Registration No :

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M.Tech
EEPC101

1st Semester Back Examination 2019-20
POWER SYSTEM ANALYSIS
BRANCH : ELECTRI & ELECTRO ENGG (POWER SYSTEM ENGG), ELECTRICAL AND ELECTRO ENGG, ELECTRICAL ENGG., ELECTRICAL POWER SYSTEM, POWER SYSTEM ENGG, POWER SYSTEMS
**Time : 3 Hours**
Max Marks : 70
Q.CODE : HB727
Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions :** **(2 x 10)**
a) Briefly explain, Complex Power.
b) How the various buses are classified in load flow studies?
c) Give reasons, why Newton Raphson method is preferred over Gauss Siedel method for Load Flow studies.
d) Briefly explain, Economic Load Dispatch.
e) Differentiate between Z-bus and Y-bus.
f) State various methods to solve Unit Commitment problem.
g) Write matrix expression for representing the three unbalanced phase voltages in terms of sequence voltages.
h) Define Penalty factor and state its significance.
i) State the importance of Triangular Factorization in Load Flow methods.
j) Explain sparsity with reference to load flow analysis.

Q2 **a)** Draw the block diagram and explain the Load frequency Scheme for a single area system. **(5)**
b) Discuss the significance of adding a secondary integral control loop to the above system. **(5)**

Q3 **a)** Draw and explain the block diagram of a two-area system LFC with only primary loop. **(5)**
b) Two generators rated 200MW and 400 MW are operating in parallel. The droop characteristics of their governors are 4% and 5% respectively from no load to full load. Assuming that the generators are operating at 50Hz at no load, how would a load of 600MW be shared between them? What will be the system frequency at this load? Assume free governor operation. Repeat the problem if both governors have a droop of 4%. **(5)**

Q4 **a)** Write a short note on hydro thermal scheduling. **(5)**
b) The fuel cost of 3 thermal plants in Rs/h are given as: $C_1=500+5.3P_1+0.004P_1^2$, $C_2=400+5.5P_2+0.006P_2^2$, $C_3=200+5.8P_3+0.009P_3^2$, P_1, P_2, P_3 are in MW. The total Load PD is 800 MW. Neglecting losses and generation limits, find the optimal dispatch and total cost in Rs/h **(5)**

Q5 **a)** Discuss the modelling of transformer with off nominal taps for load flow studies. **(5)**
b) Draw the positive and zero sequence network of the system in figure below. **(5)**
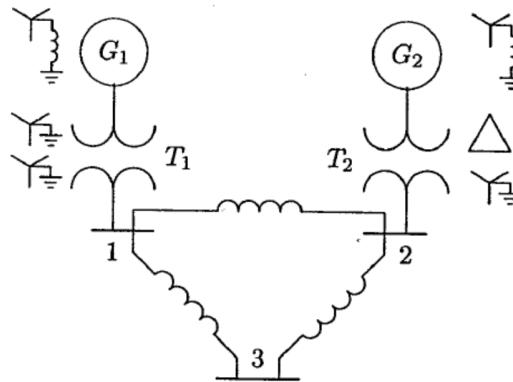
Q6 Compare the three load flow methods: Gauss Siedel, Newton Raphson and Fast Decoupled in terms of storage, execution time and no. of iterations to converge. **(10)**

Q7 Explain Z-bus building algorithm. How is Z-bus used for fault analysis? **(10)**

Q8 **Write short Notes on any TWO :** **(5 x 2)**
a) Optimal Load flow solution
b) Constraints in Unit- commitment
c) Symmetrical component analysis