Q. Paper - Special Chance
Nov. 2018
M.E (1, 2) Sem

Exam.Code:1017
Sub. Code: 7779

1108

M.E. Electrical Engineering (Power Systems)

First Semester

EE-8101: Advanced Power System Analysis

Time allowed: 3 Hours **Max. Marks: 100**

NOTE: *Attempt any five questions. The symbols have their usual meanings in context with subject. Assume suitably and state, additional data required, if any.*

x-x-x

Q. No.		Mk.
1.	For the figure given below line impedances for each line is j0.25 pu. Form A, $\hat{A}$, B, $\hat{B}$, C, $\hat{C}$, K and also form Y_{BUS} using singular Transformation .	(20)

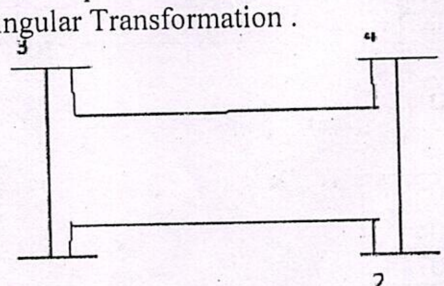

Figure 1

2. a)	Distinguish the optimal power flow solution from load flow solution. Name the various methods used for solving optimal power flow. Give two merits and demerits of gradient based methods over search based methods. Describe the optimal load flow for loss minimization of a given power system using gradient based approach. Indicate the objective function and associated constraints clearly.	(20)
3. a)	Describe Ac- Dc load flow.	(15)
b)	Give the bus classification for load flow analysis. Explain the significance of slack bus.	(5)
Q4)	A three bus power system is shown in Fig.2. The system parameters are given in Table 1 and the load and generation data in Table 2. The voltage at bus 2 is maintained at 1.03p.u. The maximum and minimum reactive power limits of the generation at bus 2 are 35 and 0 Mvar respectively. Taking bus 1 as slack bus, obtain the load flow solution using Gauss –Seidel iterative method. Give the solution upto one iteration.	(15)

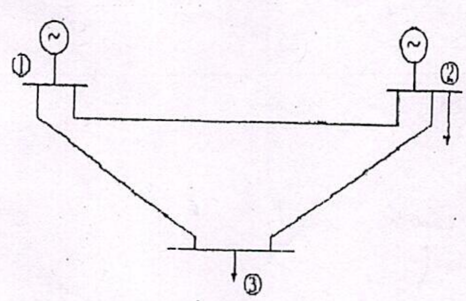

Fig 2 A three bus power system

Table 1 Bus data

Bus No I	Bus voltage V_i	Generation		Load	
		MW	Mvar	MW	Mvar
1	1.05 + j0.0	—	—	0	0
2	1.03 + j0.0	20	—	50	20
3	-----	0	0	60	25

P.T.O.

Table 2 Branch data

Bus Code i-k	Impedance (p.u.) Z_{ik}	Line charging Admittance (p.u) y_i
1-2	0.08 + j0 24	0
1-3	0.02 + j0.06	0
2-3	0.06 + j0.018	0

(b) Enlist the assumptions required for Fast decoupled method. (5)

5. a) Calculate (i) fault currents (ii) line currents (iii) voltage during fault for the system given below when fault occurs at bus no.3. (15)

Z_{BUS}^0=

1	2	3
0.0292	0.0197	0.0055
0.0197	0.0438	0.0106
0.0055	0.0106	0.0170

Z_{BUS}^1=

1	2	3
0.125	0.0117	0.101
0.0117	0.1315	0.1065
0.101	0.1065	0.0117

Z_{BUS}^2 =

1	2	3
0.0790	0.0726	0.0556
0.0726	0.0877	0.0644
0.0117	0.0644	0.0745

b) Explain the transformation of line element phase components to sequence components for static and rotating elements. (5)

Q6 Explain contingency analysis by suitable method. (20)

Q7) Write a short note on state estimation of power system. Explain the method of least square for state estimation. (20)

Q 8) (a) Explain the algorithm for economic load dispatch including transmission losses .Give the significance of penalty factor. (10)

(b) A system consists of two plants connected by a transmission line. The load is at plant 2. When 100 MW power is transmitted from plant 1 to plant 2, there is a loss of 15 MW. Find the required generation at each plant for λ =60. The incremental costs of the two plants are given by: (10)

$$\frac{dC_1}{dP_1} = 0.2P_1 + 22\ Rs/MW$$

$$\frac{dC_2}{dP_2} = 0.15P_2 + 30\ Rs/MW$$

x-x-x