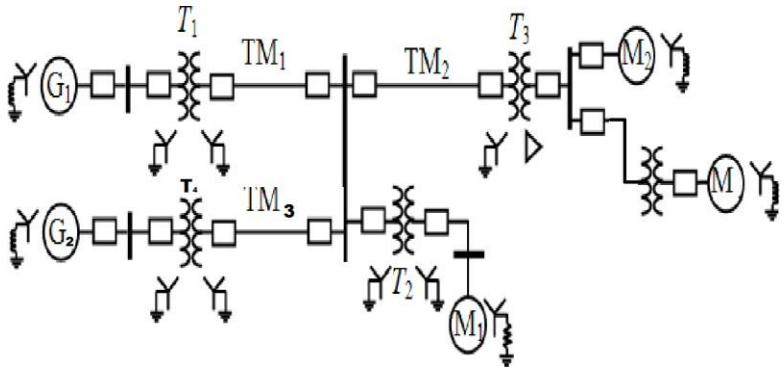
Power System Analysis Assignment

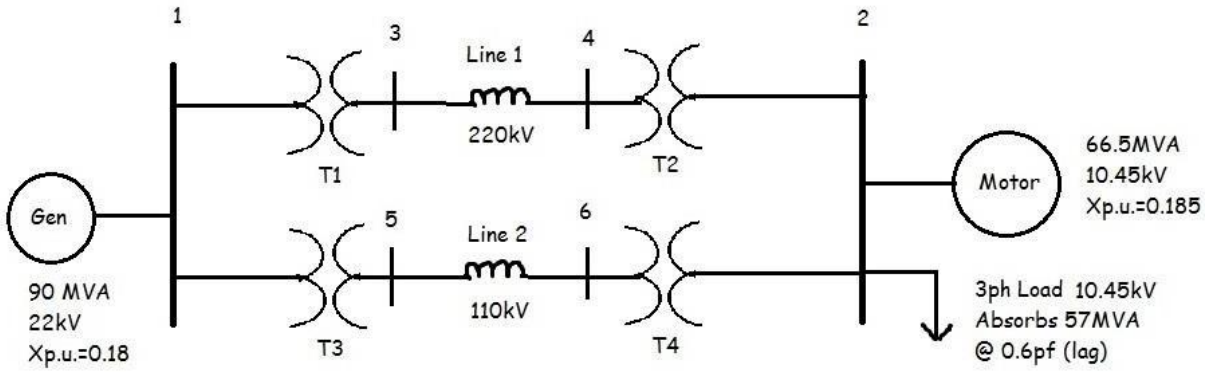
Total Marks=20

1. Prepare an Impedance diagram and a Reactance diagram from the single line diagram shown in figure.



2. A transformer is rated 20kV/200kV, 350MVA and has an internal impedance of j6.4Ω as seen from the low voltage side. Consider 22kV, 400 MVA as base and show that Vpu, S_{pu} and Z_{pu} is same for the both sides of this transformer.

3. Find per unit impedances for the following figure.



T1: 50MVA 22/220kV Xp.u.= 0.10
T2: 40MVA 220/11kV Xp.u.= 0.06
T3: 40MVA 22/110kV Xp.u.= 0.064
T4: 40MVA 110/11kV Xp.u.=0.08
Line 1: 48.4Ohms (total)
Line 2: 65.43Ohms (total)

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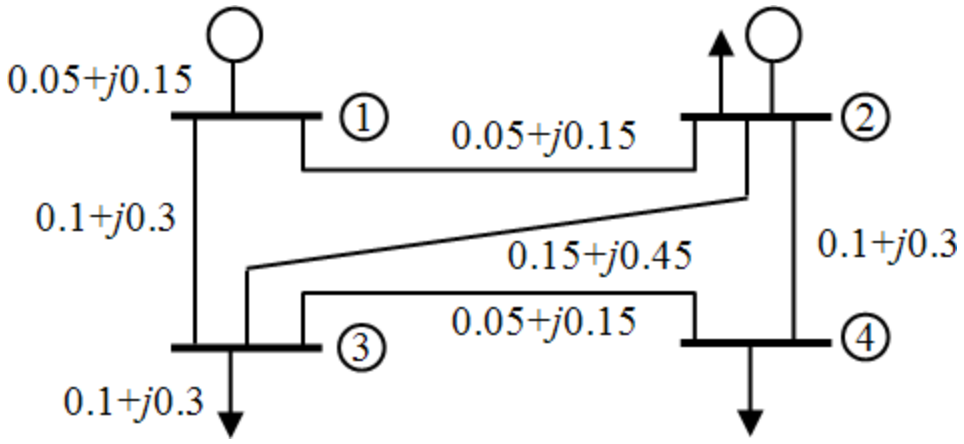
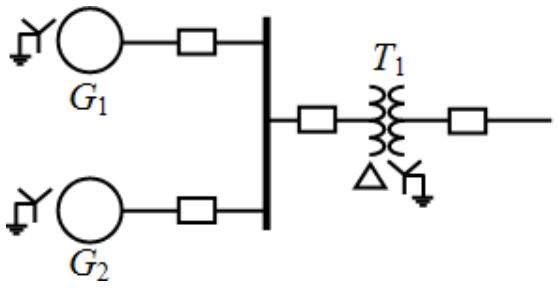
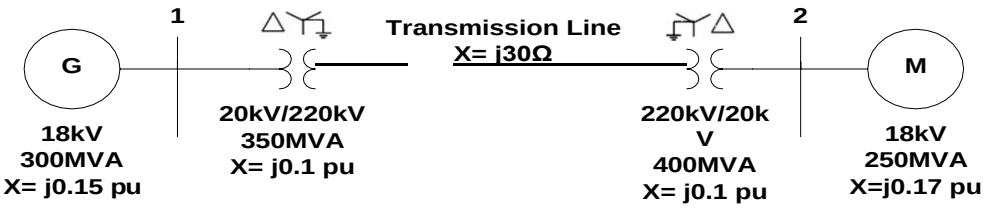
4. Make the admittance matrix, Ybus, for the following network. Given parameters are impedance in per-unit.


0.05+j0.15
①
0.05+j0.15
②
0.1+j0.3
0.15+j0.45
0.1+j0.3
0.05+j0.15
③
④
0.1+j0.3



G_1: 50 MVA, 13.8 kV, X_d''= 25%
G_2: 25 MVA, 13.8 kV, X_d''= 25%
T_1: 75 MVA, 13.8Δ/69Y kV, X = 10%

5. In the figure 11 the motor is drawing 200MW at 0.8 power factor lagging at a terminal voltage of 17.8kV, when a bolted three phase short circuit occurs at bus 2. Consider the rating of generator G, as base at generator circuit for per unit calculation of the system and find total sub-transient fault current and sub-transient generator and motor current in per unit neglecting pre-fault current.



6. What will be the sub-transient generator and motor current in per unit if pre-fault current is considered?