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VI SEMESTER **B.Tech. (EE/EL)**

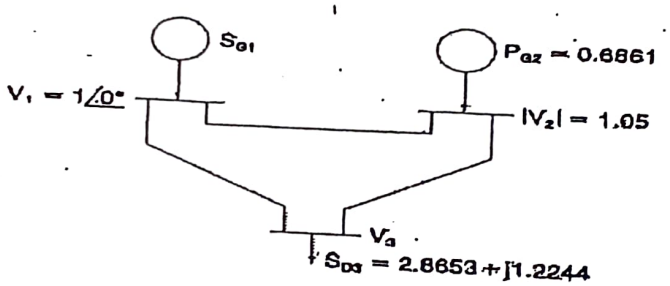
MID SEMESTER EXAMINATION ***March-2019***

EE-304 Power System and Analysis

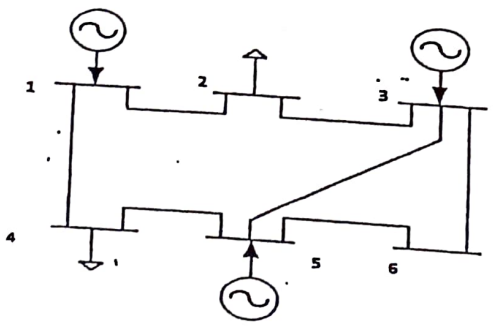
Time: 1:30 Hours *Max. Marks: 20*

Note : All questions are compulsory.
Assume suitable missing data, if any.

Q.1 For the transmission system in figure 2, all shunt elements are capacitors with an admittance $y_c = j0.01$ per unit, and all series elements are inductors with an impedance $z_{line} = j0.08$ per unit. Using G-S method, determine first iteration values of δ_2, $|V_3|$, δ_3, P_{G1}, Q_{G1}, and Q_{G2} for the system. Assume suitable acceleration factor. **6**

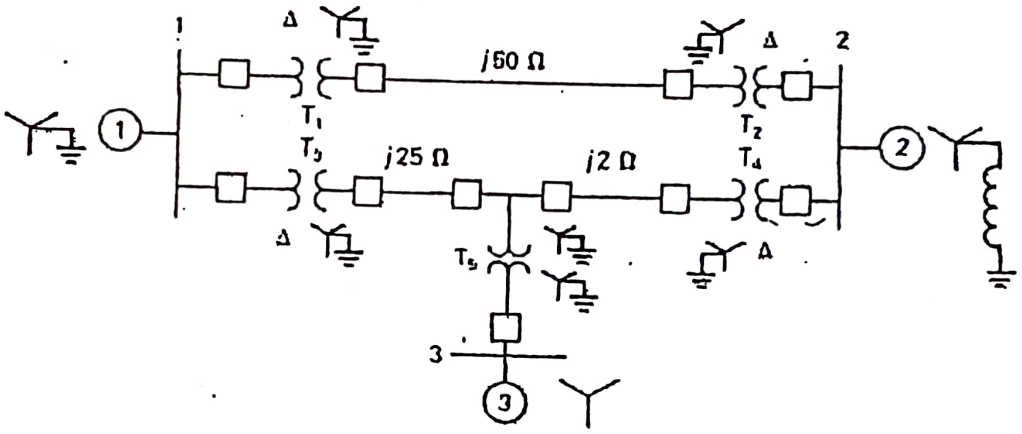


Q.2 For the following power system network, bus 1 is slack bus, bus 3 and 5 are PV buses and remaining buses are PQ buses. The first iteration of the Newton Raphson algorithm for computing power flow is given as: $[A]^1 = [B]^0 + [J]^{-1}[C]$..Fill up all the elements of the matrix J and vectors A, B and C. **4**



P. T. O.

Q.3. Consider the single-line diagram of the power system shown in Figure 1. Equipment ratings are:
Generator 1: 1000 MVA, 18 kV, X= 0.2 per unit
Generator 2: 1000 MVA, 18 kV, X= 0.2 p.u
Synchronous motor 3: 1500 MVA, 20 kV, X= 0.2 p.u
Three-phase Δ–Y transformers
T1, T2, T3, T4: 1000 MVA, 500 kV Y/20 kV Δ, X = 0.1 p.u
Three-phase Y–Y transformer
T5: 1500 MVA, 500 kV Y/20 kV Y, X = 0.1 p.u.
Neglecting resistance, transformer phase shifts, and magnetizing reactance, draw the equivalent reactance diagram. Use a base of 100 MVA and 500 kV for the 50-ohm line. Determine the per-unit reactances. 5



Q.4 Form Y_{Bus} matrix for the 6 bus system as per the data given below. 5

From Bus	To Bus	R pu	X pu	Y_{ch} / 2 pu
1	2	0.10	0.20	j 0.02
1	4	0.05	0.20	j 0.02
1	5	0.08	0.30	j 0.03
2	3	0.05	0.25	j 0.03
2	4	0.05	0.10	j.0.01
2	5	0.10	0.30	j 0.02
2	6	0.07	0.20	j 0.025
3	5	0.12	0.26	j 0.025
3	6	0.02	0.10	j 0.01
4	5	0.20	0.40	j 0.04
5	6	0.10	0.30	j 0.03