R13

Code No: 126AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech III Year II Semester Examinations, May - 2016
COMPUTER METHODS IN POWER SYSTEMS
(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A (25 Marks)

1.a) Why the incidence matrices for a given network are not unique? [2]
b) What is primitive network? Write the performance equation of primitive network in admittance form. [3]
c) What are the limitations of Newton Raphson Method. [2]
d) What is advantage of acceleration factor in GS load flow method? [3]
e) Write the objective of finding fault levels at bus. [2]
f) Write the applications of $_{series}$reactors. [3]
g) A synchronous machine having E=1.2pu is supplying power to an infinite bus with voltage 1.0pu. If the transfer reactance is 0.6pu, find the steady state power limit.[2]
h) What is the significance of Synchronizing power Coefficient? [3]
i) Write the methods to improve transient stability. [2]
j) Derive the swing equation. [3]

PART - B (50 Marks)

2. Derive the expressions for Bus admittance matrices by Singular transformation Method. [10]

OR

3. Derive the expression for adding a element between to existing buses of the existing network by using Z_{BUS} building algorithm? [10]

4.a) Write the necessity of power flow studies.
b) Develop the power flow model using decoupled method and explain the assumptions to arrive at the fast decoupled load flow method. [3+7]

OR

5.a) Define load flow problem. Classify the buses in power system and discuss the important of slack bus.
b) Describe the Newton Raphson method for the solution of power flow equations in power systems by deriving necessary equations. [4+6]

6.a) Why the analysis of unsymmetrical faults can be more easily done with the help of symmetrical components than by a direct solution of the unbalanced circuit.
b) Three 10MVA generators each having a reactance of 0.2pu are operating in parallel. They feed a transmission line through a 30MVA transformer having a per unit reactance of 0.05. Find the fault MVA for a fault at the sending end of line. [4+6]

7.a) Why the phase shift in the positive sequence and negative sequence quantities through a stat delta transformer are opposite to each other?

b) The line current in three phase supply are I_a= 12+j24A, I_b=16-j2A and I_c=-4-j6A. The phase sequence is abc. Calculate the sequence components of currents. [4+6]

8.a) What is power system stability? Define stability limit of the system.

b) A 50Hz generator of reactance 1pu is connected to an infinite bus through a line of reactance of 0.5pu. E=1.1pu and V=1pu. The inertia constant is 5MW-sec/MVA. The generator is loaded to 50% of the maximum power limit. Find the frequency of natural oscillations. [3+7]

OR

9.a) Write short notes on methods to improve steady state stability of power System.

b) Derive the expression for steady state stability limit using ABCD parameters. [4+6]

10.a) Why the use of automatic reclosing circuit breakers improve system stability.

b) What is equal area criterion? Explain how it can be used to study stability with any suitable example. [4+6]

OR

11.a) List the assumptions made in the transient stability solution techniques.

b) A three phase generator delivers 1pu power to an infinite bus through a transmission network when a faulty occurs. The maximum power which can be transferred during prefault, during fault and post fault conditions is 1.75pu, 0.4pu and 1.25pu. Find critical clearing angle. [4+6]